



Northwestern Hawaiian Islands

CORAL
REEF
ECOSYSTEM
RESERVE

FINAL RESERVE OPERATIONS PLAN

MARCH 2005

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE



About This Document

This document is the operations plan for the Northwestern Hawaiian Islands (NWHI) Coral Reef Ecosystem Reserve (Reserve). This plan has been prepared by the National Oceanic and Atmospheric Administration, National Marine Sanctuary Program, and will serve as the primary management guide for the Reserve. Comments or questions on this operations plan should be directed to:

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U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Ocean Service



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Executive Summary

Executive Order 13178, as finalized by Executive Order 13196, established the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve (Reserve). Section 5 (b) of the Executive Order calls on the Secretary of Commerce in consultation with the Secretary of the Interior and the Governor of Hawai'i, to develop a Reserve Operations Plan (ROP) to govern the management of the Reserve. In developing the ROP, the Executive Order specifies that the Secretary of Commerce shall consider the advice and recommendations of the Reserve Advisory Council (Council).

This Reserve Operations Plan was prepared by the National Ocean Service of the National Oceanic and Atmospheric Administration (NOAA), in consultation with the State of Hawai'i and the U.S. Fish and Wildlife Service (USFWS). It has been extensively reviewed by NOAA Fisheries and other parts of NOAA. Advice regarding the development of this document was provided by the Reserve Advisory Council, which reviewed and provided significant input, which is reflected herein. The Reserve Operations Plan will be updated as appropriate.

About This Plan

Each of the Reserve's program areas is covered by an action plan for implementing various management strategies. These action plans are designed to directly address current priority resource management issues and guide management of the Reserve. Each plan outlines what, who, why, when, and how different strategies will be conducted. The 10 action plans are:

- Operations
- Education and Outreach
- Native Hawaiian Cultural Resources
- Maritime Heritage
- Research and Monitoring
- Mapping
- Response, Damage Assessment and Restoration
- Marine Debris
- Enforcement
- Sanctuary Designation

The implementation of the Reserve Operations Plan involves: 1) coordination within and between action plans; 2) sharing of staff and financial resources between program areas; 3) close cooperation and coordination by the National Marine Sanctuary Program with the State of Hawai'i and the U.S. Fish and Wildlife Service; and 4) facilitation among many federal, state, and local government agencies, as well as private organizations and individuals.



Bluefin Trevally, 'omilu, *Carnax ignobilis*
at Maro Reef.

Photo Credit: James Watt



Table 1. Summary of Reserve Operation's Action Plans and Associated Strategies

ACTION PLAN	STRATEGIES
Operations	<p>OP-1: Carry out effective office administration and infrastructure.</p> <p>OP-2: Coordinate Reserve Advisory Council operations.</p> <p>OP-3: Carry out operational requirements of the Reserve, as specified in the Executive Order to protect the coral reef ecosystems, and marine resources and species of the NWHI in their natural environment.</p> <p>OP-4: Develop and implement permitting and notification procedures.</p> <p>OP-5: Conduct safe and effective field operations.</p>
Education and Outreach	<p>ED-1: Develop and implement annual education and communication plans in collaboration with partners.</p> <p>ED-2: Develop materials to support education and outreach efforts about the Reserve, the marine environment of the NWHI, and coral reef ecosystems.</p> <p>ED-3: Teach responsibility and stewardship through educational programs, partnerships and outreach events.</p> <p>ED-4: Develop interpretive, educational and volunteer programs for Discovery Center.</p> <p>ED-5: Target outreach and education activities toward specific stakeholder groups.</p> <p>ED-6: Coordination and oversight of education and outreach activities and information throughout the ROP.</p> <p>ED-7: Develop and invest in telepresence and other distance learning capabilities to bring the place to the people instead of the people to the place.</p>
Native Hawaiian Cultural Resources	<p>NH-1: Continue research, compilation, and cataloging of existing cultural and historical information.</p> <p>NH-2: Develop criteria and identify locations for Native Hawaiian use.</p> <p>NH-3: Develop culturally-appropriate criteria, provisions and constraints for access and development of Reserve permits.</p> <p>NH-4: Develop and implement a cultural resources curriculum and education program to increase dissemination of NWHI cultural information.</p>
Maritime Heritage	<p>MH-1: Construct document-based inventory for the NWHI.</p> <p>MH-2: Carry out field survey and assessment of maritime resources.</p> <p>MH-3: Develop and implement maritime heritage management protocols.</p> <p>MH-4: Develop and implement outreach and education component for maritime heritage consistent with the Education Action Plan.</p>
Research and Monitoring	<p>RM-1: Identify and review all past and present research and monitoring activities conducted in the NWHI.</p> <p>RM-2: Develop ecologically-appropriate criteria, provisions and constraints for Reserve permits and access.</p> <p>RM-3: Develop a research and monitoring plan for the Reserve and a proposed NWHI regional science plan with input from partnering agencies and the broader scientific community.</p> <p>RM-4: Assess and monitor ecosystem integrity and function of NWHI ecosystems.</p>
Mapping	<p>MP-1: Assist in the development of revised charts of the NWHI to enable enforcement of the EO and management of the Reserve.</p> <p>MP-2: Assist in finalizing the draft "Atlas of the Shallow-Water Benthic Habitats of the NWHI".</p>
Response, Damage Assessment, and Restoration	<p>RD-1: Conduct assessment of restoration needs.</p> <p>RD-2: Compile a list of all responder and stewardship agencies and available resources to respond in emergency response situations.</p> <p>RD-3: Develop a contingency plan to determine how available agencies and resources will meet the needs of emergency response to minimize impacts.</p>



Table 1. Summary of Reserve Operation’s Action Plans and Associated Strategies (cont’d)

ACTION PLAN	STRATEGIES
Marine Debris	MD-1: Assist in marine debris removal. MD-2: Assist in prevention of marine debris.
Enforcement	EN-1: Establish a study team to investigate new and emerging remote sensing technologies for surveillance and monitoring. EN-2: Implement existing Vessel Monitoring System (VMS) and conduct research development and operational evaluation of Remote Acquisition of Depth Sounding (RADS). EN-3: Publish Notice for comment in Federal Register defining permitting guidelines and requirements. EN-4: Develop and implement a coordinated enforcement plan for the Reserve, in conjunction with agency partners.
Sanctuary Designation	DES-1: Prepare the foundation for sanctuary designation. DES-2: Identify and characterize key management issues related to the NWHI and develop strategies to address them. DES-3: Develop draft Environmental Impact Statement and management plan consistent with the guidance and direction of the Act, the NMSAA and the EO. DES-4: Complete management plans and Environmental Impact Statement including the preferred management alternative for the region.

Total costs for operating the Reserve over the next 5 years have been estimated. These costs have been identified for each Action Plan and are summarized in Table 2. A further breakdown of annual estimated costs for conducting each strategy can be found at the end of each action plan.

Table 2. Costs Required to Operate the Reserve over 5 years (includes funds from the Reserve and outside funds).

Action Plan	Total Estimated Costs	% of Total
Operations	9,003,000	23.4%
Education and Outreach	2,258,000	5.9%
Native Hawaiian Cultural Resources	1,042,000	2.7%
Maritime Heritage	904,000	2.3%
Research and Monitoring	3,380,000	8.8%
Mapping	390,000	1.0%
Response, Damage Assessment, and Restoration	48,000	0.1%
Marine Debris	15,235,000	39.6%
Enforcement	5,020,000	13.0%
Sanctuary Designation	1,210,000	3.1%
TOTAL	38,490,000	100.0%
AVG/ YEAR	7,698,000	



Introduction

History of the Reserve Designation

On December 4, 2000, Executive Order 13178 (EO 13178) established the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve (Reserve), to be managed by the Secretary of Commerce (Secretary). The Reserve was established pursuant to the National Marine Sanctuaries Act (Act) and the National Marine Sanctuaries Amendments Act of 2000 (NMSAA).

The Reserve includes submerged lands and waters of the NWHI and extends approximately 1,200 nautical miles long and 100 nautical miles wide (but does not include State waters or other U.S. Fish and Wildlife Service waters which represent the marine boundary delineating Midway Atoll National Wildlife Refuge). Additionally, in places where the refuge boundaries of the Hawaiian Islands National Wildlife Refuge may extend seaward of State waters, these areas are also within the Reserve and shall provide additional protection for Refuge resources. EO 13178 contains a number of conservation measures that restrict certain activities throughout the Reserve and which grandfather in relatively small, existing, active bottomfish, commercial pelagic, and recreational fisheries. As part of the establishment of the Reserve, the Executive Order also created fifteen Reserve Preservation Areas (RPAs) in which all consumptive or extractive uses are prohibited with limited exceptions.

Between December 8, 2000 and January 8, 2001, a 30-day public comment period was held on the conservation measures, whether to make the RPAs permanent and also other issues. During the comment period, seven public hearings were held to accept written and oral comments. Within the allotted time, approximately 8,400 comments—mostly form letters—were received from every state in the U.S. by fax, letter, and email. A majority of those who responded expressed approval with the EO.

Approximately one third of the comments indicated that they would approve of the EO with some modifications, while a minority of respondents disapproved. Of those who responded, a large majority felt the RPAs and conservation measures should be made permanent or more restrictive, approximately one third did not specify their preference, and less than one percent of the total respondents felt the RPAs were too restrictive.

As a result of the public comment period, Executive Order 13196 (EO 13196) was issued on January 18, 2001, modifying EO 13178 by revising certain conservation measures, and making the 15 RPAs permanent with minor alterations. The conservation measures were changed in the following ways: Language regarding commercial and recreational trolling for pelagic species was clarified to allow these activities to continue in the Reserve and some of the RPAs; commercial bottomfishing caps were revised to clarify acceptable levels of harvest, and to include allowances for two Native Hawaiian bottomfishing permits; and discharge restrictions were revised to clarify the need to comply with the Federal Water Pollution Control Act.

EO 13196 modified the RPAs in several ways beyond allowances for fishing. For example, the depth restrictions for bottomfishing in several of these areas were revised. In addition, fishing at Raita bank and the first bank west of St. Rogatien will only be allowed to continue pending the results of a 5-year study to determine if any harmful impacts are taking place as a result of fishing activity.

Both Executive Orders are found in the appendices. The two Executive Orders will hereafter be referred to in the ROP as the Executive Order (EO). According to the EO, the principal purpose of the Reserve and any subsequent sanctuary, should one be established, is the long-term conservation and protection of the coral reef ecosystems and related marine resources and species of the NWHI in their natural character. This provides the overarching framework for all the stated goals of the Reserve and any future sanctuary management. As stated above, the EO also stipulates that this primary management goal is to be carried out by “applying a precautionary approach with resource protection favored when there is a lack of information regarding any given activity, to the extent not contrary to law”.

The EO provides that the Reserve be managed by the Secretary consistent with the purposes and the policies of the Act and the NMSAA. Accordingly, the Reserve shall be managed by the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service (NOS), National Marine Sanctuary Program (NMSP).



Whitetip reef shark,
manō lāla kea,
Trienodon obesus,
French Frigate Shoals.

Photo Credit: James Watt



Management Principles of the Reserve

The President directed the Secretary of Commerce, or his designee (hereafter "Secretary") to manage the Reserve, and any national marine sanctuary, should one be subsequently established by the Secretary, to ensure comprehensive, strong, and long lasting protection of the coral reef ecosystems and related marine resources and species of the Northwestern Hawaiian Islands, in accordance with the following management principles, contained in Sec 4 of the EO.

"The principal purpose of the Reserve is the long-term conservation and protection of the coral reef ecosystems and related marine resources and species of the Northwestern Hawaiian Islands in their natural character;

The Reserve shall be managed using available science and applying a precautionary approach with resource protection favored when there is a lack of information regarding any given activity, to the extent not contrary to law;

Culturally significant, non-commercial subsistence, cultural, and religious uses by Native Hawaiians should be allowed within the Reserve, consistent with applicable law and the long-term conservation and protection of Reserve resources;

The Reserve shall be managed using, when appropriate, geographical zoning and innovative management techniques to ensure that the Reserve resources are protected from degradation or harm;

To the extent consistent with the primary purpose of the Reserve, the Reserve shall be managed to support, promote and coordinate appropriate scientific research, assessment, and long-term monitoring of Reserve resources, and the impacts or threats thereto from human and other activities, to help better understand, protect, and conserve these resources and species for future generations;

To the extent consistent with the primary purpose of the Reserve, the Reserve shall be managed to enhance public awareness, understanding and appreciation of Reserve resources and the impacts or threats thereto from human and other activities;

The Reserve shall be managed to further restoration and remediation of degraded or injured Reserve resources; and

The Reserve shall be managed to facilitate coordinated management among Federal and State agencies and other entities, as appropriate, to provide comprehensive (looking beyond jurisdictional boundaries) conservation of the coral reef ecosystems and related marine resources and species throughout the Northwestern Hawaiian Islands, consistent with applicable authorities and the Management Principles stated herein.

Whenever the Reserve overlaps the Hawaiian Islands National Wildlife Refuge, the Reserve shall be managed to supplement and complement management of the Refuge to ensure coordinated conservation and management of the Reserve and the Refuge, consistent with the purposes and policies of the National Marine Sanctuaries Act, the National Marine Sanctuaries Amendments Act of 2000, and this order, and the authorities of the U.S. Fish and Wildlife Service under the National Wildlife Refuge System Administration Act (16 U.S.C 668dd-668ee) and other laws with respect to management of the Refuge. Nothing in this order shall enlarge or diminish the authority or jurisdiction of the Secretary or Secretary of the Interior in managing the Reserve or Refuge, respectively."

Protection and Conservation Measures of the Reserve

The Executive Order also directs in Section 7 that the following protection and conservation measures be applied throughout the Reserve.

"(a) (1) Commercial Fishing. All currently existing commercial Federal fishing permits and current levels of fishing effort and take, which also includes the non-permitted level of trolling for pelagic species by currently permitted bottomfishers, determined by the Secretary and pursuant to regulations at CFR 660 in effect on December 4, 2000, shall be capped as follows:

(A) No commercial fishing may occur in Reserve Preservation Areas;



Endemic banded spiny lobster, ula, *Panulirus marginatus*, Pearl and Hermes Atoll.

Photo Credit: James Watt



(B) There shall be no increase in the number of permits of any particular type of fishing (such as bottomfishing) beyond the number of permits of that type in effect the year preceding the date of the Executive Order.

(C) The annual level of aggregate take under all permits of any particular type of fishing may not exceed the aggregate level of take under all permits of that type of fishing as follows:

(1) Bottomfishing – the annual aggregate level for each permitted bottomfisher shall be that permittee’s individually average taken over the 5 years preceding December 4, 2000, as determined by the Secretary, provided that the Secretary, in furtherance of the principles of the Reserve, may make a one-time reasonable increase to the total aggregate to allow for the use of two Native Hawaiian bottomfishing permits;

(2) All other commercial fishing – the annual aggregate level shall be the permittee’s individual take in the year preceding December 4, 2000, as determined by the Secretary.

(D) There shall be no permits issued for any particular type of fishing for which there were no permits issued in the year preceding the date of the Executive Order;

(E) The type of fishing gear used by any permit holder may not be changed except with the permission of the Secretary as provided under paragraph (3) of this section.

(F) Trolling for pelagic species shall be capped based on reported landings for the year preceding December 4, 2000.

(2) Recreational Fishing. All currently existing (preceding the date of the Executive Order) levels of recreational fishing effort, as determined by the Secretary and pursuant to regulations in effect on the day of this Executive Order, shall be capped (i.e., no increase of take levels or levels of fishing effort, species targeted, or change in gear types) throughout the Reserve.

(3) The Secretary, after consultation with the Secretary of the Interior and Governor of the State of Hawai‘i, and after public review and comment and consideration of any advice or recommendations of the Reserve Council and Western Pacific Regional Fishery Management Council, may further restrict the fishing activities under subparagraphs (a)(1) and (a)(2) of this section if necessary to protect Reserve resources, or may authorize or require alternate gear types if such gear would offer equal or greater protection for Reserve resources.

(b) In addition to the conservation measures in paragraph (a) of this section, the following activities are prohibited throughout the Reserve:

(1) Exploring for, developing, or producing oil, gas, or minerals;

(2) Having a vessel anchored on any living or dead coral with an anchor, an anchor chain, or an anchor rope when visibility is such that the seabed can be seen;

(3) Drilling into, dredging, or otherwise altering the seabed; or constructing, placing, or abandoning any structure, material, or other matter on the seabed, except as an incidental result of anchoring vessels;

(4) Discharging or depositing any material or other matter into the Reserve, or discharging or depositing any material or other matter outside the Reserve that subsequently enters the Reserve and injures any resource of the Reserve, except:

(A) fish parts (i.e., chumming material or bait) used in and during fishing operations authorized under this order;

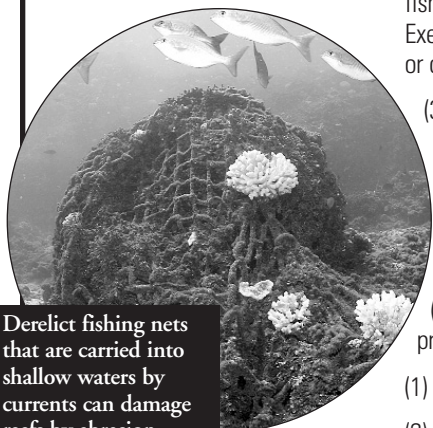
(B) biodegradable effluent incident to vessel use and generated by a marine sanitation device in accordance with section 312 of the Federal Water Pollution Control Act, as amended;

(C) water generated by routine vessel operations (e.g., deck wash down and gray water as defined in section 312 of the Federal Water Pollution Control Act), excluding oily wastes from bilge pumping; or

(D) cooling water from vessels or engine exhaust; and

(5) Removal, moving, taking, harvesting, or damaging any living or nonliving Reserve resources, except as provided under paragraph (a) of this section and sections 8(a) and 9 of this order.

(c) The Secretary may conduct, or authorize by permit the activities listed in subparagraphs (b) (3)-(5) of this section to the extent that they are necessary for research, monitoring, education, or management activities that further the Management Principles of section 4 of this order.



Derelict fishing nets that are carried into shallow waters by currents can damage reefs by abrasion, entangle marine life, and possibly introduce alien species

Photo Credit: James Watt



Reserve Preservation Areas (as specified in EO 13178 and modified by EO 13196).

(a) To further protect Reserve resources, the following areas are hereby established as permanent Reserve Preservation Areas in accordance with the National Marine Sanctuary Amendment Acts of 2000 (NMSAA) within which all activities referred to in Section 8 (b) are prohibited.

(1) From the seaward boundary of Hawai'i State waters and submerged lands to a mean depth of 100 fathoms (fm) around:

(A) Nihoa Island, provided that commercial bottomfishing and commercial and recreational trolling for pelagic species in accordance with the requirements of sections 7(a)(1) and 7(a)(2) of this order, respectively, shall be allowed to continue seaward of a mean depth of 25 fm;

(B) Necker Island, provided that commercial bottomfishing and commercial and recreational trolling for pelagic species in accordance with the requirements of sections 7(a)(1) and 7(a)(2) of this order, respectively, shall be allowed to continue seaward of a mean depth of 25 fm;

(C) French Frigate Shoals;

(D) Gardner Pinnacles, provided that commercial bottomfishing and commercial and recreational trolling for pelagic species in accordance with the requirements of sections 7(a)(1) and 7(a)(2) of this order, respectively, shall be allowed to continue seaward of a mean depth of 25 fm;

(E) Maro Reef, provided that commercial bottomfishing and commercial and recreational trolling for pelagic species in accordance with the requirements of sections 7(a)(1) and 7(a)(2) of this order, respectively, shall be allowed to continue seaward of a mean depth of 25 fm;

(F) Laysan Island, provided that commercial bottomfishing and commercial and recreational trolling for pelagic species in accordance with the requirements of sections 7(a)(1) and 7(a)(2) of this order, respectively, shall be allowed to continue seaward of a mean depth of 50 fm;

(G) Lisianski Island, provided that commercial bottomfishing and commercial and recreational trolling for pelagic species in accordance with the requirements of sections 7(a)(1) and 7(a)(2) of this order, respectively, shall be allowed to continue seaward of a mean depth of 25 fm;

(H) Pearl and Hermes Atoll; and

(I) Kure Atoll.

(2) Twelve nautical miles around the approximate geographical centers of:

(A) The first bank immediately east of French Frigate Shoals;

(B) Southeast Brooks Bank, which is the first bank immediately west of French Frigate Shoals, provided that the closure area shall not be closer than approximately 3 nmi of the next bank immediately west;

(C) St. Rogatien Bank, provided that the closure area shall not be closer than approximately 3 nmi of the next bank immediately east, provided that commercial bottomfishing and commercial and recreational trolling for pelagic species in accordance with the requirements of sections 7(a)(1) and 7(a)(2) of this order, respectively, shall be allowed to continue.

(3) Twelve nautical miles around the approximate geographical centers of:

(A) The first bank west of St. Rogatien Bank, east of Gardner Pinnacles, provided that commercial bottomfishing and commercial and recreational trolling for pelagic species in accordance with the requirements of sections 7(a)(1) and 7(a)(2) of the Executive Order, shall be allowed to continue for a period of 5 years from the date of this order [January 18, 2001]; and

(B) Raita Bank, provided that commercial bottomfishing and commercial and recreational trolling for pelagic species in accordance with the requirements of sections 7(a)(1) and 7(a)(2) of this order, shall be allowed to continue for a period of 5 years from the date of the Executive Order [January 18, 2001]; and

(C) Provided that both banks described above in (3)(A) and (3)(B) shall only continue to allow commercial bottomfishing and commercial and recreational trolling for pelagic species after the 5-year time period if it is determined that continuation of such activities will have no adverse impact on the resources of these banks.



Hawaiian Monk Seal,
ʻIlioholokauaua,
Monachus schauinslandi.

Photo Credit: James Watt



(D) Pioneer Bank, provided that commercial bottomfishing and commercial and recreational trolling for pelagic species in accordance with the requirements of sections 7(a)(1) and 7(a)(2) of this order, respectively, shall be allowed to continue, unless and until the Secretary determines otherwise after adequate public review and comment.

(b) Activities Prohibited Within Reserve Preservation Areas.

(1) In addition to the conservation measures in section 7 of the Executive Order, which are applicable to the entire Reserve, the following activities are prohibited within the Reserve Preservation Areas listed in paragraph (a) of this section, except as expressly otherwise stated in this paragraph and sections (8)(a) and 9 of the Executive Order:

- (A) Commercial and recreational fishing;
- (B) Anchoring in any area that contains available mooring buoys, or anchoring outside an available anchoring area when such area has been designated by the Secretary;
- (C) Any type of touching or taking of living or dead coral;
- (D) Discharging or depositing any material or other matter except cooling water or engine exhaust; and
- (E) Such other activities that the Secretary identifies after adequate public review and comment, and after consideration of any advice and recommendations of the Reserve Council.

(2) Notwithstanding the prohibitions in this paragraph, the Secretary may conduct, or authorize by permit, research, monitoring, education, or management activities within any Reserve Preservation Area that further the Management Principles of section 4 of this order.

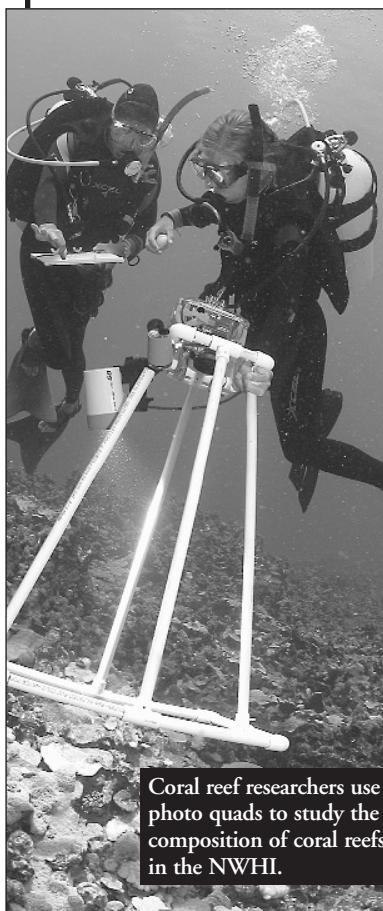
(3) The Reserve Preservation Areas in this section are approximated using fathoms. The Secretary will develop straight-line boundaries based on longitude and latitude coordinates to encompass each Reserve Preservation Area, to provide for clarity and ease of identification. The Secretary may make technical modifications to any such boundaries.”

Reserve Operations Plan

The Secretary, in consultation with the Secretary of the Interior and the Governor of Hawai‘i, shall develop an operations plan to govern the management of the Reserve. In developing the Reserve Operations Plan the Secretary shall consider the advice and recommendations of the Reserve Council.

The Reserve Operations Plan shall be directed at priority issues and actions that, at a minimum, provide for:

- (1) Coordinated management among the Reserve, Hawaiian Islands National Wildlife Refuge, Midway Atoll National Wildlife Refuge, and the State of Hawai‘i, consistent with relevant authorities;
- (2) Coordination among Federal agencies and the Director of the National Science Foundation to make vessels and other resources available for conservation and research activities for the Reserve.
- (3) The cleanup and prevention of marine debris in the Reserve;
- (4) The restoration or remediation of any degraded or injured resources of the Reserve;
- (5) Research, monitoring and assessment of the Reserve;
- (6) Education and outreach about the Reserve and its resources and efforts to conserve them;
- (7) Enforcement and surveillance for the Reserve, including the use of new technologies and coordination with the United States Coast Guard and other relevant agencies;
- (8) Identification and coordination with Native Hawaiian interests, regarding culturally significant, noncommercial subsistence, cultural, and religious uses and locations within the Reserve;
- (9) Identification of potential tourism, recreational, and commercial activities within the Reserve and actions necessary to ensure that these activities do not degrade the Reserve’s resources or diminish the Reserve’s natural character;



Coral reef researchers use photo quads to study the composition of coral reefs in the NWHI.

Photo Credit: James Watt



(10) Use of vessel monitoring systems for any vessel entering or transiting the Reserve, if warranted. To this end, the Secretary in consultation with the Department of State, United States Coast Guard, and the Department of Defense, shall evaluate the need for the establishment of vessel monitoring systems and, if warranted, shall initiate the steps necessary to that of the appropriate domestic agencies, and request that the International Maritime Organization adopt a vessel monitoring system requirement for the Reserve.

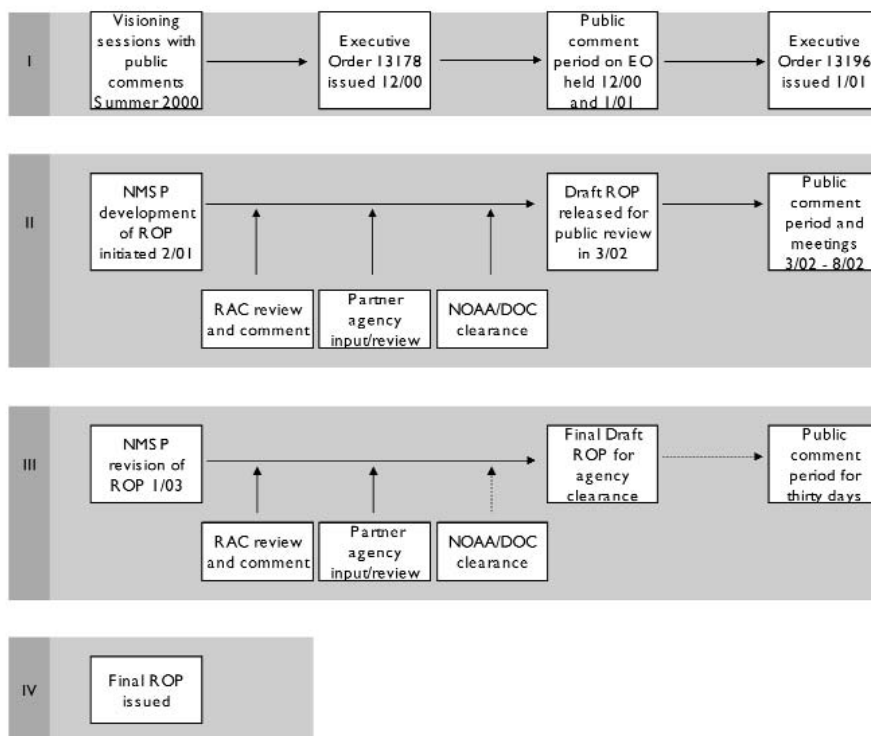
(11) Any regulations, in addition to the conservation measures and Reserve Preservation Areas established in the EO, that the Secretary determines are necessary to manage the Reserve in accordance with the EO; and

(12) Coordination of all relevant activities with the process to designate the Reserve as a National Marine Sanctuary, as provided by sec. 5 paragraph (f) "of the EO.

The Reserve Operations Plan (ROP) is constructed around a set of priority issues and actions. In developing the ROP, the Secretary considered the advice of and the recommendations of the Reserve Advisory Council. In accordance with the EO, NOS prepared this ROP on behalf of the Secretary. The initial draft Reserve Operations Plan (DRO) was released for public comment in March 2002. Based on significant public comment received, the first draft ROP was revised in consultation with U.S. Fish and Wildlife Service and the State of Hawai'i and considering the recommendations of the Reserve Advisory Council. Figure 1 depicts the steps involved in the ROP development. This ROP will serve as a guide for management of the Reserve.

The Reserve Operations Plan follows the template for management plans developed by the National Marine Sanctuary Program (NMSP) and is composed of a set of function and issue-oriented (as identified in the EO) action plans, with supporting documentation. Each action plan focuses on strategies; outlines what, who, why, when, and how different activities will be conducted; and presents an idea of what costs might be incurred for each Strategy (see Figures 1 and 2). Each Action Plan also contains a few guiding performance measures described as outcomes. Performance evaluation is an emerging priority for the NMSP to evaluate management effectiveness. On-going efforts will be made to work with NMSP staff to integrate performance measurement and evaluation into the regular cycle of site management.

Figure 1. Reserve Operations Plan Development Flowchart





Sanctuary Designation

National Marine Sanctuary. The EO states that the Secretary shall initiate the process to designate the Reserve as a national marine sanctuary pursuant to sections 303 and 304 of the National Marine Sanctuaries Act (16 U.S.C. 1433, 1434). In doing so the Secretary shall supplement or complement the existing Reserve. The Secretary shall, in consultation with the Governor of the State of Hawai'i, determine whether State submerged lands and waters should be included as part of the sanctuary. In designating and managing the sanctuary, the Secretary shall consider the advice and recommendations of the Reserve Council established pursuant to section 5 paragraph (f) of the EO.

Figure 2. Proposed Sanctuary Designation Process

I. Evaluate Issues	II. Develop Strategies	III. Prepare DEIS/DMP	IV. Conduct Review	V. Prepare FEIS/FMP
1. Undertake scoping of issues under the National Environmental Protection Act. <i>Conducted by Field/HQ Staff and RAC.</i>	1. Develop draft strategies for each outcome statement (through working groups or other means). <i>Conducted by Field/HQ Staff and RAC.</i>	1. Prepare action plans (grouping related strategies by issue or function). <i>Conducted by Field/HQ Staff and RAC.</i>	1. Release DEIS/DMP to public (hard copy, on web, advertise in local media). <i>Conducted by Field/HQ Staff.</i>	1. Summarize and analyze public comments (including preparing response to comments). <i>Conducted by Field/HQ Staff.</i>
2. Develop vision, goals, and objectives. <i>Conducted by Field/HQ Staff and RAC.</i>	2. Determine draft activities for each strategy (what, who, where, how, when, costs, perf. measures). <i>Conducted by Field/HQ Staff and RAC.</i>	2. Begin writing the DEIS/DMP, including alternatives and other sections (background, special assessments, regulations, etc.). <i>Conducted by Field/HQ Staff.</i>	2. Accept and compile public comments (in meetings, mailed, faxed, online). <i>Conducted by Field/HQ Staff.</i>	2. Revise DEIS/DMP to produce FEIS/FMP. <i>Conducted by Field/HQ Staff.</i>
3. Develop issues matrix based on scoping process, internal reviews, ROP development, and RAC input. <i>Conducted by Field/HQ Staff.</i>	3. Prioritize strategies and activities. <i>Conducted by Field/HQ Staff and RAC.</i>	3. Assemble alternatives, action plans and other sections into DEIS/DMP. <i>Conducted by Field/HQ Staff.</i>		3. Route FEIS/FMP through necessary clearances. <i>Conducted by Field/HQ Staff.</i>
4. Develop statements of desired outcome, base on issues matrix and vision, goals and objectives. <i>Conducted by Field/HQ Staff.</i>		4. Prepare and send out consultation letters (per legal requirements). <i>Conducted by Field/HQ Staff.</i>		4. Release FEIS/FMP (hard copy, on web, advertise in local media). <i>Conducted by Field/HQ Staff.</i>
5. Initiate additional special assessments that are needed (socioeconomic, cultural, affected environment). <i>Conducted by Field/HQ Staff.</i>		5. Route DEIS/DMP through necessary clearances and revised as necessary. <i>Conducted by Field/HQ Staff.</i>		5. Issue Notice of Effective Date of regulations. <i>Conducted by Field/HQ Staff.</i>

As stated above, the EO directs the Secretary to begin the process to designate the Reserve as a National Marine Sanctuary. The EO stipulates that the sanctuary, if so designated, shall complement or supplement the Reserve. The NMSAA of 2000 also stipulates that the Secretary shall initiate a sanctuary designation process for the NWHI Reserve. The sanctuary designation process requires an environmental impact statement and thus such a process is subject to NEPA and involves identifying issues facing the NWHI and determining what a sanctuary can and should do to address issues. Sanctuary designation is a long process and includes numerous opportunities for public input and involvement. A representative process for sanctuary designation is shown in Figure 2. The Reserve Advisory Council will be integrally involved, as will the State of Hawai'i, the NOAA Fisheries, the U.S. Fish and Wildlife Service, the Western Pacific Regional Fishery Management Council, the U.S. Coast Guard, the Marine Mammal Commission and other partners.



Reserve Advisory Council

The EO directs the Secretary of Commerce to convene an advisory committee under the authority of Section 315 of the NMSAA, to provide advice on the Reserve Operations Plan and designation and management of the Reserve as a National Marine Sanctuary. The Reserve Advisory Council, which has and will continue to provide advice on both the operation and management of the Reserve and the possible sanctuary designation, may at a later date be known as a Sanctuary Advisory Council should there be a National Marine Sanctuary in the future. A charter for the Council, signed in December 2000, provides for a 25-member Council, 15 of which are voting seats:

- Three Native Hawaiian representatives, including one Native Hawaiian elder;
- Three non-Federal research representatives;
- Three non-governmental conservation representatives;
- One commercial fishing representative;
- One recreational fishing representative;
- One ocean-related tourism representative;
- One non-Federal education representative;
- One citizen-at-large representative; and
- One State of Hawai'i representative.

Ten ex officio, non-voting seats include:

- Reserve Coordinator;
- Manager of the Hawaiian Islands Humpback Whale National Marine Sanctuary;
- Department of the Interior representative;
- Department of State representative;
- National Marine Fisheries Service representative;
- U.S. Coast Guard representative;
- Department of Defense representative;
- National Science Foundation representative;
- Marine Mammal Commission representative; and
- Western Pacific Regional Fishery Management Council representative.

The voting members of the Council (except for the State of Hawai'i representative) were chosen through an open, competitive process held during December 2000 and January 2001. Forty-seven applications were received, and 14 of these applicants were chosen by NOAA, in consultation with the State of Hawai'i and the Department of the Interior, to become members of the Council. The Council met for the first time on February 16, 2001, and has continued to meet since. The initial 2001 terms of appointment to the Council were staggered with one-half of the members appointed for a term of two years, the other half for three years. Newly appointed members shall serve for a full three year term beginning on the date of his/her swearing-in by the NOAA representative. All members will be appointed for a term of three years, and may compete for re-appointment.

The Council has and will play a key role in the ongoing development of this ROP and subsequent sanctuary designation process, by providing a link to the community and representing constituent views to the Reserve.

Jurisdictional Authorities

The NWHI are part of one of the most remote island chains in the world. Such an isolated, vast and exceptional marine environment will require coordinated and integrated resource management between various State and federal agencies, who, with their associated advisory councils, represent a variety of authorities and jurisdiction.

The area subject to this coordinated management is the lands and waters of the NWHI out to 50 nautical miles and includes all atolls, reefs, shoals, banks and islands from Nihoa Island in the southeast to Kure Atoll in the northwest. The marine waters and submerged lands of the NWHI encompass an area extending approximately 1,200 nautical miles long and include the State of Hawai'i waters and submerged lands, the State Wildlife Refuge at Kure Atoll, the Midway Atoll National Wildlife Refuge, the Hawaiian Islands National Wildlife Refuge, the NWHI Coral Reef Ecosystem Reserve, and portions of the fishery management area of the exclusive economic zone (EEZ) surrounding the NWHI.



Hawaiian green sea turtle hatchlings, *Chelonia mydas*, or honu at French Frigate Shoals.

Photo Credit: James Watt



- State of Hawai'i - In accordance with the Hawai'i Organic Act of April 30, 1900, c 339, 31 Stat 141 Section 2, and the Hawai'i Admission Act of March 18, 1959, Pub L 86-3, 73 Stat 4 Section 2, the Islands of the Hawaiian Archipelago, together with their appurtenant reefs and territorial waters with the exception of Midway Atoll, are part of the territory of Hawai'i and are managed by the State of Hawai'i including all emergent, submerged and marine resources. The State of Hawai'i, Department of Land and Natural Resources has stewardship responsibility for managing, administering and exercising control over the coastal and submerged lands, ocean waters and marine resources under State jurisdiction around each of the Northwestern Hawaiian Islands under Title 12, Chapter 171.3 Hawai'i Revised Statutes. The State currently manages the emergent lands at Kure Atoll as a State Wildlife Sanctuary.

The State currently holds the submerged and ceded lands of the NWHI in trust. This trust is overseen by the Office of Hawaiian Affairs (OHA) which was established in 1978 as a public trust by an amendment to the Hawai'i State Constitution, Article XII, section 5. The amendment further stated that OHA "...shall hold title to all the real and personal property now or hereafter set aside or conveyed to it which shall be held in trust for Native Hawaiians."

- U.S. Fish and Wildlife Service (USFWS), Department of the Interior - In 1909, President Theodore Roosevelt designated by Executive Order 1019 all emergent lands, islands and reefs from Nihoa Island to Kure Atoll, except Midway Atoll, as a preserve and breeding ground for the native birds and seabirds. Originally administered by the Department of Agriculture as the Hawaiian Islands Reservation, the area was later transferred to the U.S. Fish and Wildlife Service, Department of the Interior, which now manages the islands and reefs of Hawaiian Islands National Wildlife Refuge. USFWS also manages and administers the submerged lands and waters around all islands to 10 fathoms, except Midway Atoll and Necker Island. Necker Island is administered to 20 fathoms. Midway Atoll National Wildlife Refuge was established in 1988 through a cooperative agreement with the Navy, but primary jurisdiction over the three islands and nearshore waters transferred from the Navy, to Department of Interior in 1996 by Executive Order 13022. Kure Atoll was transferred to the Territory of Hawai'i by President Truman through an Executive Order.
- NOAA Fisheries (National Marine Fisheries Service –NMFS) – The Magnuson Fishery Conservation and Management Act of 1976, 16 U.S.C se. 1361 et seq., established U.S. jurisdiction over fisheries in federal waters of the EEZ (generally 3-200 miles offshore), and tasked the Secretary of Commerce in coordination with the Western Pacific Regional Fishery Management Council (WPRFMC) with stewardship over fishery resources in the EEZ (generally 3 to 200 miles offshore) surrounding the NWHI. The WPRFMC has developed fishery management plans for bottomfish, crustaceans, pelagic fisheries, and precious corals in the NWHI whose amendments are in different stages of preparation and approval. Some of these fisheries are currently closed. In 1996, the Sustainable Fisheries Act, Pub. L. 104-297, amended the Magnuson Act and made NOAA Fisheries in affiliation with the Western Pacific Regional Fishery Management Council (WPRFMC) also responsible for protecting essential fish habitat. NOAA Fisheries also oversees species protection in the EEZ surrounding the NWHI under authority granted by the Endangered Species Act (ESA) and the Marine Mammal Protection Act (MMPA).

Other Agencies Involvement

In June of 1998, the President established Executive Order 13089 (EO 13089), an Executive Order on Coral Reef Protection which directs Federal agencies to study, restore, and conserve U.S. coral reef ecosystems. The U.S. Coral Reef Task Force was established under EO 13089 to strengthen and coordinate cooperation among Federal agencies in the stewardship and conservation of the nation's coral reef ecosystems. Through the U.S. Coral Reef Task Force, several Federal agencies are required to take certain actions to protect coral reefs, including those found in the NWHI. Towards this end, the Department of Defense (DoD) has prepared and published a Coral Reef Protection Implementation Plan that describes DoD programs designed to protect and enhance coral reef ecosystems. (To learn more, see <https://www.denix.osd.mil/denix/Public/ES-Programs/Conservation/Legacy/Coral-Reef/Plan/implementation.html>).

Executive Order 13178 explicitly states that any limitations or restrictions of the Reserve do not apply to DoD military activities or the United States Coast Guard (USCG) activities consistent with Executive Orders 13089 of June 11, 1998 and 13158 of May 26, 2000, which address Coral Reef Protection (see above) and Marine Protected Areas, respectively.



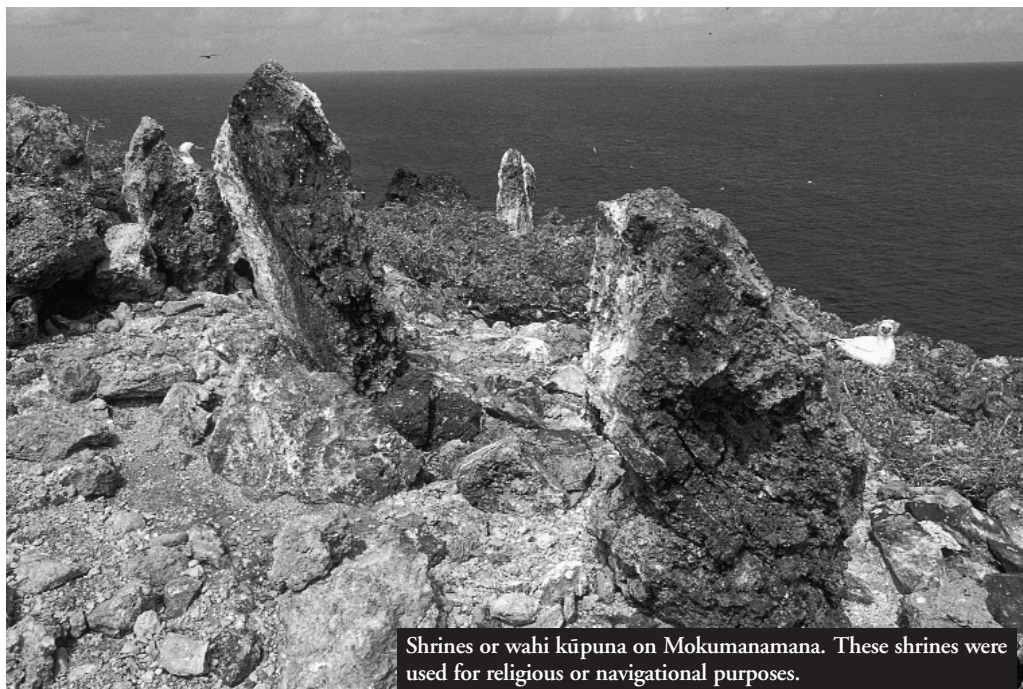
Like the Department of Defense, many of the partner agencies discussed in this ROP have been active in the NWHI for many years. Reserve staff will work with these partners in a manner that respects their ongoing efforts and jurisdictional responsibilities. In this way, it is expected that the operation of the Reserve will "add value" to the ongoing conservation efforts of others. This approach is consistent with the goals of coordinated management of the NWHI, expressly contained within the EO, the Act and the NMSAA of 2000. Working together has taken a number of forms already, including providing these agencies with seats on the Reserve Advisory Council, the development of interagency memorandum of agreements, and sharing resources for joint projects. Such cooperative efforts will look beyond jurisdictional boundaries to ensure continued and enhanced viability of the collective resources of the NWHI in a manner that embraces coordinated management.

Native Hawaiian Stakeholder Interests

Indigenous Hawaiians have a connection to and interest in the NWHI, which is documented in their oral and written histories, genealogies, spirituality, songs and dance. Polynesians traveled thousands of miles over hundreds of years in the NWHI and there is archaeological evidence of human habitation on Nihoa over a period of 500-700 years. There are also recorded visits to these islands by the monarchs of the Hawaiian Nation, which extended out to the NWHI. These lands are part of the ceded lands, including submerged lands (see State of Hawai'i, Jurisdictional Authorities), which were unlawfully taken with the help of U.S. military force from the Hawaiian government.¹ International law and treaty formally recognized the independent and self-determining authority of the Hawaiian Nation.²

Hawaiian words and phrases are often used to describe the special connection of the Hawaiian people to the NWHI. In accordance with *kānāwai* (Hawaiian law), which established responsibilities inherited from the *kūpuna* (ancestors), *'aumakūa* (ancestral deities), and *kini akua* (multitude of gods) through the *kumulipo* (creation chant), and in accordance with perpetual *Kānaka 'Ōiwi* (indigenous Hawaiian) sovereign authority, *Kānaka 'Ōiwi* are responsible for the exercise of *nā kuleana* (responsibilities) related to their interests in the NWHI. *Kuleana* created inherent and inalienable duties for *Kānaka 'Ōiwi* to *mālama* (care for) and *kūpale* (protect) the *kinolau* (body forms) that preceded us in the evolutionary process including *nā 'uku ko'ako'a* (coral polyps), *limu* (seaweed), *i'a* (fish), all other ocean life forms, *nā manu* (birds), and *nā moku puni* (islands). Connections to these *kino lau* are genealogically based. They are all *kūpuna*, connected to *Kānaka 'Ōiwi* in space, time, and *mana* (spiritual energy). Therefore, *Kānaka 'Ōiwi* are responsible for their ancestors who reside in the NWHI in their multitude of *kinolau*.

**“Hawaiian words
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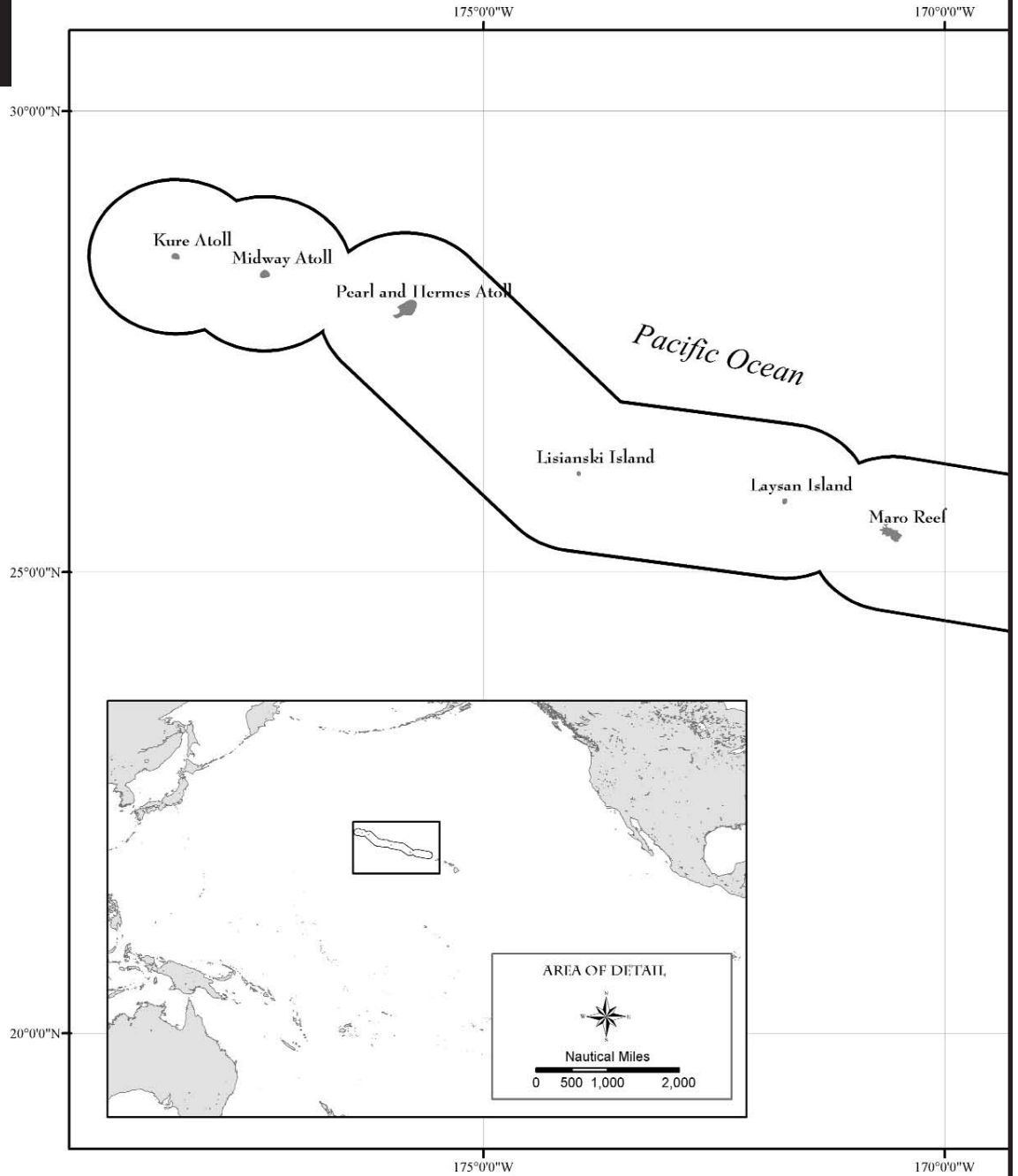


Shrines or wahi kūpuna on Mokumanamana. These shrines were used for religious or navigational purposes.

Photo Credit: Monte Costa

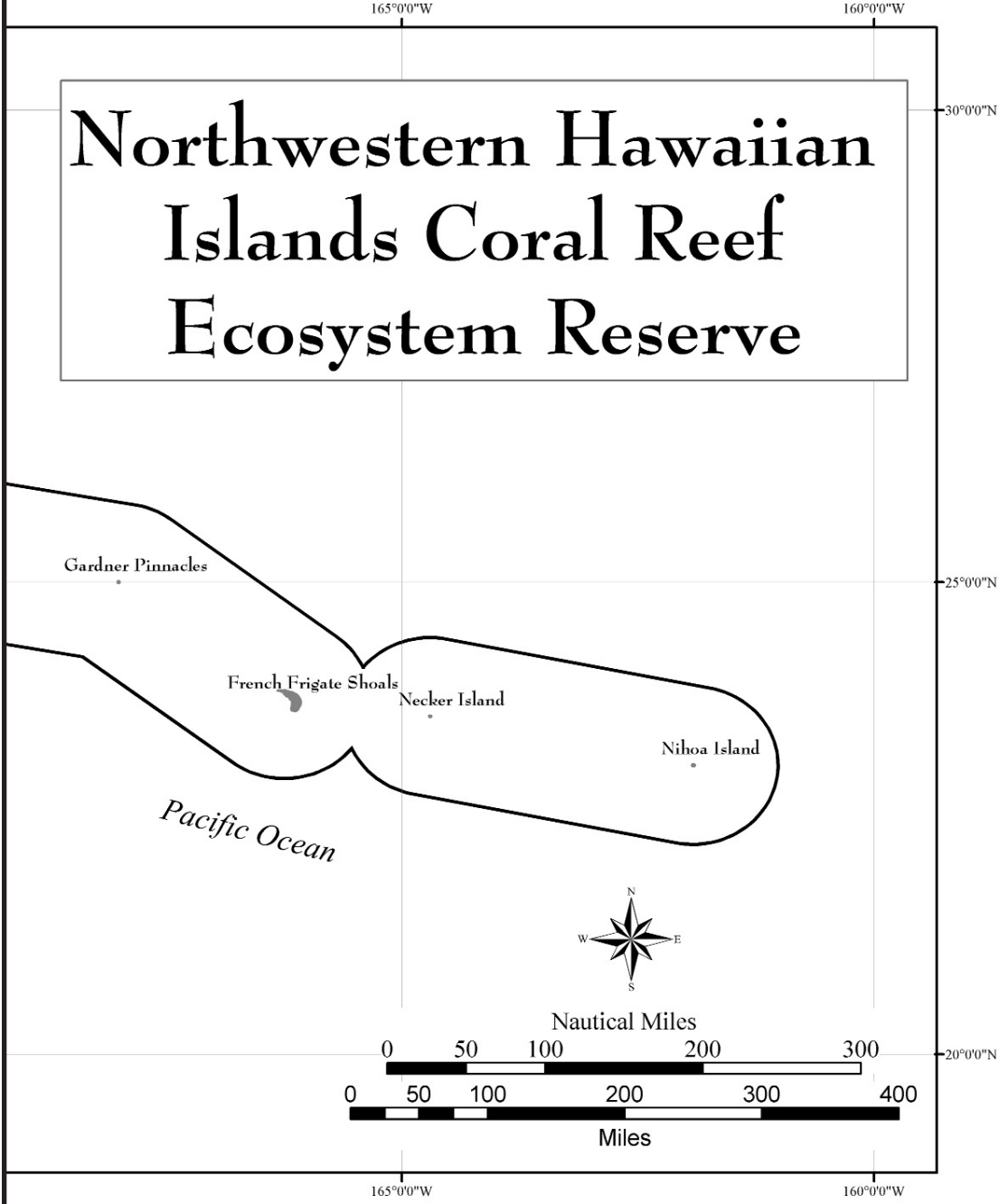
¹Unlawful takeover of the Hawaiian Kingdom acknowledged in U.S. Public Law 103-150, Joint Resolution 19. Nov. 23, 1993.

²Copies of treaties with Austria-Hungary (1875), Belgium (1862), Denmark (1846), France (1846 and 1857), Germany (1879), Great Britain (1836, 1846 and 1851), Italy (1863), Japan (1871 and 1886), Netherlands (1862), Portugal (1882), Russia (1869), Samoa (1887), Spain (1863) and Sweden and Norway (1852) can be found in Hawai'i State Archives ref. JX1182.A6 1997. Folios, Vol. I, II and III.





Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve



Map Courtesy: Susan Bevacqua
Pacific Islands Region GIS Analyst
National Marine Sanctuary Program



The coral reef ecosystems host distinctive assemblages of marine mammals, fish, sea turtles, birds, and invertebrates, including species that are endemic, rare, threatened, and endangered.

Northwestern Hawaiian Islands Setting

Introduction

The expansive coral reef ecosystems of the Northwestern Hawaiian Islands (NWHI) are among the few large-scale, intact, predator-dominated reef ecosystems left in the world and one of the most remote.

The living coral reef colonies of the NWHI are a spectacular underwater landscape. Coral animals, bonded to basalt from ancient volcanoes, secreted skeletons of calcium carbonate that formed the substance of future reef growth. Over millennia, invertebrate animals and algae have constructed massive structures.

The coral reefs ecosystems host distinctive assemblages of marine mammals, fish, sea turtles, birds, and invertebrates, including species that are endemic, rare, threatened, and endangered. Federally protected species include the endangered Hawaiian monk seal and the threatened green sea turtle. Roughly, one quarter of the estimated 7,000 species found in the NWHI are believed to be endemic to the Hawaiian Island chain, found nowhere else on Earth. Besides supporting an incredible abundance of species, the coral reefs and bits of land in the NWHI provide an amazing geological record of the volcanic and erosive powers that created the area and the erosion and subsidence that continue to sculpt it.

Beyond biological significance, the area boasts a rich cultural history. The NWHI has great cultural significance to Native Hawaiians who migrated across the Hawaiian archipelago and utilized the lands and marine resources here for centuries, making it additionally worthy of protection and understanding. During their Trans-Pacific voyages, ancient Polynesians sailed these waters and used these islands for centuries as places of residence, worship and subsistence. Ancient oli and mele (chants and songs) tell of the fire goddess Pele and her family traversing the NWHI and stopping at various sites on their way to the main Hawaiian Islands. Numerous cultural remains on Mokumanamana (Necker Island) and Nihoa Islands establish a close relationship with the Hawaiian culture in the main Hawaiian Islands, as well as early Polynesian cultures.



Shallow water corals at Maro Reef

Photo Credit: James Watt



During the more recent history of the NWHI, Euro-Americans and other foreigners who arrived in the Hawaiian Islands took an interest in the resources and location of the NWHI, and Midway was claimed as a United States possession in 1867. Entrepreneurs tried to make a living from the natural resources found in the NWHI. In the 1800's, commercial fishing began in the waters around the NWHI and continued through the twentieth century. Fishes, seals, sea turtles, shellfish and other marine animals were harvested. Pearl oysters, once abundant in the lagoon of Pearl and Hermes Reef, were heavily fished upon their discovery in 1928. The Hawaiian Territorial Government, under the advice of the U.S. Bureau of Commercial Fisheries, passed an Act in 1929 (and subsequent State law) making it unlawful to take pearl oysters in Hawaiian waters. Several islands were leased for guano extraction, and bird skins and feathers were extensively harvested, resulting in the early 20th century promulgation of conservation measures through Executive Order by President Theodore Roosevelt in 1909 to establish the area as a bird reservation and created what today is known as the National Wildlife Refuge.

Submerged historic resources, wreck sites reflecting the maritime activities of American, British, French and Japanese during the 19th and 20th centuries, are scattered throughout the NWHI. The NWHI played a pivotal role in World War II, including the Battle of Midway, considered to be one of the most decisive U.S. victories and the turning point of the Pacific war. Midway continued to be an important military installation through the end of the Cold War. Other areas within the NWHI are also historically and culturally important. State and Federal preservation laws have established guidelines for the protection and study of historically significant sites.

Global and National Significance of the Northwestern Hawaiian Islands

The world's coral reefs--considered the rain forests of the sea--are in serious decline. These important and sensitive areas of biodiversity warrant special protection. The coral reefs found in the remote, mostly uninhabited NWHI are spectacular and almost undisturbed by humans. These circumstances contrast sharply with reef systems located near human population centers, where vessel traffic, over harvest, sedimentation, habitat destruction and other human-caused factors have altered coral reef ecology. The approximately 1,200-mile stretch of atolls, volcanic islands, seamounts, banks, and shoals unquestionably host some of the healthiest and most extensive coral reefs in the world. In their own right, the spectacular coral reefs and islands provide a fascinating geological record of volcanic and erosive powers that have shaped this area and that of the entire Hawaiian archipelago. The area also includes a unique measure of the impacts of human alterations to pristine coral reef ecosystems and is a gauge of their ability to recover from the impacts of dredging, extensive human habitation, and military battles, among others.

Given the potential fragility of the NWHI ecosystems, their relatively pristine state compared to other more heavily trafficked coral reefs throughout the world, the global mandate for the strong protection of such regions, and the specific commitment made by the Executive Order to ensure comprehensive, strong, and long lasting protection for this unique region, the main management cornerstones include the concepts of kuleana (responsibility) and pu'uhonua (place of refuge and safety). As the lands themselves are already in Federal or State refuge status, and nearshore waters are home to several endangered species, an important outreach message for coordinated management is the importance of "bringing the place to the people, not the people to the place".



General description of the Northwestern Hawaiian Islands Marine Ecosystems

The coral reefs of the Northwestern Hawaiian Islands (NWHI) are the foundation of an ecosystem that hosts a distinctive assemblage of marine mammals, fish, sea turtles, birds, algae, and invertebrates, including species that are endemic, rare, threatened, endangered or have special legal protection status. Federally protected species include the endangered Hawaiian monk seal and threatened green sea turtles, several resident and transient cetacean species, and millions of migratory seabirds. Thousands of species of fishes, marine invertebrates and marine plants also exist in the region, some still unknown to science. The coral reefs and other substrates and lands that comprise these ecosystems represent an amazing biological evolution that includes one of the highest percentages of marine endemism found in the world's oceans. The NWHI play a critical role in the biogeography of the Hawaiian archipelago as a bridge to other marine regions. The fact that these reefs are remote and experience relatively little vessel traffic and no significant human population centers nearby have greatly assisted in their preservation.

“...one of the highest percentages of marine endemism found in the world's oceans.”



The Masked Angelfish, *Genicathus personatus*, is an endemic species found in the NWHI.

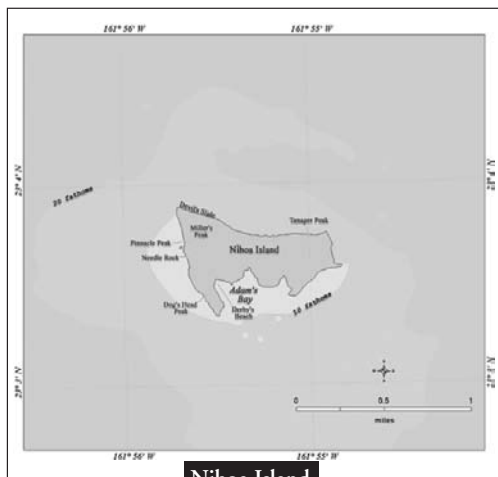
Photo Credit: James Watt



Natural Resources

Physical and Geological Description

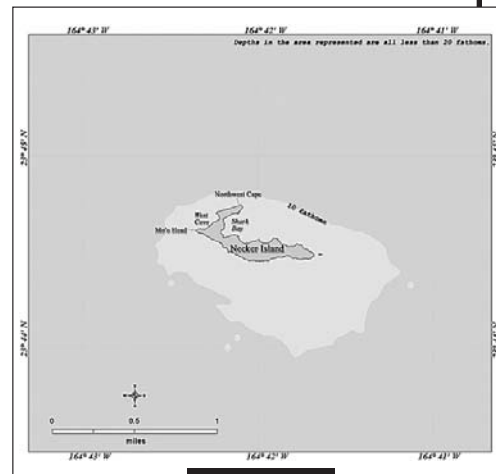
Tens to hundreds of millions of years ago, a series of seamounts emerged from the ocean to form the Hawaiian Archipelago, among the longest and most isolated chains of sub-tropical islands in the world. The NWHI constitute the northwest four-fifths of this vast chain. Moving northwest from the main Hawaiian Islands, this 1,200-mile stretch of emergent lands is characterized as small rocky islands, banks, atolls, coral islands and reefs, which become progressively older and generally smaller.



Nihoa Island

At the southeastern end is Nihoa Island, which is 155 miles from Kaua'i in the main Hawaiian Islands. Nihoa, roughly 150 land acres (equivalent to 140 football fields), is the largest emergent volcanic island in the NWHI. The island's two peaks and steep sea cliffs are clearly visible from a distance. The northern edge is a steep cliff made up of successive layers of lava through which numerous volcanic extrusions (dikes) are visible. Nihoa's surrounding submerged coral reef habitat totals approximately 142,000 acres.

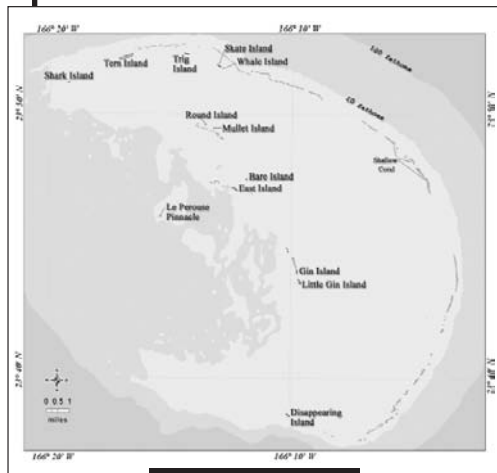
Next in the chain is Necker Island, a dry volcanic island shaped like a fishhook and includes about 45 land acres of land (equivalent to roughly 41 football fields). Necker is also known by the Hawaiian name Mokumanamana, and is spiritually significant in the Native Hawaiian culture. Geologists believe it was once as large as O'ahu. Now Mokumanamana's high point is only 365 feet above the sea. Wave erosion has reduced the rest to a submerged shelf about 40 miles long and 15 miles wide. While this shelf holds more than 380,000 acres of coral reef habitat, severe waves and currents in the exposed areas inhibit coral growth.



Necker Island

French Frigate Shoals, the largest atoll in the chain, forms an 18-mile long, crescent shaped atoll and consists of only 67 acres of total emergent land (comparable to almost 59 football fields) and approximately 230,000 acres of coral reef habitat. The lagoon contains two exposed volcanic pinnacles and 12 low, sandy islets.

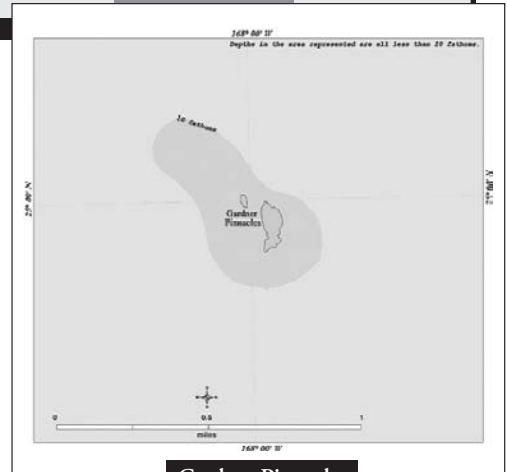
Surrounding French Frigate Shoals are a series of submerged banks. An unnamed bank is located just to the east. To the west are South East Brooks Bank, St. Rogatien Bank, and another unnamed bank. Until recently, very little was known about the banks beyond that they were shield volcanoes formed at the hot spot. Some scientists believe that many of the banks act as 'stepping stones' for marine organisms to migrate in the region. The bank areas contribute to the extensive habitat for bottomfish species in the NWHI which have become depleted in the Main Hawaiian Islands.



French Frigate Shoals



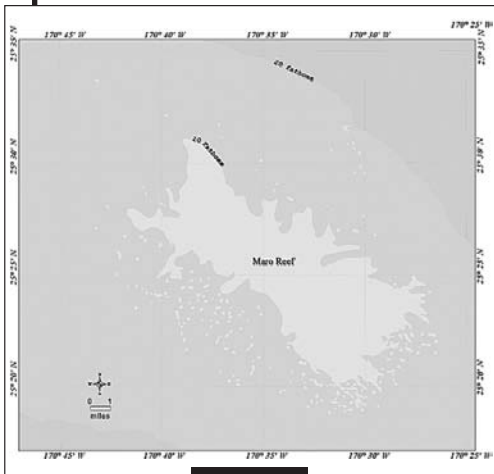
Continuing to the northwest are the Gardner Pinnacles, which consists of two peaks of volcanic rock. Bird guano gives the peaks a frosted appearance and indicates their importance as a roosting site and breeding habitat for 12 species of sub-tropical seabirds. In scale, these pinnacles are small, the larger reaching only 180 feet and about 590 feet in diameter. About 600,000 acres of coral reef habitat, most of which is in waters deeper than 60 feet, surround the pinnacles.



Gardner Pinnacles

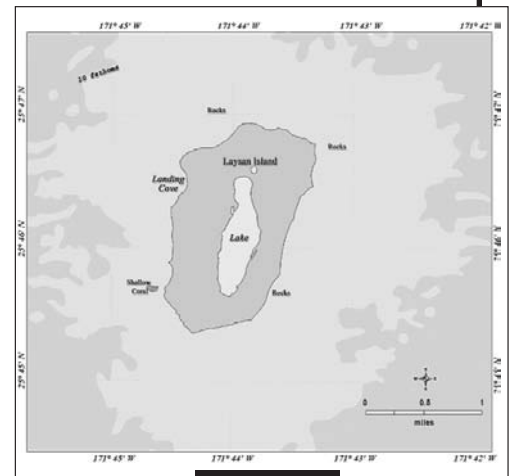
Maro Reef is a largely submerged open atoll with less than one acre of emergent land. At very low tide, only a small

coral rubble outcrop of a former island is believed to break above the surface. The shallow water reef ecosystem covers nearly half a million acres and is the largest coral reef in the NWHI. It is one of the chain's most ecologically rich with 95% coral cover in some areas, the highest observed in the NWHI. Maro has intricate "reticulated" reef crests, patch reefs and surrounding lagoons. Deep-water channels with irregular bottoms cut between shallow reef structures. Maro's outermost reefs absorb the energy of swells that travel toward the inner lagoon. The innermost area lies within reticulated reefs and aggregated patch reefs and has the characteristics of a true lagoon, with little influence from large ocean swells. Because of Maro's structural complexity, the shallow reef is poorly charted and it has been largely unexplored. The area was extensively targeted by the NWHI lobster fishery.



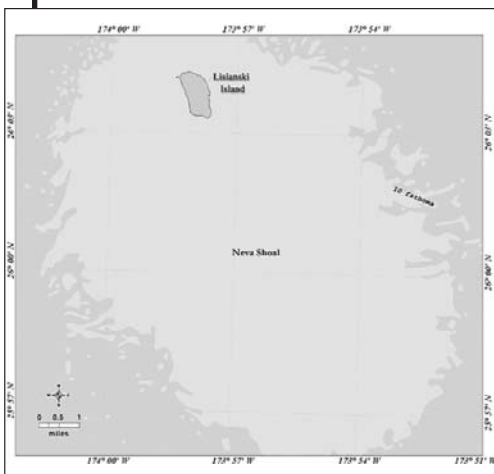
Maro Reef

Laysan is the second largest island in the NWHI chain, with about 915 acres of land. It is surrounded by approximately 100,000 acres of coral reef. Most of the reef area at Laysan is in deeper waters with a small, shallow water reef area in a bay off the southwest side of the island. Laysan is well vegetated aside from its sandy dunes and has a 100 acre hypersaline lake (one of only 5 natural lakes in Hawai'i). About 2 million birds nest here – boobies, frigate birds, terns, shearwaters, noddies, albatross, as well as, endangered Laysan ducks and finches.



Laysan Island

Lisianski Island, over 12 miles across, is a low sand and coral island and includes 400 acres of land. This 20 million-year old island's highest point stands at 40 feet. Lisianski is part of a large, open atoll, and lies at the northern end of a large reef bank, Neva Shoal which is estimated to be close to 290,000 acres. The coral cover around the island totals 310,000 acres.



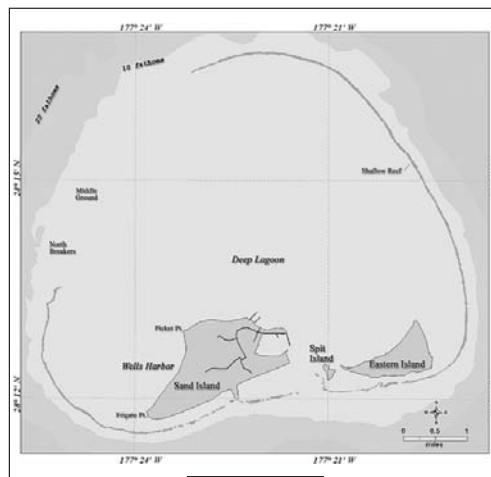
Lisianski Island



Pearl and Hermes Atoll

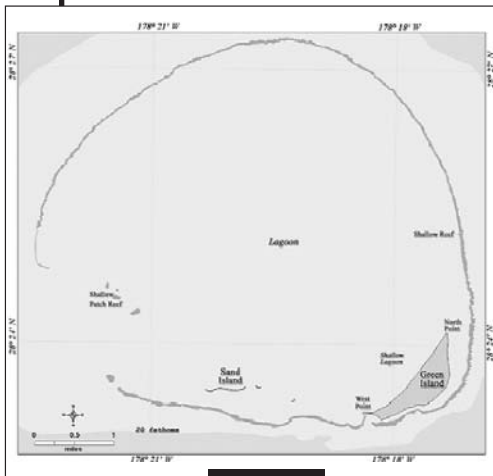
Pearl and Hermes Atoll is a large atoll with several small islets forming about 80 acres of land and almost 300,000 acres of coral reef habitat. The atoll extends over 20 miles across and 12 miles wide. Pearl and Hermes Atoll is a true atoll, fringed with shoals, permanent and ephemeral sandy islets. The islets provide important dry land respites for seals, turtles, and birds in need of rest, protection from predators, or nesting grounds. The islets are periodically washed over when winter storms pass through the area.

Midway Atoll consists of three small, sandy islets totaling 1,540 acres and a large, elliptical barrier reef measuring approximately 5 miles in diameter. The atoll is surrounded by about 88,500 acres of coral reefs. Numerous patch reefs dot the lagoon. Also known as "the Midway Islands", Midway originated as a volcano approximately 27 million years ago. In 1965, the U.S. Geological Survey took core samples and hit the solid basaltic rock 180 feet beneath Sand Island and 1,240 feet beneath the northern reef. Despite being heavily used by humans, Midway boasts the largest nesting colony of Laysan Albatross in the world and the second largest colony of Black-footed Albatross.



Midway Atoll

Kure Atoll is the northernmost coral atoll in the world. The atoll is nearly circular with a six-mile diameter enclosing nearly 200 acres of emergent land. The outer reef nearly forms a circle around the lagoon except for passages to the southwest. The only permanent land in the atoll is crescent-shaped Green Island, located near the fringing reef in the southeastern part of the lagoon. Almost 80,000 acres of coral reef habitat are found there. Kure Atoll is located at the "Darwin Point", theorized by scientists where coral growth occurs at a slower rate than the subsidence of the atoll, resulting in the atoll eventually sinking below the surface. Kure's coral is still growing slightly faster than the island is subsiding. North of Kure, where growth rates are even slower, the drowned Emperor Seamounts foretell the future of Kure and all of the Hawaiian Archipelago. As Kure Atoll continues its slow migration atop the Pacific Plate, it too will eventually slip below the surface.



Kure Atoll

Due to their active volcanism, isolation, and linear progression, the NWHI, together with the main Hawaiian Islands, represent a nearly perfect "textbook" example of the evolution of islands and reefs. The NWHI are even more exemplary because they have been subjected only to minimal human disturbance.

**Table 3.** Area and elevation of NWHI (Juvik and Juvik, 1998)

Island	Total Area		Elevation	
	Square miles	Square km	Feet	Meters
Nihoa Island	0.3	0.7	903	275
Necker Island	0.07	0.2	276	84
French Frigate Shoals	0.1	0.2	120	37
Gardner Pinnacles	0.01	0.02	190	58
Maro Reef	Awash	Awash	Awash	Awash
Laysan Island	1.6	4.1	40	12
Lisianski Island	0.6	1.5	40	12
Pearl and Hermes Atoll	0.1	0.3	10	3
Midway Atoll	2.5	6.4	12	4
Kure Atoll	0.4	1.0	20	6

A Unique Coral Ecosystem

The extensive coral reefs of the NWHI encompass over 4,460 square miles of coral reef habitat. Between both closed and open atolls, Pearl and Hermes Reef has the most extensive lagoonal reefs less than three miles from shore; Gardner Pinnacles, Maro Reef, and Necker Island, the most extensive offshore reefs. Hawai'i is the only U.S. state that has true atolls.

Table 4. Coral reef area (km²) located in nearshore waters (0-3 nautical miles (nmi)) and the Exclusive Economic Zone (3-200 nmi from shore) in Hawai'i (Hunter, 1995)*

Northwestern Hawaiian Islands	0-3 nmi	3-200 nmi	Total
Brooks Banks	0	290	290
French Frigate Shoals	456	277	733
Gambia Shoal	0	19	19
Gardner Pinnacles	86	1,818	1,904
Kure Atoll	147	20	167
Ladd Seamount	0	202	202
Laysan Island	34	23	57
Lisianski Island	202	777	979
Maro Reef	18	1,490	1,538
Midway Atoll	203	20	223
Necker Island	98	1,440	1,538
Nero Seamount	0	91	91
Nihoa Island	20	226	246
Northampton Banks	0	399	399
Pearl and Hermes Reef	1,166	0	1,166
Pioneer Bank	0	414	414
Raita Bank	0	513	513
Saint Rogatien Bank	0	311	311
Salmon Banks	0	142	142
Unnamed shoal	0	114	114
Unnamed shoal	0	2	2
Unnamed shoal	0	73	73
Unnamed shoal #1 between Nihoa and Necker	0	52	52
Unnamed shoal #2 between Nihoa and Necker	0	280	280
Unnamed shoal #3 between Nihoa and Necker	0	85	85
Unnamed shoal #4 between Nihoa and Necker	0	47	47

* These numbers are subject to change pending results of a recent investigation of shallow water coral ecosystems in the United States (Rohmann, et al., in review).



The reefs are composed of at least 55 species of stony coral, eight species of soft coral, and one anemone species for a presently recognized total of 64 species. This diversity and species richness rivals that of the main Hawaiian Islands. Compared to other regions in the world, the diversity of coral species is low and is often attributed to the isolation of this island chain. However, the NWHI hosts an exceptionally high number of endemic corals and algae.

Within the NWHI, the reefs differ in coral cover and species organization. Coral cover outside of lagoons gradually declines to the northwest due to slower growth rates of some species and the increased frequency of storm disturbances. Past studies reveal mean coral cover ranging from 8% to 69% among the islands. The data from the NOWRAMP 2002 expedition came up with similar coral cover rates 4.4%-64.1% among islands. However, within islands, the data revealed coral cover among sites varied even more, ranging from <1% to close to 100%. Coral species in the NWHI are slower growing when compared to most other reefs.

Table 5. Endemism in Hawai'i (adapted from Eldredge, L.G., and S.E. Miller 1994; Miller, S.E., and L.G. Eldredge. 1996; and Randall, J.E. 1992.)

Species	% level of endemism
Overall Invertebrates	32%
Sponges	29%
Jellyfish (Sea Jellies)	0%
Reef-building corals	18%
Non-reef-building corals	49%
Marine Worms (Polychaetes)	28%
Marine Snails (Mesogastropods)	21%
Sea Cucumbers	40%
Sea Urchins	47%
Brittlestars	49%
Sea Stars (Starfish)	65%
OVERALL REEF FISH	25%
Angelfish	57%
Blennies	62%
Butterflyfish	14%
Cardinalfish	20%
Damselfish	44%
Gobies	40%
Moray Eels	11%
Parrotfish	44%
Scorpionfish	35%
Surgeonfish	0%
Triggerfish	0%
Wrasses	39%

“...the NWHI hosts an exceptionally high number of endemic corals and algae.”



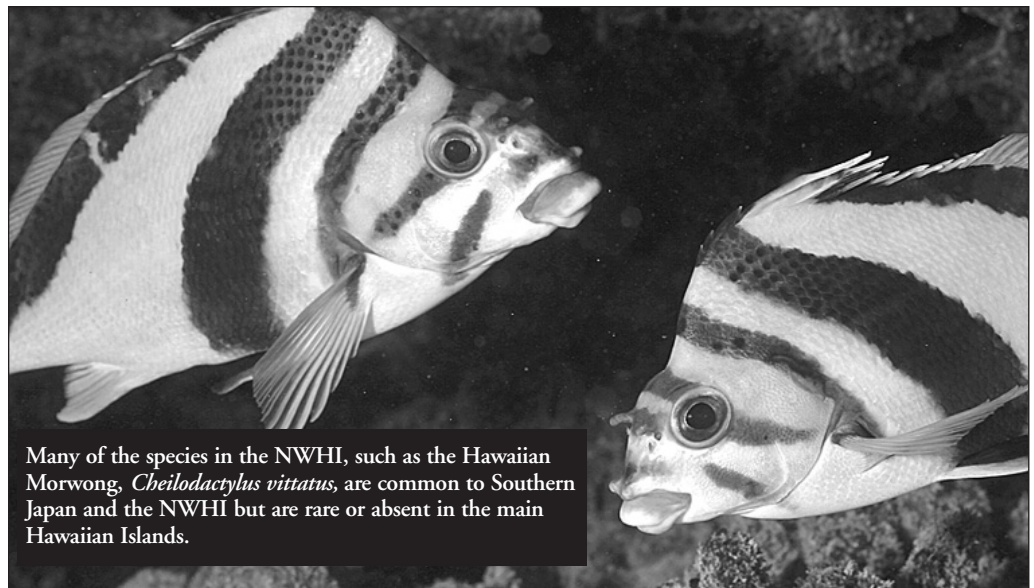
“Declines in the productivity of seabirds, monk seals, reef fishes, and chlorophyll have been documented from the early 1980s to the present.”

These vast coral reef ecosystems support a wide array of marine species. While more than 7,000 marine species have been recorded in the Hawaiian Islands, on average, roughly one third of the fish species exist only in the Hawaiian archipelago. The coral reefs are the foundation of expansive ecosystems that host an interdependent association of vertebrates (monk seals, cetaceans, reef and bottomfish, turtles, birds, and sharks), invertebrates (corals, anemones, jellyfishes, mollusks, shrimps, crabs, lobsters, sea urchins, sea stars, and sea cucumbers), sea grasses, and algae. Because the reefs in the NWHI are among the few remaining large-scale, intact, predator-dominated reef ecosystems left in the world, they offer an opportunity to understand how unaltered ecosystems are structured, how they function, and how they can most effectively be preserved.

Climatic events play an important role in the ecosystem productivity in the northwestern chain. Declines in the productivity of seabirds, monk seals, reef fishes, and chlorophyll have been documented from the early 1980s to the present. While severe tropical storms or typhoons are rare, winter storms are common, resulting in a noticeable increase in winds and high seas that impact the reef system both negatively and positively. Problems associated with increased sea surface temperatures (SST) have also been reported in the NWHI. Sea surface temperature information obtained from NOAA demonstrated that water temperatures at Midway rose nearly 2 degrees centigrade over the usual summer maxima in August of 2002. Corresponding with this warm water event, substantial bleaching of corals was observed (a process whereby coral colonies lose their color due to the expulsion of symbiotic microscopic algae (zooxanthellae) from most coral tissues) on reefs at the three northwestern-most atolls, Kure, Midway and Pearl and Hermes.

Endangered and Threatened Species Recovery

Actions needed for the recovery of species listed as endangered or threatened under the Endangered Species Act of 1973, as amended, are addressed in formal Recovery Plans. Such Recovery Plans are mandated under Section 4 of the Endangered Species Act. Recovery Plans for most terrestrial species are written and carried out under the authority of the U.S. Department of the Interior, Fish and Wildlife Service. Similarly, most Recovery Plans for marine species are written and implemented under the authority of the U.S. Department of Commerce, National Marine Fisheries Service. In some instances where species rely on both the land and the ocean for essential life stages (such as with sea turtles and monk seals), the Recovery Plans are jointly written by the agencies, and recovery actions are shared. Copies of Recovery Plans pertaining to threatened and endangered species within the Northwestern Hawaiian Islands may be obtained by contacting the offices of the agencies mentioned above. The Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve, through this Reserve Operations Plan, will assist either responsible agency in the recovery of threatened or endangered species in the Northwestern Hawaiian Islands.



Many of the species in the NWHI, such as the Hawaiian Morwong, *Cheilodactylus vittatus*, are common to Southern Japan and the NWHI but are rare or absent in the main Hawaiian Islands.

Photo Credit: James Watt



Importance to Marine Mammals

The NWHI ecosystems play an important role in supporting a host of marine mammals. Like the Hawaiian monk seals, Hawaiian spinner and bottlenose dolphins are resident species that occur within these ecosystems during the entire year. Transient species such as spotted dolphins, humpback whales, and numerous other cetaceans occur seasonally within the Reserve (see Table 6).

Table 6. Transient sea turtles and marine mammals in the Northwestern Hawaiian Islands (George Antonelis, pers. comm. And Barlow, J. 2003).

Common Name

Taxonomic Name

SEA TURTLES

Loggerhead
Olive ridley
Leatherback

Caretta caretta
Lepidochelys olivacea
Dermochelys coricea

MARINE MAMMALS

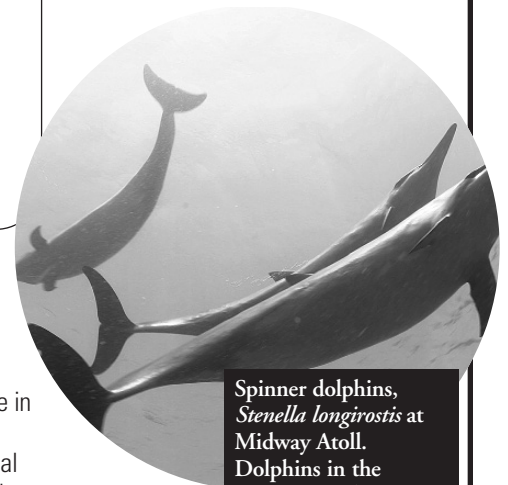
Melon-headed whale
Spotted dolphin
Striped dolphin
Rough-toothed dolphin
Risso's dolphin
Short-finned pilot whale
False killer whale
Blainville's beaked whale
Cuvier's beaked whale
Killer whale
Fin whale
Humpback whale
Sperm whale

Peponocephala electra
Stenella attenuata
Stenella coeruleoalba
Steno bredanensis
Grampus griseus
Globicephala macrorhynchus
Pseudorca crassidens
Mesoplodon densirostris
Ziphius cavirostris
Orcinus orca
Balaenoptera physalus
Megaptera novaeangliae
Physeter macrocephalus

The Hawaiian monk seal – The Hawaiian monk seal is one of the most endangered marine mammals in the United States. The species are endemic to the Hawaiian Archipelago and nearly the entire world population of endangered Hawaiian monk seals is found in the NWHI. The first range-wide beach counts of monk seals occurred in the late 1950's. Due to a fifty percent decline discovered in beach counts, the Hawaiian monk seal was listed as endangered throughout its range in 1976. NOAA Fisheries designated critical habitat for the Hawaiian monk seal from shore out to 20 fathoms in ten areas of the NWHI in May 1988. NOAA Fisheries believes these areas require special management consideration or protection now and in the reasonably foreseeable future. Currently, the mean number of seals older than pups observed in beach counts is about 375 seals. This number has remained essentially unchanged since 1993. Approximately 1,400 animals remain throughout the island chain.

Monk seals were believed to forage primarily on prey associated with the coral reefs. Although a number of different species are eaten, recent research has shown that individual seals are specialized in the various benthic habitats where they feed and in the methods they use to locate and catch prey. Recent research on foraging patterns reveal that monk seals are capable of diving to depths greater than 1500 feet for prey items associated with precious gold coral beds found in deep waters in the subphotic zone. It is now known that Hawaiian monk seals typically range well outside of the currently designated critical habitat.

Given the current low population estimates of monk seals, and the limited nature of their breeding habitats, the importance of ongoing protection to improve monk seal habitats and available prey, such as bottom and reef fish, octopuses, eels and spiny lobsters, cannot be overstated.



Spinner dolphins, *Stenella longirostris* at Midway Atoll. Dolphins in the NWHI use the shallow atoll lagoons as rest areas during the day and forage nearby

Photo Credit: James Watt



Importance to Sea Turtles

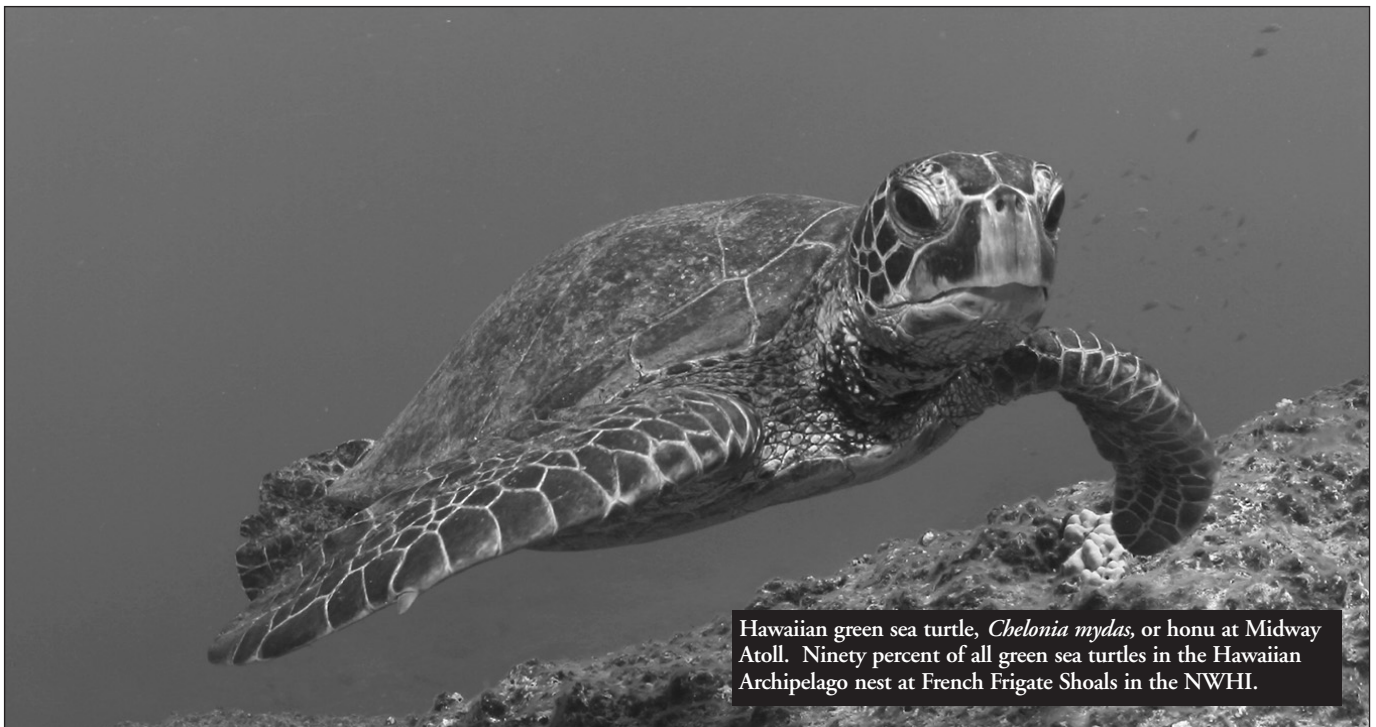
The NWHI are an important nesting habitat for the threatened green sea turtle. Significant nesting sites exist on French Frigate Shoals and to a lesser degree on Laysan Island, Lisianski Island, and Pearl and Hermes Atoll. The green sea turtle occupies three habitat types: open beaches, open sea, and feeding and sleeping grounds in shallow, protected waters. Upon hatching, the young turtles gradually crawl from the beach and swim over shallow reef areas and extensive shoal areas to the open ocean. When their shells grow 8-10 inches long, they move to shallow feeding grounds over coral reefs and rocky bottoms. Age at sexual maturity is estimated at 20-50 years. The green sea turtle was listed as threatened in 1978. Although the population has increased significantly since the 1970's, the total number of nesting females is still well below the historical levels of the late 1800's.

“Although the population has increased significantly since the 1970s, the total number of nesting females is still well below the historical levels of the late 1800s.”

Although scattered low-level nesting occurs throughout the Hawaiian archipelago, over 90 percent of the nesting is at French Frigate Shoals. Some sandy islets within French Frigate Shoals have been identified as nesting habitat for adult females and near shore waters contain adult males that migrate to breed at this key site. Mating occurs in the water, yet both males and females arrive on land to bask in the sun. Approximately 200-700 adult green turtle females nest on French Frigate Shoals annually. Research indicates that the range of adult green turtles nesting at French Frigate Shoals is limited to the 1,500-mile stretch of the Hawaiian archipelago and to Johnston Atoll immediately to the south, where algal foraging pastures occur. While the green sea turtle is a resident species, the endangered leatherback, the endangered olive ridley, and the threatened loggerhead sea turtles are considered transient species that occur seasonally in this expansive area (see Table 6).

Importance to Fishes

The NWHI support numerous species of unique marine, reef, and shore fish and invertebrates that are also found in geographically distant ecosystems. It is believed that the NWHI provide a bridge to these ecosystems via associated seamounts and the island groups adjacent to them. The coral reefs around the NWHI support numerous species of reef fish. Some fish species commonly found on these reefs, such as the slingjaw wrasse, the masked angelfish, and the knifejaw are rare elsewhere in the archipelago. The total number of species in the region is unknown, but initial sampling indicates the presence of approximately 260 species at Midway alone.



Hawaiian green sea turtle, *Chelonia mydas*, or honu at Midway Atoll. Ninety percent of all green sea turtles in the Hawaiian Archipelago nest at French Frigate Shoals in the NWHI.

Photo Credit: James Watt



Table 7. List of reef fish and apex predatory sharks recorded in the NWHI reefs during September/October periods of 2000, 2001 and 2002 (Adapted from DeMartini and Friedlander, 2004).

Common Name	Hawaiian name	Scientific Name
Grey reef shark	Mano	<i>Carcharhinus amblyrhynchos</i>
Galapagos shark	Mano	<i>Carcharhinus galapagensis</i>
Whitetip reef shark	Mano lalakea	<i>Triaenodon obesus</i>
Giant moray	Puhi	<i>Gymnothorax javanicus</i>
Houndfish	'aha	<i>Tylosurus crocodilus</i>
Hawaiian Grouper	Hapu'u	<i>Epeniphelus quernus</i>
Barred jack	Ulua	<i>Carangoides ferdau</i>
Giant trevally	Ulua aukea	<i>Caranx ignobilis</i>
Black jack	Ulua la'uli	<i>Caranx lugubris</i>
Bluefin trevally	Omilu	<i>Caranx melampygus</i>
Island jack	Ulua	<i>Carangoides orthogrammus</i>
Bigeye jack	Pake ulua	<i>Caranx sexfasciatus</i>
Rainbow runner	Kamanu	<i>Elagatis bipinnulata</i>
Leatherback jack	Lai	<i>Scomberoides lysan</i>
Greater amberjack	Kahala	<i>Seriola dummerili</i>
Grey snapper	Uku	<i>Aprion veriscens</i>
Great barracuda	Kaku	<i>Sphyræna barracuda</i>
Island skipjack	Kawakawa	<i>Euthynnus affinis</i>

“The rich and abundant biodiversity of the NWHI may play a critical role in supporting the genetic diversity of the entire Hawaiian Archipelago.”

Structurally, apex predators, such as sharks and jacks, dominate fish communities on the reefs in the NWHI. In addition, abundance and biomass estimates indicate that the reef community is characterized by fewer herbivores, such as surgeonfishes, and more carnivores, such as damselfishes, goatfishes, and scorpionfishes. The value of these exquisite reef communities extend beyond the intrinsic; they also have the potential to enhance fishing and hedge against fisheries collapses by potentially providing sources of recruits and propagules (part of an organism that can reproduce) to the Main Hawaiian Islands. The rich and abundant biodiversity of the NWHI may play a critical role in supporting the genetic diversity of the entire Hawaiian Archipelago. While preliminary evidence supports close biological and ecological linkages between the NWHI species and those in the Main Hawaiian Islands, more research is necessary to clearly understand the sources and sinks and recruitment patterns between these two areas.

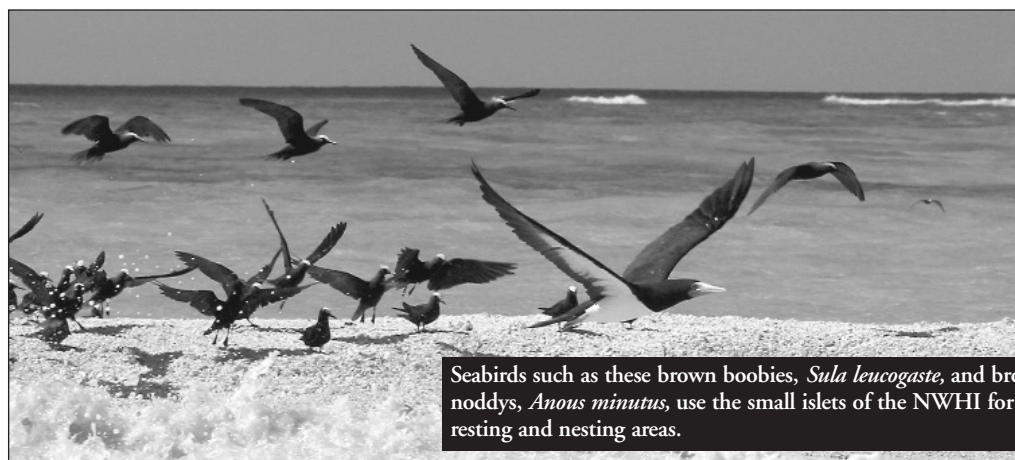


Importance to Seabirds, Water Birds, and Land Birds

The NWHI are home to millions of seabirds, many of which rely on the coral reef ecosystems for food and other habitat needs. Four endangered endemic bird species, which are not seabirds (Laysan duck, Laysan finch, Nihoa finch, and Nihoa millerbird), breed on the islands, along with 14 million seabirds of 18 species.

Table 8. Breeding birds in the Northwestern Hawaiian Islands (Bernice Pauahi Bishop Museum, 2000)

Common Name	Taxonomic Name
LAND BIRDS	
Laysan Duck	<i>Anas laysanensis</i>
Laysan Finch	<i>Telespiza cantans</i>
Nihoa Finch	<i>Telespiza ultima</i>
Nihoa Millerbird	<i>Acrocephalus familiaris kingi</i>
SEABIRDS	
Band-rumped storm petrel	<i>Oceanodroma castro</i>
Black Noddy	<i>Anous minutus melanogenys</i>
Black-footed Albatross	<i>Diomedea nigripe</i>
Blue-gray noddy	<i>Procelsterna cerula saxatilis</i>
Bonin Petrel	<i>Pterodroma hypoleuca</i>
Brown Booby	<i>Sula leucogaster plotus</i>
Brown Noddy	<i>Anous stolidus pileatus</i>
Bulwer's Petrel	<i>Bulweria berwerii</i>
Christmas Shearwater	<i>Puffinus nativitatis</i>
Dark-rumped Petrel	<i>Pterodroma phaeopygia sandwichensis</i>
Gray-backed Tern	<i>Sterna lunata</i>
Great Frigatebird	<i>Fregata minor palmerstoni</i>
Laysan Albatross	<i>Diomedea immutabilis</i>
Masked Booby	<i>Sula dactylatra personata</i>
Red-footed Booby	<i>Sula sula rubripes</i>
Red-tailed Tropicbird	<i>Phaethon rubricauda rothschildi</i>
Sooty Tern	<i>Sterna fuscata oahuensis</i>
Wedge-tailed Shearwater	<i>Puffinus pacificus</i>
White Tern	<i>Gygis alba rothschildi</i>
White-tailed Tropicbird	<i>Phaethon lepturus dorotheae</i>



Seabirds such as these brown boobies, *Sula leucogaste*, and brown noddys, *Anous minutus*, use the small islets of the NWHI for resting and nesting areas.

Photo Credit: James Watt



Importance to Invertebrate Communities

The coral reefs of the NWHI support diverse communities of benthic macroinvertebrates. As many as 600 species of macroinvertebrates, largely mollusks, echinoderms, and crustaceans, were identified at French Frigate Shoals alone on the 2000 Northwestern Hawaiian Islands Reef Assessment and Monitoring Program (NOWRAMP 2000) expedition, with more than 250 species (not including marine snails) reported as new records.

Lobsters represent a vital link in the trophic food web of many other organisms in the near shore coral reef ecosystem. Excessive fishing likely led to the depletion of many local populations of spiny lobsters in the NWHI. Despite significant reductions in commercial fishing activities in the NWHI, local populations of spiny lobsters remain depressed while common slipper lobsters have increased significantly in some areas. The commercial lobster fishery in the NWHI has been closed since 2000, initially under a NMFS emergency closure, and then under a permanent injunction by the federal district court in Honolulu, and by Executive Orders 13178 and 13196.

Table 9. Composition of benthic biota in patch reef habitat of the NWHI (All values are in percent of the total biota from benthic samples-Adapted from Parrish et al., 1985).

Organism Group	% Numbers
ALGAE	--
ZOOPLANKTON	11
BENTHIC INVERTEBRATES	89
Sponges	--
Worms ¹	11
Annelid Worms	10
Other worms	1
Echinoderms¹	0.025
Echinoids	0.007
Ophiuroids	0.018
Benthic Mollusks¹	2.1
Gastropods	1.9
Bivalves	0.2
Benthic Crustaceans¹	75.5
Small Crustaceans¹	75
Tanaidacea	41
Isopoda	15
Amphipoda	19
Large Crustaceans¹	0.55
Hermit Crabs	0.03
Other Crabs	0.21
All Shrimp	0.3

¹ Includes in its total all the subgroups immediately below that are indented to the right.



Importance to Algal communities

Algae are an important component in maintaining the NWHI's ecological balance as a food source for a number of reef organisms, including the green sea turtle, and also serve as settling and attachment sites for small and cryptic reef species. Some 205 species of marine algae were identified in 1989 in the NWHI, including a number of newly identified deepwater species that were previously unknown. Since then, these numbers have nearly doubled and will continue to increase as the recent NOWRAMP collections are fully identified and recorded. A recent study conducted in 2001 by the Division of Aquatic Resources at Kure Atoll resulted in an increase in the total number of known algae species from 45 to 98 species. Fifty-three new algal species were reported for the atoll.

**“Some 205 species
of marine algae
were identified
in 1989...”**



Algae are the basis of an extensive food web, and feed many species of herbivorous fish, as well as cement the reef together.

Photo Credit: James Watt



Native Hawaiian Cultural Foundation and Significance

*Ku pākū ka pali o Nihoa i ka makani
The cliff of Nihoa stands as resistance against the wind.*

The Executive Order (EO) ensures the comprehensive, strong, and lasting protection of the coral reef ecosystem and related marine resources and species (resources) of the Northwestern Hawaiian Islands (NWHI). The EO gives special recognition to Native Hawaiians and specifically refers to allowable actions such as culturally significant, noncommercial subsistence, cultural and religious uses within the Reserve that are consistent with long-term protection of NWHI marine resources.

Long before Western ships sighted the NWHI, Kānaka ʻŌiwi (Native Hawaiians) and other Polynesians journeyed in large double-hulled canoes to these resource-rich islands and atolls as they explored the vast Pacific Ocean. Physical remnants of wahi kūpuna (ancestral places) at Nihoa and Mokumanamana (Necker) islands indicate use of these islands and the surrounding oceans by the ancients. Oral traditions and archaeological finds confirm a relationship of the islands to ancestral Kānaka ʻŌiwi. Evidence indicates that the NWHI served as homes and places of worship for centuries.

Initial archaeological surveys done on the islands of Nihoa and Mokumanamana have shown that there is a high density of cultural material located on these small islands. On the island of Nihoa, where there are significant soil deposits, there are a total of 88 wahi kūpuna. On Mokumanamana, there are 52 wahi kūpuna, including habitation sites, rock shelters, agricultural terraces, and religious shrines. Several archaeological expeditions have removed numerous cultural remains from both of these islands. Many of these cultural remains are believed to have served subsistence and religious functions and attest to the use of these islands and the surrounding oceans by Native Hawaiian ancestors. Both Nihoa and Mokumanamana are recognized as culturally vibrant and are listed on the National Register of Historic Places.

Mele (song, chant) that have been passed down through Native Hawaiian oral traditions, refer to islands beyond the main Hawaiian Islands and recall the travels of seafaring ancestors on their way to and from the Pae ʻĀina ʻo Hawaiʻi (Hawaiian archipelago). In one significant huakaʻi (journey), Pele, the Hawaiian goddess of fire and volcanoes, and her family migrate from their distant homeland to Niʻihau in the main Hawaiian Islands. They travel by way of Polapola, Kuaihelani "where Kāne (Hawaiian god) hides the islands" and other places inhabited by gods including Mokumanamana (Necker Island). Further oral traditions also recall migrations of Native Hawaiians passing through the Northwestern shoals. These oral traditions also reveal the presence of ancestors that predate the Pele migrations.

Use of the Hawaiian language was prohibited by the Republic of Hawaiʻi and may have contributed to the loss of some of the traditional names of the NWHI over time. Oral histories conducted to recover this information reveal that place names in Hawaiʻi are often referred to by multiple names. There is currently a difference of opinions among historians regarding the correct names of the islands and efforts are underway to identify, as accurately as possible, the original names. The following island names appear in various mele (song, chant) and moʻolelo (narratives): Kamokupapapa, Nihoa, Haʻena, Haʻenakū, Haʻenamoe, Haʻenaala, Haʻenaʻē, Haʻenamauhoalalaihiki, Laloiho, Laloaʻe, Lalohele, Lalokona, Laloʻāniani, Kamole, Kapou, Pouheʻeua, Pouheʻelani, Manawainui, Manawaihiki, Kuaihelani, and Holanikū.

Recent written records clearly demonstrate the Kingdom of Hawaiʻi rulers' interest in Nihoa. In 1822 Queen Kaʻahumanu organized and participated in an expedition to explore the island of the ancient chants. King Kamehameha IV Alexander Liholiho traveled to Nihoa in 1857, to formally annex the NWHI for his Kingdom. Perhaps the most famous visit was made by Lydia Liliʻuokalani (princess at the time) and her 200 person party that visited Nihoa on the ship Iwalani in 1885. Despite this establishment of formal ownership, other visits were made by representatives of the Kingdom of Hawaiʻi to reassert ownership claims as outside European explorers began to "re-discover" the NWHI.

In 1893, Queen Lydia Liliʻuokalani was unlawfully overthrown by the self-proclaimed Provisional Government, made up of largely western business interests and missionary descendants, with the assistance of U.S. Minister John L. Stevens. In 1898, the NWHI, along with title of the main Hawaiian archipelago were collectively, but unlawfully, ceded to the United States.³

“Both Nihoa and Mokumanamana are recognized as culturally vibrant...”



There is no question among historians that Native Hawaiians were the first discoverers of the 1,500 mile-long Hawaiian archipelago and continued to inhabit and survive in these islands for hundreds of years prior to Western contact. During this time, Native Hawaiians evolved a complex system of resource management and developed a specialized set of skills to survive on these remote islands with limited resources. Presently, Native Hawaiians continue to maintain their strong cultural ties to the ocean and continue to understand the importance of managing these islands as a whole, rather than separate from each other.

The Native Hawaiian people remain intimately connected to the Hawaiian archipelago on genealogical, cultural, spiritual and geological levels. Today, sovereignty of and responsibility for the Hawaiian archipelago continues to exist in the na'au (essence of being) of many Native Hawaiians. This position is reinforced by U.S. Public Law 103-150, a joint resolution of Congress that was signed by the President of the U.S. in 1993. Public Law 103-150 acknowledges the role of United States' officers in the overthrow of the Kingdom of Hawai'i and "apologizes to Native Hawaiians on behalf of the people of the United States" for the unlawful overthrow and the "deprivation of the rights of Native Hawaiians to self-determination."³

In summary, the NWHI are intimately connected to Kānaka 'Ōiwi and the main Hawaiian Islands on genealogical, cultural, spiritual and historical levels. The natural, primordial elements (land, wind, rain) and creatures of the northwestern islands are considered primordial ancestors and therefore the older relatives of living Kānaka 'Ōiwi. Both share an interdependent, 'ohana (family-based) relationship that requires mālama (care) and kia'i (guardianship) for the older siblings who, in turn, provide for the well being of the younger. These traditions remind us of the time-honored Native Hawaiian value of kuleana (responsibility) to care for this unique, fragile place and its many resources through strong conservation and protection principles. The need to mālama ka pae 'āina (care for the archipelago) continues as we look toward the future.

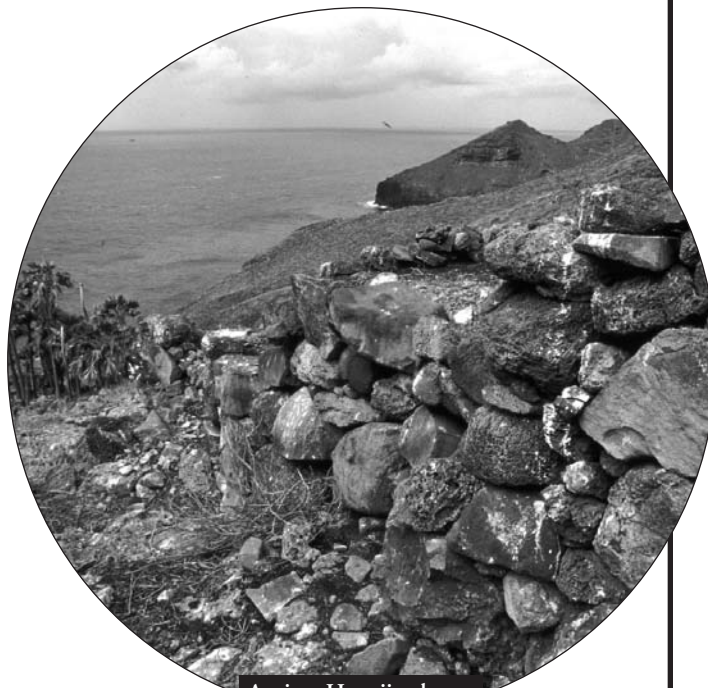
³Apology Bill (103-150) Sect (1): Resolved by the Senate and House of Representatives of the United States of America in Congress assembled,

(1) on the occasion of the 100th anniversary of the illegal overthrow of the Kingdom of Hawaii on January 17, 1893, acknowledges the historical significance of this event which resulted in the suppression of the inherent sovereignty of the Native Hawaiian people; (2) recognizes and commends efforts of reconciliation initiated by the State of Hawai'i and the United Church of Christ with Native Hawaiians; (3) apologizes to Native Hawaiians on behalf of the people of the United States for the overthrow of the Kingdom of Hawai'i on January 17, 1893 with the participation of agents and citizens of the United States, and the deprivation of the rights of Native Hawaiians to self-determination; (4) expresses its commitment to acknowledge the ramifications of the overthrow of the Kingdom of Hawai'i, in order to provide a proper foundation for the reconciliation between the United States and the Native Hawaiian people; and (5) urges the President of the United States to also acknowledge the ramifications of the overthrow of the Kingdom of Hawai'i and to support reconciliation efforts between the United States and the Native Hawaiian people.

*E iho ana o luna
E pi'i ana o lalo
E hui ana nā moku
E kū ana ka paia*

*That which is above shall be brought down
That which is below shall rise up
The islands shall come together
To form the walls of our nation*

Prophecy of Kapihe in Kona 18th Century



Ancient Hawaiian house sites on Nihoa Island.

Photo Credit: Monte Costa



U.S. History and Maritime Heritage of the Northwestern Hawaiian Islands

During the late 18th and early 19th centuries, European and American traders began to call at the main Hawaiian Islands, and by 1825 Honolulu became the most important port in the entire Pacific. During the 19th and 20th centuries, the NWHI were witness to a distinct series of extractive activities. These included whaling ships working in the vicinity of the NWHI, as well as the commercial exploitation of other marine and terrestrial wildlife. Hawaiian monk seals experienced mass hunting for their oil and pelts. Bird skins and feathers were also harvested.

Commercial fishing in the waters surrounding the NWHI began with the arrival of large schooners and other sailing ships that hailed from ports around the world. These vessels left the reefs and shoals with cargoes of shark meat, fins and oil, turtle shells and oil, and bêche-de-mer. By the early 1900's, the fishing range of the Honolulu-based "sampan" fleet extended to the NWHI. This fleet was established by Japanese immigrants who adapted fishing technology and skills developed in their homeland to the resources and sea conditions in Hawai'i. Commercial harvesting of tuna, bottomfish, lobsters, and other marine animals in the NWHI continued through the twentieth century. For some species, such as the pearl oyster (*Pinctada galtsoffii*) and spiny lobster (*Panulirus marginatus*), fishing resulted in dramatic depletion.

Mineral resources were also exploited. Several of the NWHI islands were leased for a period of 25 years to the North Pacific Phosphate and Fertilizer Company for guano extraction. Development of land-based facilities supporting these commercial activities was most significant on Laysan Island, where a small community existed in the 1890's, but facilities were also established on Lisianski Island.

Unfortunately, the ill-charted NWHI presented a challenge to ships and sailors engaged in these commercial activities. The low inconspicuous reefs and atolls of the NWHI represented a significant navigational hazard and were frequently sites for shipwrecks. Crews were often stranded for many months, while they constructed smaller vessels from salvaged timbers and set out for rescue. Some vessels were lost with all hands. Marine salvage expeditions from the main Hawaiian Islands profited from the area.

Beyond natural and mineral resources, the geographical location of the NWHI itself proved to be a "valuable" commodity. From the beginning of the 20th century onward, the strategic location of Hawai'i and the NWHI became increasingly important to commercial and military planners. The Spanish American War in 1898 led to the American colonization of Guam and the Philippines, as well as the unlawful annexation of the Hawaiian Islands. This greatly expanded American colonial presence made transpacific communication a priority. By 1903, the first transpacific cable and cable station was in operation and employees of the Commercial Pacific Cable Company settled at Midway. Tons of imported soil and numerous introduced plants significantly altered the landscape. In the 1930's, Pan American Airways "flying clippers" (seaplanes) were crossing the ocean, flying into Midway from Honolulu on their five-day transpacific passage. The U.S. Navy took an early interest in the strategic location of Midway, and in 1939, millions of dollars were awarded to the Pacific Naval Air Base (PNAB) Consortium, and construction of the naval air facility at Midway was begun the following year.

Intense impact on the region occurred during the World War II period. French Frigate Shoals was the temporary staging site for Japanese seaplanes, as well as a U.S. naval air facility at a later point. The Navy built a base at Midway Atoll, dredging the reef to form a channel and harbor to create a major submarine refit and repairs base. Eastern Island had the main airfield in the early days of the war, while submarine and seaplane support operations were concentrated on Sand Island. Together, these areas comprised a vital center for submarine, surface fleet, and naval aviation operations. In fact, the Hawaiian Sea Frontier Forces stationed patrol vessels at most of the islands and atolls. Tern Island, in French Frigate Shoals, was initially developed as a naval air facility for staging aircraft from the main Hawaiian Islands.

In June 1942, the Battle of Midway took place in the seas to the north of this Pacific outcrop. Four Japanese aircraft carriers and one American carrier were sunk, and Japanese forces were forced to withdraw from the planned invasion. Though the majority of the battle took place between 100 to 200 miles to the north, an intense air fight was waged directly over and around the atoll itself. Training exercises before and after the Battle also took their toll. At least 67 naval aircraft, both American and Japanese, crashed or were ditched into near shore waters of Midway and Kure Atolls, many of them combat losses for both American and Japanese Navies. Many of these crash sites are war graves. This battle proved to be the most decisive

**“The low
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“...many of these sites, as defined by State and Federal Preservation Law, are of historical and national significance.”

U.S. victory and was the turning point of World War II in the Pacific. Midway Atoll is designated as a National Memorial to the Battle of Midway and ensures that those who fought and died in this battle will always be remembered and appreciated for their sacrifices. Nine defensive structures related to the Battle of Midway were designated a National Historic Landmark in 1986. Many others are eligible for placement on the National Register of Historic Places.

In the interim between 1944 until the late 1970's, the U.S. Coast Guard occupied Tern Island (French Frigate Shoals) and Eastern Island (Midway) and operated long-range navigational aid (LORAN) stations. The Coast Guard also operated a LORAN station at Kure Atoll, which was decommissioned in 1992.

All of these activities have left a scattered material legacy around and on the Islands, including shipwrecks, sunken naval aircraft, toxic waste sites and unexploded ordnance (UXO). Currently, there are 52 known shipwreck sites among the NWHI, the earliest dating back to 1822. This combined with known aircraft, gives a total of 119 potential maritime resource sites. Some of these represent environmental threats. Some consist chiefly of marine debris of little specific value. But many of these sites, as defined by State and Federal Preservation Law, are of historical and national significance. They are a physical record of past activities in the NWHI and embody unique aspects of Island and Pacific history.

In recent years, the Navy has phased out its presence at Midway Atoll, making way for the Midway Atoll National Wildlife Refuge, which assumed full custody and jurisdiction following the Navy's departure. Congress provided in excess of \$3 million for the Navy's identification and remediation of man-made hazards which included the removal of 85 structures that were not wanted by the Department of Interior. Today, Midway Atoll National Wildlife Refuge is the only remote NWHI site open to public visitation. This effort complements President Theodore D. Roosevelt's legacy of the Hawaiian Islands National Wildlife Refuge, which encompasses the eight easternmost islands in the chain and the surrounding reefs, for the protection of seabirds.



Photo Credit: James Watt

Shipwreck *USS Macaw*, ASR-11, Sub tender, sunk 1944, Midway Atoll.



Current Human Activities

Today, few human activities occur in the Reserve area, which include submerged lands and waters of the NWHI and is adjacent to and seaward of the seaward boundaries of the Hawai'i State waters and the Midway Atoll National Wildlife Refuge. However, there are limited human activities that do occur in the NWHI. None of the islands are inhabited, with the exception of Sand Island at Midway Atoll and year round field camps at Tern Island (French Frigate Shoals) and on Laysan Island. Researchers occasionally occupy the islands for limited periods of time and take part in research expeditions. In 1996, a limited ecotourism program opened on Midway Atoll National Wildlife Refuge. Research activities are one of the more predominant activities in Reserve waters, along with commercial fishing and transiting ships.

Over the last several years, the NWHI has experienced an increase in research activity. Several multi-agency research expeditions have been carried out in the NWHI with the goal of increasing the overall understanding of the NWHI, resulting in increased vessel traffic and increased potential impacts to the area. There is a fundamental need to balance increased research interests with the protection and long-term conservation of the NWHI.

Currently, one small commercial fishery in the NWHI is managed under a Fishery Management Plan developed by the Western Pacific Regional Fishery Management Council (WPRFMC) and approved by NOAA Fisheries. The bottomfish fishery has two limited entry zones, the Ho'omalulu Zone, which ranges from Kure to French Frigate Shoals, with four active permits; and the Mau Zone, which ranges from French Frigate Shoals to Nihoa, with five active permits. Two permits, set aside under the Community Development Program for Native Hawaiians, have not been filled.

As stated previously, the commercial lobster fishery in the NWHI has been closed since 2000, initially under a NMFS emergency closure, and then under a permanent injunction by the federal district court in Honolulu, and by Executive Orders 13178 and 13196. NOAA Fisheries scientists continue to conduct biological research to assess the health of the lobster stock.

The pelagic longline fishery is a limited-entry system with a maximum of 164 permits, about 100 of which are active. These vessels are prohibited from operating in a 185 kilometer wide corridor in the NWHI to protect monk seals and other species from unwanted interaction with the longline fishery. Trolling and handline fishing for pelagic species is allowed within the NWHI by NOAA Fisheries and the State of Hawai'i and through special provisions in the EO.

Other Activities Recently Proposed in the NWHI

There has been occasional interest in the establishment of a commercial fishery for precious corals in the NWHI. However, none has come to realization due to economic constraints, as well as restrictions imposed on the precious coral fishery as a result of a final rule promulgated in 2002 by NOAA Fisheries (52 FR 11941, March 18, 2002) and provisions of EO 13178 and 13196 that previously established the NWHI Coral Reef Ecosystem Reserve.



Researcher counting coral species at Lisianski.

Photo Credit: James Watt



“Each action plan outlines what, who, why, when, and how different strategies will be conducted.”

Introduction to Action Plans

The Reserve Operations Plan is constructed around a set of functional- and issue-oriented action plans that outline how the Reserve will be managed (see Table 1. Summary of Action Plans and Strategies). Each action plan outlines what, who, why, when, and how different strategies will be conducted. A list of anticipated costs for each strategy over a 5-year timeframe is provided at the end of each action plan. Each strategy is ranked with an A, B or C based on the following criteria - A: Mandated by EO/Reserve Management Principles; B: Highly Desirable; and C: If Sufficient Funds are Available. Each action plan also contains performance measures and outcomes whose principal objectives are to: 1) determine how effectively the proposed actions in these action plans are addressing the management issues; and 2) present a set of outcome-based measures that demonstrate progress towards Reserve goals and objectives. The action plans were designed with the most current information available at the time. The Reserve Operations Plan is intended to be a living document and will evolve as changes become necessary.

Interested parties should note that while many of the strategies may be complete before the designation process is over, others may be carried into various sanctuary management plan alternatives because they are ongoing, have led to new projects, or have not been started. It is anticipated that this Reserve Operations Plan will serve as a basis for future management plan alternatives considered during the sanctuary designation process.

List of Action Plans:

- Operations: Includes interagency coordination, activity and area identification, Reserve Advisory Council operations, infrastructure development and field operations.
- Education and Outreach: Encompasses education, outreach, and interpretive projects.
- Cultural Resources: Consists of projects related to Native Hawaiian culture, uses, and locations.
- Maritime Heritage: Contains projects related to maritime historic resources.
- Research and Monitoring: Contains projects related to research and monitoring.
- Mapping: Covers all projects related to developing charts and maps of the NWHI.
- Response, Damage Assessment and Restoration: Contains projects related to contingency planning, response and restoration.
- Marine Debris: Consists of projects related to the removal of marine debris from the NWHI.
- Enforcement: Includes air and sea support for existing enforcement operations and expansion of a vessel monitoring system.
- Sanctuary Designation: Comprised of all projects related to the sanctuary designation process.

**Table 10.** Summary of Reserve Operation's Desired Outcomes and Performance Measures:

Action Plan	Desired Outcome	Performance Measures
Operations	To develop and implement successful operations and programs that supports the management principals of the Reserve.	a. Necessary infrastructure (staff, offices and facilities, equipment and vehicles) acquired.
		b. Reserve Advisory Council meeting attendance remains regular; Council operations continue when member terms expire and/or changes in leadership occur; Council advice is timely and specific to management needs; and regular feedback and evaluation provided by Council.
		c. Appropriate and effective programs developed (e.g. completion of Reserve Operations Plan), to facilitate the long-term conservation and protection of the coral reef ecosystem and related marine resources and species of the NWHI.
		d. A progressive increase in safe and effective field operations as measured by a decrease in accidents; improved safety for all users; reduced impact to the natural, historic and cultural resources of the area; sharing of costs and resources with partner agencies to minimize vessel and air traffic in the area; and the successful implementation of cooperative Reserve and partner agency activities (as described in MOU's established with the State of Hawai'i and USFWS).
		e. Documentation and tracking of all activities occurring within the Reserve.
Education and Outreach	To increase public awareness of the NWHI and the management principals of the EO.	a. Creation of a coordinated and planned inter-agency education and communication plan by the end of 2004.
		b. An increase in the number of educational materials distributed to the public that support the management principles of the Reserve.
		c. A formal network of educators, opinion-leaders, and concerned public that work together to protect the natural, historic and cultural resources of the NWHI.
		d. Interpretive, education and volunteer programs developed and implemented by the end of 2004 that support the NWHI Coral Reef Ecosystem Reserve's overall mission and goals.
		e. A measurable increase in the use of distance-learning technologies in the Reserve's education and outreach programs.
Native Hawaiian Cultural Resources	Protected Native Hawaiian cultural resources in the NWHI.	a. A measurable increase in materials researched and compiled, establishment of an on-line database, and the reconnection and use of Hawaiian names for places in the region.
		b. In consultation with the Native Hawaiian community, cultural best management practices developed by the end of 2004 that include protocols designed to guide the recognition and continuation of appropriate Native Hawaiian practices in the NWHI.
		c. Adoption of cultural best management practices by all users who access the NWHI to conduct activities in the Reserve.



Table 10. Summary of Reserve Operation’s Desired Outcomes and Performance Measures: (cont’d)

Action Plan	Desired Outcome	Performance Measures
Maritime Heritage	Improved protection of maritime cultural resources in the NWHI.	a. An improved understanding of all known and potential maritime resource sites within the Reserve.
		b. Coordinated management partnership among research and management agencies regarding maritime, cultural and natural resources within the Reserve.
		c. A measurable increase in the appreciation of the unique maritime history and archaeological resources in Hawai'i and the Pacific.
Research and Monitoring	To better understand the function and biogeography of the NWHI coral reef ecosystem to assist and inform management decision-making.	a. An increased understanding of all past and ongoing research conducted in the NWHI.
		b. Development of a draft Reserve science plan that supports the management principles and protection and conservation measures described in the EO and serves as a guide to coordinate research in the NWHI.
		c. Ecosystems and resources maintained in their natural character.
Mapping	To better inform users and management of the NWHI through improvement of regional nautical charts.	a. Revised charts incorporate accurate bathymetry and island locations that aid navigation.
		b. A decrease in the number of accidental vessel groundings.
Response, Damage Assessment and Restoration	Avoid to the greatest degree possible any further degradation and rehabilitate and restore injured resources, as appropriate.	a. Updated assessment of degraded or injured resources in the NWHI completed by early 2004.
		b. Prioritized list of resources in need of restoration completed by June 2004.
		c. Increased communication between partner agencies regarding the handling of response procedures during an emergency situation.
		d. A contingency plan is adopted by all appropriate agencies by the end of 2004.

Table 10. Summary of Reserve Operation's Desired Outcomes and Performance Measures: (cont'd)

Action Plan	Desired Outcome	Performance Measures
Marine Debris	To reduce threats by marine debris to natural resources in the Reserve and neighboring waters with an emphasis on preventing endangered species entanglement.	a. Reduction in current number of entanglements of marine life.
Enforcement	To increase the level of enforcement and the level of compliance for all users within the Reserve.	b. Draft set of surveillance and enforcement recommendations completed by 2004.
		c. Increased knowledge of use patterns within Reserve boundaries.
		d. Increase public awareness of the Reserve and its conservation measures.
Sanctuary Designation	A successful sanctuary designation process that adheres to guidelines established by NEPA, the NMSA and the EO.	a. Increased public awareness and engagement in the NWHI sanctuary designation process.
		b. Collaboration between all stakeholders, including the Reserve Advisory Council, Reserve staff, contractors and partner agencies in the development of a range of reasonable alternatives.
		c. Selection of the appropriate management alternative for the marine environment of the NWHI that provides long-term conservation and protection of the coral reef ecosystems and related marine resources and species of the NWHI in their natural character, utilizing a "precautionary approach" (see glossary), in accordance with laws and authorities relative to the NWHI.



“Strategies for this action plan will focus on effective office administration and infrastructure...”

Action Plan: Operations



Field research is an important part of Reserve operations. Near shore dive operations are usually conducted from smaller vessels.

Photo Credit: James Watt

Desired Outcome: To develop and implement successful operations and programs that supports the management principles of the Reserve.

Background/Context

The Executive Order (EO) established the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve (Reserve) and gave the Secretary of Commerce (Secretary) the responsibility to manage the Reserve. The principles, conservation measures, and requirements of the EO, the National Marine Sanctuaries Act (Act) and the National Marine Sanctuaries Amendments Act of 2000 (NMSAA) serve as the legal foundation for the strategies and activities contained in this Action Plan. Strategies for this action plan will focus on effective office administration and infrastructure; Reserve Advisory Council (Council) operations; and carrying out the operational requirements set forth in the EO to ensure the comprehensive, strong and lasting protection of the coral reef ecosystems and related marine resources and species of the Northwestern Hawaiian Islands (NWHI). Included in these strategies are actions such as basic office establishment, priority staff hires, priority procurements, development of formal agreements with partners, determination of fishing caps, clarification of boundaries, and development of permitting procedures. This action plan also focuses on remote field operations and planning necessary to conduct research, enforcement, monitoring, mapping, education and management activities within the Reserve. This action plan provides the operational foundation and framework for all other Action Plans. In particular, strategies and activities contained within this Action Plan are directly linked to activities contained within the Research and Monitoring, Enforcement, Education and Outreach, Native Hawaiian Cultural Resources, Historic Resources and Maritime Archaeology, and Sanctuary Designation action plans.



As of April 2003, the Reserve recruited and hired staff and contractors to fill the following functions:

- Reserve Coordinator
- Assistant Reserve Coordinator
- Research Coordinator
- Education Coordinator
- Sanctuary Designation Coordinator
- Administrative Assistant
- Program Assistant
- Policy Analyst
- Administrative and Fiscal Assistant
- Discovery Center Manager
- Pacific Region Maritime Archaeologist/Submerged Historic Resource Coordinator (partial NWHI duties)
- Graduate student hire

As the needs of the Reserve expand, additional priority staff and contractors will need to be hired to carry out these requirements. Priority staff and contractor positions have been identified and are listed under OP-1.

Strategies

- OP-1: Carry out effective office administration and infrastructure.
- OP-2: Coordinate Reserve Advisory Council operations.
- OP-3: Carry out operational requirements of the Reserve, as specified in the Executive Order, to protect the coral reef ecosystems, and marine resources and species of the NWHI in their natural character.
- OP-4: Develop and implement permitting and notification procedures.
- OP-5: Conduct safe and effective field operations.

Performance Measures

- a. Necessary infrastructure (staff, offices and facilities, equipment and vehicles) acquired.
- b. Reserve Advisory Council meeting attendance remains regular; Council operations continue when member terms expire and/or changes in leadership occur; Council advice is timely and specific to management needs; and regular feedback and evaluation provided by Council.
- c. Appropriate and effective programs developed (e.g. completion of Reserve Operations Plan), to facilitate the long-term conservation and protection of the coral reef ecosystem and related marine resources and species of the NWHI.
- d. A progressive increase in safe and effective field operations as measured by a decrease in accidents; improved safety for all users; reduced impact to the natural, historic and cultural resources of the area; sharing of costs and resources with partner agencies to minimize vessel and air traffic in the area; and the successful implementation of cooperative Reserve and partner agency activities (as described in MOU's established with the State of Hawai'i and USFWS).
- e. Documentation and tracking of all activities occurring within the Reserve.

Summary of Resource Needs

In-house staff time and:

- OP- 1: costs for the hiring of priority staff and contractors, equipment, office supplies, furniture, travel and printing.
- OP-2: costs for travel, materials and supplies, and telephone conferencing.
- OP-3: additional costs for travel, data acquisition, meetings and printing.
- OP-4: additional costs for the hiring of a permit coordinator, equipment, printing, and meetings.
- OP-5: additional costs for travel to Midway and French Frigate Shoals including air flights, small boat operations and ship charters, vessel maintenance, equipment and repairs.



It is anticipated that substantial increases in budget will be needed to implement strategies 1, 4 and 5 as the scope of work and operational requirements for the Reserve increases.

Potential Participants

- Research Corporation of the University of Hawai'i
- University of Hawai'i
- NOAA Marine and Aircraft Operations (NMAO)
- NOAA Fisheries
- NOAA Enforcement
- State of Hawai'i
- U.S. Fish and Wildlife Service
- U.S. Coast Guard
- Department of Defense
- Reserve Advisory Council
- WPRFMC
- Non-governmental organizations
- Academic Institutions

Relation to Other ROP Action Plans and Projects

The Operations Action Plan lays the operational foundation and framework for all other Action Plans. This Action plan includes necessary staff and contract personnel required to conduct effective Reserve operations and management. Specifically, the Operations Action plan relates to other plans as follows:

- The formal agreements with partners will help describe how the National Ocean Service (NOS) and the National Oceanic and Atmospheric Administration (NOAA) work with its resource management (and other) partners on various operation and designation strategies described in other action plans and will facilitate the sharing of information, resources and interagency planning based on shared principles, goals and objectives. Such agreements will facilitate implementation of coordinated permit, surveillance and enforcement procedures and activities.
- The establishment of fishing caps and permitting procedures will provide guidance for enforcement actions and will be augmented by strategies contained within the Enforcement Action Plan.
- The clarification of straight-line boundaries affects the need for and development of a depth-based vessel monitoring system and enforcement activities.
- Effective field operations planning will enable the Reserve to conduct remote activities such as research, monitoring, enforcement, education and management.
- The successful operation of the Council contributes to successful Reserve operations overall by providing a source of good advice and ideas on Reserve operations and the sanctuary designation process.



OP-1: Carry out effective office administration and infrastructure.

Description and Need for the Strategy

The National Ocean Service, National Marine Sanctuary Program has been given the responsibility to establish infrastructure and administrative procedures to implement the operations of the Reserve. Such infrastructure and administration includes establishing, operating and maintaining offices and other facilities, recruitment and hiring of staff, procuring and maintaining equipment and vehicles and establishing administrative policies and procedures. Without effective office administration and infrastructure, the Reserve would not be able to implement the directives, provisions, and protection and conservation measures of the EO.

Activities

1. Recruit and hire priority staff and contractors, including identifying and obtaining expertise through partners.
2. Establish Reserve offices and other facilities, as needed.
3. Procure necessary equipment and vehicles.
4. Operate and maintain Reserve facilities and equipment.

Location

Offices will be located in Hilo and Honolulu, with attendant office equipment and vehicles. A NWHI Discovery Center is built and operating in Hilo. Vessel storage and maintenance takes place on Kauai. This infrastructure will support operations across the Reserve and in the main Hawaiian Islands. Any additional infrastructure will be assessed as to whether it meets the principal purpose of the Reserve or other objectives of the EO and its potential impacts to the Reserve's resources.

Timeline

- Activity 1: A number of priority staff have already been hired. Additional staff will be recruited and hired as future Reserve budgets allow.
- Activity 2: Hilo and Honolulu offices have been established along with a Hilo Discovery Center. In 2004, the Honolulu staff will co-locate with the Honolulu staff from the Hawaiian Islands Humpback Whale National Marine Sanctuary (HIHWNMS) and National Marine Sanctuary Program (NMSP) Regional Coordinator's office.
- Activity 3: Some equipment and vehicles have been procured. This activity is ongoing.
- Activity 4: Ongoing.

Costs

Labor will mainly be provided by in-house staff and contractors and will continue to expand. Additional costs will be incurred for additional staff hires, office and warehouse space, phones and utilities, facility upgrades, office and computer equipment, and vessel upgrades and maintenance.

Results of the Strategy

Outputs:

- In addition to staff functions already acquired, additional priority staff and contractors hired (or otherwise available to assist in Reserve Operations through agreements established with partner agencies) including (in no particular order):
 - a. Enforcement Coordinator
 - b. Permit Coordinator
 - c. Coral Reef Ecologist
 - d. Native Hawaiian Cultural Advisor
 - e. Reserve Advisory Council Coordinator
 - f. Field Operations Coordinator
 - g. Discovery Center Docents/Education Support Staff
 - h. Volunteer Coordinator
- Regional offices established in Honolulu (O'ahu).
- Hilo Discovery Center established.
- Necessary equipment procured and vehicles leased.
- Reserve catamaran vessel built and in operation.



OP- 2: Coordinate Reserve Advisory Council Operations.

Description and Need for the Strategy

The Act, the NMSAA and the EO direct the Secretary of Commerce to convene an advisory committee under the authority of Section 315 of the NMSA to provide advice on the Reserve Operations Plan and designation and management of the Reserve as a National Marine Sanctuary. Such an advisory committee will provide advice on both the operation of the Reserve and the possible designation of the NWHI as a sanctuary and will be known as the Reserve Advisory Council (Council). The Council was established in January 2001 and has met several times since its establishment. The Council is composed of 25 members: 15 voting members representing the community (Native Hawaiian, research, conservation, commercial fishing, recreational fishing, ocean-related tourism, education, citizen-at-large, and State of Hawai'i interests) and 10 non-voting members representing government interests (Departments of Defense, Interior, and State, Marine Mammal Commission, National Marine Fisheries Service, Western Pacific Regional Fishery Management Council, National Science Foundation, U.S. Coast Guard plus the managers of the Reserve and the Hawaiian Islands Humpback Whale National Marine Sanctuary). The Council was actively involved in the development of and priority setting for the Reserve Operations Plan and will be integral during the sanctuary designation process and management of any future sanctuary.

Activities

1. Conduct regular Council meetings to advise NMSP on Reserve operations and sanctuary designation process.
2. Establish administrative procedures for the Council.
3. Facilitate Council advice in the refinement and priority setting for the Reserve Operations Plan including travel, venues and other services as necessary.
4. Prepare and engage the Council in the sanctuary designation process through meetings, regular communication, training, workshops, materials and other means.

Location

Meetings and activities of the Council will occur in various places in the State of Hawai'i.

Timeline

- Activity 1: Meetings will be held not less than 4 times a year, not to exceed one meeting per month.
- Activity 2: Administrative procedures have largely been put into place. Modifications and improvements will be ongoing, with specific changes to occur as Council officers change and/or Council members change during term expirations.
- Activity 3: Council input into the ROP will be ongoing.
- Activity 4: Council recommendations on sanctuary designation began in spring 2002, continuous throughout the designation process.

Costs

Labor will mainly be provided by in-house staff. Additional travel, meeting venue, copying, printing, conference calling, and mailing costs will also be incurred. In FY 02, costs for operating the Council, adjusted for the amount of time devoted by Reserve staff, was about \$150,000.

Results of the Strategy

Outputs:

- At least 4 Council meetings per year conducted.
- Procedures for conducting Council operation (e.g., leadership structure, travel arrangements, meeting arrangements, and communication protocols) established and reviewed annually.
- Council advice on the Reserve Operations Plan solicited and evaluated for the final draft.
- Council prepared for role in sanctuary designation process.



OP-3: Carry out operational requirements of the Reserve, as specified in the Executive Order, to protect the coral reef ecosystems, and marine resources and species of the NWHI in their natural character.

Description and Need for the Strategy

The EO specifies several requirements that must be carried out as part of the implementation of the Reserve, in accordance with eight Management Principles listed in Section 4. These requirements (Activities 1-4 & 9) include specific directives such as the development of an operations plan to govern the management of the Reserve and entering into one or more memoranda of agreement for the coordinated conservation and management of the Reserve, submerged lands and waters of Midway Atoll, Hawaiian Islands National Wildlife Refuges, and State of Hawai'i submerged lands and waters within the NWHI. The EO also provides the Secretary of Commerce, with discretion, to make decisions about additional activities such as the establishment of straight-line boundaries and fishing caps (Activities 5&7), which the NMSP has begun to seek advice on from partner agencies and the Reserve Advisory Council. Other activities contained in this section (Activity 8) are necessary in order to achieve specified requirements. For example, in order to facilitate coordinated management among Federal and State agencies to provide comprehensive conservation of the coral reef ecosystems, partner agencies have identified the need to establish a management committee to develop interagency mechanisms to do so. Initial consultation with the Governor of the State of Hawai'i, NOAA Fisheries and USFWS has already been conducted. In addition, the EO calls for the development of enforcement and surveillance for the Reserve. Due to the high priority and importance of enforcement in the NWHI, a separate action plan was developed to address all enforcement activities (See Enforcement Action Plan).

In order to protect the coral reef ecosystems and marine resources and species of the NWHI in their natural character, applying a "precautionary approach" (see glossary), the EO:

- a. Calls for the development of an operations plan, directed at priority issues and actions, to govern the management of the Reserve in consultation with the Department of Interior, U.S. Fish and Wildlife Service and the State of Hawai'i. In developing the plan, advice and recommendations of the Reserve Advisory Council (Council) shall be considered.
- b. Requires that one or more Memoranda of Agreement with the State of Hawai'i and the USFWS to provide for coordinated management and protection of the Reserve. MOAs with other agencies, such as the University of Hawai'i and the Research Corporation of the University of Hawai'i have already been developed. Additional MOAs will be developed as necessary.
- c. Outlines both the outer Reserve boundaries and Reserve Preservation Area boundaries and makes possible a straight-line approach for the outer Reserve boundary (Section 6(c) of the EO) and mandates straight-line boundaries for seaward delineation of the RPAs surrounding State waters (Section 8(b)(3) of the EO).
- d. Prohibits fishing within the Reserve unless specifically exempted through the establishment of fishing caps and other protection and conservation measures designed at implementing the "precautionary approach" (see glossary) and limiting commercial and recreational fishing at levels of take and effort as described in the EO, with the exception of adding two additional Native Hawaiian bottomfish permits (Section 7(a)(1)(c) of the EO).

Activities

1. Develop an operations plan to govern the management of the Reserve.
2. Develop formal agreements with partners for the coordinated conservation and management of the Reserve.
3. Report progress on the implementation of the EO to the Council on Environmental Quality.
4. Determine, in consultation with the Governor of Hawai'i, whether State submerged lands and waters should be included in part of a proposed National Marine Sanctuary.
5. Delineate Reserve and Reserve Preservation Area (RPA) boundaries using straight-line boundaries, as appropriate, as well as other technologies such as GPS and electronic charts for boundary clarification purposes.



6. Develop formulas and definitions to determine fishing caps for commercial and recreational fisheries, including publishing a Notice of proposed caps in the Federal Register, and participation in the process of adding two Native Hawaiian bottomfish permittees.
7. Establish interagency management committee through interagency MOAs to facilitate coordinated management in the region.
8. Develop additional formal agreements with partner agencies, as necessary, for various aspects of formal management.
9. Work with the Native Hawaiian community and partner agencies to identify areas within the Reserve where appropriate non-commercial subsistence, cultural or religious uses may continue and evolve.

Location

The activities contained within this Strategy will be conducted by NOS staff both in Hawai'i and in D.C. in partnership with other agencies and organizations. Straight-line boundaries may be established for each RPA adjacent to State waters and Reserve boundaries as soon as bathymetric work has been conducted. Fishing caps will be in place throughout the Reserve.

Timeline

- Activity 1: The ROP will be finalized in 2004.
- Activity 2: Efforts to begin establishing interagency agreements are already underway. An interagency agreement among NOAA, USFWS and State of Hawai'i should be completed in 2005. Additional agreements will be developed and approved as necessary.
- Activity 3: Two progress reports have already been provided to the Council on Environmental Quality and other stakeholders. Additional reports will be provided on a regular basis.
- Activity 4: Discussions will occur throughout the sanctuary designation process with the Governor of the State of Hawai'i (See Sanctuary Designation action plan).
- Activity 5: Bathymetric research has begun to clarify RPA boundaries and develop straight-line boundaries, as appropriate. These efforts are ongoing and should remain a high priority for the Reserve. A rationale for implementing straight-line boundaries and requesting public input will occur in FY 04, prior to the implementation of such boundaries. In addition, new NOAA charts including outer Reserve boundaries and local notice to mariners describing outer boundaries of the Reserve and narrative references to the RPAs will be published in 2005, with additional Reserve Preservation Area boundaries included in 2005 revisions to the nautical charts.
- Activity 6: Work has begun to provide formulas and definitions relative to fishing caps. The Council has already provided NOAA with advice on bottomfish (on 1/18/02) and lobster caps (on 5/29/02 and 9/18/02) and other definitions. Federal Register Notice for public comment on fishing caps is a high priority and will be conducted as soon as possible. NOAA Fisheries, in consultation with WPRFMC will take the lead on offering two NWHI Mau Zone Community Development Program Bottomfish permits (referred to as Native Hawaiian bottomfish permits in the EO).
- Activity 7: Discussions have begun among the management agencies to establish such a committee.
- Activity 8: Ongoing:
- Activity 9: Initial discussions have begun with various Hawaiian groups. Additional advice will be solicited and facilitated through the Cultural Working Group of the Reserve Advisory Council (See Native Hawaiian Cultural Resources Action Plan).

Costs

Labor will mainly be provided by in-house staff and staff from partner agencies, as necessary. Additional travel, meeting venue, copying, printing, conference calling, and mailing costs will also be incurred. In addition:

- Activity 1: approximately \$12,000 to print the final ROP.
- Activity 5: the NOAA vessel *Hi'ialakai* and/or other appropriate non-XIOAA vessels will gather data to complete bathymetric work to clarify and determine RPA boundaries.

- Activity 7: additional funds may be necessary to provide sufficient staffing to support the committee.
 Activity 9: contract funds to conduct an analysis of past activities and uses and a plan for proposed future uses.

Results of the Strategy

Outputs:

- Completion of Reserve Operations Plan. Elements of the Plan operationalized.
- Interagency agreement among NOAA, the State of Hawai'i and the USFWS completed.
- Additional agreements with individual management and/or enforcement agencies completed, as necessary.
- Determination made on whether State submerged lands and waters should be included as part of a proposed National Marine Sanctuary.
- Regular progress reports completed.
- Necessary straight-line boundaries established.
- Straight-line boundaries and Reserve outer boundaries included on corrected NOAA nautical charts.
- Appropriate fishing caps adopted for commercial fishing.
- Necessary data collected and used to establish appropriate fishing caps for recreational fishing.
- Two NWHI Mau Zone Community Development Program Bottomfish permits offered.
- Formulas and definitions leading to the determination of fishing caps for commercial and recreational fisheries developed.
- Interagency management committee established.
- Areas identified where appropriate non-commercial subsistence, cultural or religious uses may continue.





OP-4: Develop and implement permitting and notification procedures.

Description and Need for the Strategy

The Management Principles of the EO state that the principal purpose of the Reserve is the conservation and protection of the coral reef ecosystem and related marine resources and species of the NWHI in their natural character and that “the Reserve shall be managed using available science and applying a precautionary approach with resource protection favored when there is a lack of information regarding any given activity, to the extent not contrary to law” (EO Section 4). These management principles will help provide Reserve staff with an overarching framework for the development and implementation of permitting and notification procedures.

The purpose of this Strategy is to develop tiered permitting procedures and notification mechanisms for activities within Reserve boundaries. Such permitting and notification procedures and reporting regime would enable monitoring of the potential cumulative impacts of access to the NWHI and would enable the provision of controls and conditions on proposed activities.

Under this Strategy, permit and notification procedures will be developed for activities such as research, monitoring, education and management. Recognized experts will assist in developing criteria necessary to establish a permit system. Criteria for research permits will be developed by recognized experts in the scientific community and culturally appropriate criteria will be developed by recognized cultural practitioners. The permitting procedures will be developed considering potential short and long-term impacts on the Reserve and related species and marine resources of the NWHI. As stated above, activities allowed by permit shall meet the principal purpose of the Reserve (EO Sections 4 and 5).

Currently, there are a number of prohibited activities, in addition to restrictions to commercial and recreational fishing, throughout the Reserve. For example, removal, moving, taking, harvesting or damaging any living or non-living Reserve resource is prohibited. The Reserve also has fifteen RPAs where such prohibitions are more numerous. Exceptions, however, can be made to some of the prohibited activities. For example, the Secretary may conduct, or authorize by permit, such activities to the extent that they are necessary for research, monitoring, education or management activities that further the management principles of the Reserve.

The Council will be presented with a draft permit system for the Reserve. The Council will also have the opportunity to provide recommendations to the Reserve Coordinator regarding permit criteria and other aspects of the proposed permit and notification system. The Council will also be notified regarding actions proposed within the Reserve that may require a permit. Subsequently, the Council will be notified regarding permits that have been issued. Such a permit system would include a reporting regime which would provide, at minimum, basic data on the nature and location of activities occurring within Reserve boundaries, data on the potential impact of activities carried out in Reserve boundaries, consistent with the Management Principles of the Reserve. Such a permitting system and reporting regime would also enable monitoring of the potential cumulative impacts of access to the NWHI and would enable the provision of controls and conditions on proposed activities in order to meet the mandate of long-term conservation, utilizing a “precautionary approach” (see glossary).

It is necessary for Reserve staff to have a complete picture of the impacts or trends generated by activities conducted in Reserve waters. Individual activities that appear harmless on their own may become detrimental if they are repeated over long time periods or in overlapping locations. While the EO only specifically prohibits certain specific types of activities, its intent is to provide for comprehensive and long-term conservation. As such, the Reserve will institute a registration process applicable to all individuals operating within the boundaries of the Reserve to gather information to determine whether seemingly innocuous activities may be detrimental to the resources over time. This process will request standardized notification of any activity proposed in the Reserve, and determine which proposed activities require permits.

This process serves several benefits to individuals operating in the Reserve as well as to the Reserve manager. Such a tracking system gives individuals operating in the Reserve (1) assurance that their proposed activity is not contrary to the management principles of the EO or the health of Reserve resources; (2) recognition that Reserve management is aware of and does not object to the proposed activity; and (3) valuable insight and recommendations from the Reserve manager that might help make their activity more efficient, effective, and safe. At the same time, registration allows the Reserve manager to be aware of activities that are taking place inside Reserve boundaries and to evaluate the possible cumulative effects of all human activities on Reserve resources.



Such a process shall not diminish or enlarge the jurisdiction or authority of any other permitting agencies. It is important to note that access permits to the NWHI are already in place by both the State and USFWS. Cooperative discussions are underway to ensure that all permit applications submitted to these jurisdictional partners will trigger notification to the Reserve.

Activities

1. Establish guidelines, requirements, thresholds, definitions and review criteria for Reserve permit applications, with input from recognized experts, and in accordance with the primary purpose of the EO.
2. Develop and facilitate permitting and notification procedures and protocols throughout the NWHI, in coordination with jurisdictional partners.
3. Implement initial permit and notification procedures, inclusive of activities 1 & 2, including publishing a Federal Register Notice for public comment on proposed permitting procedures.
4. Develop standard permit conditions to require the following:
 - Pre-access training for all persons authorized or permitted to conduct activities within the Reserve.
 - Cooperation with developing information for products for use in outreach and education.
 - Procedures to inspect and treat vessels and equipment to prevent introduction of alien species.
5. Explore all possible avenues with partner agencies to prevent negative impacts to the Reserve and adjacent and related ecosystems by any means of human conveyance including vessels (e.g. hull inspections).
6. Promote and explore all avenues to require insurance against vessel groundings, in partnership with other agencies.
7. Conduct regular evaluations of the effectiveness of permitting procedures, and impacts of permitted activities.
8. Continuously improve permitting procedures based on outcomes of activities 4-7.
9. Conduct outreach to ensure awareness and compliance with permitting procedures of all jurisdictional agencies.

Location

Permit procedures will be developed and established for the entire Reserve. Technical processes (e.g. review and conditioning, or acceptance or denial of permit applications and issuance of permits and notification of permit requests and issuances to partners and Council) will take place at the Reserve's Honolulu office and the headquarters office of the NMSP.

Timeline

- Activity 1 -3: Establishing permitting procedures is a high priority for the Reserve. Reserve and NMSP will work with jurisdictional partners, via the interagency management committee, as soon as the committee is established. The Reserve Advisory Council, through the formation of working groups, will begin advising on these activities as soon as possible.
- Activity 4: To be established once initial permitting procedures are implemented.
- Activity 5 & 6: To be initiated along with activities 1&2.
- Activity 7: First evaluation to be conducted one year after initial permitting procedures are established and implemented.
- Activity 8: To begin after completion of first evaluation.
- Activity 9: To begin once initial permitting procedures are developed and implemented.

Costs

Labor will be provided in large-part by in-house staff and additional resources to hire a permit coordinator. Additional printing, conference calling, mailing, and Federal Notice publishing costs will also be incurred throughout the planning, development and implementation process. In addition, costs will be incurred for hardware and software to develop and design an appropriate database to manage and track permits and activities.



Results of the Strategy

Outputs:

- Guidelines, requirements thresholds, definitions and review criteria for permit applications developed.
- Permitting and notification procedures developed and implemented to address activities.
- Published Federal Register Notice for public comment on initial permitting and notification procedures.
- All persons authorized or permitted to carry out activities in the Reserve receive pre-access training and develop outreach and education information products on their activities.
- Survey of all possible negative impacts to the Reserve by human conveyance completed.
- Assist partner agencies with inspection procedures of vessels entering the NWHI.
- Requirements for vessel grounding insurance developed with partners.
- Annual report produced, documenting the nature and location of all activities tracked in the Reserve, including research, monitoring, education, recreational and commercial fishing.
- A permit and notification tracking and reporting system established.



OP-5: Conduct safe and effective field operations.

Description and Need for the Strategy

Given the remote nature of the NWHI Reserve, and the need to implement effective management, research, education and enforcement strategies, it is necessary to develop and implement a logistics plan for remote field operations. Such a plan would outline available and needed resources and infrastructure that exist or need to be developed to carry out effective programs. Such a logistics plan would provide an operational foundation for several action plans and strategies outlined in the Reserve Operations Plan that require activities to be conducted in remote field locations or aboard vessels and aircraft. The logistics plan will be developed in close coordination with partner agencies and implemented collaboratively.

Several of the activities described in this action plan have already been initiated. For example, an assessment of currently available resources has already begun. Interagency field planning began with the execution of the 2002 field season.

Activities

1. Develop and implement logistics plan for remote field operations.
2. Coordinate and facilitate interagency field operations within the region.
3. Conduct small boat operations.
4. Coordinate with NOAA Marine and Aircraft Operations (NMAO) for increased ship and aircraft support.
5. Establish field capacity at Midway Atoll National Wildlife Refuge working with USFWS.
6. Conduct annual evaluation of effectiveness and safety of field operations.

Location

Field activities will largely be conducted in remote locations along the NWHI chain both in the water and on land in cooperation with other agencies with management jurisdiction in the area. Small boat operations will occur during the summer and fall in the NWHI and during the winter and spring months in the main Hawaiian Islands to assist the Hawaiian Islands Humpback Whale National Marine Sanctuary and other partner agencies and organizations.

Timeline

- Activity 1: Development of the logistics plan will begin in spring 2004. Implementation will be ongoing with some components of the plan to be tested during the 2004 field season.
- Activity 2: Ongoing.
- Activity 3: Operations are continuous and will remain consistent with the latest NOAA guidance on safe small boat operations.
- Activity 4: Continuous.
- Activity 5: Planning will begin to work with the USFWS to develop an appropriate field capacity at Midway.
- Activity 6: At the completion of the 2005 field season, the first annual evaluation will take place, to be completed by December 2005. Annual evaluations will follow.

Costs

Labor to carry out these activities will be provided by Reserve staff, NMSP program staff, contracts and the involvement of other partners. Additional labor costs to hire seasonal employees will also be incurred. In addition:

- Activity 1: Once the logistics plan is complete, an appropriate estimate of additional resources necessary to implement the plan will be developed.
- Activity 3: Storage, fuel, equipment, satellite communications, maintenance and repair costs will also be incurred.
- Activity 5: Equipment, travel, fuel, lodging, food, communications, warehouse space and maintenance, repair and minor construction costs will be incurred. Specific cost estimates will be developed along with the plan. Field camp and ship-based operations costs will be shared with other agencies.



Results of the Strategy

Outputs:

- Assessment of available resources, identification of needed resources and logistics plan for remote field operations completed in coordination with partner agencies.
- All Reserve field operations conducted in partnership with other agencies and organizations.
- Reserve catamaran completed and outfitted, and captain/crew contracted.
- Injury free, cost-effective small boat operations conducted in accordance with NOAA policies.
- Increased ship and aircraft support obtained for research, monitoring, surveillance and enforcement.
- T-AGOS class vessel (HI'IALAKAI) properly outfitted and commissioned for use in the NWHI. Ship time requested and allocated annually.
- Coordination with other research and field operations within the Reserve, particularly operations aboard the NOAA ship OSCAR ELTON SETTE.
- Field capacity established at Midway Atoll National Wildlife Refuge for research, monitoring, education, management and enforcement purposes.
- Annual evaluations conducted to measure the effectiveness and safety of Reserve field operations.



Table 11. Estimated Costs for Operations. A list of estimated costs (numbers are in thousands of dollars) for each strategy is shown over a 5-year timeframe. Each strategy is ranked with an A, B or C based on the following criteria – A: Mandated by EO/Reserve Management Principles; B: Highly Desirable; and C: If Sufficient Funds are Available.

Action Plan: Operations							
STRATEGIES AND ASSOCIATED ACTIVITIES	ESTIMATED ANNUAL COST					Total Estimated Costs	Rank
	YR 1	YR 2	YR 3	YR 4	YR 5		
OP-1: Carry out effective office administration and infrastructure.							
1. Recruit and hire priority staff and contractors, including identifying and obtaining expertise through partners.	250.0	300.0	300.0	300.0	300.0	1450.0	A
2. Establish Reserve offices and other facilities, as needed.	200.0	0.0	0.0	0.0	0.0	200.0	C
3. Procure necessary equipment and vehicles.	200.0	200.0	200.0	200.0	200.0	1000.0	B
4. Operate and maintain Reserve facilities and equipment.	600.0	500.0	500.0	500.0	500.0	2600.0	A
OP-2: Manage Reserve Advisory Council operations.							
1. Conduct regular Council meetings to advise NMSP on Reserve operations and Sanctuary Designation process.	60.0	60.0	60.0	60.0	60.0	300.0	A
2. Establish administrative procedures for the Council.	15.0	15.0	15.0	15.0	15.0	75.0	A
3. Facilitate Council advice in the development and priority setting for the Reserve Operations Plan including travel, venues and other services as necessary.	14.0	14.0	14.0	14.0	14.0	70.0	A
4. Prepare and engage the Council in the Sanctuary Designation process through meetings, regular communication, training, workshops, materials and other means.	30.0	30.0	30.0	30.0	30.0	150.0	A
OP-3: Carry out operational requirements as specified in the Executive Order.							
1. Develop an operations plan to govern the management of the Reserve.	27.0	0.0	0.0	0.0	0.0	27.0	A
2. Develop formal agreements with partners for the coordinated conservation and management of the Reserve.	3.0	5.0	5.0	0.0	0.0	13.0	A
3. Report progress on the implementation of the EO to the Council on Environmental Quality.	2.0	0.0	0.0	0.0	0.0	2.0	A
4. Determine, in consultation with the Governor of Hawaii, whether State submerged lands and waters should be included in part of a proposed National Marine Sanctuary.	5.0	5.0	0.0	0.0	0.0	10.0	A
5. Delineate Reserve and Reserve Preservation Area (RPA) boundaries using straight-line boundaries, as appropriate, using technologies such as GPS and electronic charts for clarification purposes.	45.0	45.0	0.0	0.0	0.0	90.0	A



Table 11. Estimated Costs for Operations. A list of estimated costs (numbers are in thousands of dollars) for each strategy is shown over a 5-year timeframe. Each strategy is ranked with an A, B or C based on the following criteria – A: Mandated by EO/Reserve Management Principles; B: Highly Desirable; and C: If Sufficient Funds are Available. (cont'd)

Action Plan: Operations							
STRATEGIES AND ASSOCIATED ACTIVITIES	ESTIMATED ANNUAL COST					Total Estimated Costs	Rank
	YR 1	YR 2	YR 3	YR 4	YR 5		
6. Develop formulas and definitions to determine fishing caps for commercial and recreational fisheries, including Notice and Comment of proposed caps in the Federal Register, and participation in the process of adding two Native Hawaiian bottomfish permits.	15.0	15.0	0.0	0.0	0.0	30.0	A
7. Establish inter-agency management committee through a series of MOAs to facilitate coordinated management in the region.	20.0	20.0	20.0	20.0	20.0	100.0	A
8. Develop additional formal agreements with partner agencies, as necessary, for various aspects of formal management.	5.0	5.0	5.0	5.0	5.0	25.0	A
9. Work with the Native Hawaiian community and partner agencies to identify areas where appropriate non-commercial subsistence, cultural or religious uses may continue and evolve.	100.0	0.0	0.0	0.0	0.0	100.0	A
OP-4 Develop and implement permitting procedures							
1. Establish guidelines, requirements, thresholds, definitions and review criteria for Reserve permit applications, with input from recognized experts, and in accordance with the primary purpose of the EO.	15.0	15.0	0.0	0.0	0.0	30.0	A
2. Develop and facilitate permitting and notification procedures and protocols throughout the NWHI, in coordination with jurisdictional partners.	10.0	10.0	10.0	10.0	10.0	50.0	A
3. Develop and implement initial permit and notification procedures, inclusive of activities 1 & 2, including publishing a Federal Register Notice for public comment on proposed permitting procedures.	25.0	10.0	10.0	10.0	10.0	65.0	A
4. Develop standard permit conditions to require: 1) pre-access training for all persons authorized or permitted to conduct activities in the Reserve; 2) cooperation with developing information for products for use in outreach and education; 3) Procedures to inspect and treat vessels and equipment to prevent introduction of alien species.	0.0	15.0	7.0	7.0	7.0	36.0	B
5. Explore all possible avenues to prevent negative impacts to the Reserve and related ecosystems by any means of human conveyance including vessels and aircraft (e.g. hull inspections).	5.0	5.0	5.0	5.0	5.0	25.0	B
6. Promote and explore all avenues to require insurance against vessel groundings, in partnership with other agencies.	10.0	10.0	0.0	0.0	0.0	20.0	B



Table 11. Estimated Costs for Operations. A list of estimated costs (numbers are in thousands of dollars) for each strategy is shown over a 5-year timeframe. Each strategy is ranked with an A, B or C based on the following criteria – A: Mandated by EO/Reserve Management Principles; B: Highly Desirable; and C: If Sufficient Funds are Available. (cont'd)

Action Plan: Operations							
STRATEGIES AND ASSOCIATED ACTIVITIES	ESTIMATED ANNUAL COST					Total Estimated Costs	Rank
	YR 1	YR 2	YR 3	YR 4	YR 5		
7. Conduct regular evaluations of the effectiveness of permitting procedures and impacts of permitted activities.	0.0	0.0	5.0	5.0	5.0	15.0	B
8. Continuously improve permitting procedures based on outcomes of activities 4-7.	0.0	10.0	10.0	10.0	10.0	40.0	B
9. Conduct outreach to ensure awareness and compliance with permitting procedures of all jurisdictional agencies.	5.0	5.0	5.0	5.0	5.0	25.0	C
OP-5: Conduct safe and effective field operations.							
1. Develop and implement logistics plan for remote field operations.	30.0	30.0	0.0	0.0	0.0	60.0	B
2. Coordinate and facilitate inter-agency field operations within the region.	70.0	70.0	70.0	70.0	70.0	350.0	B
3. Conduct small boat operations.	200.0	200.0	200.0	200.0	200.0	1000.0	B
4. Coordinate with NOAA Marine and Aircraft Operations (NMAO) for increased ship and aircraft support.	20.0	20.0	10.0	10.0	10.0	70.0	B
5. Establish field capacity at Midway Atoll National Wildlife Refuge.	0.0	350.0	200.0	200.0	200.0	950.0	B
6. Conduct annual evaluation of effectiveness and safety of field operations.	5.0	5.0	5.0	5.0	5.0	25.0	B



Action Plan: Education and Outreach



The NWHI Discovery Center, Mokuapāpapa, in Hilo, Hawai'i allows visitors to explore the special ocean region of NWHI without getting wet.

Photo Credit: James Watt

Desired outcome: To increase public awareness of the NWHI and the management principles of the EO.

Background/Context

The Executive Order (EO) which created the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve (Reserve) specifies that the Reserve Operations Plan be directed at priority issues such as education and outreach and lists as one of its Management Principles, to the extent consistent with the primary purpose of the Reserve, the Reserve shall be managed to enhance public awareness, understanding, and appreciation of Reserve resources, and the impacts or threats thereto from human and other activities. This action plan reflects the education strategies and activities the Reserve will undertake in order to fulfill the principal purpose of the Reserve, that is, the long-term conservation and protection of the coral reef ecosystem and related marine resources and species of the Northwestern Hawaiian Islands (NWHI) in their natural character, while utilizing "a precautionary approach with resource protection favored when there is a lack of information regarding any given activity" (EO section 4.b).

The fundamental goals of the Reserve's education and outreach initiatives are to 1) increase public awareness of the NWHI ecosystems; 2) increase public understanding of this unique place and its global importance; 3) increase public appreciation of the NWHI's resources; 4) increase public awareness of the impacts and threats to the NWHI from human and other activities; and 5) clearly convey to the public how they can participate in management of the Reserve and actions they can take to help conserve it. Strategies are based upon these goals and incorporate the underlying principle of appreciating from afar.

Given the Reserve's unique status as possibly the last large-scale, relatively intact, predator-dominated reef ecosystems remaining in the world, one of the primary goals of the Education Action Plan is to educate the public about the Reserve, its resources and efforts necessary to conserve them by focusing on the fact that the Reserve is best protected and appreciated from afar. This includes publicizing the core concept of



bringing the NWHI to the people, not the people to the NWHI and specifying the threat of invasive species introductions, marine debris as well as the potential for degradation of the area as a result of human access. Any type of education and outreach about the Reserve will certainly inspire a desire among many to visit the area for recreational or extractive pursuits. With this in mind, education and outreach efforts and materials will be paired with messages that stress the fragility of this place, the benefits associated with conserving it for the future and the necessity of appreciating it from afar.

Education and Outreach initiatives carried out in support of the fundamental goals listed above, will seek to provide the necessary information, training, and support to the public, educational institutions and specific stakeholder groups such that they will understand the existing rules, regulations and laws and the critical importance of protecting this area, as well as how they can align their actions to enhance and not diminish conservation of the region. A relatively small percentage of the general public are aware of the existence of the NWHI, their geographic location and relationship with the main Hawaiian Islands (MHI). Through education and outreach the public will have an increased understanding and awareness of the Reserve and become equipped with the knowledge they need to help protect it for the future as well as to obey existing laws.

All action plans within this document are integrally related with education and outreach and are not discrete; the Reserve Education Coordinator and Reserve Advisory Council (Council) working groups will work to ensure that efforts in all areas are coordinated and communicated among scientists, managers, enforcement, educational institutions, constituents, and the public. The Education and Outreach and Research working groups of the Council will identify key themes for education and outreach, in accordance with the principal purposes of the Reserve (conservation and protection). These themes will also be complemented by traditional Native Hawaiian perspectives, provided by the Cultural working group of the Council, on resource use, resource management and overall human relationship to the natural world. Ideally, the education and outreach action plan will serve as an umbrella to coordinate educational activities contained within other action plans.

This action plan is implemented through strategies that define the pieces, or steps necessary to achieve the education and outreach objectives. Following each strategy are listed activities that are the vehicles by which the strategy is delivered to the target audience. Activities may also be capacity building efforts, or mechanisms to build and foster broad participation. Location where the activities will be carried out, timeline and cost of implementation and overall results of the strategy are included for planning and evaluation purposes.

The majority of these efforts will target the main Hawaiian Islands. In addition, the remoteness of the Reserve, coupled with a primary objective of bringing the place to the people, not the people to the place, necessitates the development of, and investment in, remote learning opportunities and technologies (telepresence). These technologies, such as web sites, video streaming, satellite communications, and others will strive to reach a broad group of the public worldwide and attempt to instill in them a sense of responsibility to help conserve this special ocean region.

Strategies

- ED-1: Develop annual education and communication plans in collaboration with partners.
- ED-2: Develop materials to support education and outreach efforts about the Reserve, the marine environment of the NWHI, and coral reef ecosystems.
- ED-3: Teach responsibility and stewardship through educational programs, partnerships and outreach events.
- ED-4: Develop interpretive, educational and volunteer programs for Discovery Centers.
- ED-5: Target outreach and education activities toward specific stakeholder groups.
- ED-6: Coordination and oversight of education and outreach activities and information throughout the ROP.
- ED-7: Develop and invest in telepresence and other distance learning capabilities to bring the place to the people instead of the people to the place.

“This action plan reflects the education strategies and activities...”



Performance Measures

- a. Creation of a coordinated and planned interagency education and communication plan by the end of 2004.
- b. An increase in the number of educational materials distributed to the public that support the management principles of the Reserve.
- c. A formal network of educators, opinion-leaders, and concerned public that work together to protect the natural, historic and cultural resources of the NWHI.
- d. Interpretive, education and volunteer programs developed and implemented by the end of 2004 that support the NWHI Coral Reef Ecosystem Reserve's overall mission and goals.
- e. A measurable increase in the use of distance-learning technologies in the Reserve's education and outreach programs.

Summary of Resource Needs

In-house staff time and:

- ED-1: additional costs for the creation and distribution of materials plus travel costs when necessary.
- ED-2: additional costs for the creation of material and purchasing of equipment and satellite time, plus lease costs and staff associated with operation of facilities.
- ED-3: additional costs for the creation and distribution of materials plus travel costs when necessary.
- ED-4: additional costs for the creation and distribution of materials plus travel costs when necessary.
- ED-5: additional costs for the creation and distribution of materials plus travel costs when necessary.
- ED-6: cost will be distributed across the items above.
- ED-7: additional costs for the creation and distribution of materials plus travel costs when necessary.

Potential Participants

- Reserve Advisory Council
- State of Hawai'i, Department of Land and Natural Resources
- State of Hawai'i, Department of Education
- U.S. Fish and Wildlife Service
- NOAA Fisheries
- NOAA Enforcement
- Department of Defense
- University of Hawai'i system
- Office of Hawaiian Affairs
- Bishop Museum
- U.S. Coral Reef Task Force
- Non-Governmental Organizations

Relation to Other ROP Action Plans and Projects

This Strategy will serve as a foundation for all education and outreach activities for the Reserve. It will specifically coordinate with outreach and education efforts included within the Sanctuary Designation, Research, Enforcement, Native Hawaiian Cultural Resources and Reserve Operations Action Plans. This Strategy will also be coordinated with the communications plan that will support Reserve operations, information dissemination, education efforts throughout the ROP, and other ongoing education plans being conducted by the Reserve management partners.



ED-1: Develop and implement annual education and communication plans in collaboration with partners.

Description and Need for the Strategy

Educating the public and increasing awareness about the Reserve is critical to the success of protection and management efforts. Awareness of the Reserve will also help promote public involvement. Existing educational partnerships need to be fostered, as well as new partnerships sought. These partnerships will be utilized to determine the unique opportunities and challenges involved in educating the public about the NWHI. Cooperation and collaboration between the partnering agencies and constituents is mandated by the EO. The EO states that the Reserve shall be managed to facilitate coordinated management among Federal and State agencies and other entities, as appropriate, to provide comprehensive (looking beyond jurisdictional boundaries) conservation of the coral reef ecosystem and related marine resources and species throughout the NWHI, consistent with applicable authorities and the Management Principles. Development of annual education plans in concert with partner agencies will help to ensure commitment of funds to education efforts, and will help in allocation of resources, such as staff time and participation. Through coordination with partner agencies we can reach a broader audience with our educational messages, avoid duplication of efforts, and provide clear information on conservation measures, rules, regulations and laws pertaining to the NWHI. Participation in partner agency educational programs, such as the State of Hawaii's "Living Reef Campaign," can only help to enhance communication with partner agencies, and allows the Reserve's educational messages to reach a broader audience. As part of clarifying the Reserve's educational messages and protocols for dissemination of information, an interagency communications plan will be developed. This plan should make it easier for partner agencies to coordinate with the Reserve.

Activities

1. Conduct, assess and evaluate unique educational opportunities and challenges in the NWHI.
2. Build on existing educational network and the multi-agency NWHI education project team.
3. Develop annual education plans, and the processes by which they will be carried out, in concert with partner agencies.
4. Develop and implement an interagency communications plan.
5. Participate in and sponsor partner agency educational effort.

Location

The scope of annual education plans and interagency communications plan will cover the entire Reserve and surrounding areas. Education and outreach (including media) by the Reserve and partner agencies will be conducted throughout the Main Hawaiian Islands, the nation and the Pacific Basin.

Timeline

- Activity 1: Formal meetings coordinated through the NWHI education project partners and the Education and Outreach working group and a workshop held in 2004 to compile assessment.
- Activity 2: An existing network is already in place but will be continuously added to.
- Activity 3: First plan to be completed by summer 2004, with subsequent plans completed by October 1 of each calendar year.
- Activity 4: An initial interagency communications plan will be completed by spring of 2004 and updated annually.
- Activity 5: Two partner agency educational efforts are currently active as of spring 2003 - the State of Hawaii's "Living Reef Campaign" and a statewide sail of the voyaging canoe, Hōkūle'a, conducted by the Polynesian Voyaging Society and the Bishop Museum.



Costs

This Strategy will require in-house staff labor plus additional costs for creation and distribution of plans and participation in partner agency education efforts. Additional travel costs will also be associated with outreach efforts.

Results of the Strategy

Outputs:

- Assessment of the educational challenges and opportunities in the NWHI conducted with priorities outlined in summative document.
- Network of educators and concerned individuals to carry the educational and outreach messages of the Reserve continuously expand.
- Annual education plans completed and implemented within available funds.
- Interagency Communications plan completed, implemented and updated regularly.
- Partner agency education efforts identified, prioritized and included in annual education plan.



ED- 2: Develop materials to support education and outreach efforts about the Reserve, the marine environment of the NWHI, and coral reef ecosystems.

Description and Need for the Strategy

Coral reefs and coral reef ecosystems globally are under great pressure and has resulted in coral reef decline worldwide. It is uncommon to find large-scale coral reef habitats containing ecosystems that are relatively free of human impact such as the NWHI, including marine waters contained within the boundaries of the Reserve. The marine waters of the NWHI contain possibly the last intact, large-scale, predator-dominated coral reef ecosystems in the world. The region is remote and therefore less familiar to the public even on the main Hawaiian Islands. In fact, while few are aware that these islands, atolls and reefs even exist, fewer know of the management jurisdictions already in place to protect them, including the Reserve. The Reserve is also largely unknown to a global audience. Educating the public about the importance of coral reef ecosystems, ecosystem based management, and the necessity to protect these special places is critical to the success of protection and management efforts of the Reserve and partner agencies. Increased understanding of the Reserve and coral reef ecosystems, as well as existing protective measures, will promote public involvement and help to change detrimental behaviors. The awareness and knowledge gained will help protect coral reef ecosystems in the NWHI, MHI, and globally.

Educational materials are essential for information dissemination to the public. These educational materials will serve as tools to accomplish the education and outreach goals of the Reserve. These goals will be accomplished directly through Reserve staff, and through partners, educators, and other interested individuals who can use this material as a foundation for their own outreach efforts. Many education and outreach materials have already been produced by Reserve staff with input from partnering agencies. These include:

- a NWHI resource guide
- a traveling display exhibit
- an interagency website (www.hawaiianatolls.org)
- slide presentation materials
- public scoping materials
- Research in the NWHI video

Activities

1. Develop a collection of printed materials that will be used as education resources and tools and where possible, produce Hawaiian language versions of the same.
2. Produce traveling exhibits and other materials for outreach events.
3. Create multi-media and web-based content for general public education.
4. Produce PowerPoint presentations, slideshows, and handouts. for community and professional presentations.
5. Develop media outreach materials as prioritized in annual communication plans.
6. Ensure linkages to partner agency website and message programs that include regulation and management issues of partner agencies.

Location

The scope of content for interpretive materials will cover the entire Reserve and surrounding areas. The first interpretive displays will be developed for the offices in Hilo and Honolulu, but they will also be used on other islands. Specifically, these interpretive displays and signage should be located at places that have high traffic and target populations. Partnering agencies will also provide venues for information dissemination. The Reserve office and staff will take advantage of partners, community events, and large public events to maximize contact with the public.

Timeline

- Activity 1: Already underway. Will be an ongoing, continuous process.
- Activity 2: Initial traveling display has been created and is being improved to include games, young people's activities and specific materials for different target audiences. Work to improve and develop new displays will be an ongoing, continuous process.



- Activity 3: Efforts to continuously improve the interagency website and the Reserve's <http://hawaiireef.noaa.gov> website will be ongoing. New and improved multi-media products will be created and improved on a continuous basis, pending available funds.
- Activity 4: Developing audience-specific, timely presentations are an ongoing and continuous process.
- Activity 5: Additional media products will be developed in concert with annual communications plans.

Costs

This Strategy will require in-house staff labor plus additional costs for printing, design consultation services, professional media creation services, as well as additional resources through partnering with multiple agencies. The ability of the Reserve to create and update educational materials will largely be dependent on available funds.

Results of the Strategy

Outputs:

- Printed materials such as brochures, resource guide, posters, and handbooks collected or created.
- Interpretive displays, exhibits, and interactive kiosks at the Hilo Discovery Center designed and constructed.
- Interactive DVD, interactive website including distance learning opportunities developed.
- PowerPoint presentations, multi-media products developed and continuously improved.
- Image database established and catalogued.
- Interaction with target audiences and the general public increased annually.
- Media products developed, as described for in annual communications plans.



ED- 3: Teach responsibility and stewardship through educational programs, partnerships and outreach events.

Description and Need for the Strategy

Educating the public and increasing awareness about the stewardship mandates and conservation philosophies of the Reserve and other current management regimes is critical to the success of protection and management efforts. Awareness of the Reserve and the greater NWHI region will also help promote public involvement in public decision-making processes. Through education and outreach programs, messages of responsibility and stewardship can help instill values of conservation and affect positive change in behavior and values that will generate positive impacts on the NWHI, marine environments of the main Hawaiian Islands, and coral reef ecosystems throughout the world. It is hoped that these messages will inspire educators, youth, user groups, and all people to take positive actions and continue to pass along the knowledge gained. Educators in public and private schools have a particularly strong role to play in this strategy and partnerships will play a key role in its implementation. Substantial outreach efforts for the NWHI have already taken place. Several workshops targeting both public and private school teachers were conducted by NWHI partner organizations in 2002. Ten additional teacher workshops were conducted in spring 2003 in coordination with a statewide sail of the voyaging canoe Hōkūle'a. The Reserve and its educational partners have also participated in numerous community and public events since the Reserve's inception in 2001.

Activities

1. Coordinate with teachers statewide to create NWHI curriculum for grades K-12 and make them available nationwide.
2. Coordinate and participate in annual teacher workshops across the State of Hawai'i regarding NWHI curriculum.
3. Strengthen partnerships with the State of Hawai'i Department of Education (DOE), charter, and private schools throughout Hawai'i, in order to incorporate NWHI information in school curriculum.
4. Participate in public and community outreach events.
5. Develop and implement media strategies to publicize programs and events.

Location

The scope of educational materials will cover the entire Reserve and surrounding areas. Material will be located at the Hilo and Honolulu offices and be distributed throughout the State and beyond. Material generated will be available to partner agencies, educational institutions and the public for educational purposes. School visits, and public outreach events throughout the State.

Timeline

- Activity 1: K-12 curriculum creation has begun and will be ongoing.
- Activity 2: The first set of teacher workshops were conducted by NWHI partner organizations in 2002. Ten additional teacher workshops are being conducted statewide in spring 2003, in coordination with a statewide sail of the voyaging canoe Hōkūle'a. Additional teacher workshop opportunities will be provided annually.
- Activity 3: Ongoing.
- Activity 4: The Reserve and its educational partners have participated in numerous community and public events since the Reserve's inception in 2001. This activity will continue to be ongoing.
- Activity 5: This activity will be ongoing.



Costs

This Strategy will require in-house staff labor and associated travel costs plus additional costs for creation and distribution of outreach materials.

Results of the Strategy

Outputs:

- NWHI based K-12 curriculum developed and aligned with State of Hawai'i, DOE Standards.
- Teacher workshops conducted annually.
- State Department of Education, charter, and private schools throughout Hawai'i, incorporate NWHI information in school curriculum.
- Participation in at least 25 community and public events each year.
- A record produced of all created material, presentations, events, and activities to track benchmarks and the evaluation process.
- Media coverage obtained for key programs and events.



ED- 4: Develop interpretive, educational and volunteer programs for Discovery Centers.

Description and Need for the Strategy

Discovery Centers within the State of Hawai'i and in partnership with existing locations throughout the nation will provide venues in which the public, school children, and other interested parties can learn about and be immersed in the NWHI, truly bringing the place to the people. The first of these centers, opened in May of 2003. Named "Mokupāpapa: Discovery Center for Hawaii's Remote Coral Reefs," this center, and other facilities like it, will provide a venue for educating local school children, visitors, and the community about the NWHI and adjacent waters. Interactive displays, multimedia exhibits, aquaria, wet labs and other interpretive elements will provide platforms from which educational programs can be run. Local school field trips to the Centers, community reef walks, guest lecture series and other programs will be coordinated from the facilities. The hope is that these facilities and attendant programs will increase knowledge of and education about the Reserve and adjacent areas, and help Hawai'i residents and national audiences to relate this knowledge to their surrounding environment.

Activities

1. Develop volunteer programs to help run the facilities and programs.
2. Develop outreach plan to identify target constituencies and build volunteer capacity to accommodate specific visitor groups (e.g. K-3, 4-6, 7-9, general public, Hawaiian language, tourists and others)
3. Conduct outreach to schools to build annual school visitation programs with State Department of Education, charter and private schools.
4. Develop and implement school visitation calendars.
5. Develop Hawaiian language interpretive tours for Hawaiian Language immersion schools.
6. Provide marine science students with knowledge of the NWHI so that they can better aid in future research expeditions.
7. Develop and coordinate educational and community programs such as community reef walks, speaker programs, and programs for local school groups.
8. Continue to enhance and "fine-tune" Discovery Center exhibits in response to visitor feedback and the growing scientific knowledge about the marine ecosystems of the NWHI.

Location

The first Discovery Center is located in Hilo, Hawai'i. Additional Discovery Centers may be located throughout Hawai'i, if appropriate, and as funding and other resources permit. Additional facilities may be developed as exhibits within existing marine educational venues such as the Waikiki Aquarium, where partnerships allow. Partnerships with other national venues will also be pursued.

Timeline

- | | |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Activity 1: | To begin developing program in summer 2004 and will be ongoing. |
| Activity 2: | Outreach plan will be completed by early 2004. Build-out of volunteer capacity began in summer 2003 and will be ongoing. |
| Activity 3: | Outreach will begin in spring 2003 and be ongoing. |
| Activity 4: | A school visitation calendar for the Mokupāpapa Discover Center has been initiated in summer 2003 and will be routinely updated and added to as staff and participation allows. Additional calendars will be developed as new facilities come on-line. |
| Activity 5: | Completion will be dependent upon the acquisition of Hawaiian Language capacity among staff. Once the capacity is acquired, program completion date for the Mokupāpapa Discovery Center will be six months hence. |
| Activity 6: | Programs and use of the wet lab facility at the Mokupāpapa Discovery Center will commence fall semester of 2004. |
| Activity 7: | Community outreach programs will be developed once core programming and materials are developed for use in the NWHI Discovery Centers. The projected start of community programs is spring 2004. |
| Activity 8: | Continuous process. Mechanisms for evaluating effectiveness of exhibit design and orientation will be developed by in early 2004. Enhancements will be ongoing as funding permits. |



Costs

This Strategy will require in-house staff labor plus additional costs for creation and distribution of materials, as well as, resources through partnering with multiple agencies. Facility lease and operational costs, as well as funding for specialized contractor design services. Additional costs for volunteer program development, decent uniforms, and appreciation programs will also be incurred.

Results of the Strategy

Outputs:

- Discovery Center volunteer program developed, volunteers recruited and trained.
- Outreach plan completed and implemented for Discovery Centers. Schools recruited for regular visits.
- Outreach to schools conducted.
- School visitation calendar developed and implemented.
- Hawaiian language interpretive tour developed and put into use.
- Active use of the wet lab at the Mokupāpapa Discovery Center.
- Community educational programs developed and implemented.
- Visitor feedback and evaluation mechanisms designed, produced and implemented.
- Exhibitory refined and improved on a regular basis.



ED- 5: Target outreach and education activities toward specific stakeholder groups.

Description and Need for the Strategy

Stakeholders in this context are defined as agencies, groups or individuals that are 1) active or potentially active in the NWHI such as user groups (researchers, the military, recreational and commercial fishers, and transiting vessels); or 2) active in management of the area but not physically present in the area. Specific stakeholder groups need to be identified in order to better educate these populations as to what effects their activities may have in the region and on the ecosystem, or upon management of the region. Identification of recreational activities in the Reserve is also called for in the EO that created the Reserve. The EO states that identification of potential tourism, recreational, and commercial activities within the Reserve and actions are necessary to ensure that these activities do not degrade the Reserve's resources or diminish the Reserve's natural character. Education and outreach customized to stakeholder groups active or potentially active in the Reserve and surrounding areas is of particular importance because these groups may be enlisted as conscious stewards of the region. Active users both pose an immediate threat to the resources of the NWHI as well as have the potential to increase understanding of these resources, thus it is very important to provide them with the most current and accurate scientific and regulatory information concerning the region so that they can be empowered to act in a responsible fashion. It is important that the Reserve and partner agencies work with these user groups to ensure that their activities do not diminish or harm the natural character of the Reserve or its resources. Once other stakeholder groups are identified, educational material and training programs can be directed towards increasing stakeholder group knowledge and reducing the amount of impact on the resources, as well as providing knowledge so that these groups can aid in conservation of the region. Toward this end, a set of best management practices will be developed with input from researchers and cultural practitioners and will be used as guidelines for pre-access training. Educating and training user groups and increasing awareness about the stewardship mandates of the Reserve are critical to the success of protection and management efforts.

Activities

1. Identify current and future stakeholder groups.
2. Customize existing education and outreach materials to identified stakeholder audiences so that they will be of maximum interest and effect.
3. Utilize environmental and cultural best practices guidelines (see Research and Cultural Resources Action Plans) and EO provisions, specific to the NWHI ecosystem, in user group outreach efforts and materials.
4. Develop best practices brochures and handbooks available for specific user groups and enlist them as conscious stewards of the Reserve.
5. Develop a system to disseminate material to specific stakeholder groups, including training programs and videos for user groups.

Location

The scope of educational materials will cover the entire Reserve and surrounding areas. Material will be located at the Hilo and Honolulu offices and at specific stakeholder group contact points, such as NOAA Fisheries, USFWS, U.S. Coast Guard, the State of Hawai'i offices and the Department of Defense. Material generated will be available to partner agencies and the public for educational purposes. Training classes will be held at onsite and offsite facilities, depending upon resource needs.

Timeline

- | | |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Activity 1: | Completed in 2003 and is ongoing. |
| Activity 2: | Ongoing as new educational materials come out and new stakeholders identified. |
| Activity 3: | Best practices will be identified and developed under the Research and Cultural Action Plan Strategy 2 and 3, respectively. The use of these best practices will be ongoing and continuously reviewed and updated. Some general guidelines are currently available from the NOWRAMP 2002 research cruise. |
| Activity 4: | First handbooks and program materials to be completed in 2004. |
| Activity 5: | The completion of this activity will be dependent upon completion of Activity 3 and partner agency review. |



Costs

This Strategy will require in-house staff labor plus additional costs for creation, printing and distribution of presentations and materials, as well as, resources through partnering with multiple agencies. Additional costs may be incurred through contracting with training development consultants. Travel costs will be incurred to carry out this Strategy.

Results of the Strategy

Outputs:

- Stakeholder groups identified.
- Environmental best practices utilized in targeted user group outreach.
- Brochures, handbooks, PowerPoint, and video presentations created for specific stakeholder groups.
- Plan to disseminate material to specific user groups, in coordination with partner agencies developed.
- Training programs for specific user groups developed in coordination with partner agencies.



ED- 6: Coordination and oversight of education and outreach activities and information throughout the ROP.

Description and Need for the Strategy

It is necessary that the information generated from all activities within the Reserve Operations Plan be accurate, consistent, and easily accessible to the general public. Especially important is a need for coordination of education components described in each action plan which is one of the roles of the Education working group. Specific education-related strategies and/or activities are listed in the following Action Plans: Operations, Native Hawaiian Cultural Resources, Historic Resources and Maritime Heritage, Enforcement and Marine Debris. Annual coordination of these activities will largely be done through the development of annual operation plans. The primary goal of this Strategy is to avoid duplication of efforts and maintain consistent and accurate information across the program. Coordination among staff and between agencies has already begun.

Activities

1. Continued coordination among staff, Reserve Advisory Council working groups and partner agencies to facilitate coordinated education and outreach efforts.
2. Provide regular updates on ongoing and upcoming education projects through Reserve Education Coordinator.
3. Require education and outreach components of all permitted activities to be completed by the permittee and develop criteria describing implementation and completion.
4. Conduct evaluation of educational and outreach materials by partner agencies, Reserve Advisory Council education working group and other experts as needed.

Location

The scope of information and material will cover all education and outreach activities conducted by the Reserve.

Timeline

- | | |
|-------------|----------------------------------------------------------------------------------------------------------|
| Activity 1: | Ongoing. |
| Activity 2: | Ongoing. |
| Activity 3: | Evaluation and facilitation will be ongoing once the requirement is built into the permitting structure. |
| Activity 4: | Ongoing. |

Costs

This Strategy will require in-house staff labor and participation by Reserve Advisory Council education working group members and partner agency input.

Results of the Strategy

Outputs:

- Reserve education and outreach efforts well coordinated among staff, partner agencies, and the Reserve Advisory Council.
- Regular updates provided to the Reserve Advisory Council and partner agencies on education and outreach projects and activities.
- Education and outreach materials and content distributed.
- Duplicative education and outreach efforts eliminated.
- Education and outreach materials evaluated for consistency and accuracy.



ED- 7: Develop and invest in telepresence and other distance learning capabilities to bring the place to the people instead of the people to the place.

Description and Need for the Strategy

It is important to find methods to bring the story of the Reserve to the public. Due to the remote geographic location and sensitive nature of the ecosystem, most people will not have the opportunity to visit the area. It is also important to articulate how detrimental human impacts can be to this region and the necessity to appreciate the Reserve, and the surrounding reefs, shoals, islands and atolls, from afar. Although a multi-agency website is already in use, exploring the use of new innovative technologies will be essential for successfully relaying images and information to people throughout the MHI, the mainland U.S.A., and the world. These technologies often carry significant costs, in equipment, satellite time, media distribution, and other infrastructure costs. The Reserve will seek to partner with other management and educational agencies to execute this Strategy.

Activities

1. Research and develop telepresence and distance-learning technologies, including cost-benefit analysis, and identification of partners to share in costs.
2. Create mechanisms for distribution, such as web sites, and find venues for reception and airing of telepresence content.
3. Offer opportunities for students and the general public to experience the NWHI through transmitted and recorded images.
4. Coordinate with other high technology efforts and other educational initiatives that use telepresence technology for distance learning opportunities, and to create virtual classrooms.
5. Develop a teacher at sea program, with streaming content back to classrooms nationally.

Location

Information, video web site updates, streaming video, and other transmissions will emanate from research vessels active in the NWHI and from land-based educational facilities at Midway Atoll National Wildlife Refuge in partnership with the U.S. Fish and Wildlife Service and the State of Hawai'i (pending formal partnership agreements). Satellite transmission reception and dissemination of information will take place via the Hilo Discovery Center and other partner facilities yet to be identified, such as the Hawai'i Maritime Center and University of Hawai'i facilities, and other education and research institutions, if possible.

Timeline

- | | |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Activity 1: | Began in summer 2003 and will be ongoing. |
| Activity 2: | Enhancement of current websites will be ongoing. |
| Activity 3: | Several facilities for the airing of recorded content are already in place, and new venues and opportunities will be pursued. Reception and airing of live or bursted content will need additional resources that may be acquired on an as-needed basis as funds allow and the program grows. |
| Activity 4: | Discussion is already underway for a multi-agency project at Midway Atoll National Wildlife Refuge. Depending upon funding and interagency cooperation and approval, a pilot project could begin as soon as 2004. |
| Activity 5: | A pilot program may be executed in 2004 depending upon ship berth availability and funding. |

Costs

This strategy will involve in-house staff labor plus significant additional costs for satellite time, equipment, facility leasing costs, shared costs with partner agencies, and specialist consulting time necessary for implementation. The implementation of this strategy is entirely dependent on the allocation of significant funds for this purpose.

Results of the Strategy

Outputs:

- A comprehensive feasibility assessment of technology available for telepresence and distance learning conducted.
- Telepresence and web-based learning capacities established.
- Distribution avenues via web sites, at the NWHI Discovery Center, and partner agency venues established.
- Execution of a joint multi-agency education project based at Midway Atoll National Wildlife Refuge.
- First teacher at sea program conducted in 2004 with one teacher participating. Future programs conducted based on success and evaluation of first program.

Table 12. Education Estimated Costs. A list of estimated costs (in thousands of dollars) is shown for each strategy over a 5-year timeframe. Each strategy is ranked with an A, B or C based on the following criteria – A: Mandated by EO/Reserve Management Principles; B: Highly Desirable; and C: If Sufficient Funds are Available.



Action Plan: Education and Outreach							
STRATEGIES AND ASSOCIATED ACTIVITIES	ESTIMATED ANNUAL COST					Total Estimated Costs	Rank
	YR 1	YR 2	YR 3	YR 4	YR 5		
ED-1: Develop annual education and communication plans in collaboration with partners.							
1. Conduct, assess and evaluate unique educational opportunities and challenges in the NWHI.	5.0	0.0	0.0	0.0	0.0	5.0	A
2. Build on existing educational network and the multi-agency NWHI education project team.	5.0	2.0	2.0	2.0	2.0	13.0	B
3. Develop annual education plans, and the processes by which they will be carried out, in concert with partner agencies.	5.0	5.0	5.0	5.0	5.0	25.0	C
4. Develop and implement an inter-agency communications plan.	20.0	10.0	10.0	10.0	10.0	60.0	C
5. Participate in and sponsor partner agency educational efforts.	5.0	5.0	5.0	5.0	5.0	25.0	B
ED-2: Develop materials to support education and outreach efforts about the Reserve, the marine environment of the NWHI, and coral reef ecosystems.							
1. Develop a collection of printed materials that will be used as education resources and tools, and where possible produce Hawaiian language versions of the same.	15.0	15.0	15.0	15.0	15.0	75.0	A
2. Produce traveling exhibits and other materials for outreach events.	10.0	10.0	10.0	10.0	10.0	50.0	B
3. Create multi-media and web-based content for general public education.	30.0	30.0	30.0	30.0	30.0	150.0	B
4. Produce PowerPoint presentations, slideshows, handouts, etc. for community and professional presentations.	6.0	6.0	6.0	6.0	6.0	30.0	B
5. Develop media outreach materials as prioritized in annual communication plans.	5.0	15.0	20.0	5.0	5.0	50.0	B
ED-3: Teach responsibility and stewardship through educational programs, partnerships and outreach							
1. Coordinate with teachers statewide to create NWHI curriculum for grades K-12 and make them available nationwide.	25.0	25.0	25.0	0.0	0.0	75.0	C
2. Coordinate and participate in annual teacher workshops across the state of Hawaii regarding NWHI curriculum.	15.0	15.0	15.0	15.0	15.0	75.0	C
3. Strengthen partnerships with the State of Hawaii Department of Education, charter, and private schools throughout the state of Hawaii, in order to incorporate NWHI information within school curriculum.	5.0	5.0	5.0	5.0	5.0	25.0	C
4. Participate in public and community outreach events.	8.0	8.0	10.0	5.0	5.0	36.0	C
5. Develop and implement media strategies to publicize programs and events.	5.0	10.0	10.0	5.0	5.0	35.0	B



Table 12. Education Estimated Costs. A list of estimated costs (in thousands of dollars) is shown for each strategy over a 5-year timeframe. Each strategy is ranked with an A, B or C based on the following criteria – A: Mandated by EO/Reserve Management Principles; B: Highly Desirable; and C: If Sufficient Funds are Available. (cont'd)

Action Plan: Education and Outreach							
STRATEGIES AND ASSOCIATED ACTIVITIES	ESTIMATED ANNUAL COST					Total Estimated Costs	Rank
	YR 1	YR 2	YR 3	YR 4	YR 5		
ED-4: Develop interpretive, educational and volunteer programs for Discovery Centers.							
1. Develop volunteer programs to help run the facilities and programs.	50.0	50.0	25.0	25.0	25.0	175.0	A
2. Develop outreach plan to identify target constituencies and build staff capacity to accommodate specific visitor groups (e.g. k-3, 4-6, 7-9, general public, Hawaiian language, tourists etc.).	15.0	15.0	15.0	15.0	15.0	75.0	B
3. Conduct outreach to schools to build annual school visitation programs with State Department of Education, charter and private schools.	8.0	8.0	8.0	8.0	8.0	40.0	B
4. Develop and implement school visitation calendars.	2.0	2.0	2.0	2.0	2.0	10.0	B
5. Develop Hawaiian language interpretive tours for Hawaiian Language immersion schools.	10.0	2.0	2.0	2.0	2.0	18.0	B
6. Provide marine science students with knowledge of the NWHI so that they can better aid in future Research Expeditions.	20.0	4.0	4.0	4.0	4.0	36.0	B
7. Develop and coordinate educational and community programs such as community reef walks, speaker programs, and programs for local school groups	15.0	10.0	10.0	10.0	10.0	55.0	C
8. Continue to enhance and "fine-tune" Discovery Center exhibits in response to visitor feedback and the growing scientific knowledge about the marine ecosystems of the NWHI.	40.0	30.0	100.0	30.0	30.0	230.0	B
ED-5: Target outreach and education activities toward specific stakeholder groups.							
1. Identify current and future stakeholder groups.	5.0	5.0	5.0	5.0	5.0	25.0	A
2. Customize existing education and outreach materials to identified stakeholder audiences so that they will be of maximum interest and effect.	20.0	15.0	10.0	10.0	10.0	65.0	B
3. Utilize environmental best practices guidelines (see Research Action Plan) and EO provisions, specific to the NWHI ecosystem, in user group outreach efforts and materials.	3.0	3.0	3.0	3.0	3.0	15.0	B
4. Develop best practices brochures and handbooks available for specific user groups and enlist them as conscious stewards of the region	20.0	20.0	10.0	10.0	10.0	70.0	C
5. Develop a system to disseminate material to specific stakeholder groups, including training programs and videos for user groups.	50.0	20.0	20.0	20.0	20.0	130.0	C



Table 12. Education Estimated Costs. A list of estimated costs (in thousands of dollars) is shown for each strategy over a 5-year timeframe. Each strategy is ranked with an A, B or C based on the following criteria – A: Mandated by EO/Reserve Management Principles; B: Highly Desirable; and C: If Sufficient Funds are Available. (cont'd)

Action Plan: Education and Outreach							
STRATEGIES AND ASSOCIATED ACTIVITIES	ESTIMATED ANNUAL COST					Total Estimated Costs	Rank
	YR 1	YR 2	YR 3	YR 4	YR 5		
ED-6: Coordination and oversight of education and outreach activities and information throughout the							
1. Continued coordination among staff, Reserve Advisory Council working groups and partner agencies to facilitate coordinated education and outreach efforts.	5.0	5.0	5.0	5.0	5.0	25.0	B
2. Provide regular updates on ongoing and upcoming education projects through Reserve Education Coordinator.	3.0	3.0	3.0	3.0	3.0	15.0	B
3. Require education and outreach components of all permitted activities to be completed by the permittee and develop criteria describing implementation and completion.	5.0	5.0	5.0	5.0	5.0	25.0	B
4. Conduct evaluation of educational and outreach materials by partner agencies, Reserve Advisory Council education working group and other experts as needed.	15.0	15.0	15.0	15.0	15.0	75.0	B
ED-7: Develop and invest in telepresence and other distance learning capabilities to bring the place to the people instead of the people to the place.							
1. Research and develop telepresence and distance-learning technologies, including cost-benefit analysis, and identification of partners to share in costs.	50.0	50.0	10.0	10.0	10.0	130.0	B
2. Create mechanisms for distribution, such as web sites, and find venues for reception and airing of telepresence content.	20.0	20.0	10.0	10.0	10.0	70.0	B
3. Offer opportunities for students and the general public to experience the NWHI through transmitted and recorded images.	5.0	5.0	5.0	5.0	5.0	25.0	B
4. Coordinate with other high technology efforts and other educational initiatives that use telepresence technology for distance learning opportunities, and to create virtual classrooms.	20.0	20.0	20.0	20.0	20.0	100.0	C
5. Develop a teacher at sea program, with streaming content back to classrooms nationally.	40.0	20.0	20.0	20.0	20.0	120.0	C



Action Plan: Native Hawaiian Cultural Resources

“An increasing number of resource management and conservation partnerships are being formed between indigenous groups...”



Sunrise over Mokumanamana

Photo Credit: James Watt

Desired Outcome: Protected Native Hawaiian cultural resources in the NWHI.

Background/Context

Section 4(c) and Section 9 of the Executive Order (EO) provide that culturally significant, noncommercial subsistence, cultural, and religious uses by Native Hawaiians should be allowed within the Reserve and Reserve Preservation Areas. The EO also directs the Secretary to work with Native Hawaiian interests to identify those areas where such Native Hawaiian uses of the Reserve’s resources may be conducted without injury to the Reserve’s coral reef ecosystems and related marine resources and species. Such a condition is consistent with the centuries old practices of kuleana (responsibility) to respect and mālama (care) for this place, as a younger sibling would do for an elder. As a result, these uses will serve to strengthen the Reserve’s management efforts. Toward this end, this action plan provides an outline to deepen the understanding and care for cultural resources related to Native Hawaiians.

An increasing number of resource management and conservation partnerships are being formed between indigenous groups and governmental bodies worldwide. In Hawai‘i, the Kaho‘olawe and Mo‘omomi partnerships are examples of how traditional knowledge and values have been integrated into resource management. Within the National Marine Sanctuary Program, members of the Quinault, Hoh, Quileute, and Makah Native American tribes participate as advisors to the Olympic Coast National Marine Sanctuary. The trend is also occurring internationally. In New Zealand, Maori involvement in government conservation management projects ranges from consultation to full control over marine and terrestrial tribal regions.

The Native Hawaiian community has expressed a strong interest in participating as a full partner in management decisions affecting the Reserve. Respecting Native Hawaiian traditions and values and providing them an effective degree of participation and control in the protection and management of the Reserve will provide a chance for Native Hawaiians to reconnect past, present and future generations. This reconnection will continue to further the reconciliation efforts between Native Hawaiians and the United States.



Native Hawaiian interests will be defined primarily by Native Hawaiian cultural and historical experts, knowledgeable kūpuna (elders), fishers experienced with the NWHI, the Center for Hawaiian Studies with the University of Hawai‘i, and the Cultural Working Group of the Reserve Advisory Council (Council). Native Hawaiians will identify cultural practices and will work cooperatively with the State of Hawai‘i, Office of Hawaiian Affairs, Historic Preservation Office of DLNR, Hawaiian Islands National Wildlife Refuge and Midway Atoll National Wildlife Refuge to identify all such uses and locations within the Reserve and other Federal and State waters outside of Reserve boundaries as part of the coordinated management called for by the EO. Section 4(h), as well as Section 5(d), provides mechanisms for coordinated management among the State of Hawai‘i, U.S. Fish and Wildlife Service (USFWS), and the National Oceanic and Atmospheric Administration (NOAA). Such coordinated management should include the requirements of Native Hawaiians throughout the NWHI. In addition, Native Hawaiians will develop criteria to assess the cultural significance of any noncommercial subsistence, cultural, and religious use, and will develop appropriate protocols and criteria regarding access to the NWHI for the conduct of culturally significant practices. Finally, Section 9 of EO, which describes Native Hawaiian uses within the Reserve and Reserve Preservation Areas, may be revised based on a better knowledge of those areas where such Native Hawaiian uses of the Reserve’s resources may be conducted.

The Native Hawaiian people are intimately connected to the Hawaiian Archipelago on genealogical, cultural, spiritual and geological levels. The natural elements of the NWHI are considered ancestors born in primordial times and therefore the older relatives of living Native Hawaiians. The EO recognizes this ancestral connection. The strategies in this action plan are aimed at addressing the cultural resource mandates of the EO.

In carrying out all of these strategies and activities, a group of kumu (cultural experts and practitioners), kūpuna (Native Hawaiian elders) and native fishermen knowledgeable about the region will be consulted to ensure cultural appropriateness and accuracy of information related to Native Hawaiian culture and history of the NWHI.

(For more information on the cultural history of the NWHI, see Native Hawaiian Cultural Significance section in the Introduction.)

**“The natural
elements of the
NWHI are
considered ancestors
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primordial times
and are therefore
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Native Hawaiians.”**



Strategies

- NH- 1: Continue research, compilation, and cataloging of existing cultural and historical information.
- NH- 2: Develop criteria and identify locations for Native Hawaiian use.
- NH- 3: Develop culturally-appropriate criteria, provisions and constraints for access and development of Reserve permits.
- NH- 4: Develop and implement a cultural resources curriculum and education program to increase dissemination of NWHI cultural information.

Performance Measures

- a. A measurable increase in materials researched and compiled, establishment of an on-line database, and the reconnection and use of Hawaiian names for places in the region.
- b. In consultation with the Native Hawaiian community, cultural best management practices developed by the end of 2004 that include protocols designed to guide the recognition and continuation of appropriate Native Hawaiian practices in the NWHI.
- c. Adoption of cultural best management practices by all users who access the NWHI to conduct activities in the Reserve.

Summary of Resource Needs

- NH- 1: additional costs for contracted research, printing, cataloging and storage.
 NH- 2: additional costs for meeting and facilitation, materials, printing and travel.
 NH- 3: no additional costs anticipated.
 NH- 4: additional costs for funding for contracts, printing and materials development.

Potential Participants

- Reserve Advisory Council
- Cultural working group of the Council
- Native Hawaiian Cultural Advisor
- The Bishop Museum
- State of Hawai'i
- US. Fish and Wildlife Service
- Native Hawaiian Cultural experts and interests
- Polynesian Voyaging Society
- University of Hawai'i System

Relation to Other ROP Action Plans and Projects

Criteria identified to determine appropriate Native Hawaiian use and access will assist in the development of overall Reserve permitting procedures described under OP-4 of the Operations Action Plan. The compilation and cataloging of the existing cultural and historic information will be included in the GIS section under Activity #1 of RM-1 of the Research and Monitoring Action Plan. The development and implementation of a cultural resources curriculum and education program will supplement and expand the goals and activities contained within the Education Action Plan. Overall, Native Hawaiian approaches, history and respect for host culture values will guide and inform the strategies and activities of the Reserve Operations Plan in its entirety. The Research Action Plan, RM-4, describes the need to conduct investigations into the biological connectivity and gene flow between the NWHI and the main Hawaiian Islands. This is consistent with the Native Hawaiian deep understanding of the chain of islands as a connected, integrated archipelago as expressed through mele (song) and oli (chant).



NH- 1: Continue research, compilation and cataloging of existing cultural and historical information.

Description and Need for the Strategy

Presently, much of the information about the NWHI is scattered throughout different types of information and sources. This Strategy seeks to continue to research, compile, and catalog information regarding the culture and history of the region from various forms of information such as mele (song), oli (chant), mo'olelo (native oral histories) writing in both the Hawaiian language and English that were published in newspapers in the 1800's, European and Western ship logs and journals, diaries and correspondence, archaeological studies and cultural remains collections, as well as accounts by living Native Hawaiians. Initial efforts have already been undertaken by the Bishop Museum to disseminate information about its holdings of unpublished and published resources (<http://www2.bishopmuseum.org/noaanwhi/index.asp>) and Hawaiian cultural collections associated with the NWHI (<http://www2.bishopmuseum.org/nwhiobjects/index.asp>). This strategy is designed to build upon that effort.

An immediate research goal of the Council's cultural working group is the identification and re-establishment of the traditional names of the islands and atolls. This type of information is necessary for the re-characterization of the area in terms of its Native Hawaiian sense of place and was contemplated in a joint report on Reconciliation published in 1999 by the U.S. Department of the Interior and the U.S. Department of Justice. In later stages of research and writing, it will be desirable to develop curricula that educate people about the process of settlement in this region of the Hawaiian archipelago, the importance of Hawaii's traditional voyaging heritage, the history of activities that took place here, and the cultural need to preserve the area and its resources.

Part of the information gathering process is to document cultural knowledge contained within mele (song) and hula (dance) for public outreach and education. The compilation of cultural information will provide a baseline of known information and help identify future education and research needs related to Native Hawaiian heritage and culture.

In an effort to be as exhaustive as possible in the cataloging of existing information, efforts will be made to search the following:

- Mele (song, chants, verse)
- Ethnographic interviews/oral histories of native speakers
- Journals, expedition notes, maps, illustrations, and photographs
- Hawaiian language newspapers
- Legal records, including ownership and deaccession/repatriation history
- Journals of 18th and 19th century European explorers and traders
- Museum catalogues containing plates and /or descriptions of Hawaiian cultural objects
- Unpublished material

Activities

1. Identify, collect and review collections, including publications of limited distribution, archived at various research institutions. Sources may include:
 - Bernice Pauahi Bishop Museum
 - Hawai'i State Historic Preservation Office
 - Hawai'i State Archives
 - Hawai'i State Libraries
 - Mission Houses Library
 - Hawai'i Historical Society Library
 - University of Hawai'i System
 - Peabody Essex Museum
 - Smithsonian Institution
 - National Archives
2. Expand on current efforts to establish an annotated, web-searchable bibliography.
3. Develop a scope of work, job description, and timeline for the hiring of a Native Hawaiian cultural advisor, in consultation with the Council's Cultural Working Group and group of experts (described above).
4. Hire a Native Hawaiian cultural advisor.



Location

The activities under this Strategy will cover the scope of the Reserve and surrounding areas, including the Hawaiian Islands National Wildlife Refuge, Midway Atoll National Wildlife Refuge, and the State of Hawai'i waters and lands of Kure Atoll, as part of the coordinated management approach called for Sec 4(h) and 5 (d) of the EO. The Native Hawaiian cultural advisor will be based out of the Honolulu or Hilo Reserve Offices.

Timeline

- Activity 1: Ongoing.
- Activity 2: Will begin once resources to develop such a database are acquired.
- Activity 3: To be completed as soon as possible.
- Activity 4: This is a high priority for the Reserve. Hiring will take place as soon as the resources are allocated and job requirements are developed.

Costs

Labor will be provided in large part by contractors. Additional funds will be needed to hire the Native Hawaiian cultural advisor; purchase necessary database software and hardware; and collect and store information in various forms.

Results of the Strategy

Outputs:

- Published and unpublished materials pertaining to cultural activities and sites in the NWHI identified, reviewed and collected.
- A web-searchable database created.
- Appropriate Hawaiian place names for islands and reefs identified and accepted by the Native Hawaiian community.
- Native Hawaiian cultural advisor hired.



NH- 2: Develop criteria and identify locations for Native Hawaiian use.

Description and Need for the Strategy

Once the information about the NWHI is compiled, it will become necessary to interpret the information in order to put it to practical use. This Strategy seeks to assess the compiled information in order to identify culturally significant, noncommercial subsistence, cultural, and religious uses and locations within the Reserve, as called for in the EO. In addition, the compiled information will be used to develop criteria to assess the cultural significance of any proposed noncommercial subsistence, cultural research, cultural and religious use and to develop protocols regarding access to the Reserve for the conduct of such culturally significant uses and practices. These protocols would address issues such as the treatment of wahi kūpuna (ancestral sites), mea kapu (sacred objects), iwi kūpuna (ancestral bones), moepu (funerary objects), ki'i pōhaku (stone images), other cultural remains, subsistence fishing for on-island consumption and gathering, among other possibilities. In order to maintain and preserve the integrity of the resources in the NWHI, all activities will be assessed to ensure they will not have ecological or biological impacts. Of particular consideration will be discussions and interactions with the U.S. Fish and Wildlife Service, State of Hawai'i, NOAA Fisheries and other jurisdictional partners over potential differences in regulations governing these various areas.

Activities

1. Identify culturally significant noncommercial subsistence, cultural and religious uses and locations within the Reserve, and surrounding areas, in consultation with the Native Hawaiian community and partners.
2. Seek Traditional Cultural Places status for selected important wahi kūpuna.
3. Develop criteria to help evaluate proposed uses in order to determine whether such uses are culturally appropriate.
4. Develop protocols for cultural uses conducted in the Reserve and surrounding areas.
5. Facilitate dialogue between management partners and Native Hawaiian communities to discuss the needs and purpose for potential access to the NWHI.

Location

This Strategy will cover the entire Reserve and, in consultation with jurisdictional partners, surrounding areas, including the Hawaiian Islands National Wildlife Refuge, Midway Atoll National Wildlife Refuge and State of Hawai'i waters and the lands of Kure Atoll as part of the coordinated management approach called for in Section 4(h), Section 5(d) and Section 10 (b) of the EO.

Timeline

- | | |
|-------------|------------------------------------------------------------------------------|
| Activity 1: | Began in 2003 and is ongoing. |
| Activity 2: | To begin in 2004. |
| Activity 3: | Began in 2003. Modifications and improvements to these criteria are ongoing. |
| Activity 4: | Began in 2003. Modifications and additions to these protocols are ongoing. |
| Activity 5: | Began in 2002: Dialogue is ongoing. |

Costs

Labor will mainly be provided by the Native Hawaiian Cultural Advisor to be hired under NH-1. Additional costs may include meeting and facilitation that could include Native Hawaiian traditional practices, materials, printing and travel.

Results of the Strategy

Outputs:

- Culturally significant noncommercial subsistence, cultural and religious uses and locations identified within the Reserve and surrounding areas.
- Traditional Cultural Places status for selected wahi kūpuna designated.
- Criteria established to assess the appropriateness of proposed cultural uses in Reserve waters and surrounding areas.
- Protocols developed for Native Hawaiian activities conducted in the Reserve and surrounding areas.
- Need and purpose for Native Hawaiians access to NWHI identified.



NH- 3: Develop culturally-appropriate criteria, provisions and constraints for access and development of Reserve permits.

Description and Need for the Strategy

A permitting process is being developed under the Operations Action Plan, OP-4, to ensure that activities conducted within the Reserve do not undermine the comprehensive, strong and lasting protection of the natural, cultural and historic resources of the area. The EO states that the Secretary may conduct, or authorize by permit, activities to the extent that they are necessary for research, monitoring, education or management activities that further the management principles detailed in the EO. Toward this end, permitting and access criteria and cultural best management practices will be developed in order to guide activities that occur in the Reserve to display respect and sensitivity toward the Native Hawaiian host culture. The development of such permitting criteria is necessary to protect culturally sensitive areas that will be identified in NH-2. Reserve staff will also coordinate with USFWS and State officials to recommend criteria for cultural access to lands and waters under their jurisdiction. Reserve staff will also coordinate with USFWS and State officials to recommend criteria for cultural access to lands and waters under their jurisdiction.

The purpose of this Strategy is to identify culturally sensitive activities that will help guide the development of the Reserve's overall permitting and notification procedures (see Operations Action Plan; OP-4) and to use the information to develop a set of cultural best management practices that will be adopted by all groups who conduct activities in the Reserve (see Education Action Plan, ED-5).

Activities

1. Identify threats from and impacts of all past, present, and proposed future activities in the Reserve and surrounding areas.
2. Draft guidelines and criteria to conduct activities in a culturally appropriate manner in the Reserve and surrounding areas, in consultation with the Native Hawaiian community and partner agencies.
3. Identify, prioritize and evaluate proposed activities in the Reserve and surrounding areas, using criteria developed in Activity 2.
4. Integrate criteria developed under this Strategy with the overall Reserve permitting procedures described in the Operations Action Plan.

Location

Activities will be conducted largely by in-house staff, including the Native Hawaiian cultural advisor, with input from the Council's Cultural Working Group.

Timeline

- | | |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Activity 1: | Many threats and potential impacts have already been identified. Completion of the identification will be based on the development and completion of GIS database described under RM-1 of the Research Action Plan. |
| Activity 2: | To begin in 2004. |
| Activity 3: | To begin after criteria developed. |
| Activity 4: | To begin after the above activities are completed, will be ongoing thereafter. |

Costs

Labor will be provided by in-house staff. No additional costs are anticipated.

Results of the Strategy

Outputs:

- Threats and impacts on culturally sensitive areas identified.
- Written guidelines and criteria developed which demonstrate respect for the traditional values of the Native Hawaiian host culture.
- Activities comply with the criteria developed.
- Written guidelines and criteria integrated with the overall permitting procedures of the Reserve.



NH- 4: Develop and implement a cultural resources education program to increase dissemination of NWHI cultural information.

Description and Need for the Strategy

The EO directs the enhancement of public awareness, understanding, and appreciation of the Reserve. Section 1 of the EO recognized that the NWHI area has great cultural significance to Native Hawaiians as well as linkages to early Polynesian culture - making it additionally worthy of protection and understanding. Once the cultural and historical information about the NWHI Archipelago is compiled and researched, the next step is to organize this knowledge in a way that it can be made accessible to the larger general public. This shall be done in at least three ways: (1) create basic educational materials that contain the cultural history of the NWHI using mo'olelo (narratives), mele (song, chant), 'ōlelo no'eau (proverbs and sayings), hula (dance), and plays (hana keaka); (2) the development of an undergraduate course at the Kamakūokalani Center for Hawaiian Studies at the University of Hawai'i at Mānoa concerning the cultural and historical significance of the NWHI; and (3) create new curriculum to be utilized by Hawai'i schools, in particular Hawaiian language immersion and charter schools. In addition, a key method of increasing cultural information into schools and communities is to have the NWHI become the subject of new mele, oli, hula, and contemporary art forms. Hearing songs on the radio, seeing new art, or learning to dance new hula about places unfamiliar, can be very powerful means to have communities learn about and embrace the NWHI. All activities will be developed in consultation with the Council's Cultural Working Group and Education Working Group.

Activities

1. Develop and implement a cultural resources education program on the NWHI that includes basic educational materials.
2. Create and disseminate new curricula for use in Hawai'i schools.
3. Develop and implement an undergraduate Hawaiian Studies course that focuses on the NWHI.
4. Develop and implement a program to study and perpetuate traditional navigation.
5. Facilitate access to the Reserve for Native Hawaiian cultural practitioners, kumu hula (master-level teachers of dance), and artists to create new mele (song), oli (chant), hula (dance) and other art forms for use in contemporary Hawaiian culture.
6. Develop and implement a Strategy for the dissemination of educational materials in schools and other forums targeting the general public.

Location

Activities under this Strategy will take place throughout the Hawaiian Islands, in accordance with rules and regulations established by agencies with jurisdiction over the region.

Timeline

- | | |
|-------------|---------------------------------------------------------------------------------------------------------------------------|
| Activity 1: | This is a high priority for the Reserve. To begin as soon as funds and staffing are available. |
| Activity 2: | To begin as soon as funds and staffing are available. |
| Activity 3: | Initial planning has begun. Course(s) to be offered in 2004-2005 school year and continue as long as funds are available. |
| Activity 4: | To begin as soon as funds and staffing are available. |
| Activity 5: | To begin as soon as funds and staffing are available. |
| Activity 6: | To begin as soon as funds and staffing are available. |

Costs

The costs of this Strategy will include in-house staff labor, including Native Hawaiian cultural advisor, funding for contracts, printing and materials development.

Results of the Strategy

Outputs:

- Basic education materials developed.
- A Hawaiian Studies course on the NWHI and lessons developed. Course(s) implemented.
- Curriculum developed and disseminated in Hawai'i schools.
- A plan developed for disseminating components of this curriculum to the Native Hawaiian community, as well as the general public. Elements of the plan implemented.
- A strategy developed to disseminate educational materials to schools and to the general public.
- Educational materials disseminated to schools.
- Access for Native Hawaiian cultural practitioners and artists facilitated.



Table 13. Native Hawaiian Cultural Resources Estimated Costs. A list of estimated costs for each strategy is shown over a 5-year timeframe. Each strategy is ranked with an A, B or C based on the following criteria - A: Mandated by EO/Reserve Management Principles; B: Highly Desirable; and C: If Sufficient Funds are Available.

STRATEGIES AND ASSOCIATED ACTIVITIES	ESTIMATED ANNUAL COST					Total Estimated Costs	Rank
	YR 1	YR 2	YR 3	YR 4	YR 5		
NH-1: Continue research, compilation, and cataloging of existing cultural and historical information.							
1. Identify, collect and review collections, including publications of limited distribution, archived at various research institutions.	10.0	10.0	10.0	10.0	10.0	50.0	B
2. Expand on current efforts to establish an annotated, web-searchable bibliography.	0.0	25.0	0.0	0.0	0.0	25.0	B
3. Develop a scope of work, job description, and timeline for the hiring of a Native Hawaiian cultural advisor, in consultation with the Council's Cultural Working Group and group of experts.	10.0	0.0	0.0	0.0	0.0	10.0	A
4. Hire a Native Hawaiian cultural advisor.	30.0	47.5	47.5	47.5	47.5	220.0	A
NH-2: Develop criteria and identify locations for Native Hawaiian use.							
1. Identify culturally significant noncommercial subsistence, cultural and religious uses and locations within the Reserve, and surrounding areas, in consultation with the Native Hawaiian community and partners.	5.0	5.0	5.0	0.0	0.0	15.0	A
2. Seek Traditional Cultural Places status for selected important wahi kupuna.	4.0	0.0	0.0	0.0	0.0	4.0	B
3. Develop criteria to help evaluate proposed uses in order to determine whether such uses are culturally appropriate.	5.0	5.0	5.0	5.0	5.0	25.0	B
4. Develop protocols for cultural uses conducted in the Reserve and surrounding areas.	3.0	0.0	0.0	0.0	0.0	3.0	B
5. Facilitate dialogue between management partners and Native Hawaiian communities to discuss the needs and purpose for potential access to the NWHI.	3.0	3.0	3.0	3.0	3.0	15.0	B
NH-3: Develop culturally-appropriate criteria, provisions and constraints for access and development of Reserve							
1. Identify threats from and impacts of all past, present, and proposed future activities in the Reserve and surrounding areas.	5.0	5.0	3.0	3.0	3.0	19.0	A
2. Draft guidelines and criteria to conduct activities in a culturally appropriate manner in the Reserve and surrounding areas, in consultation with the Native Hawaiian community and partner agencies.	8.0	8.0	0.0	0.0	0.0	16.0	B
3. Identify, prioritize and evaluate proposed activities in the Reserve and surrounding areas, using criteria developed in Activity 2.	0.0	0.0	5.0	5.0	5.0	15.0	B
4. Integrate criteria developed under this Strategy with the overall Reserve permitting procedures described in the Operations Action Plan.	0.0	0.0	5.0	5.0	5.0	15.0	B



Table 13. Native Hawaiian Cultural Resources Estimated Costs. A list of estimated costs for each strategy is shown over a 5-year timeframe. Each strategy is ranked with an A, B or C based on the following criteria - A: Mandated by EO/Reserve Management Principles; B: Highly Desirable; and C: If Sufficient Funds are Available. (cont'd).

Action Plan: Native Hawaiian Cultural Resources							
STRATEGIES AND ASSOCIATED ACTIVITIES	ESTIMATED ANNUAL COST					Total Estimated Costs	Rank
	YR 1	YR 2	YR 3	YR 4	YR 5		
NH-4: Develop and implement a cultural resources curriculum and education program to increase dissemination of NWHI cultural information.							
1. Develop and implement a cultural resources education program on the NWHI that includes basic educational materials.	20.0	10.0	10.0	10.0	10.0	60.0	B
2. Create and disseminate new curricula for use in Hawaii schools.	10.0	5.0	5.0	5.0	5.0	30.0	C
3. Develop and implement an undergraduate Hawaiian Studies course that focuses on the NWHI.	100.0	50.0	50.0	50.0	50.0	300.0	B
4. Develop and implement a program to study and perpetuate traditional navigation.	50.0	50.0	20.0	20.0	20.0	160.0	C
5. Facilitate access to the NWHI for Native Hawaiian cultural practitioners, kumu hula (master-level teachers of dance), and artists to create new mele (song), oli (chant), hula (dance) and other art forms for use in contemporary Hawaiian culture.	10.0	10.0	10.0	10.0	10.0	50.0	B
6. Develop and implement a strategy for the dissemination of educational materials in schools and other forums targeting the general public.	5.0	5.0	0.0	0.0	0.0	10.0	B



Action Plan: Maritime Heritage



19th century wooden stock anchors from the wreck of the USS Saginaw at Kure Atoll.

Photo Credit: Hans Van Tilburg

“Marine resources within the NWHI include certain historic artifacts dating from post-European exploration through World War II...”

Desired Outcome: Improved protection of maritime cultural resources in the NWHI.

Background/Context

Marine resources within the NWHI include certain historic artifacts dating from post-European exploration through World War II, and should be treated in a manner that allows for documentation and possible historic preservation. Almost all of the activities and human impacts in the NWHI have been intimately related to the sea. The physical traces of those activities, wreck sites, are windows into this historic past and much can be learned from this past. Furthermore, historic preservation is mandated by State and Federal preservation laws. These are aimed at resource appreciation, preservation, and protection, similar to the goals of the Reserve’s EO.

The EO states that “the Reserve shall be managed using best available science and applying a precautionary approach with resource protection favored when there is a lack of information regarding any given activity, to the extent not contrary to the law” (EO Section 4.b.). It also states that to the extent consistent with the primary purpose of the Reserve, the Reserve shall be managed to support, promote, and coordinate appropriate scientific research and assessment, and long term monitoring of Reserve resources, and the impacts or threats thereto from human and other activities. To the extent consistent with the primary purpose of the Reserve, the Reserve shall be managed to enhance public awareness, understanding, and appreciation of Reserve resources. Historic sites are part of these resources and should be treated with care and an understanding of the relevant and established preservation laws.

The Federal Abandoned Shipwreck Act of 1987 (Public Law 100-298) charges the State of Hawai’i with the “responsibility for management of a broad range of living and nonliving resources in State waters and submerged lands; and included in the range of resources are certain abandoned shipwrecks, which have been deserted and to which the owner has relinquished ownership rights with no retention.” States are directed to support “the study, interpretation, protection, and preservation of historic shipwrecks and properties.” A lack of management in the main Hawaiian Islands has, in the past, led to theft and disturbance of historic public properties.



More directly, the National Historic Preservation Act of 1966 (Public Law 89-665 as amended 2000) defines preservation law for the Federal Archaeology Program. Section 110 states of the NHPA mandates the establishment of a preservation program for the identification, evaluation, and nomination of historic properties to the National Register of Historic Places. Properties, in this sense, include buildings, sites, structures, and objects. NHPA further directs that both nominated properties and properties eligible for nomination under the jurisdiction of Federal agencies are managed and maintained in a way that considers the preservation of their historic, archaeological, architectural, and cultural values. Special consideration is given to those properties designated as having national significance. State and Federal guidelines for the preservation of submerged historic properties in particular have been drafted by the Department of the Interior's National Park Service.

U.S. Navy wreck sites in the NWHI, however, receive special consideration and are property of the federal government and come under the regulation of the Naval Historical Center's Underwater Archaeology branch. This branch advises the Navy in all matters relating to historic preservation of Navy ship and aircraft wrecks, as well as those pertaining to war graves, unexploded ordnance, weapons recovery, and legal issues. U.S. warships as State vessels are entitled to sovereign immunity no matter their location, as outlined by the United Nations Conference on the Law of the Sea (UNCLOS) Articles 95-6.

Though Hawai'i has a history of approximately 1,500 years of continuous and intensive maritime activity (and thus literally hundreds of wreck sites), very little survey or investigation has been accomplished so far. During the recent NOWRAMP 2002 Expedition, a small team of divers conducted a limited shallow water inventory of the NWHI. Examples of historic maritime resources include: the whaler ship Gledstanes lost in 1837; the side-wheel steam warship USS Saginaw lost in 1870; the French ship Conetabale de Richmond lost in 1903; the American sailing bark Carrollton, launched from A.E. Sewall's shipyard in Bath Maine and lost in 1906; the Pacific copra schooner O.M. Kellogg lost in 1915; and the deep sea Navy salvage vessel USS Macaw lost during the attempted rescue of the submarine Flier in 1944. That these sites exist at all is due to protective measures, restricted accessibility, and lack of access to confirmed location information.

The Maritime Heritage Action Plan is not only concerned with the historical aspects of resources in the Reserve, but places a high priority on the interaction between these resources and the immediate environment. Wrecks can provide artificial reef habitats, but also have the potential for leaching metals, cargo, and fuel into the ecosystem. In 1957 the 580-foot Navy tanker Mission San Miguel ran full speed into Maro Reef. Reports indicate the tanker may have been in ballast, the main cargo tanks empty. Oil did spill from the ship, though, during her grounding. After a month-long attempt to refloat the vessel, the ship was abandoned on the reef. Today there is no sign of the Mission San Miguel at the reported coordinates. How far it has moved, and how much of an environmental threat wrecks such as this still pose to the environment is unknown in the NWHI. Numerous areas in the NWHI were used as dumpsites or target practice ranges. Military training activities may still be occurring today. Mine fields were sewn and cleared but submerged unexploded ordnance was encountered at several locations during the 2002 survey.

The Maritime Heritage Action Plan emphasizes a historical landscape study approach, in contrast to site-specific individual and unrelated projects. This broader historical approach is more compatible with ecosystem management. Sites are often most significant for what they can tell us about human impact to the ecosystem, not just the individual event. Potential environmental threats from maritime resources further emphasize ecosystem interactions.

Stewardship of historic maritime resources is compatible with the overall conservation and preservation goals of the Reserve. Work carried out under this plan will emphasize a low impact approach, to an extent consistent with the management principles and conservation measures of the EO. As with all research and monitoring conducted by the Reserve, activities under this action plan will be conducted in a manner that supports the principle purpose of the Reserve, and the aims of related action plans, such as the Native Hawaiian Cultural Resources Action Plan. Maritime resources emphasize the 19th and 20th century historic past. Any potential investigations of submerged cultural artifacts that might be found as part of this Action Plan would only be carried out in coordination with the Native Hawaiian cultural experts and advisors described in the Native Hawaiian Cultural Resources Action Plan. Maritime resources lie scattered throughout the NWHI within the jurisdictions of the Reserve, the State of Hawai'i, and the U.S. Fish and Wildlife Service (USFWS). Coordinated management of maritime resources in non-Reserve areas can only occur with the cooperation and approval of the partnering agencies.



Strategies

- MH- 1: Construct document-based inventory for the NWHI.
- MH- 2: Carry out field survey and assessment of maritime resources.
- MH- 3: Develop and implement maritime heritage management protocols.
- MH- 4: Develop and implement outreach and education component for maritime heritage consistent with the Education Action Plan.

Performance Measures

- a. An improved understanding of all known and potential maritime resource sites within the Reserve.
- b. Coordinated management partnership among research and management agencies regarding maritime, cultural and natural resources within the Reserve.
- c. A measurable increase in the appreciation of the unique maritime history and archaeological resources in Hawai'i and the Pacific.

Summary of Resource Needs

In-house staff time and:

MH- 1: additional expenses for necessary travel, archival access, copying costs, etc.

MH- 2: costs for remote sensing survey equipment and trained seasonal hires to assist in field surveys. Where appropriate, funds must be allocated to secure ship time and possibly deep-water research. Costs also potentially include air travel to Midway and French Frigate Shoals, small boat operations, ship charters, equipment and repairs.

MH- 3: additional expenses for necessary travel to planning meetings, and appropriate hardware/software.

MH- 4: additional expenses for necessary travel to conferences and presentations and funds for materials development, printing, and display.

Potential Participants

- NMSP's Submerged Cultural Resources Team
- State of Hawai'i, Department of Land and Natural Resources Historic Preservation Office and Division of Aquatic Resources
- Reserve Advisory Council
- U.S. Fish and Wildlife Service's Cultural Resources Program
- NOAA's Ocean Exploration Program
- Naval Historical Center
- National Park Service Submerged Resource Center
- University of Hawai'i (UH) System
- Hawai'i Undersea Research Laboratory
- Bishop Museum and other museums
- Coastal Maritime Archaeological Resources (avocational)
- Maritime Archaeology and History Society (avocational)
- Other universities and research institutions
- Non-governmental organizations



Relation to Other ROP Action Plans and Projects

MH-1 will proceed in conjunction with RM-1 of the Research and Monitoring Action Plan, which calls for the collection and cataloging of selected research publications. Additionally, both archive and field operations may lead to discoveries of items that are not of historical value, but could pose threats to the living marine environment of the NWHI. Identification of such threats, and proper remediation measures, closely link this Action Plan with the Restoration Action Plan and Emergency Response Action Plan. Objects which are neither of historic nor environmental concern may link this Action Plan to the Marine Debris Action Plan. Such research and information should be linked to the Environmental Impact Statement relative to the Sanctuary Designation Action Plan. MH-2, field survey, is accomplished through the use of remote sensing tools (satellite and aerial imagery, magnetometer and side scan sonar), tying this strategy to the Mapping Action Plan. Assessment of existing data can enhance the survey of maritime resources. In addition, any surveys specific to the Maritime Heritage Action Plan will enhance Mapping goals. Maritime heritage fieldwork also adds certain elements to the Operations Action Plan as well. The potential discovery of, or possible survey for, submerged artifacts related to the Native Hawaiian presence in the NWHI will involve close coordination with the Native Hawaiian Cultural Resources Action Plan. MH-3, a maritime heritage management document, will include, to a certain extent, permitting criteria for any activities, which will have an impact on significant historic sites in the NWHI. This stems from existing historic preservation guidelines as they apply to the NWHI. This involves coordination with RM-2 of the Research and Monitoring Action Plan. The education and outreach component, MH-4 of this plan directly supports and enhances several strategies within the Education and Outreach Action Plan.



MH- 1: Construct document-based inventory for the NWHI.

Description and Need for Strategy

The NWHI have a fascinating natural and cultural history, but not much is known concerning the maritime historical activities. The islands consist of resource rich yet low and hazardous reefs and shoals extending across some historical Pacific shipping routes. Shipwrecks were a common occurrence, and castaway camps dotted the islands. Salvage companies raced for shipwreck sites, or made "speculative" tours of the islands. At times, maritime activity in the NWHI was intense, yet only a few texts are currently available.

A documentary search needs to be conducted to collect all records pertaining to maritime resources. Records associated with maritime losses in the Reserve and adjacent waters are located in a number of different local and mainland archives. These include Bishop Museum, National Archives and Records Administration (both in San Bruno California and College Park Maryland), Naval Historical Center in Washington D.C., Pearl Harbor National Historic Park, UH and Hawai'i state libraries, Honolulu newspaper records, and other locations. Records include written, oral, photo and cartographic documents, published or unpublished.

Not only does information need to be collected, but it must also be interpreted. Documents provide the known history of individual sites and are essential to full evaluation of the resource. From a management perspective, protection of historical properties like shipwrecks revolves around basic preservation criteria: 1) association with a major historical event, 2) association with a major figure in history, 3) unique example of construction type or class, and 4) possession of abundant historical or archaeological data. Documentary evidence is crucial to the evaluation of maritime resources. Records also allow investigations to be prioritized. Only certain sites may warrant further attention. If they do, location data from documents can prove invaluable.

With the exception of specific approved management purposes, information relating to the location of historic maritime resources is considered sensitive data and not released to the general public.

Activities

1. Identify, collect and review publications, data sets, and documents archived at various locations.
2. Create maritime heritage reference collection for Reserve; catalogue selected books, photographic data, unpublished manuscripts, etc.
3. Adapt preservation criteria to historic setting of the Reserve, and prioritize documented sites in terms of these criteria.

Location

As maritime resources adjacent to Reserve boundaries within State of Hawai'i and U.S. Fish and Wildlife Service areas may represent impacts (historical and environmental) to the Reserve itself, targeted documents will include the NWHI region in general. Documentary research will be conducted from the Reserve office, with material collected from various local and mainland institutions.

Timeline

- | | |
|-------------|--------------------------------------------------------------------------------------------------------------------------------|
| Activity 1: | Ongoing. Fieldwork (MH-2) often reveals previously unknown maritime resources, which then initiate further documentation work. |
| Activity 2: | Reference collection complete by fall 2004. |
| Activity 3: | Prioritization of known maritime resources will be complete by fall 2004. |

Costs

The main cost for this strategy will be in-house funding (staff support). This strategy will also require some additional expenses for necessary travel, archival access, copying costs, and the creation of a small reference collection.

Results of the Strategy

Outputs:

- Comprehensive review and evaluation of published and unpublished materials and data sets from archives completed.
- Reference collection of documents relating to maritime heritage in the NWHI created.
- Prioritized selection of maritime resources in the NWHI for future use drafted.



MH- 2: Carry out field survey and assessment of maritime resources.

Description and Need for Strategy

Completed archival research represents only a partial survey of the required inventory for maritime resources. Fieldwork is required to locate and assess known and previously unknown maritime resources. Some features may be located on shores, necessitating beach surveys. All maritime archaeology work done in the Reserve and adjacent waters will take into account the fragile nature of the ecosystems and the need to stress low impact methods and will be carried out in consultation with the Reserve Advisory Council and permission of Reserve partners of affected jurisdictions. The aim is to survey, locate, and assess historical maritime resources. Where possible, an effort shall be made to conduct maritime field work in conjunction and coordination with other research expeditions in order to reduce the cumulative impact on the environment and increase efficiency. Surveys will always be conducted by personnel properly trained in conducting ecological assessments.

Frequently the study of shipwreck sites features non-invasive (non-excavation) techniques. Data recovery can be maximized while site disturbance is minimized. Where the removal of diagnostic artifacts from historical maritime resource sites is deemed appropriate (i.e. in support of education/outreach goals, or in response to external threats to the site), removal shall be done in compliance with all conservation and management goals of the Reserve, and all associated management and permitting agencies. Plans for invasive (excavation) fieldwork should be reviewed by the appropriate jurisdictional partner for potential impacts to the biological and environmental setting.

With the exception of specific approved management purposes, information relating to the location of historic maritime resources is considered sensitive data and not released to the general public.

It should be noted that increasing research activities of all types in the NWHI might lead to potential impacts on historical maritime resources. Oversight and coordination of research activities should promote cross-disciplinary communication. Access to some locations of significant historical resources (shipwrecks) or environmental dangers (unexploded ordnance) may need to be restricted. Furthermore, where evidence of human remains is encountered, State and Federal law relating to burials and war graves may be applicable, providing additional protections against disturbance.

Fieldwork activities are preliminary and will be guided by input from the scientific community at forums, such as the NWHI Science Workshop held in May 2003. All maritime heritage activities will be coordinated opportunistically with the Reserve's field season and conducted as funds allow. Any activities proposed within another agency's jurisdiction will be coordinated with and permitted by that agency.

Activities

1. Conduct surveys of potential maritime resource threats to the ecosystems of the Reserve and complete an initial assessment of their conditions.
2. Carry out remote sensing surveys by using appropriate tools for both known and potential (unknown) submerged maritime resources.
3. Plan and direct assessments of located targets within appropriate diving ranges and conditions.
4. Conduct shore surveys as permitted for maritime resource material.
5. Arrange for appropriate surveys of historic deep-water targets as warranted.
6. Carry out recovery and proper conservation of diagnostic artifacts where warranted.

Location

Fieldwork will take place within the boundaries of the Reserve. Fieldwork conducted within the boundaries of State or USFWS waters will only take place in cooperation with the appropriate partner agency. Work platforms will generally include small craft launched from research vessels. Researchers may accompany general scientific research cruises, as well as work from the shore (eg. Midway) or from dedicated maritime archaeology survey vessels.



Timeline

- Activity 1: Assessment of potential environmental threats will begin in summer of 2004 as part of diving surveys (Activity #3).
- Activity 2: Remote-sensing surveys will begin in summer 2004 at Midway and Kure, contingent on procuring funding and equipment.
- Activity 3: Diving surveys will begin in summer of 2004 at Midway and Kure.
- Activity 4: Initial shore surveys will begin in summer 2004 at Midway and Kure. Subsequent additional shore surveys to be conducted on other islands as funding and agreement with jurisdictional partners is negotiated.
- Activity 5: Deep-water maritime archaeology work will begin pending grant proposal acceptance, summer 2004.
- Activity 6: Pending permitting process and coordination with partner agencies, location of conservation facilities and long-term storage/display facilities, etc.

Costs

The cost for this strategy will be handled by in-house funding, as well as grants from outside agencies. Where possible, an effort shall be made to use Reserve funds for Reserve projects and outside funds for projects in adjacent waters, with the approval of the partnering agencies. Potential granting agencies include: NOAA's Ocean Exploration program, Historic Hawai'i Foundation, National Trust for Historic Preservation, and others. Support will have to be found for acquiring the necessary survey equipment. Fieldwork can be done opportunistically as a part of the Research and Monitoring Action Plan activities.

Results of the Strategy

Outputs:

- Data records from remote sensing surveys (magnetometer records, side scan sonar digital files) compiled and archived.
- Data records from survey dives (measured sketches, still and video digital imagery) compiled and archived, and written field assessments from survey dives completed.
- Shore survey data compiled.
- Deepwater targets investigated.
- Assessment of potential threats to the ecosystems made available to the proper agencies.
- Representative artifacts conserved and appropriately displayed (when warranted).
- Recovery of artifacts (where warranted).



MH- 3: Develop and implement maritime heritage management protocols.

Description and Need for Strategy

Comprehensive management protocols stressing protection and preservation of maritime resources are required for the NWHI. Shipwrecks and related sites are often more than just collections of historical or archaeological artifacts. They can be gravesites, marine habitats, ecological threats, and potential sites for commercial salvage or illegal plunder. Competing claims and uses underlie the importance of having protocols that support the management principles and protection and conservation measures described in the EO. Nomination of historic properties, in this case vessels and wreck sites, to the National Register of Historic Places is often the method used to protect individual sites.

Management of maritime resources includes, among other things, control and regulation of activities involving wreck sites, and the creation and implementation of a clear disclosure policy regarding the position of submerged historical sites. Attempts at the illegal recovery of historic submerged artifacts have been documented in the NWHI. The Reserve is in the position of correcting this and setting a national example for preservation management in this developing field. Such management would be a prototype for NOAA's system-wide Submerged Cultural Resources Program.

Networking with the broader field of conservation and resource protection in the Pacific must be a dynamic part of any management system. Therefore, management protocols must include the creation of a flexible database available to legitimate resource managers. In other words, access to sensitive data would be restricted to educational and management needs. Disclosure policy and the protection of sensitive data must be taken into account. These management goals are consistent with NOAA's National Shipwreck Database project, a comprehensive approach allowing for identification of gaps within the material record.

The NWHI scientific workshop in May 2003 included a number of representatives in the field of historical preservation and maritime archaeology, as well as representatives from the partner agencies involved with Reserve management. Input from this workshop assisted with creating an initial outline for this management document. Completion of this document will require coordination with all partnering agencies in the NWHI.

Activities

1. Create draft management protocols and circulate for approval.
2. Submit revised draft to NOAA Submerged Cultural Resources Program.
3. Implement finalized document.
4. Create database and links available to related resource managers.

Location

The maritime heritage management document will cover specific resources within the Reserve and adjacent waters.



Timeline

- Activity 1: Outlining the management guidelines for the NWHI will begin immediately. A draft guideline for NOAA maritime archaeology program completed with partner review by early spring, 2004.
- Activity 2: Revised draft for NOAA review will be completed by summer 2004.
- Activity 3: Ongoing throughout plan period.
- Activity 4: Databases are flexible: work will be ongoing. No access to the database will occur, however, prior to approval of management design January 2004.

Costs

The cost for this Strategy will be handled by in-house funding, with some additional expenses for necessary travel to planning and review meetings.

Results of the Strategy

Outputs:

- A comprehensive design which clarifies approaches and procedures for the study and preservation of maritime resources in the Reserve and adjacent waters completed.
- A searchable database for maritime resources online (restricted access) created.



MH- 4: Develop and implement outreach and education component for maritime heritage consistent with the Education Action Plan.

Description and Need for Strategy

Maritime resources add a previously undocumented element into the mix, artifacts which open the door to the 19th and 20th century history of the NWHI. Shipwreck discoveries appeal to the public, but outreach must be handled with care and sensitivity. It must be done in a manner that emphasizes the ecosystem conservation and protection goals of the Reserve.

Outreach and education are the primary avenues for raising public awareness about the special nature of the Reserve and its resources. The field of Maritime Heritage represents an opportunity for the Reserve to promote progressive conservation, preservation, and management perspectives for historical, as well as natural and cultural resources. Given the potential for negative impacts on the ecosystems, all publicity surrounding shipwreck resources will be carefully handled in a manner that stresses preservation, site protection, and management and in close coordination with the Reserve Advisory Council Education Working Group and the agencies with jurisdictional authority of the area.

Outreach and education for maritime heritage dovetails nicely with the Outreach and Education Action Plan. The topic of maritime heritage is a natural subject for capacity building type programs, such as school presentations, public forums, and experiential survey training programs. These have the added benefit of creating a small pool of assistants for fieldwork. Maritime heritage can also generate product development, as in brochures, web-based content, video and still imagery, and displays. These methods can all serve in bringing the "resource" to the people, rather than encouraging people to travel to the resource. This strategy in maritime education and outreach differs from the Education and Outreach Action Plan in specific ways as well. MH-4 involves the specialized field of maritime history, particularly as it applies to the Pacific. It involves participation in specialized national and international conferences. It may involve the appropriate public display of historical artifacts, which requires abilities in material conservation. Archaeological work often raises questions regarding ownership, salvage, and commercial exploitation, issues that may be inconsistent with the goals of the Reserve.

Typical methods for making maritime heritage information available to the public include not only brochures and slide shows, but also the designation of historic preserves, coordinated learning activities (such as at Midway Atoll), and nominations to the National Register of Historic Places. The selection of appropriate approaches must be made in coordination with all affected partnering agencies.

Activities

1. Prepare public information document on maritime heritage management and preservation laws as they pertain to the Reserve and adjacent waters.
2. Prepare maritime heritage educational materials featuring conservation and protection of the Reserve.
3. Add educational maritime content to the Reserve's web site(s).
4. Identify appropriate local institutions for cooperative learning projects and presentation venues.
5. Develop experiential training program for volunteers and in-house staff.



Location

The scope of educational materials will cover the entire Reserve and surrounding areas. Education and outreach projects will be carried out at a variety of locations throughout the main Hawaiian Islands. Partnering agencies can provide venues for information dissemination. The NWHI Discovery Center and Hawai'i Maritime Center are likely locations for maritime heritage display information.

Timeline

- Activity 1: Short public document emphasizing management approach to be completed by fall 2004.
- Activity 2: Educational material preparation was initiated fall 2003; ongoing throughout plan period.
- Activity 3: Material available on web site(s) posted fall 2003 and updates will be ongoing.
- Activity 4: Location of educational venues have been initiated and presentations began fall 2003.
- Activity 5: Implementation of experiential training program to begin fall 2005.

Costs

Costs involved in this strategy include expenses for necessary travel to public conferences and presentations. Limited funds for materials development, printing, and display are needed as well.

Results of the Strategy

Outputs:

- Informational material addressing management priorities completed.
- Public educational material assembled.
- Maritime heritage information online.
- Cooperative partnership with local educational institutions formed.
- Experiential training program implemented.



Table 14. Maritime Heritage Estimated Costs. A list of estimated costs for each strategy is shown (in thousands of dollars) over a 5-year timeframe. Each strategy is ranked with an A, B or C based on the following criteria - A: Mandated by EO/Reserve Management Principles; B: Highly Desirable; and C: If Sufficient Funds are Available.

Action Plan: Maritime Heritage							
STRATEGIES AND ASSOCIATED ACTIVITIES	ESTIMATED ANNUAL COST					Total Estimated Costs	Rank
	YR 1	YR 2	YR 3	YR 4	YR 5		
MH-1: Construct document-based inventory for the NWHI.							
1. Identify, collect and review publications, data sets, and documents archived at various locations.	15.0	10.0	10.0	5.0	5.0	45.0	A
2. Create maritime heritage reference collection for Reserve; catalogue selected books, photographic data, unpublished manuscripts, etc.	5.0	0.0	0.0	0.0	0.0	5.0	C
3. Adapt preservation criteria to historic setting of the Reserve, and prioritize documented sites in terms of these criteria.	10.0	0.0	0.0	0.0	0.0	10.0	C
MH-2: Carry out field survey and assessment of maritime resources.							
1. Conduct surveys of potential maritime resource threats to the ecosystems of the Reserve and complete an initial assessment of their conditions.	50.0	30.0	15.0	15.0	15.0	125.0	B
2. Carry out remote sensing surveys by using appropriate tools for both known and potential (unknown) submerged maritime resources.	20.0	35.0	35.0	35.0	35.0	160.0	A
3. Plan and direct assessments of located targets within appropriate diving ranges and conditions.	15.0	15.0	15.0	15.0	15.0	75.0	A
4. Conduct shore surveys as permitted for maritime resource material.	0.0	5.0	5.0	5.0	0.0	15.0	C
5. Arrange for appropriate surveys of historic deep-water targets as warranted.	0.0	125.0	17.5	125.0	17.5	285.0	B
6. Carry out recovery and proper conservation of diagnostic artifacts where warranted.	0.0	8.0	8.0	8.0	8.0	32.0	C
MH-3: Develop and implement maritime heritage management protocols.							
1. Create draft management protocols and circulate for approval.	10.0	15.0	0.0	0.0	0.0	25.0	B
2. Submit revised draft to NOAA Submerged Cultural Resources Program.	5.0	5.0	5.0	5.0	5.0	25.0	C
3. Implement finalized document.	0.0	0.0	10.0	10.0	10.0	30.0	C
4. Create database and links available to related resource managers.	2.0	2.0	0.5	0.5	0.5	5.5	C



Table 14. Maritime Heritage Estimated Costs. A list of estimated costs for each strategy is shown (in thousands of dollars) over a 5-year timeframe. Each strategy is ranked with an A, B or C based on the following criteria - A: Mandated by EO/Reserve Management Principles; B: Highly Desirable; and C: If Sufficient Funds are Available. (cont'd)

Action Plan: Maritime Heritage							
STRATEGIES AND ASSOCIATED ACTIVITIES	ESTIMATED ANNUAL COST					Total Estimated Costs	Rank
	YR 1	YR 2	YR 3	YR 4	YR 5		
MH-4: Develop and implement outreach and education component for maritime heritage consistent with							
1. Prepare public information document on maritime heritage management and preservation laws as they pertain to the Reserve and adjacent waters.	4.0	0.0	0.0	0.0	0.0	4.0	B
2. Prepare maritime heritage educational materials featuring conservation and protection of the Reserve.	5.0	5.0	5.0	5.0	5.0	25.0	B
3. Add educational maritime content to the Reserve's web site(s).	0.5	0.5	0.5	0.5	0.5	2.5	C
4. Identify appropriate local institutions for cooperative learning projects and presentation venues.	1.0	0.0	0.0	0.0	0.0	1.0	C
5. Develop experiential training program for volunteers and in-house staff.	10.0	7.0	7.0	5.0	5.0	34.0	C

Action Plan: Research and Monitoring



Researchers counting algae species, Lisianski Island.

Photo Credit: James Watt

Desired Outcome: To better understand the function and biogeography of the NWHI coral reef ecosystem to assist and inform management decision-making.

Background/Context

Executive Orders 13178 and 13196 (EO) direct the Secretary to support, promote, and coordinate appropriate scientific research and assessment, and long-term monitoring of the Reserve resources, and the impacts or threats thereto from human and other activities, to help better understand, protect, and conserve these resources and species for future generations.

As stated in the Management Principles of the EO, a priority issue for the Reserve Operations Plan is to monitor and assess the Reserve." Monitoring projects provide a critical role in assessing the overall health and integrity of the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve (Reserve). These projects will develop a baseline of information necessary for effective resource management decisions. Several monitoring projects have been proposed that involve multiple federal and state agencies, including the State of Hawai'i, U.S. Fish and Wildlife Service (USFWS), NOAA Fisheries, as well as local partners. Such collaboration aims to achieve the goal of coordinated management of the NWHI ecosystems.

All research and monitoring activities by the Reserve will support and facilitate the implementation of the management principles of the Reserve, in particular to effect the long-term conservation and protection of the coral reef ecosystems and related marine resources of the NWHI in their natural character.



Since the Reserve's inception, significant accomplishments in research and monitoring have been achieved. For example, the Reserve launched its first comprehensive field season in 2002 with significant participation in other major ongoing research and mapping efforts. The primary effort was a month-long, multi-agency expedition in September and October of 2002 to rapidly evaluate and assess the near shore marine resources at the 10 islands and atolls of the northwestern chain. Northwestern Hawaiian Islands Reef Assessment and Monitoring Program (NOWRAMP) expeditions reconfirmed the results of recent multi-agency expeditions that the coral reefs and near shore waters surrounding the NWHI are healthy and among the most pristine in the world. Despite this confirmation, one of the most significant findings of the 2002 NOWRAMP expedition was the observance of mass coral bleaching for the first time in the NWHI, providing evidence that no coral reef on the planet is immune to the phenomenon of bleaching. In addition, the bleaching event underscored the importance of regular, long-term monitoring activities to assess temporal changes in the condition of the reefs in the NWHI.

A partial annotated bibliography of biological and physical studies in the NWHI has been created as partial fulfillment of a contract awarded to the Bishop Museum, to assist in the identification, conservation, and protection of the NWHI coral reef ecosystems and related marine resources and species.

**“...to support,
promote, and
coordinate appropriate
scientific research
and assessment,
and long-term
monitoring of the
Reserve resources...”**



Strategies

- RM- 1: Identify and review all past and present research and monitoring activities conducted in the NWHI.
- RM- 2: Develop ecologically-appropriate criteria, provisions and constraints for Reserve permits and access.
- RM- 3: Develop a proposed research and monitoring plan for the Reserve, and a proposed NWHI regional science plan with input from partnering agencies and the broader scientific community.
- RM- 4: Assess and monitor ecosystem integrity and function of NWHI ecosystems.

Performance Measures

- a. An increased understanding of all past and ongoing research conducted in the NWHI.
- b. Development of a draft Reserve science plan that supports the management principles and protection and conservation measures described in the EO and serves as a guide to coordinate research in the NWHI.
- c. Ecosystems and resources maintained in their natural character.

Summary of Resource Needs

In-house staff time and:

- RM- 1: Funds were awarded to the Bishop Museum to compile an annotated bibliography of all activities in the NWHI. In addition, NMSP funds have been provided to develop a GIS database inventory of prior research activities in the NWHI.
- RM- 2: Additional funds for travel and materials.
- RM- 3: Funds were awarded by NOS to the Bishop Museum to conduct a NWHI science workshop; additional costs will be incurred for travel, printing and materials.
- RM- 4: Additional funds must be allocated to establish and conduct assessment and monitoring activities over the long-term, including funds already allocated to the Hawai'i Undersea Research Laboratory (HURL) for a 5-year monitoring project of deep-water banks. In addition, a significant amount of NOAA ship time and small boat time will be required to conduct research and monitoring activities. Additional resources need to be allocated to support vessel operations and maintenance.

Potential Participants

- Reserve Advisory Council
- State of Hawai'i, Department of Land and Natural Resources
- NOAA Fisheries
- NOAA Marine and Aircraft Operations
- US Fish and Wildlife Service
- University of Hawai'i and other universities
- Other research institutions
- Non-governmental organizations
- Bishop Museum and other museums



Relation to Other ROP Action Plans and Projects

An inventory of all research and monitoring activities in the NWHI, proposed in RM-1, provides valuable information to NOAA and partners for establishing priorities for future research and other project investments in the Reserve, including NOAA-funded research cruises and missions. RM-2, "Develop permit criteria for research and monitoring activities in the Reserve" will assist in ongoing efforts to develop a permitting system as described in OP-4 of the Operations Action Plan. The development of Best Management Practices will support the training workshops described in the Education Action Plan, ED-5. The development of an integrated tracking system described in RM-2, Activity #4 is designed to complement efforts to develop a coordinated enforcement plan in the Enforcement Action Plan. The main product of RM-3, a well coordinated and integrated science plan, will provide the foundation for management of the NWHI that is consistent with the requirements of the EO, including the long-term conservation and protection of the coral reef ecosystems and related marine resources and species of the NWHI in their natural character and ensure long-term monitoring of ecosystem integrity and function for the region. The ground-truthing and earlier mapping work done during the NOWRAMP 2000, 2001, 2002 and most recently 2003 cruises, as well as a 2001 cruise dedicated to ground-truthing of remote sensing imagery provides more data to assist with the completion of the 2003 draft *Atlas of the Shallow-Water Benthic Habitats of the NWHI* described in the Mapping Action Plan. A detailed description of staff administrative and logistical support for research field activities in RM-4 of this action plan can be found in OP-5 of the Operations Action Plan. All activities described in RM-4 will be carefully reviewed following the completion of RM-3 in this action plan to ensure they are consistent with the Reserve Science Plan and other products generated from the Science Workshop.



RM- 1: Identify and review all past and present research and monitoring activities conducted in the NWHI.

Description and Need for the Strategy

An inventory of past and present research in the NWHI will provide information to help better understand past trends that may affect the Reserve, provide a reference base for evaluating future access and is necessary to avoid duplication of efforts. The Bishop Museum has provided a partial bibliographic database that documents some of the marine research in the region. This bibliography will serve as a starting point for a comprehensive analysis of research activities, results, and impacts on the ecosystem. More recently, NOS staff created a draft spatial GIS bibliographic database designed to illustrate the general location of relevant characterizations and research conducted in the region. This database will be web-based and available to the general public. All activities described in this strategy will take into account the ecological and cultural sensitivities and avoid disclosing specific site information to protect the integrity and heritage of these resources.

Activities

1. Assist in the continued development of the spatial GIS bibliographic database. Such information will include, but will not be limited to:
 - Ecological assessment;
 - In situ oceanographic, ecological, keystone species and other monitoring as necessary;
 - Trophic modeling studies;
 - Bottomfish habitat identification;
 - Terrestrial and sea bird research, as may be requested by the partners;
 - Marine mammal and other protected species research;
 - Shark research;
 - Native Hawaiian cultural and other historic resources;
 - A history of past relevant extractive and non-extractive uses; and
 - Other available data sources.
2. Expand annotated Reserve bibliography begun by Bishop Museum including published manuscripts, research findings, historical accounts, popular publications, etc.
3. Collect and catalogue selected books, photographic data, articles, published and unpublished manuscripts and unanalyzed data sets not readily available through journals or Hawaiian collection at the University of Hawaii's Hamilton Library.
4. Facilitate and participate in collaborative workshops, conferences, symposia and other meetings in the future.

Location

This project will relate to the entire Reserve and surrounding areas, and will be conducted from Reserve offices in Honolulu, as well as partner agency facilities and assets.



Timeline

- Activity 1: Ongoing.
- Activity 2: Bishop Museum bibliography was completed in early 2003; literature search and additions to the bibliography will be ongoing.
- Activity 3: The collections will begin upon the acquisition of adequate staffing and resource funding.
- Activity 4: Participate as opportunities arise.

Costs

Labor will mainly be provided by in-house staff and in-kind resources of partner agencies. Additional resources will be needed to hire staff for and acquire items related to activity #3. Additional space and specialty archival storage materials may be needed as the collection of materials expand.

Results of the Strategy

Outputs:

- A GIS database developed, incorporating the information described above.
- A bibliographic database completed, that will include all known research in the NWHI.
- Specialty resource collection related to research activities in the NWHI established.
- Collaboration with partners enhanced to allow staff to stay current with ongoing research activities.



RM- 2: Develop ecologically-appropriate criteria, provisions and constraints for Reserve permits and access.

Description and Need for the Strategy

A permitting process is being developed under the Operations Action Plan, OP-4, to ensure that activities conducted within the Reserve do not undermine the comprehensive, strong and lasting protection of the natural, cultural and historic resources of the area. Regarding activities that are prohibited in the Reserve, the EO provides that, the Secretary of Commerce may conduct, or authorize by permit otherwise prohibited activities to the extent that they are necessary for research, monitoring, education, or management activities that further the Management principles of the Reserve. To this end, permitting criteria must be developed in consultation with partnering agencies in the spirit of Section 5(d) of the EO to properly address activities related to research and monitoring in Reserve waters, and reduce threats and impacts to the Reserve and surrounding waters. Threats to the Reserve from research activities include vessel groundings, bilge water dumping, inadvertent dumping of toxic materials, introduction of alien species, ship transiting, re-fueling and anchor damage, among others. The purpose of this strategy is to identify research-specific criteria that will help guide the development of the Reserve's overall permitting and notification procedures (see Operations Action Plan, OP- 4) and used as a foundation for developing a set of ecological best management practices that will be adopted by researchers who conduct activities in the Reserve (see Education Action Plan, ED- 5). Such criteria will be identified to assist in the review and potential issuance of permits. An integrated process will be established that shall identify all applicable permits and will be designed to properly track and document research activities in the Reserve. Such a process shall not diminish or enlarge the jurisdiction or authority of any other permitting agencies.

Activities

1. Identify threats from and impacts of research and monitoring activities to Reserve resources.
2. Draft protocols or guidelines, in consultation with partner agencies that address threats and potential impacts to Reserve resources which will be presented as best management practices to be followed when conducting research in Reserve waters.
3. Develop research-specific criteria for identifying, prioritizing, and evaluating research and monitoring activities in the Reserve.
4. Integrate the above criteria with the development of overall Reserve permitting procedures described in the Operations Action Plan.
5. Establish an integrated process to identify and track all activities in the Reserve for which a permit has been issued, including research, monitoring, education, recreational and commercial fishing.

Location

Permit criteria will apply to research and monitoring activities within the Reserve.

Timeline

- Activity 1: Some threats and potential impacts have already been identified. Completion of the identification will be based on the development and completion of GIS database described under RM- 1 of this section. This is a high priority for the Reserve.
- Activity 2: To begin spring 2004.
- Activity 3: Initial criteria to be developed prior to 2004 field season.
- Activity 4: To begin once initial criteria is developed and under the MOA described in OP-3 (Activity 2) of the Operations Action Plan.
- Activity 5: To begin once permit process has been developed and implemented.



Costs

Labor will be provided by in-house staff. No additional costs are anticipated to implement these activities. Computer software, training and additional staffing costs necessary to establish an integrated tracking system.

Results of the Strategy

Outputs:

- Threats and potential impacts from research and monitoring activities identified.
- Written guidelines and protocols developed for safely conducting research in the NWHI.
- Research-specific criteria for identifying, prioritizing, and evaluating research and monitoring activities identified and integrated with overall Reserve permitting procedures.



RM- 3: Develop a research and monitoring plan for the Reserve, and a proposed NWHI regional science action plan with input from partnering agencies and the broader scientific community.

Description and Need for the Strategy

The NWHI has an extensive history of research and monitoring. The Reserve will develop a research and monitoring plan that supports the management principles and protection and conservation measures described in the EO. In order to develop an effective plan to assist management, a science workshop was held in May 2003 with the assistance of NMSP staff and partnering agencies. Workshop participants included experts in all areas of NWHI scientific research, as well as representatives from non-government organizations and each of the partnering agencies. This effort provided a forum for identifying critical gaps in the current body of knowledge about the NWHI, and was designed to drive the formulation of the science and research component of Reserve operations. A regional science plan will be developed from the information obtained during the workshop. Although the Reserve's primary focus is to monitor the extensive natural resources of the NWHI, Reserve staff will continue to be involved in helping to support other research activities by providing logistical support and ship-time.

Activities

1. Create a research and monitoring plan considering workshop priorities that contribute to the long-term conservation and management of the NWHI Reserve.
2. Summarize workshop products, working collaboratively with partnering agencies, into a multi-agency regional science action plan.
3. Implement multi-agency regional science plan with partners, which include logistical support and ship-time.

Location

A science workshop was held in Honolulu, Hawai'i in May 2003. The resulting Reserve Plan will be developed through coordination with NMSP and Reserve staff out of the Hilo and Honolulu Reserve Offices. The content of the multi-agency regional science action plan will apply to the entire NWHI region.

Timeline

- To be completed by end of 2004.
- To be completed by the end of 2004.
- To begin after multi-agency regional science action plan is developed and ongoing.

Costs

Regional science action plan workshop costs, printing and publication costs for workshop products will be supported by NMSP Headquarters and the Reserve.

Results of the Strategy

Outputs:

- Activity 1: NWHI multi-agency regional science workshop conducted.
- Activity 2: Research and monitoring plan written for the Reserve.
- Activity 3: NWHI multi-agency regional science action plan drafted.



RM- 4: Assess and Monitor the Integrity and Function of NWHI ecosystems.

Description and Need for the Strategy

The reefs in the NWHI are among the few remaining large-scale, intact, predator-dominated reef ecosystems left in the world and offer an opportunity to understand how unaltered ecosystems are structured, how they function, and how they can most effectively be preserved. The NWHI is also one of the most isolated collections of marine ecosystems in the world and home to many endemic, rare, threatened and endangered species. The EO directs the Reserve to "be managed using available science" and "to the extent consistent with the primary purpose of the Reserve, . . .to support, promote, and coordinate appropriate scientific research, monitoring, and assessment." In addition, the EO specifically directs the Reserve to determine whether existing levels of take on Raita Bank and near St. Rogatien Bank have an "adverse impact on the resources of these banks." Improved understanding of NWHI coral reef ecosystems will enable managers to more fully protect and properly manage the existing integrity of the marine environment in its natural character and prevent any further degradation. These reefs also offer a yardstick with which to measure the success of management and recovery efforts in the main Hawaiian Islands and elsewhere. Activities contained within this strategy will be consistent with the Reserve's research and monitoring plan and the management principles and conservation measures of the EO. Frequently, monitoring may detect changes which will lead to the identification of new research projects.

Activities

1. Develop baseline inventory of biological resources, including, but not limited to:
 - biodiversity,
 - systematics,
 - taxonomy,
 - life history,
 - ecology,
 - trophic-level interaction,
 - biogeography, and
 - demographics of shallow and deep-water species.
2. Assess ecosystem connectivity within the NWHI and between the NWHI and the main Hawaiian Islands (including recruitment, stock isolation, source and sink areas, and stock resilience).
3. Characterize the types and distributions of marine habitats in the NWHI (as with Activity 2, this involves an understanding of ocean current patterns, wave energy distribution patterns and other oceanographic conditions).
4. Establish a monitoring program for shallow reef sites.
5. Establish monitoring on deep reefs sites, including Raita and St. Rogatien Banks.
6. Continue ongoing monitoring efforts and target research activities based on results of monitoring.

Location

Research will be conducted in Reserve and adjacent waters.

Timeline

- | | |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Activity 1: | Ongoing. |
| Activity 2: | To begin by 2004 field season. |
| Activity 3: | Ongoing in some areas; spatial coverage to expand in 2004 field seasons. Multi-agency monitoring efforts began in 1999, and have continued with NOWRAMP cruises and state efforts at Kure Atoll. |
| Activity 4: | Began in 2001, to be completed by 2005. |
| Activity 5: | Began in 2001, monitoring to be completed by 2005. Will require one year follow-up analysis |
| Activity 6: | Ongoing. |



Costs

Labor will be provided by in-house staff and contractors. Significant additional resources will be required for contract research, vessel and field time (covered in the Operations Action Plan), data analysis, and publication of results.

Results of the Strategy

Outputs:

- Biodiversity and biogeography of the NWHI documented.
- Descriptions of new species published and species checklists created.
- Habitat types and their spatial distributions in the NWHI identified.
- Monitoring program for shallow reefs established.
- Biological and physical impacts of take on deepwater banks (beginning at Raita and St. Rogatien) and their resources documented.
- Information on the physical and biological parameters that connect the NWHI to the main Hawaiian Islands acquired.



Table 15. Research and Monitoring Estimated Costs. A list of estimated costs for each strategy is shown (in thousands of dollars) over a 5-year timeframe. Each strategy is ranked with an A, B or C based on the following criteria - A: Mandated by EO/Reserve Management Principles; B: Highly Desirable; and C: If Sufficient Funds are Available.

Action Plan: Research and Monitoring							
STRATEGIES AND ASSOCIATED ACTIVITIES	ESTIMATED ANNUAL COST					Total Estimated Costs	Rank
	YR 1	YR 2	YR 3	YR 4	YR 5		
RM-1: Identify and review all past and present research and monitoring activities conducted in the NWHI.							
1. Assist in the continued development of the spatial GIS bibliographic database.	25.0	10.0	10.0	10.0	10.0	65.0	B
2. Expand annotated Reserve bibliography begun by Bishop Museum including published manuscripts, research findings, historical accounts, popular publications, etc.	5.0	5.0	5.0	5.0	5.0	25.0	B
3. Collect and catalogue selected books, photographic data, articles, published and unpublished manuscripts and unanalyzed data sets not readily available through journals or NWHI collection at UH Hamilton library.	3.0	3.0	3.0	3.0	3.0	15.0	C
4. Facilitate and participate in collaborative workshops, conferences, symposia and other meetings in the future.	20.0	20.0	20.0	20.0	20.0	100.0	B
RM-2: Develop ecologically-appropriate criteria, provisions and constraints for Reserve permits and access.							
1. Identify threats from and impacts of research and monitoring activities to Reserve resources.	10.0	5.0	5.0	5.0	5.0	30.0	A
2. Draft protocols or guidelines, in consultation with partner agencies, that address threats and potential impacts to Reserve resources which will be presented as best management practices to be followed when conducting research in Reserve waters.	15.0	5.0	5.0	5.0	5.0	35.0	A
3. Develop research-specific criteria for identifying, prioritizing, and evaluating research and monitoring activities in the Reserve.	10.0	0.0	0.0	0.0	0.0	10.0	B
4. Integrate the above criteria with the development of overall Reserve permitting procedures described in the Operations Action Plan.	0.0	5.0	5.0	5.0	5.0	15.0	B
5. Establish an integrated process to identify and track all activities in the Reserve for which a permit has been issued.	0.0	20.0	5.0	5.0	5.0	35.0	B
RM-3: Develop a research and monitoring plan for the Reserve and a proposed NWHI regional science action plan with input from partnering agencies and the broader scientific community.							
1. Create a research and monitoring plan considering workshop priorities that contribute to the long-term conservation and management of the NWHI Reserve.	30.0	0.0	0.0	0.0	0.0	30.0	B
2. Summarize workshop products, working collaboratively with partnering agencies, into a multi-agency regional science action plan.	15.0	20.0	20.0	20.0	20.0	95.0	A
3. Implement multi-agency regional science plan with partners, which include logistical support and ship-time.	20.0	30.0	30.0	30.0	30.0	140.0	B



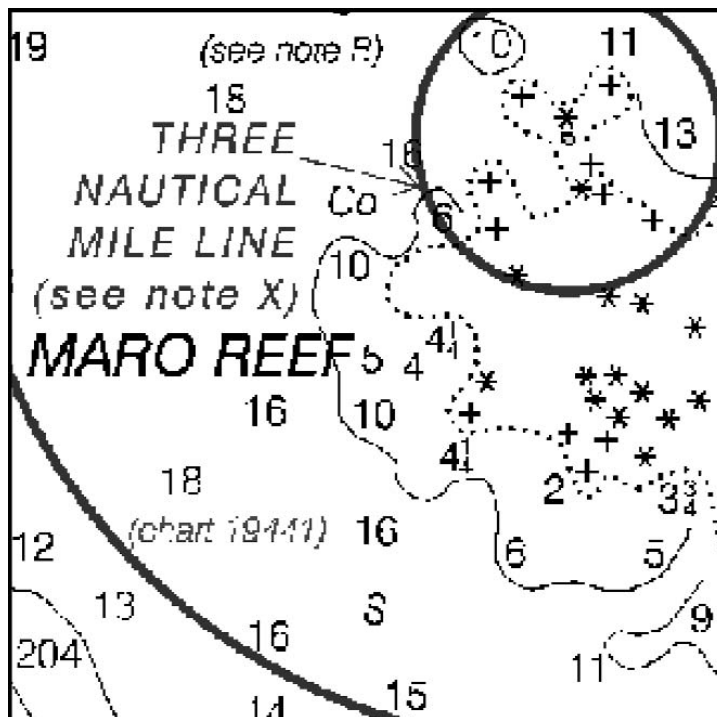
Table 15. Research and Monitoring Estimated Costs. A list of estimated costs for each strategy is shown (in thousands of dollars) over a 5-year timeframe. Each strategy is ranked with an A, B or C based on the following criteria - A: Mandated by EO/Reserve Management Principles; B: Highly Desirable; and C: If Sufficient Funds are Available. (cont'd)

Action Plan: Research and Monitoring (continued)							
STRATEGIES AND ASSOCIATED ACTIVITIES	ESTIMATED ANNUAL COST					Total Estimated Costs	Rank
	YR 1	YR 2	YR 3	YR 4	YR 5		
RM-4: Assess and monitor ecosystem integrity and function.							
1. Develop baseline inventory of biological resources.	100.0	100.0	75.0	75.0	75.0	425.0	A
2. Assess ecosystem connectivity within the NWHI and between the NWHI and the Main Hawaiian Islands (including recruitment, stock isolation, source and sink areas, and stock resilience).	60.0	75.0	75.0	75.0	75.0	360.0	B
3. Characterize the types and distributions of marine habitats in the NWHI.	60.0	60.0	60.0	60.0	60.0	300.0	A
4. Establish a monitoring program for shallow reef sites.	150.0	150.0	150.0	150.0	150.0	750.0	A
5. Establish monitoring on deep reefs sites, including Raita and St. Rogatien Banks.	200.0	200.0	50.0	0.0	0.0	450.0	A
6. Continue ongoing research and monitoring efforts.	100.0	100.0	100.0	100.0	100.0	500.0	A



Action Plan: Mapping

“...relies on a truly cooperative interagency effort.”



Desired Outcome: To better inform users and management of the NWHI through improvement of regional nautical charts.

Background/Context

The Mapping Action Plan addresses data collection and other activities leading to the production of accurate, updated nautical charts and habitat maps of the NWHI. Outcomes of this plan will include updated nautical charts and a finalized atlas of the near shore environments of the NWHI, including habitat characterization. The NWHI Mapping Action Plan relies on a truly cooperative interagency effort. This action plan will consolidate data from several mapping projects scheduled in the National Ocean Service (NOS) and NOAA Fisheries' Coral Implementation Plans. In addition, map products generated by the USFWS will play a significant role in the mapping of this region.

Updated charts are needed to accurately define the Reserve boundaries and manage the resources within it. Activities prohibited or regulated by the Executive Order (EO) are dependent on clear delineation of Reserve and Reserve Preservation Areas (RPA) boundaries. Current data and charts for the region are outdated or nonexistent. Requirements are made within the EO to update this information. NOS and its partners have designed the following Strategies to address these requirements.

A draft *Atlas of the Shallow-Water Benthic Habitats of the NWHI* was published by NOAA in March 2003. Updated NOAA charts of the NWHI will incorporate accurate geo-positioning of islands, the protected species zone, and the Reserve boundary.



Strategies

- MP- 1: Assist in the development of revised charts of the NWHI to enable enforcement of the EO and management of the Reserve.
- MP- 2: Assist in finalizing the draft *Atlas of the Shallow-Water Benthic Habitats of the NWHI*.

Performance Measures

- a. Revised charts incorporate accurate bathymetry and island locations that aid navigation.
- b. A decrease in the number of accidental vessel groundings.

Summary of Resource Needs

In-house staff time and:

- MP- 1: additional costs in NOS Coral Reef Funding to support all mapping projects, and significant Reserve funding to HURL for deep-water multi-beam bathymetry.
- MP- 2: additional costs necessary to ground truth, edit and print final copies of existing draft atlas.

Potential Participants

- NOAA General Counsel
- NOAA Fisheries
- National Geodetic Survey, NOAA
- Office of Coast Survey, NOAA
- Special Projects Office, NOAA
- Coastal Services Center, NOAA
- State of Hawai'i partners
- University of Hawai'i, HURL
- USFWS partners

Relation to Other ROP Action Plans and Other Projects

This Strategy is the first step in a comprehensive mapping and charting process of the NWHI. Reserve and RPA boundaries will be based on data collected under the Mapping Action Plan, and will determine the areas in which permits will be required for activities prohibited by the EO, bottomfish areas and other relevant activities. The Enforcement Action Plan is thus dependent on the products of the Mapping Action Plan. The current draft document *Atlas of the Shallow-Water Benthic Habitats of the NWHI* will continue to be ground-truthed as described in the Research and Monitoring Action Plan, RM-4 and edited as appropriate. Bathymetric data collected for charting purposes will aid in characterization of deep-water habitats and complements habitat utilization research conducted by NOAA Fisheries.



MP- 1: Assist in the development of revised charts of the NWHI to enable enforcement of the EO and management of the Reserve.

Description and Need for the Strategy

The EO allows the Secretary, after consultation with the Governor of Hawai'i, to make technical modifications to the boundary of the Reserve for the purposes of clarity and ease of identifying. Before any such modifications can be made, a functional chart must be produced. A working chart depicting the Reserve and RPA boundaries is also needed for management and enforcement activities. This project will adjust existing chart information to reflect current geographic information derived from satellite imagery and field data. These data will be used to develop boundaries delineating the overall Reserve and RPAs as defined in the EO. The new working chart will be made available to resource users, managers, and enforcement officers, and represents the first step in a larger, more detailed mapping effort in the region that will be underway over the next five years. New charts are essential to the sanctuary designation process and Reserve enforcement.

Activities

1. Collect appropriate bathymetric data for revision of nautical charts.
2. Update current chart data using best available information.
3. Generate draft GIS compatible boundary files.
4. Produce working chart depicting the Reserve and RPA boundaries.
5. Publish notification in the Federal Register referencing the boundaries.

Location

Bathymetric data collection will take place in the NWHI. Generation of boundaries and creation of revised charts will be handled by appropriate NOAA offices.

Timeline

- | | |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Activity 1: | Ongoing. Initial bathymetric data for RPAs has been collected and will be ongoing. |
| Activity 2: | Ongoing. Immediate issuance of "local notice to mariners" with text descriptions of RPA and Reserve boundaries on existing maps to be completed as soon as information becomes available. |
| Activity 3: | Ongoing. |
| Activity 4: | Very high priority. Will be completed as soon as possible. |
| Activity 5: | To be initiated following completion of Activity 3. |

Costs

Costs include funding the Hawai'i Undersea Research Laboratory (HURL) for bathymetric work along the 100-fathom isobath. These funds will support ship time for bathymetric work, and technical support for all mapping projects.

Results of the Strategy

Outputs:

- Bathymetric data for the 25- and 100-fathom contours in the NWHI collected.
- Nautical charts incorporating new bathymetric data revised.
- Boundaries for the Reserve and Reserve Preservation Areas clearly defined.



MP- 2: Assist in finalizing the draft Atlas of the Shallow-Water Benthic Habitats of the NWHI.

Description and Need for the Strategy

The draft *Atlas* supports the U.S. Coral Reef Task Force's mandate to develop shallow-water coral reef ecosystem maps for all U.S. waters. In order to finalize the draft *Atlas*, further field ground-truthing is required for accurate depiction of habitat types, bottom cover, and their spatial distributions.

Activities

1. Obtain field verifications and ground-truthing for substrate types and cover represented in the current draft *Atlas*.
2. Suggest additions, deletions and other modifications to the text and plates of the draft *Atlas*.

Location

Ground-truthing will take place in the NWHI. Editorial suggestions will be generated in the Honolulu Reserve Offices.

Timeline

- Activity 1: Ongoing. Further ground-truthing will occur during upcoming 2004 field seasons.
 Activity 2: Ongoing.

Costs

Labor will be provided by in-house staff and contractors. Additional resources will be required to support field operations (covered in the Operations Action Plan). Costs of publication will be supported by NOS.

Results of the Strategy

Output:

- *Atlas of the Shallow-Water Benthic Habitats of the NWHI* finalized.



Table 16. Mapping Estimated Costs. A list of estimated costs for each strategy is shown (in thousands of dollars) over a 5-year timeframe. Each strategy is ranked with an A, B or C based on the following criteria - A: Mandated by EO/Reserve Management Principles; B: Highly Desirable; and C: If Sufficient Funds are Available.

Action Plan: Mapping							
STRATEGIES AND ASSOCIATED ACTIVITIES	ESTIMATED ANNUAL COST					Total Estimated Costs	Rank
	YR 1	YR 2	YR 3	YR 4	YR 5		
MP-1: Assist in the development of revised charts of the NWHI to enable enforcement of the EO and management of the Reserve.							
1. Collect appropriate bathymetric data for revision of nautical charts.	100.0	100.0	0.0	0.0	0.0	200.0	A
2. Update current chart data using best available information.	3.0	3.0	3.0	3.0	3.0	15.0	A
3. Generate draft GIS compatible boundary files.	30.0	0.0	0.0	0.0	0.0	30.0	A
4. Produce working chart depicting the Reserve and RPA boundaries.	50.0	0.0	0.0	0.0	0.0	50.0	A
5. Publish notification in the Federal Register referencing the boundaries.	0.0	10.0	0.0	0.0	10.0	20.0	A
MP-2: Assist in finalizing the draft Atlas of the Shallow-Water Benthic Habitats of the NWHI.							
1. Obtain field verifications and ground-truthing for substrate types and cover represented in the current draft Atlas.	30.0	20.0	0.0	0.0	0.0	50.0	A
2. Suggest additions, deletions and other modifications to the text and plates of the draft Atlas.	5.0	5.0	5.0	5.0	5.0	25.0	B

Action Plan: Response, Damage Assessment and Restoration



This decaying sea wall at French Frigate Shoals presents a hazard to marine life that can become trapped behind the wall.

Photo Credit: James Watt

“...the NWHI have been subject to a variety of incidents that threaten the Reserve and surrounding areas.”

Desired Outcome: Avoid to the greatest degree possible any further degradation and rehabilitate and restore injured resources, as appropriate.

Background/Context

The Executive Order (EO) directs the Secretary to further the restoration and remediation of degraded or injured Reserve resources. Restoration is usually needed if some natural or anthropogenic incident has caused damage to the resources. Examples of natural occurrences include typhoons and coral bleaching events. An assessment of these damages will help Reserve staff and other experts determine if restoration is appropriate.

Despite their remote location, the NWHI have been subject to a variety of incidents that threaten the Reserve and surrounding areas. The most recent boat groundings have been the *F/V Paradise Queen* that went aground at Kure Atoll in 1999 and the *F/V Swordman II* that went aground at Pearl and Hermes Reef in 2000. An assessment of the damage due to the latter grounding is ongoing. Four hundred meters of permanent monitoring transects have been established; initial fieldwork has been completed, and analysis is now underway by the USFWS and the State of Hawai‘i.

In light of recognized damage from past vessel groundings and shipwrecks in the NWHI, there is a clear need for internal rapid response capacity to address emergency situations that threaten the integrity of the Reserve. This capacity would include coordinating and working with the U.S. Coast Guard and other partners to quickly remove grounded vessels from the coral reefs and to clean up the associated marine debris and related pollution resulting from such groundings. The longer grounded vessels, related debris, and associated pollution remain on the reefs, the more severe the damage to the reefs will be and the higher the likelihood that the debris and pollution could threaten the marine resources, including protected marine mammals, turtles and seabirds of the Reserve.



Coast Guard and NOAA's Office of Response and Restoration have standard procedures in place to respond to oil and other hazardous materials spills, through a Regional Response Team (RRT). The Reserve intends to work to become an integral part of this process and the RRT, as appropriate.

Although little is known about restoration needs within the waters of the Reserve, several restoration projects are proposed or ongoing in the areas surrounding the Reserve, including:

- Proposed monitoring of Tern Island reefs during a seawall construction project;
- Ongoing restoration of native vegetation at Laysan Island;
- Ongoing evaluation of relationship between a former Navy hazardous materials (HazMat) storage area on Midway Atoll and chronic seabird nest failure on a nearby beach;
- Recent removal of contaminated sediments and a grounded tug and barge on Midway Atoll by the U.S. Navy, and ongoing monitoring of the area;
- Cleanup of jet fuel spill on Sand Island at Midway Atoll;
- Proposed removal of contaminated landfill sediments (PCBs and lead) from Tern Island by the U.S. Coast Guard (USGS); and
- Ongoing efforts by the State of Hawai'i to assist with restoration of nesting habitat for 16 species of seabirds at Kure Atoll, including vegetation control trials to determine a methodology for control of *Verbesina*, an aggressive introduced weed that has overrun a significant portion of the island. In addition to the seabird habitat work, the State of Hawai'i is working to establish a year-round research field camp on Green Island and hopes to facilitate research supporting the designation of the area as an ecological reserve.

NOS recognizes the importance of restoration activities both outside the Reserve that can affect Reserve resources and those that may also be needed within the Reserve.

Strategies

- RD- 1: Conduct an assessment of restoration needs.
- RD- 2: Compile a list of all responder and stewardship agencies and available resources involved in responding to emergency response situations.
- RD- 3: Develop a contingency plan to determine how available agencies and resources will meet the needs of emergency response to minimize impacts.

Performance Measures

- a. Updated assessment of degraded or injured resources in the NWHI completed by early 2004.
- b. Prioritized list of resources in need of restoration completed by June, 2004.
- c. Increased communication between partner agencies regarding the handling of response procedures during an emergency situation.
- d. A contingency plan adopted by all appropriate agencies by the end of 2004.

Summary of Resource Needs

In-house staff time and:

RD- 1: additional costs incurred only if resources in need of restoration are discovered in Reserve waters.



Potential Participants

- NOAA, Office of Response and Restoration
- State of Hawai'i
- NOAA Fisheries
- U.S. Fish and Wildlife Service
- U.S. Coast Guard
- U.S. Navy
- Non-governmental organizations

Relation to Other ROP Action Plans and Projects

An assessment of degraded or damaged resources in the Reserve will be closely integrated with basic habitat characterization and monitoring efforts, and thus this Response, Damage Assessment and Restoration action plan is closely related to the Research and Monitoring Action Plan. RD-2 of this Action Plan directly relates to OP-4, Activity #7 of the Operations Action Plan to promote and explore all avenues to require insurance against vessel groundings, in partnership with other agencies.

Impacts to resources caused by vessel groundings or marine debris may have ties to the Marine Debris Action Plan. Coordination with the ongoing and proposed restoration projects of partner agencies such as those listed at the beginning of this action plan will occur. The Reserve-wide assessment will be critical to establishing an overall baseline of ecosystem health in the Reserve. This is critical to any future response and restoration effort post-incident. This information is also integral to developing effective contingency plans.



RD- 1: Conduct an assessment of restoration needs.

Description and Need for the Strategy

The EO directs the Secretary to restore or remediate any degraded or injured resources of the Reserve. While the National Marine Sanctuary Program recognizes the importance of restoration activities, there is no assessment of where restoration efforts are most critical. The first step in the restoration process is thus a documentation of resources in need of restoration.

Activities

1. Record location and nature of degraded resources during field activities in the Reserve. Assessment will be conducted concurrently with habitat characterization and monitoring activities.
2. Review existing information and consult with the Reserve Advisory Council, management partners, and other knowledgeable parties to develop a priority list of restoration areas/projects.

Location

Resource surveys occur in the field in the NWHI. Additional inquiries with partner agencies and other organizations will occur administratively in Honolulu.

Timeline

- Activity 1: Ongoing, to be summarized by early 2004.
Activity 2: To be completed by summer 2004.

Costs

Labor will be provided by in-house staff and research contractors. Support for field assessment of degraded resources will be absorbed by research and monitoring activities under the Research and Monitoring Action Plan.

Results of the Strategy

Outputs:

- Priority list of damaged or degraded resources in Reserve waters developed.
- List of remediation required for damaged or degraded resources prioritized.



RD- 2: Compile a list of all responder and stewardship agencies and available resources to respond in emergency response situations.

Description and Need for the Strategy

A list of agencies and available resources is necessary to determine if the available level of response sufficiently meets the needs for emergency response in the Reserve and surrounding areas. Typical threats include ship groundings, collisions, marine debris, oil spills, and chemical or other contaminants spilled or leaching from former dumpsites.

Activities

1. Develop an inventory of the existing response and assessment structures for the NWHI, in consultation with the NOAA Office of Response and Restoration, the Oceania Regional Response Team and other appropriate jurisdictional response groups.

Location

The inventory will cover the entire Reserve and surrounding areas.

Timeline

Activity 1: The inventory will be completed by the end of 2004.

Costs

The costs will be mainly in-house staff labor.

Results of the Strategy

Output:

- An inventory of existing emergency response and damage assessment resources and personnel compiled.



RD- 3: Develop a contingency plan to determine how available agencies and resources will meet the needs of emergency response to minimize impacts.

Description and Need for the Strategy

If it is determined that existing capabilities are insufficient, a contingency plan to enhance existing capabilities is necessary to protect Reserve resources, including endangered marine mammals that frequent Reserve waters. Vessel groundings have on numerous occasions damaged reefs in the NWHI. Often, there is insufficient insurance for vessel removal, debris cleanup, and damage mitigation. This strategy is necessary to address these deficiencies and meet the goals of conservation and preservation to retain the natural character of the NWHI.

Activities

1. Evaluate and assess the existing response and assessment structures for the NWHI.
2. Draft a contingency plan, in consultation with jurisdictional partners and all relevant agencies.

Location

The assessment will cover the entire Reserve and surrounding areas.

Timeline

- Activity 1: The analysis will begin in early 2004.
Activity 2: A contingency plan will be drafted by spring 2004.

Costs

The costs will be mainly in-house staff labor and training.

Results of the Strategy

Outputs:

- Assessment of existing emergency response and damage assessment resources and personnel completed.
- Emergency response draft contingency plan completed.



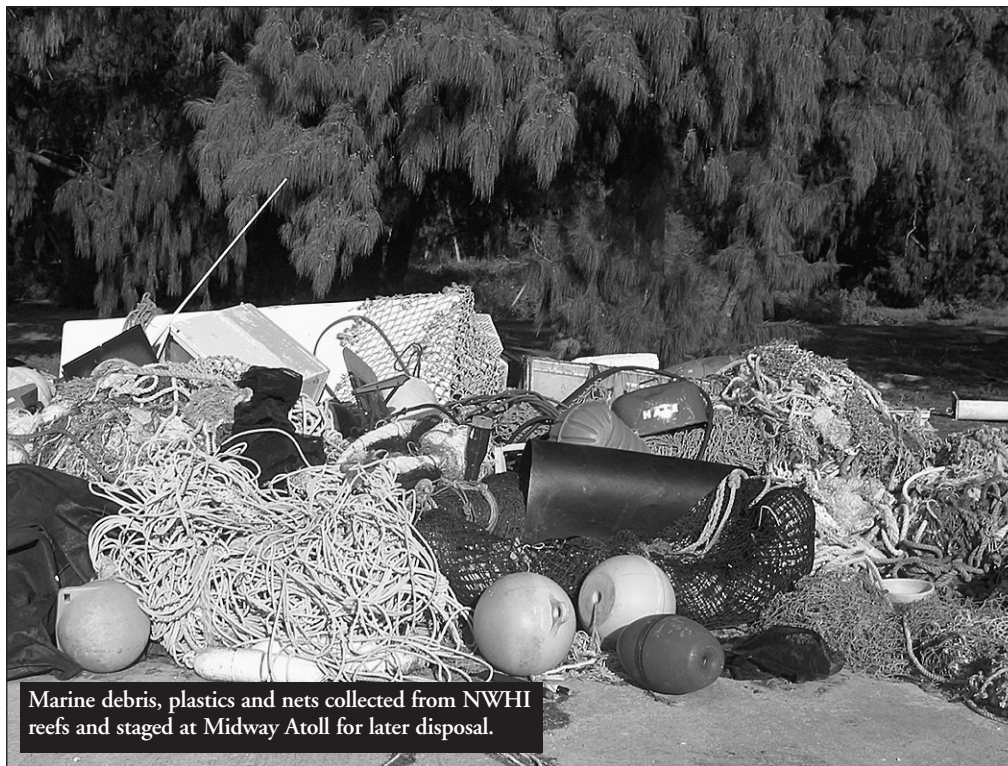
Table 17. Response, Damage Assessment and Restoration. A list of estimated costs for each strategy is shown (in thousands of dollars) over a 5-year timeframe. Each strategy is ranked with an A, B or C based on the following criteria - A: Mandated by EO/Reserve Management Principles; B: Highly Desirable; and C: If Sufficient Funds are Available.

Action Plan: Response, Damage Assessment, and Restoration							
STRATEGIES AND ASSOCIATED ACTIVITIES	ESTIMATED ANNUAL COST					Total Estimated Costs	Rank
	YR 1	YR 2	YR 3	YR 4	YR 5		
RD-1: Conduct assessment of restoration needs.							
1. Record location and nature of degraded resources during field activities in the Reserve.	3.0	0.0	0.0	0.0	0.0	3.0	B
2. Review existing information and consult with the Reserve Advisory Council, management partners, and other knowledgeable parties to develop a priority list of restoration areas/projects	5.0	5.0	0.0	0.0	0.0	10.0	B
RD-2: Compile a list of all responder and stewardship agencies and available resources to respond							
1. Develop an inventory of the existing response and assessment structures for the NWHI, in consultation the NOAA Office of Response and Restoration, the Oceania Regional Response Team and other appropriate jurisdictional response groups.	10.0	0.0	0.0	0.0	0.0	10.0	B
RD-3: Develop a contingency plan to determine how available agencies and resources will meet the needs of emergency response to minimize impacts.							
1. Evaluate and assess the existing response and assessment structures for the NWHI.	10.0	0.0	0.0	0.0	0.0	10.0	B
2. Draft a contingency plan, in consultation with jurisdictional partners and all relevant agencies.	0.0	15.0	0.0	0.0	0.0	15.0	A



“...this area is particularly vulnerable to collecting marine debris.”

Action Plan: Marine Debris



Marine debris, plastics and nets collected from NWHI reefs and staged at Midway Atoll for later disposal.

Photo Credit: James Watt

Desired Outcome: To reduce threats by marine debris to natural resources in the Reserve and neighboring waters with an emphasis on preventing endangered species entanglement.

Background/Context

The Executive Order (EO) directs the Secretary to address the cleanup and prevention of marine debris in the Reserve. Many reefs in the NWHI and throughout the Pacific have been inundated with large amounts of debris lost by commercial fishing operations or dispersed from other marine or terrestrial sources. These objects degrade reef health by abrading, smothering, and dislodging corals and other benthic organisms, preventing recruitment on reef surfaces, and entangling fish, marine mammals, crustaceans, and other mobile species.

Due to the location of the NWHI and ocean current patterns in the Pacific, this area is particularly vulnerable to collecting marine debris. An interagency effort spearheaded by the NOAA Fisheries Pacific Islands Fisheries Service Center (PIFSC) has begun to address this problem that was much larger than any one agency had the ability to resolve. NOAA Fisheries, in collaboration with 14 other partners such as the U.S. Coast Guard, National Ocean Service, UH Sea Grant College Program, U.S. Navy, U.S. Fish and Wildlife Service, City and County of Honolulu, the State of Hawai'i, the Ocean Conservancy (formerly the Center for Marine Conservation), Hawai'i Wildlife Fund and others removed almost 100 tons of marine debris and derelict fishing gear from 1997 to 2001. In 2002, with an increase of funding from NOAA Fisheries and NOAA's National Ocean Service, the cleanup effort was extended and cleanup results grew from 25 tons per year to 107 tons in 2002. Before clean-up efforts began, there were an estimated 1,000 metric tons of derelict fishing gear remaining on reefs and beaches, and this debris continues to accumulate.

In recognition of the magnitude of this problem, the EO directs the Reserve Operations Plan to address removal and prevention of marine debris in the Reserve. The Reserve will build upon existing efforts of the interagency partnership, including the recommendations outlined at the International Marine Debris Conference, 2000, to address this very serious threat to coral reef resources. Areas identified as most



important for marine debris removal should be consistent with endangered species recovery efforts, such as monk seal recovery.

Strategies

- MD- 1: Assist in marine debris removal.
- MD- 2: Assist in prevention of marine debris.

Performance Measures

- a. Reduction in current number of entanglements of marine life.

Summary of Resource Needs

NOS provided \$730,000 for cooperative marine debris clean up and prevention efforts in FY 2001. In FY 2002, the funding from the Reserve budget of NOS was \$750,000 adding to the total of over \$3 million spent on marine debris removal from the NWHI. Funding will need to remain at similar levels to maintain the same level of effort.

Potential Participants

- NOAA Fisheries, Pacific Islands Regional Office
- U.S. Fish & Wildlife Service
- U.S. Coast Guard
- University of Hawai'i system
- U.S. Navy
- State of Hawai'i

Relation to Other ROP Action Plans and Projects:

Objects identified in the Maritime Heritage Action Plan which are neither of historic nor environmental concern may be considered marine debris and thus will be directly related to this action plan. Marine debris present in the NWHI can dramatically impact an area and may be a candidate for restoration, as described in the Restoration Action Plan.



MD- 1: Assist in marine debris removal.

Description and Need for the Strategy

Marine debris damages the natural resources and threatens critical habitat for the endangered Hawaiian monk seals and other marine life. From 1998-2002, an interagency effort removed over 200 tons of debris from NWHI reefs. However, hundreds of tons remain. Ongoing efforts at the interagency level need to continue. The NOAA Fisheries-led collaborative effort proposes to remove a majority of derelict fishing gear by the end of FY05. To achieve this goal, efforts need to be increased beyond current levels.

Activities

1. Boats will be secured by the NOAA Fisheries Coral Reef Ecosystem Investigation program to serve as platforms to remove the debris.
2. Participants from various agencies will systematically tour the NWHI to remove the debris.
3. Require all permitted research and monitoring activities in the Reserve to support marine debris removal efforts by noting the location and type(s) of marine debris encountered.

Location

Marine debris removal occurs in the NWHI; related educational and outreach programs occur in the main Hawaiian Islands and elsewhere.

Timeline

The Reserve joined the interagency effort in FY01 with the intent to continue as an ongoing partner through FY04.

Costs

NOAA supplied a total of \$3.0 million for cooperative marine debris clean up and prevention efforts in FY02. \$750,000 of this amount came from the Reserve, and continued participation by the Reserve is contingent on its annual funding remaining at current levels.

Results of the Strategy

Output:

- Projected removal of a substantial amount of the marine debris in the NWHI by the end of FY04.



MD- 2: Assist in marine debris prevention.

Description and Need for the Strategy

Marine debris is considered one of the most serious threats facing natural resources within the NWHI. Although progress is being made in removal of debris from the beaches and reefs of the NWHI, sources of marine debris need to be identified, followed by efforts to stop further pollution.

Activities

1. Support NOAA Fisheries efforts to identify and track derelict fishing gear and other types of marine debris and their sources, using satellite remote sensing, surface drifters, and oceanographic models.
2. Support education programs directed at commercial fishing, maritime industries and other potential sources of marine debris about the damage to coral reefs by marine debris.
3. Work with U.S. State Department to identify solutions to foreign debris sources, including, but not limited to permanent identification of fishing gear, bounties on recovered debris, and dockside gear accountability inspections prior to vessels departing for fishing trips and upon return from fishing trips.
4. Support NOAA Fisheries' work to catalog and inventory types of marine debris and deposition rates.
5. Work with the North Pacific Fishery Management Council and Western Pacific Regional Fishery Management Council to determine if the types of marine debris found in the NWHI could be coming from commercial fisheries under the jurisdiction of these Fishery Management Councils. If it is determined that the commercial fisheries could be contributing to the NWHI marine debris problem, the Reserve will work with the Fishery Management Councils and work with NOAA Fisheries to initiate an accountability requirement for all vessels that utilize the type of gear contributing to marine debris in the NWHI. This could include permanent identification of fishing gear, dockside gear accountability inspections prior to vessels departing for fishing trips and upon return from fishing trips.
6. Assist in carrying out the recommendations from the International Marine Debris Conference.

Location

This strategy will affect the entire Reserve and surrounding areas.

Timeline

- | | |
|-------------|-------------------------------------|
| Activity 1: | Ongoing. |
| Activity 2: | Began in 2003 and ongoing. |
| Activity 3: | Began in 2003 and ongoing. |
| Activity 4: | Ongoing. |
| Activity 5: | To be completed by the end of 2004. |
| Activity 6: | Ongoing. |

Costs

In FY 2000-02, some of these activities were covered by the Reserve with funds provided directly to NOAA Fisheries Coral Reef Ecosystem Investigation Division. Educational activities will be supported by Reserve staff time.

Results of the Strategy

Outputs:

- Identification of sources and deposition rates of various types of marine debris.
- Marine debris tracking techniques researched and developed.
- Improved oceanographic models.
- Stronger communication with domestic and international producers of marine debris in order to reduce the amount of marine debris entering the ocean.



Table 18. Marine Debris Estimated Costs. A list of estimated costs for each strategy is shown (in thousands of dollars) over a 5-year timeframe. Each strategy is ranked with an A, B or C based on the following criteria – A: Mandated by EO/Reserve Management Principles; B: Highly Desirable; and C: If Sufficient Funds are Available.

Action Plan: Marine Debris							
STRATEGIES AND ASSOCIATED ACTIVITIES	ESTIMATED ANNUAL COST					Total Estimated Costs	Rank
	YR 1	YR 2	YR 3	YR 4	YR 5		
MD-1: Assist in marine debris removal.							
1. Boats will be secured by NOAA Fisheries Coral Reef Ecosystem Investigation program to serve as platforms to remove the debris.	2,000	2,000	2,000	2,000	2,000	10,000	B
2. Participants from various agencies will systematically tour the NWHI to remove the debris.	1,000	1,000	1,000	1,000	1,000	5,000	B
3. Require all permitted research and monitoring activities in the Reserve to support marine debris removal efforts by noting the location and type(s) of marine debris encountered.	15.0	15.0	10.0	10.0	10.0	60.0	C
MD-2: Assist in prevention of marine debris.							
1. Support NOAA Fisheries efforts to identify and track derelict fishing gear and their sources, using satellite remote sensing, surface drifters, and oceanographic models.	5.0	5.0	5.0	5.0	5.0	25.0	B
2. Support education programs directed at commercial fishing, maritime industries and other potential sources about the damage to coral reefs by marine debris.	10.0	10.0	10.0	10.0	10.0	50.0	B
3. Work with U.S. State Department to identify solutions to foreign debris sources, including, but not limited to permanent identification of fishing gear, bounties on recovered debris, and dockside gear accountability inspections prior to vessels departing for fishing trips and upon return from fishing trips.	2.0	2.0	2.0	2.0	2.0	10.0	C
4. Support NOAA Fisheries work to catalog and inventory types of marine debris and deposition rates.	2.0	2.0	2.0	2.0	2.0	10.0	C
5. Work with the North Pacific Fishery Management Council and Western Pacific Fishery Management Council to determine if the types of marine debris found in the NWHI could be coming from commercial fisheries under the jurisdiction of these Fishery Management Councils.	5.0	5.0	5.0	5.0	5.0	25.0	C
6. Assist in carrying out the recommendations from the Marine Debris conference.	15.0	10.0	10.0	10.0	10.0	55.0	B

Action Plan: Enforcement



The U.S. Coast Guard enforces regulations governing the country's waters.

Photo Credit: Andy Collins

Desired Outcome: To increase the level of enforcement and level of compliance for all users within the Reserve.

Background/Context

The principal purpose of the Reserve is the conservation and long-term protection of the coral reef ecosystem and related marine resources and species of the Northwestern Hawaiian Islands (NWHI) in their natural character. Section 4 of the EO specifically states "the Reserve shall be managed using available science and applying a precautionary approach with resource protection favored when there is a lack of information regarding any given activity, to the extent not contrary to law". Section 7 of the EO contains a number of conservation measures that prohibit certain activities throughout the entire Reserve. Section 8 of the EO establishes fifteen Reserve Preservation Areas (RPAs) within which there are additional restrictions. These provisions of the EO are self-executing and have the force and effect of law. As such, NOAA has determined it is not necessary to issue implementing regulations for these measures and RPAs.

The EO directs the Reserve Operations Plan to address enforcement and surveillance of the Reserve as a priority issue. Such enforcement and surveillance actions will include the use of new technologies and will be coordinated with the United States Coast Guard and other relevant agencies. Management techniques within the Reserve are also aimed at ensuring the highest levels of compliance.

Due to its remote location and vast area, the NWHI present a challenge to carry out effective surveillance and enforcement, similar in scope to Australia's Great Barrier Reef. It is quite likely that the single most important element in this ROP that will cause vessels to adhere to Reserve boundaries and other conservation measures is the implementation of an efficient, real-time surveillance and monitoring system. Without the design and rapid implementation of a method of monitoring vessel traffic in the NWHI and to provide for effective enforcement, efforts to conserve and protect the NWHI may fall short of intended goals as mandated by the EO. As such, there is a need for immediate enforcement and surveillance protocols to be developed and implemented.



“The principal purpose of the Reserve is the conservation and protection of the coral reef ecosystem and related marine resources...”



Strategies

- EN- 1: Establish a study team to investigate new and emerging remote sensing technologies for surveillance and monitoring.
- EN- 2: Implement existing Vessel Monitoring System (VMS) and conduct research development and operational evaluation of Remote Acquisition of Depth Sounding (RADS).
- EN- 3: Publish Federal Register Notice defining permitting guidelines and requirements.
- EN- 4: Develop and implement a coordinated enforcement plan for the Reserve, in conjunction with agency partners.

Performance Measures

- a. Draft set of surveillance and monitoring recommendations completed by 2004.
- b. Increased knowledge of use patterns within Reserve boundaries.
- c. Increased public awareness of the Reserve and its conservation measures.

Summary of Resource Needs

In-house staff time and:

- EN- 1: Costs for travel and meeting of participants.
- EN- 2: Additional costs for research and development of new systems.
- EN- 3: Staff time.
- EN- 4: Significant costs for increased air and sea support (including fuel and lodging) and for satellite and other surveillance technology. Additional costs will mostly include in-house staff time, with in-kind staff support from partnering agencies and NMSP. Costs will also include purchase and maintenance of surveillance technologies.

Potential Participants

- State of Hawai'i
- Department of State
- U.S. Fish and Wildlife Service
- NOAA Office of Law Enforcement
- U.S. Coast Guard
- Department of Defense
- NOAA Fisheries
- NOAA General Counsel
- Academic institutions
- Non-governmental organizations
- Reserve Advisory Council

Relation to Other ROP Action Plans and Projects

The coordinated Enforcement plan developed in this Action Plan integrates with OP-3 of the Operations Action Plan to "Carry out operational requirements as specified in the Executive Order."

- a. Establishment of fishing caps and permitting procedures described in the Operations Action Plan will guide enforcement actions developed in EN-4.
- b. The ability to develop a depth-based vessel monitoring system (VMS) is based on the development of straight-line boundaries described in the Operations Action Plan.
- c. The successful development of a coordinated enforcement plan will be the direct result of efforts described in the Operations Action Plan to "Establish an interagency management committee to facilitate coordinated management in the region".
- d. The development of an education and outreach program to further this action plan will be coordinated by the Education Action Plan activities.



EN- 1: Establish a study team to investigate new and remote sensing technologies for surveillance and monitoring.

Description and Need for the Strategy

The broad area of the Reserve (99,500 sq. nautical mi.) makes surveillance an extremely difficult task. However, remote capabilities, such as satellite photography, unmanned aircraft, video and audio technologies could prove to be an effective means of surveillance for such a large area. Innovative technology will be required for effective surveillance and successful enforcement operations in the NWHI.

In order to investigate the full range of options available in remote sensing surveillance technologies, a study team will be formed that will include appropriate experts from industry, academia and agencies, non-governmental organizations, potential partners and personnel experienced in the NWHI. Currently available and emerging technologies that are both efficient and cost-effective, and can potentially serve Reserve needs will be identified. Technologies to be investigated include, but are not limited to radar, telepresence video, hydrophones, remote sensing (aircraft/satellite), VMS, Automatic Identification System (AIS), sensor webs, satellite imagery, mandatory transponder tracking, Specific Emitter Identification (SEI), Autonomous aircraft (UAV), boats and ships.

Activities

1. In consultation with partnering agencies and with input from the Council, identify and select study team members and convene meetings.
2. Organize and conduct a workshop to identify the range of options of currently available and emerging technologies for surveillance and monitoring of the Reserve.
3. In consultation with partnering agencies, utilize workshop recommendations to develop a prioritized list of viable options for carrying out efficient and cost-effective surveillance and related monitoring of the Reserve.
4. Implementation of plan developed for the use of technology surveillance and monitoring of the Reserve (link with EN- 4).

Location

Study team meetings and workshop will be held in Honolulu. Evaluations of products resulting from the workshop will be conducted in the Honolulu Reserve Office. Content of study will cover the entire NWHI region.

Timeline

- Activity 1: Initial discussions have already been initiated and are ongoing.
- Activity 2: Workshop to be conducted in mid 2004.
- Activity 3: A range of viable options produced by the end of 2004 and presented to the Council in a timely manner.
- Activity 4: To begin once plan is adopted.

Costs

Planning costs will be mainly in-house labor with support from NMSP staff. Additional staff support will be provided by a NOAA Fisheries enforcement agent. Costs for invitation travel for workshop participants and for conducting the workshop will be supported by NMSP. Research and development for some of these techniques has already begun. Implementation costs are, as yet, undefined.

Results of the Strategy

Outputs:

- Increased collaboration among multiple agencies that share the responsibility of monitoring the Reserve.
- Multi-agency workshop conducted.
- A prioritized list of available and emerging technologies available for monitoring in the NWHI that have been evaluated by partners and experts in the field.
- Results of workshop presented in a timely manner to the Council.



EN- 2: Implement existing Vessel Monitoring Systems (VMS) and conduct research development and operational evaluation of Remote Acquisition of Depth Sounding (RADS).

Description and Need for the Strategy

The EO directs the use of vessel monitoring systems for any vessel entering or transiting the Reserve, if warranted. To this end, the Secretary in consultation with the Department of State, United States Coast Guard (U.S. Coast Guard) and the Department of Defense (DOD) shall evaluate the need for the establishment of vessel monitoring systems. If VMS is determined to be warranted, then both existing technologies and VMS technologies under development may be utilized to help track vessels operating within the Reserve. Likewise, if warranted, the Secretary shall initiate the steps necessary to have the appropriate domestic agencies request that the International Maritime Organization adopt a vessel monitoring system requirement for the Reserve. At Section 5 (b)(10) of the EO, it is contemplated that all vessels entering or transiting the Reserve could be required to carry VMS if approved by all parties named in that Section.

Since certain activities have depth restrictions placed on them by the EO, a real-time vessel monitoring system with integrated depth monitoring could provide an efficient and economical means of monitoring these areas. However, while hardware, software, and communications components of a VMS are commercially available, VMS currently operates on a positional basis only. Linking existing global positioning technology to depth recorders on ocean going vessels may provide for a real-time depth and position capable VMS program. A research and development project called Remote Acquisition of Depth Soundings (RADS) is now underway to assess this potential.

Activities

1. The Secretary will carry out consultations with USCG and DOD regarding use of existing VMS. If warranted, request these agencies implement a domestic vessel monitoring system.
2. The Secretary will carry out consultations with the Department of State and, if warranted, request that the International Maritime Organization (IMO) adopt a mandatory VMS for the Reserve.
3. Support research and development start up costs, where gaps are identified, related to improved surveillance technology in an expanded VMS in the NWHI.
4. Make recommendations to the technology study team
5. Purchase and install additional transducers for the VMS, if warranted and approved.

Location

This Strategy will take place throughout the Reserve and in adjacent areas if desired by the partners.

Timeline

- | | |
|-------------|----------------------------------------------------------------------------------------------|
| Activity 1: | Carry out consultations as required by Sec 5(b)(10) of the EO as soon as possible. |
| Activity 2: | Implement the results of consultations under Section 5(b)(10) of the EO as soon as possible. |
| Activity 3: | Ongoing. |
| Activity 4: | Began in spring 2003 and will continue throughout the operations of the Reserve. |
| Activity 5: | To begin as soon as possible. |

Costs

The Reserve has provided funding to the NOAA Fisheries Office of Law Enforcement, Pacific Islands Division. Most of the other development costs associated with this strategy involve in-house labor and staff. Start-up costs for software, hardware, monitoring staff, and equipment may be incurred.

Results of the Strategy

Output:

- Development and implementation of real-time, increased capacity (depth-position capable) VMS hardware and software completed.

EN- 3: Publish Notice in Federal Register defining permitting guidelines and requirements.**Description and Need for the Strategy**

The Reserve intends to publish a notice and seek public comment regarding the intent to establish a permitting system to conduct activities for the purposes of research, monitoring, education, or management.

Activities

1. Develop definitions, guidelines and requirements for permits.
2. Publish a notice seeking comment on conducting research, monitoring, education, or management activities that further the management principles of the EO.

Location

Potentially permitted activities could take place throughout the Reserve and areas in the main Hawaiian Islands.

Timeline

- Activity 1: The Reserve Advisory Council has initiated the process of providing advice on definitions and guidelines for permitting research, education, monitoring, and other management activities and will be ongoing.
- Activity 2: 2004.

Costs

Development costs associated with this Strategy involve in-house labor and staff of Reserve and partner agencies. Additional costs for public notification of Notice and Review in the Federal Register will be incurred.

Results of the StrategyOutputs:

- Definitions, guidelines and requirements for permits developed.
- A notice seeking public comment for permitting certain activities.





EN- 4: Develop and implement a coordinated enforcement plan for the Reserve, in conjunction with agency partners.

Description and Need for the Strategy

The EO specifies that the ROP shall, at a minimum provide for enforcement and surveillance of the Reserve. The EO further directs the Secretary to manage the Reserve "to facilitate coordinated management among Federal and State agencies and other entities, as appropriate, to provide comprehensive (looking beyond jurisdictional boundaries) conservation of the coral reef ecosystem and related marine resources and species throughout the NWHI, consistent with applicable authorities and the Management Principles". Under this directive, the Reserve, in consultation with partner agencies, will develop an enforcement plan that utilizes the recommendations of the study team to address each of the directives stated in the EO.

NOAA will work cooperatively with a variety of Federal and State agencies on educational and enforcement programs to assist in the conservation and protection of Reserve marine resources. For example, both Coast Guard and NOAA Office of Law Enforcement have worked together using joint assessments to carry out the enforcement of federal fishery laws. Therefore, NOAA believes that a coordinated enforcement plan will be very useful in the protection of the natural resources of the Reserve. NOAA has engaged in extensive discussion with the Coast Guard concerning enforcement of the conservation measures contained in the Executive Order. Both agencies have agreed to continue devoting attention to the application of existing laws and regulations to maintain and protect the resources within the reserve. As opportunity arises, USCG and NOAA will conduct enforcement by providing educational materials and conducting outreach activities to inform the public and marine users of the Reserve and the conservation measures of the Executive Order.

Enforcing historic preservation laws is just one example of how a coordinated enforcement plan may be advantageous to agency partners and the Reserve. Currently, enforcement of State and Federal historic preservation laws is currently the responsibility of each jurisdictional agency (Reserve, State, U.S. Fish and Wildlife). State historic preservation laws stem from State laws chapter 6E (establishing the Historic Preservation Program) and the Abandoned Shipwreck Act of 1987. Federal agency historic preservation authority is outlined in the Antiquities Act of 1906, the Historic Sites Act of 1935, the National Wildlife Refuge System Administration Act of 1966, the National Historic Preservation Act (NHPA) of 1966, the National Environmental Policy Act (NEPA) of 1969, and the Federal Archaeological Resource Protection Act (ARPA) of 1979. Enforcement of historic preservation laws in this multi-agency, multi-jurisdictional setting will require significant coordination at a higher level.

Activities

1. Establish interagency enforcement committee to develop a coordinated enforcement presence for the NWHI. Additional formalized agreements with partnering agencies will be developed as necessary (see Operations Action Plan, OP-3, Activity #8).
2. Implement the enforcement plan which will include the following elements:
 - Air and sea support for enforcement authorities, as deemed appropriate.
 - Dockside monitoring program developed in conjunction with partners.
 - Clarification of State catch database to assure area accuracy.
 - Development of straight-line boundaries.
 - Use of remote technologies for surveillance and monitoring.
3. Establish an education and outreach program to inform the public and users of the conservation measures to improve compliance with the EO and any instances of non-compliance with the EO once they become public record.
4. Build capacity as required among partnering agencies to effectively carry out enforcement in the NWHI.



Location

Interagency enforcement committee meetings will be convened in Honolulu as appropriate, at the Reserve office and partner locations. Implementation of the program will occur in the Reserve and in the main Hawaiian Islands.

Timeline

- Activity 1: Formal interagency enforcement committee established early 2004.
- Activity 2: Federal Register Notice and Comment Actions, mid-2004.
- Activity 3: Ongoing.
- Activity 4: Ongoing.

Costs

There will be significant costs for increased air and sea support (including fuel and lodging) and for satellite and other surveillance and monitoring technology. Additional costs will mostly require in house staff time and meeting venues as needed for planning. Invitational and inter-island travel for staff and participants will be required. In-kind support for inspection staff required for dockside monitoring program will be provided by existing partners. Additional staffing may be required, if access to the Reserve increases. Start-up costs will be required for printing and distribution of educational materials. Additional costs may be incurred for travel and contract support.

Results of the Strategy

Outputs:

- Use patterns of the Reserve are more clearly defined.
- Catch and other resources landed from the Reserve are monitored.
- Air and sea support in the Reserve increased, if warranted.
- Oral, written, and video presentation material about Reserve resources produced.



Table 19. Enforcement Estimated Costs. A list of estimated costs for each strategy is shown (in thousands of dollars) over a 5-year timeframe. Each strategy is ranked with an A, B or C based on the following criteria – A: Mandated by EO/Reserve Management Principles; B: Highly Desirable; and C: If Sufficient Funds are Available.

Action Plan: Enforcement							
STRATEGIES AND ASSOCIATED ACTIVITIES	ESTIMATED ANNUAL COST					Total Estimated Costs	Rank
	YR 1	YR 2	YR 3	YR 4	YR 5		
EN-1: Establish a study team to investigate new and emerging remote sensing technologies for surveillance and monitoring.							
1. In consultation with partnering agencies and the Council, identify and select study team members and convene meetings.	5.0	0.0	0.0	0.0	0.0	5.0	A
2. Organize and conduct a workshop to identify the range of options of currently available and emerging technologies for surveillance and monitoring of the Reserve.	35.0	0.0	0.0	0.0	0.0	35.0	A
3. In consultation with partnering agencies, utilize workshop recommendations to develop a range of viable options for carrying out an efficient and cost-effective surveillance and monitoring of the Reserve.	0.0	15.0	0.0	0.0	0.0	15.0	A
4. implementation of plan developed for the use of technology surveillance and monitoring of the Reserve (link with EN-4).	0.0	10.0	0.0	0.0	0.0	10.0	A
EN-2: Implement existing Vessel Monitoring Systems (VMS) and conduct research development and operational evaluation of Remote Acquisition of Depth Sounding (RADS).							
1. The Secretary will carry out consultations with USCG and DOD regarding use of existing VMS. If warranted, request these agencies to implement a domestic vessel monitoring system.	15.0	0.0	0.0	0.0	0.0	15.0	A
2. The Secretary will carry out consultations with Dept. of State and if warranted, requests that the International Maritime Organization (IMO) adopt a mandatory VMS for the Reserve.	50.0	0.0	0.0	0.0	0.0	50.0	A
3. Support research and development start up costs, where gaps are identified, related to improved surveillance technology in an expanded VMS in the NWHI.	0.0	50.0	50.0	50.0	50.0	200.0	A
4. Make recommendations to the technology study team.	20.0	10.0	10.0	10.0	10.0	60.0	A
5. Purchase and install additional transducers for the VMS, if warranted and approved.	100.0	10.0	10.0	10.0	0.0	130.0	A



Table 19. Enforcement Estimated Costs. A list of estimated costs for each strategy is shown (in thousands of dollars) over a 5-year timeframe. Each strategy is ranked with an A, B or C based on the following criteria – A: Mandated by EO/Reserve Management Principles; B: Highly Desirable; and C: If Sufficient Funds are Available. (cont'd)

Action Plan: Enforcement							
STRATEGIES AND ASSOCIATED ACTIVITIES	ESTIMATED ANNUAL COST					Total Estimated Costs	Rank
	YR 1	YR 2	YR 3	YR 4	YR 5		
EN-3: Publish Notice in Federal Register defining permitting guidelines.							
1. Develop definitions and requirements for permits.	25.0	10.0	10.0	10.0	10.0	65.0	A
2. Publish Notice seeking comment on conducting research, monitoring, education, or management activities that further the management principles of the EO.	5.0	0.0	0.0	0.0	0.0	5.0	A
EN-4: Develop and implement a coordinated enforcement plan for the Reserve, in conjunction with agency							
1. Establish inter-agency enforcement committee to develop a coordinated enforcement presence for the NWHI. Additional formalized agreements with partnering agencies will be developed, as necessary.	10.0	0.0	0.0	0.0	0.0	10.0	A
2. Implement the enforcement plan which includes the following elements: Air and sea support for enforcement authorities, as deemed appropriate; Dockside monitoring program developed in conjunction with partners; Clarification of State catch database to assure area accuracy; Development of straight-line boundaries; Use of remote technologies for surveillance and monitoring.	0.0	1,000	1,000	1,000	1,000	4,000	A
3. Establish an education and outreach program to inform the public and users of the conservation measures to improve compliance with the EO and any instance of non-compliance with the EO once they become public record.	10.0	15.0	15.0	15.0	15.0	70.0	A
4. Build capacity as required among partnering agencies to effectively carry out enforcement in the NWHI.	50.0	75.0	75.0	75.0	75.0	350.0	A



Action Plan: Sanctuary Designation



The abundance of marine life in the NWHI can be seen in this large school of Yellowfin goatfish, weke 'ula, *Mulloidictyus*.

Photo Credit: James Watt

Desired Outcome: A successful sanctuary designation process that adheres to guidelines established by NEPA, the NMSA and the EO.

Background/Context

The National Marine Sanctuaries Act (Act), the National Marine Sanctuaries Amendments Act of 2000 (NMSAA) and Executive Order 13178 as finalized by 13196 (EO) direct the Secretary of Commerce (Secretary) to begin the process to designate the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve (Reserve) as a National Marine Sanctuary. Consequently, the Reserve was declared an Active Candidate for sanctuary designation on January 17, 2001 (5509 FR 66). The National Marine Sanctuary Program (NMSP) will follow the designation process described in the NMSAA, and further developed in this action plan, to consider a range of sanctuary alternatives for the region. The overarching process for developing a range of reasonable alternatives is the development of an Environmental Impact Statement (EIS) under the National Environmental Policy Act (NEPA). Adjustments to the NEPA process and scheduling will be made as necessary as the designation process continues.

The sanctuary designation process includes three major steps: the initial solicitation of public scoping and comment period under NEPA regarding the sanctuary proposal, identification and characterization of key management issues for the NWHI marine ecosystems, and the development of an EIS that includes a range of management alternatives for the region.

The NWHI sanctuary designation process formally began on March 18, 2002 when the NMSP initiated a series of 10 public scoping meetings hosted in Hawai'i and Washington D.C. The purpose of these meetings was to collect public comment regarding the possibility of a sanctuary in the NWHI. NMSP staff prepared a draft summary of approximately 1,600 comments that were received during these meetings, and more than 4,500 comments, most of which were form letters, that were received during the comment period that closed on August 6, 2002.



The vast majority of these comments strongly support the conservation and protective measures established by the EO and ask for these measurements to be expanded to provide increased levels of protection for the region. Cultural considerations regarding the appropriate perception, and subsequent management of the NWHI region, play a substantial role in the make up of these comments as well. Many of the culturally oriented comments express a desire to include Native Hawaiians in sanctuary management decisions. A minority of comments express concern that placing additional restrictions on commercial activities, such as fishing, is unnecessary and may cause economic and ecological harm to the Main Hawaiian Islands.

The NMSP will work with partner agencies and the Council to identify the key issues from the scoping comments. These issues will be added to those identified during the development of the ROP, and used to create a reasonable range of sanctuary alternatives in a draft EIS. The EIS will outline a range of different sanctuary alternatives, and analyze the environmental and socioeconomic impacts each one could have on the region. The Reserve has contracted the Sustainable Resources Group International Inc. (SRGII) to work with the NMSP, the Reserve/Sanctuary Advisory Council (Council), and partner agencies to develop the Fishing Discussion Group and related documents.

The NWHI sanctuary designation process is unique for a variety of reasons including the size, complex ecology, Native Hawaiian heritage and continued traditional uses, limited existing commercial and recreational fisheries, lack of human population centers, and remote nature of the region under consideration. A significant difference between this designation and those conducted by the program in the past is that the NMSP already manages the Reserve in the waters of the NWHI. As such, the NMSP will seek to provide comprehensive and long-term protection for the region by adhering to the NEPA process and to meet the mandates contained in the EO to designate a sanctuary that supplements or complements the current Reserve.

Several accomplishments have already been made with regard to the designation process. In March 2004, a draft final Reserve Operations Plan (ROP) was released for public comment. When final, this plan will provide the daily management structure, and identify future goals for the Reserve. In addition, the ROP will be used as a building block to create a sanctuary management plan during the designation process. Finalizing this ROP provides an opportunity to set a clear direction for sanctuary designation.

The designation process requires a high degree of coordination and communication between the NMSP, partner agencies, the Reserve/Sanctuary Advisory Council, the Western Pacific Regional Fisheries Management Council, and the public. As a result, Reserve staff developed a communications plan to outline the best methods to work with all of these entities. This plan will be regularly updated as the designation process moves forward.

All of these accomplishments represent significant milestones in the sanctuary designation process to date. The purpose of this Action Plan is to outline the steps required to effectively carry out the remainder of the sanctuary designation process.

**“The designation
process requires
a high degree
of coordination and
communication...”**



Strategies

- DES- 1: Prepare the foundation for sanctuary designation.
- DES- 2: Identify and characterize key management issues related to the NWHI and develop strategies to address them.
- DES- 3: Develop draft Environmental Impact Statement and management plan consistent with the guidance and direction of the Act, the NMSAA and the EO.
- DES- 4: Complete management plans and Environmental Impact Statement including the preferred management alternative for the region.

Performance Measures

- a. Increased public awareness and engagement in the NWHI sanctuary designation process.
- b. Collaboration between all stakeholders, including the Reserve Advisory Council, Reserve staff, contractors and partner agencies in the development of a range of reasonable alternatives.
- c. Selection of the appropriate management alternative for the marine environment of the NWHI that provides long-term conservation and protection of the coral reef ecosystems and related marine resources and species of the NWHI in their natural character, utilizing a “precautionary approach” (see glossary), in accordance with laws and authorities relative to the NWHI.

Summary of Resource Needs

Most of the work for this designation process will involve in-house staff labor and costs for travel, contract support, and printing. However, contracts and public meetings will require a significant level of funding as well. Final contract costs have yet to be determined.

- DES- 1: Additional \$250,000 or more may be required to support contracts in activity 4.
- DES- 2: Primarily in-house staff-labor.
- DES- 3: Primarily in-house staff-labor.
- DES- 4: Additional \$200,000 to conduct public meetings in activity 2 will be required.



Potential Participants

- State of Hawai'i
- U.S. Fish and Wildlife Service
- NOAA Fisheries (including the Pacific Islands Fisheries Service Center and the Pacific Islands Regional Area Office)
- NOAA Office of Law Enforcement
- NOAA General Counsel
- Western Pacific Regional Fisheries Management Council
- U.S. Coast Guard
- U.S. Department of Defense
- Reserve/Sanctuary Advisory Council
- Non-governmental organizations
- Native Hawaiian community
- Other scientific experts
- The general public

Relation to Other ROP Action Plans and Projects

The sanctuary designation process will be an extension of the work done to operationalize the Reserve. Each ROP action plan, strategy, and activity will serve as a framework for the development of the proposed draft sanctuary management plan. Some examples of how the ROP will serve as a beginning for the draft management plan include the evolution of the permitting process (see Operations Action Plan, OP- 4) to include proposed regulations which supplement or complement the Reserve under the NMSAA and other Federal law; the application of surveillance technology and on-the ground enforcement initiated under the ROP's Enforcement Action Plan; and the clarification and implementation of straight-line boundaries; and how coordinated research, monitoring, and management activities among Federal and State partners will develop based on the implementation of a core management committee and the development of a regional science plan. Formal agreements developed by the Reserve with its resource management (and other) partners will serve as a model for how the National Ocean Service (NOS) and the National Oceanic and Atmospheric Administration (NOAA) will continue to facilitate the sharing of information, resources, and interagency planning based on shared principles, goals and objectives throughout the sanctuary designation process.



DES- 1: Prepare the foundation for sanctuary designation.

Description and Need for the Strategy

The proposed NWHI National Marine Sanctuary is situated in an extraordinarily large and remote region. This area is unique to most other coral reef systems in that it hosts relatively few commercial or recreational activities. This region is especially important ecologically, as it encompasses what is among the few remaining large-scale, intact, predator-dominated reef ecosystems left in the world. In addition, the area encompasses a range of coral reef habitats, unique within the National Marine Sanctuary System. The far northerly location and attendant slow growth rates suggest that these reefs are fragile in their ability to recover from human impacts. The region plays a significant role in the living culture of Native Hawaiians as well. As a part of 18th, 19th, and 20th century modern history, it was a sea path for early western explorers, and played a key role in WWII and the Cold War.

The NMSP will work with the Reserve/Sanctuary Advisory Council and partner agencies to develop a comprehensive set of vision, goals, and objectives to guide future progress of the sanctuary in a manner consistent with the EO. This unified vision will promote the highest level of resource protection by drawing on the strengths of all those concerned with the stewardship of the marine ecosystems of the NWHI.

The designation process requires a high degree of coordination and open communication among the Council, the public, and partner agencies. Communication and project plans will provide a critical link between staff and partners, and ensure that the proper messages are delivered to and understood by the Reserve/Sanctuary Advisory Council and public. At the same time, various legal obligations must be met to satisfy NEPA requirements, as well as the obligations of the federal government under the EO. These requirements will ensure that the appropriate ranges of sanctuary alternatives are developed. Some of this work will be completed in conjunction with outside contracts. However, NMSP staff will oversee these contracts.

Activities

1. Draft vision, goals, and objectives to define the purpose of the proposed sanctuary.
2. Develop a communications plan to clarify the roles of the NMSP, partner agencies, Reserve/Sanctuary Advisory Council, Western Pacific Regional Fisheries Management Council, and public.
3. Complete a project plan to coordinate all activities associated with the designation process.
4. Oversee contracts for resource assessments, NEPA compliance documents, and various supporting sections of the draft management plan.



Location

These activities will take place in the Reserve office, with implementation of the documents occurring throughout the State.

Timeline

- Activity 1: To be completed by early 2004.
- Activity 2: To be completed by April 2004.
- Activity 3: To be completed by early 2004.
- Activity 4: Planning and consultation began in 2002. Ongoing implementation of contracts will continue through the completion of the EIS.

Costs

Costs associated with this strategy consist mainly of in-house staff time and travel. In addition, Activity 4 will require approximately \$250,000 to complete the EIS. Private contractors are often used to assist with agency decision documents such as the EIS and costs could vary significantly depending on the scope of work and the successful bidder.

Results of Strategy

Outputs:

- Vision, goals, and objectives developed.
- Communications plan, including a question and answer brochure and web updates completed.
- Project plan for the designation process written and implemented.



DES- 2: Identify and characterize key management issues related to the NWHI and develop strategies to address them.

Description and Need for the Strategy

Over 12,000 public comments regarding the prospect of sanctuary designation were collected during the April-August 2002 comment period. Comments were collected at a series of 10 scoping meetings held in Hawai'i and Washington D.C., as well as by fax, letter, and e-mail. NMSP staff reviewed these comments, along with submissions from the summer of 2000 "Visioning" sessions, and a series of public hearings held in December 2000 and January 2001, and drafted a list of issues that they raise. The NMSP is committed to working closely with partner agencies and the Reserve/Sanctuary Advisory Council to ensure that the full range of issues is properly identified.

Once the key issues are identified they will be ranked and characterized. This will ensure that limited resources and staff time will be allotted appropriately to address the priority issues. A number of different techniques will be employed to identify, rank, and characterize the issues. These techniques include the use of working groups, direct consultation with partner agencies, white papers and other reports. In addition, detailed strategies will be developed to address each priority issue. These will be used to produce a list of reasonable alternatives and various sections of the draft sanctuary management plan/EIS.

Some of these alternatives will consider the inclusion of other Federal and State managed waters. Throughout the designation process, the Reserve will coordinate with partner agencies to discuss and consider the various options. The Governor of the State of Hawai'i will have final approval on whether to include State waters in any future proposed sanctuary.

Activities

1. Identify key issues related to the management of the NWHI coral reef ecosystem.
2. Review key issues with Reserve/Sanctuary Advisory Council utilizing comments from scoping, visioning, science workshop, partner agencies and EO.
3. Characterize key issues and develop strategies to address each one in a sanctuary management plan working with partner agencies and the Reserve/Sanctuary Advisory Council.

Location

These activities will take place in various locations across the state. Key issues and strategies will address management issues throughout the NWHI region.

Timeline

- | | |
|-------------|--------------------------------|
| Activity 1: | To be completed by early 2004. |
| Activity 2: | To be completed by March 2004. |
| Activity 3: | To be completed by July 2004. |

Costs

Costs associated with this strategy consist mainly of in-house staff time and travel, inter-island and inter-state conference calling, and venue rentals for working group meetings.

Results of Strategy

Output:

- Key management issues identified for the NWHI region.
- Key management issues prioritized with input from partner agencies and the Reserve/Sanctuary Advisory Council.
- Strategies developed to address each of the key management issues for inclusion in the draft sanctuary management plan/draft EIS.



DES- 3: Develop a draft Environmental Impact Statement and management plan consistent with the guidance and direction of the Act, the NMSAA and the EO.

Description and Need for the Strategy

The Act requires an EIS under NEPA as a part of any sanctuary designation process. This document will provide various management alternatives for the proposed sanctuary, as well as detailed environmental and socioeconomic analyses examining the effect that each alternative could have on the region.

Once a range of alternatives has been identified and analyzed, the NMSP will consult with partner agencies, the public, and the Reserve/Sanctuary Advisory Council to select a preferred alternative. The preferred alternative will represent the NMSP's favored approach to protecting the NWHI and will be developed into a management plan similar in form and function to the ROP. Another alternative will be labeled the "no action alternative." This will describe a method to continue managing the region utilizing the specific conservation measures established by the EO and detailed in the ROP.

The preferred alternative will include a fully developed management plan that could be immediately implemented. The Reserve Operations Plan will also represent a detailed management plan for the "no action" alternative within the NEPA analysis. NEPA requires that several other alternatives be suggested for consideration as well. These will not be described in as much detail. Some of these alternatives may fall under a "considered but rejected" section of the EIS. The NMSP will work closely with its partner agencies, the Reserve/Sanctuary Advisory Council, the Western Pacific Regional Fisheries Management Council, and the public to develop and refine the range of alternatives included in the EIS. These draft documents will be prepared through a series of working group meetings, public hearings, and direct consultation with partner agencies, Reserve/Sanctuary Council and the Western Pacific Regional Fisheries Management Council.

Activities

1. Identify a range of sanctuary management alternatives, as required by NEPA, and describe the environmental and socioeconomic impacts of each.
2. Write the draft management plan, including the introductory and background sections, as well as the socioeconomic and ecological analyses.
3. Draft proposed regulations to be released as a part of the draft management plan.
4. Consult with partner agencies and the Reserve/Sanctuary Advisory Council on the draft management plan.

Location

The draft management plan and EIS will address the key management issues and strategies related to the marine ecosystems of the entire NWHI region.

Timeline

- | | |
|-------------|-----------------------------------|
| Activity 1: | To be completed by December 2004. |
| Activity 2: | To be completed by spring 2004. |
| Activity 3: | To be completed by spring 2004. |
| Activity 4: | To be completed by summer 2004. |

Costs

Costs associated with this strategy consist mainly of in-house staff time. Private contractors are often used to assist with agency decision documents such as the EIS and costs could vary significantly depending on the scope of work and the successful bidder.

Results of Strategy

Outputs:

- Draft EIS including a range of sanctuary management alternatives developed.
- Preferred and no action alternatives identified, as well as other alternatives.
- Draft regulations and system of penalties prepared as a part of the preferred alternative.



DES- 4: Complete management plans and Environmental Impact Statement including the preferred management alternative for the region.

Description and Need for the Strategy

In order to implement the appropriate management structure for the region the management plan/NEPA process must be completed. Once the full range of management alternatives has been identified, along with the supporting sections and analyses of the EIS, it will be released to the public for comment. This will provide a final public comment period regarding the proposals brought forth under NEPA. Input from this comment period will be collected and analyzed; revisions to the EIS and preferred alternative will be made as necessary. The NMSP, NOAA, and the Department of Commerce will then carry out a Record of Decision, ending the NEPA process.

Activities

1. Conduct public review of draft EIS and management plan, including hosting public meetings and providing a public review and comment period.
2. Record and respond to all oral, written, faxed, and e-mailed comments.
3. Draft a summary document describing the comments and the NMSP response; utilize it to improve the draft EIS and management plan.
4. Prepare, review, and release Record of Decision, which will include the final management plan to public, state, and federal consideration, which will conclude the NEPA process.

Location

These activities will take place at a variety of locations throughout the state and in Washington D.C. The public meetings will be held in easily accessible venues and the review of the EIS/management plan will occur in various state and federal offices.

Timeline

- | | |
|-------------|-----------------------------------|
| Activity 1: | To be completed by November 2004. |
| Activity 2: | To be completed by December 2004. |
| Activity 3: | To be completed by spring 2005. |
| Activity 4: | To be completed by summer 2005. |

Costs

Costs associated with this Strategy consist mainly of in-house staff time and travel. In addition, Activity 1 will require approximately \$200,000 for costs associated with public meetings.

Results of Strategy

Outputs:

- Public meetings and associated comment period completed.
- Summary document and responses to the public comments completed.
- Management plan and EIS completed.



Table 20. Sanctuary Designation Estimated Costs. A list of estimated costs for each strategy is shown (in thousands of dollars) over a 5-year timeframe. Each strategy is ranked with an A, B or C based on the following criteria – A: Mandated by EO/Reserve Management Principles; B: Highly Desirable; and C: If Sufficient Funds are Available.

Action Plan: Sanctuary Designation							
STRATEGIES AND ASSOCIATED ACTIVITIES	ESTIMATED ANNUAL COST					Total Estimated Costs	Rank
	YR 1	YR 2	YR 3	YR 4	YR 5		
DES-1: Prepare the foundation for Sanctuary designation.							
1. Draft vision, goals, and objectives to define the purpose of the proposed Sanctuary.	30.0	0.0	0.0	0.0	0.0	30.0	A
2. Develop a communications plan to clarify the roles of the NMSP, partner agencies, Reserve/Sanctuary Advisory Council, Western Pacific Regional Fisheries Management Council, and public.	50.0	0.0	0.0	0.0	0.0	50.0	A
3. Complete a project plan to coordinate all activities associate with the designation process.	30.0	0.0	0.0	0.0	0.0	30.0	A
4. Oversee contracts for resource assessments, NEPA compliance documents, and various supporting sections of the draft management plan.	50.0	0.0	0.0	0.0	0.0	50.0	A
DES-2: Identify and characterize key management issues related to the NWHI and develop strategies to address them.							
1. Identify key issues related to the management of the NWHI coral reef ecosystem.	30.0	0.0	0.0	0.0	0.0	30.0	A
2. Prioritize key issues with Reserve/Sanctuary Advisory Council working groups utilizing white papers and scoping comment summaries.	25.0	0.0	0.0	0.0	0.0	25.0	A
3. Characterize key issues and develop strategies to address each one in a Sanctuary management plan working with partner agencies, the Reserve/Sanctuary Advisory Council, and subject-matter working groups.	40.0	0.0	0.0	0.0	0.0	40.0	A



Table 20. Sanctuary Designation Estimated Costs. A list of estimated costs for each strategy is shown (in thousands of dollars) over a 5-year timeframe. Each strategy is ranked with an A, B or C based on the following criteria – A: Mandated by EO/Reserve Management Principles; B: Highly Desirable; and C: If Sufficient Funds are Available. (cont'd)

Action Plan: Sanctuary Designation (continued)								
STRATEGIES AND ASSOCIATED ACTIVITIES	ESTIMATED ANNUAL COST					Total Estimated	Rank	
	YR 1	YR 2	YR 3	YR 4	YR 5			
DES-3: Develop draft Environmental Impact Statement and management plan consistent with the guidance and direction of the Act, the NMSAA and the EO.								
1. Identify a range of Sanctuary management alternatives, as required by NEPA, and describe the environmental and socioeconomic impacts of each.	130.0	0.0	0.0	0.0	0.0	130.0	A	
2. Write the draft management plan, including the introductory and background sections, as well as the socioeconomic and ecological analyses.	130.0	0.0	0.0	0.0	0.0	130.0	A	
3. Draft proposed regulations to be released as a part of the draft management plan.	100.0	100.0	0.0	0.0	0.0	200.0	A	
4. Conduct a review of the draft management plan, including consultations with partner agencies and the Reserve/Sanctuary Advisory Council.	0.0	50.0	0.0	0.0	0.0	50.0	A	
DES-4: Complete management plans and Environmental Impact Statement including the preferred management alternative for the region.								
1. Conduct public review of draft EIS and management plan, including hosting public meetings and providing a public review and comment period.	0.0	300.0	0.0	0.0	0.0	300.0	A	
2. Record and respond to all oral, written, faxed, and e-mailed comments.	0.0	75.0	0.0	0.0	0.0	75.0	A	
3. Draft a summary document describing the comments and the NMSP response; utilize it to improve the draft EIS and management plan.	0.0	50.0	0.0	0.0	0.0	50.0	A	
4. Prepare, review, and release Record of Decision, which will include the final management plan to public, state, and federal consideration, which will conclude the NEPA process.	0.0	20.0	0.0	0.0	0.0	20.0	A	

Appendix 1: Executive Order 13178 of December 4, 2000



Brown noddies taking a rest on a small sand pit at Pearl and Hermes Atoll. Sand pits serve as resting places for many marine birds.

Photo Credit: James Watt

Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve

By the authority vested in me as President by the Constitution and the laws of the United States of America, including the National Marine Sanctuaries Act, (16 U.S.C. 1431 et seq.), and the National Marine Sanctuaries Amendments Act of 2000, Public Law 106-513, and in furtherance of the purposes of the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801 et seq.), Marine Protection, Research, and Sanctuaries Act (33 U.S.C. 1401 et seq.), Coastal Zone Management Act (16 U.S.C. 1451 et seq.), Endangered Species Act (16 U.S.C. 1531 et seq.), Marine Mammal Protection Act (16 U.S.C. 1362 et seq.), Clean Water Act (33 U.S.C. 1251 et seq.), National Historic Preservation Act (16 U.S.C. 470 et seq.), National Wildlife Refuge System Administration Act (16 U.S.C. 668dd-ee), and other pertinent statutes, it is ordered as follows:

Section 1. Preamble. The world's coral reefs—the rain forests of the sea—are in serious decline. These important and sensitive areas of biodiversity warrant special protection. While United States waters contain approximately 3 percent of the world's coral reefs, approximately 70 percent of U.S. coral reefs are in the Northwestern Hawaiian Islands. The 3.5 million acres of coral reefs around the remote, mostly uninhabited Northwestern Hawaiian Islands are spectacular and almost undisturbed by humans. The approximately 1,200 mile stretch of coral islands, seamounts, banks, and shoals are unquestionably some of the healthiest and most extensive coral reefs in the United States. In their own right, the spectacular coral reefs and lands provide an amazing geological record of volcanic and erosive powers that have shaped this area. This vast area supports a dynamic reef ecosystem that supports more than 7,000 marine species, of which approximately half are unique to the Hawaiian Island chain. This incredibly diverse ecosystem is home to many species of coral, fish, birds, marine mammals, and other flora and fauna including the endangered Hawaiian monk seal, the threatened green sea turtle, and the endangered leatherback and hawksbill sea turtles. In addition, this area has great cultural significance to Native Hawaiians as well as linkages to early Polynesian culture—making it additionally worthy of protection and understanding. This is truly a unique and special place, a coral reef ecosystem like no place on earth, and a



source of pride, inspiration, and satisfaction for all Americans, especially the people of Hawai'i. It is fully worthy of our best efforts to preserve a legacy of America's natural wonders for future generations. Due to the special significance of this area, I have determined that it is in the best interest of our Nation, and of future generations, to provide strong and lasting protection for the coral reef ecosystem of the Northwestern Hawaiian Islands.

On May 26, 2000, I directed the Secretaries of Commerce and the Interior, working cooperatively with the State of Hawaii and consulting with the Western Pacific Regional Fishery Management Council, to develop recommendations for a new, coordinated management regime to increase protection of the coral reef ecosystem of the Northwestern Hawaiian Islands and provide for sustainable use of the area. Upon consideration of their recommendations and comments received during the public visioning process on this initiative, and based on the statutory authorities set forth above, I am issuing this Executive Order.

Sec. 2. Purpose. The purpose of this Executive Order is to ensure the comprehensive, strong, and lasting protection of the coral reef ecosystem and related marine resources and species (resources) of the Northwestern Hawaiian Islands.

Sec. 3. Establishment of Coral Reef Ecosystem Reserve. There is hereby established in the Northwestern Hawaiian Islands a coral reef ecosystem reserve to be known as the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve (Reserve). The Reserve shall include submerged lands and waters of the Northwestern Hawaiian Islands, extending approximately 1,200 nautical miles (nm) long and 100nm wide. The Reserve shall be adjacent to and seaward of the seaward boundaries of the State of Hawaii and the Midway Atoll National Wildlife Refuge, and shall overlay the Hawaiian Islands National Wildlife Refuge to the extent that it extends beyond the seaward boundaries of the State of Hawaii. The boundaries of the Reserve are described in section 6 of this order.

Sec. 4. Management Principles. The Secretary of Commerce, or his designee, (hereafter "Secretary") shall, subject to section 10(b) of this order, manage the Reserve in accordance with the following principles:

- (a) The principal purpose of the Reserve is the long-term conservation and protection of the coral reef ecosystem and related marine resources and species of the Northwestern Hawaiian Islands in their natural character;
- (b) The Reserve shall be managed using available science and applying a precautionary approach with resource protection favored when there is a lack of information regarding any given activity, to the extent not contrary to law;
- (c) Culturally significant, noncommercial subsistence, cultural, and religious uses by Native Hawaiians should be allowed within the Reserve, consistent with applicable law and the long-term conservation and protection of Reserve resources;
- (d) The Reserve shall be managed using, when appropriate, geographical zoning and innovative management techniques to ensure that the Reserve resources are protected from degradation or harm;
- (e) To the extent consistent with the primary purpose of the Reserve, the Reserve shall be managed to support, promote, and coordinate appropriate scientific research and assessment, and long-term monitoring of Reserve resources, and the impacts or threats thereto from human and other activities, to help better understand, protect, and conserve these resources and species for future generations;
- (f) To the extent consistent with the primary purpose of the Reserve, the Reserve shall be managed to enhance public awareness, understanding, and appreciation of Reserve resources, and the impacts or threats thereto from human and other activities;
- (g) The Reserve shall be managed to further restoration and remediation of degraded or injured Reserve resources; and

(h) The Reserve shall be managed to facilitate coordinated management among Federal and State agencies and other entities, as appropriate, to provide comprehensive (looking beyond jurisdictional boundaries) conservation of the coral reef ecosystem and related marine resources and species throughout the Northwestern Hawaiian Islands, consistent with applicable authorities and the Management Principles of this section.

Sec. 5. Implementation. (a) Management of the Reserve. The Secretary shall manage the Reserve under the National Marine Sanctuaries Act and in accordance with this order.

(b) Reserve Operations Plan. The Secretary, in consultation with the Secretary of the Interior and the Governor of Hawai'i, shall develop an operations plan to govern the management of the Reserve. In developing the Reserve Operations Plan the Secretary shall consider the advice and recommendations of the Reserve Council established pursuant to paragraph (c) of this section.

The Reserve Operations Plan shall be directed at priority issues and actions that, at a minimum, provide for:

- (1) Coordinated management among the Reserve, Hawaiian Islands National Wildlife Refuge, Midway Atoll National Wildlife Refuge, and the State of Hawaii, consistent with relevant authorities;
- (2) Coordination among Federal agencies and the Director of the National Science Foundation to make vessels and other resources available for conservation and research activities for the Reserve;
- (3) The cleanup and prevention of marine debris in the Reserve;
- (4) The restoration or remediation of any degraded or injured resources of the Reserve;
- (5) Research, monitoring, and assessment of the Reserve;
- (6) Education and outreach about the Reserve and its resources and efforts to conserve them;
- (7) Enforcement and surveillance for the Reserve, including the use of new technologies and coordination with the United States Coast Guard and other relevant agencies;
- (8) Identification and coordination with Native Hawaiian interests, regarding culturally significant, non commercial subsistence, cultural, and religious uses and locations within the Reserve;
- (9) Identification of potential tourism, recreational, and commercial activities within the Reserve and actions necessary to ensure that these activities do not degrade the Reserve's resources or diminish the Reserve's natural character;
- (10) Use of vessel monitoring systems for any vessel entering or transiting the Reserve, if warranted. To this end, the Secretary in consultation with the Department of State, United States Coast Guard, and the Department of Defense, shall evaluate the need for the establishment of vessel monitoring systems and, if warranted, shall initiate the steps necessary to have the appropriate domestic agencies, and request that the International Maritime Organization, adopt a vessel monitoring system requirement for the Reserve;
- (11) Any regulations, in addition to the conservation measures and Reserve Preservation Areas established under this order, that the Secretary determines are necessary to manage the Reserve in accordance with this order; and
- (12) Coordination of all relevant activities with the process to designate the Reserve as a National Marine Sanctuary, as provided under paragraph (f) of this section.

(c) Conservation Measures. The Reserve Operations Plan shall also include the conservation measures in section 7 of this order and the Reserve Preservation Areas in section 8 of this order.





(d) Memorandum of Agreement. To further paragraph (b)(1) of this section, and subject to section 10(b) of this order, and in particular to promote coordinated management of the entirety of the shallow areas of the coral reef ecosystem throughout the Northwestern Hawaiian Islands, the Secretary shall work with the Secretary of the Interior and Governor of the State of Hawaii to enter into one or more memoranda of agreement for the coordinated conservation and management of the Reserve, Midway Atoll and Hawaiian Islands National Wildlife Refuges, and State of Hawai'i submerged lands and waters within the Northwestern Hawaiian Islands.

(e) National Marine Sanctuary. The Secretary shall initiate the process to designate the Reserve as a national marine sanctuary pursuant to sections 303 and 304 of the National Marine Sanctuaries Act (16 U.S.C. 1433, 1434). In doing so the Secretary shall supplement or complement the existing Reserve. The Secretary shall, in consultation with the Governor of the State of Hawai'i, determine whether State submerged lands and waters should be included as part of the sanctuary. In designating and managing the sanctuary, the Secretary shall consider the advice and recommendations of the Reserve Council established pursuant to paragraph (f) of this section.

(f) Council. After considering input from the Secretary of the Interior and Governor of the State of Hawai'i, the Secretary shall establish a Coral Reef Ecosystem Reserve Council pursuant to section 315 of the National Marine Sanctuaries Act (16 U.S.C. 1445a) to provide advice and recommendations on the Reserve Operations Plan and designation and management of any sanctuary. The Council shall include:

- (1) Three Native Hawaiian representatives, including one Native Hawaiian elder, with experience or knowledge regarding Native Hawaiian subsistence, cultural, religious, or other activities in the Northwestern Hawaiian Islands.
- (2) Three representatives from the non-Federal science community with experience specific to the Northwestern Hawaiian Islands and with expertise in at least one of the following areas:
 - (A) Marine mammal science.
 - (B) Coral reef ecology.
 - (C) Native marine flora and fauna of the Hawaiian Islands.
 - (D) Oceanography.
 - (E) Any other scientific discipline the Secretary determines to be appropriate.
- (3) Three representatives from nongovernmental wildlife/marine life, environmental, and/or conservation organizations.
- (4) One representative from the commercial fishing industry that conducts activities in the Northwestern Hawaiian Islands.
- (5) One representative from the recreational fishing industry that conducts activities in the Northwestern Hawaiian Islands.
- (6) One representative from the ocean-related tourism industry.
- (7) One representative from the non-Federal community with experience in education and outreach regarding marine conservation issues.
- (8) One citizen-at-large representative.
- (9) One representative from the State of Hawaii as appointed by the Governor.
- (10) One representative each, as nonvoting, ex officio members, from the Department of the Interior, United States Coast Guard, Department of Defense, Department of State, the National Marine Fisheries Service, the Hawaiian Islands Humpback Whale National Marine Sanctuary, National Science Foundation, Marine Mammal Commission, and Western Pacific Regional Fishery Management Council.

(g) Report. The Secretary shall provide a progress report on the implementation of this order to the Chair of the Council on Environmental Quality within 1 year from the date of this order.



Sec. 6. Area of the Reserve. The Reserve includes the waters and submerged lands of the Northwestern Hawaiian Islands as follows:

(a) The seaward boundary of the Reserve is 50nm from the approximate center geographical positions of Nihoa Island, Necker Island, French Frigate Shoals, Gardner Pinnacles, Maro Reef, Laysan Island, Lisianski Island, Pearl and Hermes Reef, Midway Atoll, and Kure Island. Where the areas are not contiguous, parallel lines drawn tangent to and connecting those semicircles of the 50nm areas that lie around such areas shall delimit the remainder of the Reserve.

(b) The inland boundary of the Reserve around each of the areas named in subparagraph (a) of this section is the seaward boundary of Hawai'i State waters and submerged lands, and the seaward boundary of the Midway Atoll National Wildlife Refuge, as appropriate.

(c) The Reserve boundary is generally depicted on the map attached to this order. The Secretary, after consultation with the Governor of the State of Hawai'i, may make technical modifications to the boundary of the Reserve, including providing straight-line boundaries for the Reserve for clarity and ease of identification, as appropriate.

Sec. 7. Protection and Conservation Measures. The conservation measures in this section apply throughout the Reserve.

(a) (1) Commercial Fishing. All currently existing commercial Federal fishing permits and current levels of fishing effort and take, as determined by the Secretary and pursuant to regulations in effect on the date of this order, shall be capped as follows:

- (A) No commercial fishing may occur in Reserve Preservation Areas pursuant to section 8 of this order;
- (B) There shall be no increase in the number of permits of any particular type of fishing (such as for bottomfishing) beyond the number of permits of that type in effect the year preceding the date of this order;
- (C) The annual level of aggregate take under all permits of any particular type of fishing may not exceed the aggregate level of take under all permits of that type of fishing in the years preceding the date of this order, as determined by the Secretary, provided that the Secretary shall equitably divide the aggregate level into individual levels per permit, and further provided that the Secretary may make a one-time reasonable increase to the total aggregate to allow for the use of two Native Hawaiian bottomfishing permits;
- (D) There shall be no permits issued for any particular type of fishing for which there were no permits issued in the year preceding the date of this order; and
- (E) The type of fishing gear used by any permit holder may not be changed except with the permission of the Secretary, as provided under paragraph 3 of this section.

(2) Recreational Fishing. All currently existing (preceding the date of this order) levels of recreational fishing effort, as determined by the Secretary and pursuant to regulations in effect on the day of this order, shall be capped (i.e., no increase of take levels or levels of fishing effort, species targeted, or change in gear types) throughout the Reserve. However, fishing is further restricted as provided in section 8 of this order.

(3) The Secretary, after consultation with the Secretary of the Interior and Governor of the State of Hawai'i, and after public review and comment and consideration of any advice or recommendations of the Reserve Council and Western Pacific Regional Fishery Management Council, may further restrict the fishing activities under subparagraphs (a)(1) and (a)(2) of this section if necessary to protect Reserve resources, or may authorize or require alternate gear types if such gear would offer equal or greater protection for Reserve resources.



(b) In addition to the conservation measures in paragraph (a) of this section, the following activities are prohibited throughout the Reserve:

- (1) Exploring for, developing, or producing oil, gas, or minerals;
- (2) Having a vessel anchored on any living or dead coral with an anchor, an anchor chain, or an anchor rope when visibility is such that the seabed can be seen;
- (3) Drilling into, dredging, or otherwise altering the seabed; or constructing, placing, or abandoning any structure, material, or other matter on the seabed, except as an incidental result of anchoring vessels;
- (4) Discharging or depositing any material or other matter into the Reserve, or discharging or depositing any material or other matter outside the Reserve that subsequently enters the Reserve and injures any resource of the Reserve, except fish parts (i.e., chumming material or bait) used in and during authorized fishing operations, or discharges incidental to vessel use such as deck wash, approved marine sanitation device effluent, cooling water, and engine exhaust; and
- (5) Removal, moving, taking, harvesting, or damaging any living or nonliving Reserve resources, except as provided under paragraph (a) of this section and sections 8(a) and 9 of this order.

(c) The Secretary may conduct, or authorize by permit the activities listed in subparagraphs (b)(3)-(5) of this section to the extent that they are necessary for research, monitoring, education, or management activities that further the Management Principles of section 4 of this order.

Sec. 8. Reserve Preservation Areas.

(a) To further protect Reserve resources, the following areas are hereby established as Reserve Preservation Areas until some or all are made permanent after adequate public review and comment, within which all activities referred to in paragraph (b) of this section are prohibited.

(1) From the seaward boundary of Hawai'i State waters and submerged lands to a mean depth of 100 fathoms (fm) around:

(A) Nihoa Island, provided that bottomfishing in accordance with the requirements of section 7(a)(1) of this order shall be allowed to continue seaward of a mean depth of 10fm, unless and until the Secretary determines otherwise after adequate public review and comment;

(B) Necker Island, provided that bottomfishing in accordance with the requirements of section 7(a)(1) of this order shall be allowed to continue seaward of a mean depth of 20fm, unless and until the Secretary determines otherwise after adequate public review and comment;

(C) French Frigate Shoals;

(D) Gardner Pinnacles, provided that bottomfishing in accordance with the requirements of section 7(a)(1) of this order shall be allowed to continue seaward of a mean depth of 10fm, unless and until the Secretary determines otherwise after adequate public review and comment;

(E) Maro Reef, provided that bottomfishing in accordance with the requirements of section 7(a)(1) of this order shall be allowed to continue seaward of a mean depth of 20fm, unless and until the Secretary determines otherwise after adequate public review and comment;

(F) Laysan Island, provided that bottomfishing in accordance with the requirements of section 7(a)(1) of this order shall be allowed to continue seaward of a mean depth of 50fm, unless and until the Secretary determines otherwise after adequate public review and comment;

(G) Lisianski Island, provided that bottomfishing in accordance with the requirements of section 7(a)(1) of this order shall be allowed to continue seaward of a mean depth of 50fm, unless and until the Secretary determines otherwise after adequate public review and comment;

(H) Pearl and Hermes Atoll; and



(l) Kure Island.

(2) Twelve nautical miles around the approximate geographical centers of:

- (A) The first bank immediately east of French Frigate Shoals;
 - (B) Southeast Brooks Bank, which is the first bank immediately west of French Frigate Shoals, provided that the closure area shall not be closer than approximately 3nm of the next bank immediately west;
 - (C) St. Rogatien Bank, provided that the closure area shall not be closer than approximately 3nm of the next bank immediately east, provided further that bottomfishing in accordance with the requirements of section 7(a)(1) of this order shall be allowed to continue, unless and until the Secretary determines otherwise after adequate public review and comment;
 - (D) The first bank west of St. Rogatien Bank, east of Gardner Pinnacles;
 - (E) Raita Bank; and
 - (F) Pioneer Bank, provided that bottomfishing in accordance with the requirements of section 7(a)(1) of this order shall be allowed to continue, unless and until the Secretary determines otherwise after adequate public review and comment.
- (b) Activities Prohibited Within Reserve Preservation Areas.

(1) In addition to the conservation measures in section 7 of this order, which are applicable to the entire Reserve, the following activities are prohibited within the Reserve Preservation Areas listed in paragraph (a) of this section, except as expressly otherwise stated in this paragraph and sections (8)(a) and 9 of this order:

- (A) Commercial and recreational fishing;
- (B) Anchoring in any area that contains available mooring buoys, or anchoring outside an available anchoring area when such area has been designated by the Secretary;
- (C) Any type of touching or taking of living or dead coral;
- (D) Discharging or depositing any material or other matter except cooling water or engine exhaust; and
- (E) Such other activities that the Secretary identifies after adequate public review and comment, and after consideration of any advice and recommendations of the Reserve Council.

(2) Notwithstanding the prohibitions in this paragraph, the Secretary may conduct, or authorize by permit, research, monitoring, education, or management activities within any Reserve Preservation Area that further the Management Principles of section 4 of this order.

(3) The Reserve Preservation Areas in this section are approximated using fathoms. The Secretary will develop straight line boundaries based on longitude and latitude coordinates to encompass each Reserve Preservation Area, to provide for clarity and ease of identification. The Secretary may make technical modifications to any such boundaries.

Sec. 9. Native Hawaiian Uses. Native Hawaiian noncommercial subsistence, cultural, or religious uses may continue, to the extent consistent with existing law, within the Reserve and Reserve Preservation Areas identified under section 8 of this order. The Secretary shall work with Native Hawaiian interests to identify those areas where such Native Hawaiian uses of the Reserve's resources may be conducted without injury to the Reserve's coral reef ecosystem and related marine resources and species, and may revise the areas where such activities may occur after public review and comment, and consideration of any advice and recommendations of the Reserve Council.



Sec. 10. National Wildlife Refuges.

(a) The Secretary of the Interior, in managing, through the U.S. Fish and Wildlife Service the Hawaiian Islands and Midway Atoll National Wildlife Refuges pursuant to the National Wildlife Refuge System Administration Act (16 U.S.C. 668dd-668ee) and other applicable laws, shall follow the Management Principles of section 4 of this order, to the extent consistent with applicable law.

(b) Wherever the Reserve overlaps the Hawaiian Islands National Wildlife Refuge, the Reserve shall be managed to supplement and complement management of the Refuge to ensure coordinated conservation and management of the Reserve and the Refuge, consistent with the purposes and policies of the National Marine Sanctuaries Act, the National Marine Sanctuaries Amendments Act of 2000, and this order, and the authorities of the U.S. Fish and Wildlife Service under the National Wildlife Refuge System Administration Act (16 U.S.C. 668dd-668ee) and other laws with respect to management of the Refuge. Nothing in this order shall enlarge or diminish the jurisdiction or authority of the Secretary or Secretary of the Interior in managing the Reserve or Refuge, respectively.

(c) The Secretary of the Interior, through the U.S. Fish and Wildlife Service, shall coordinate with the Secretary and the Governor of the State of Hawai'i, as provided under section 5(b) of this order, to ensure coordinated protection and management among the Reserve, Refuges, and State, consistent with relevant authorities.

Sec. 11. Administration and Judicial Review.

(a) International Law. Management of the Reserve and any regulations issued pursuant thereto and all other provisions of this order shall be applied consistently with the 1983 Presidential Proclamation on the Exclusive Economic Zone, the 1988 Presidential Proclamation on the Territorial Sea, and the 1999 Presidential Proclamation on Contiguous Zone and in accordance with generally recognized principles of international law, and with the treaties, conventions, and other agreements to which the United States is a party. The Secretary shall consult with the Department of State in implementing this order.

(b) Agency Responsibilities. All Federal agencies whose actions may affect the Reserve and any National Marine Sanctuary established by the Secretary pursuant to this order shall carry out such actions in accordance with applicable laws, regulations and Executive Orders, including Executive Orders 13089 of June 11, 1998, and 13158 of May 26, 2000.

(c) National Security and Emergency Actions. Consistent with applicable law, nothing in this order is intended to apply to military activities (including those carried out by the United States Coast Guard), including military exercises, conducted within or in the vicinity of the Reserve, consistent with the requirements of Executive Orders 13089 of June 11, 1998, and 13158 of May 26, 2000. Further, nothing in this order is intended to restrict the Department of Defense from conducting activities necessary during time of war or national emergency, or when necessary for reasons of national security as determined by the Secretary of Defense, consistent with applicable law. In addition, consistent with applicable law, nothing in this order shall limit agency actions to respond to emergencies posing an unacceptable threat to human health or safety or to the marine environment and admitting of no other feasible solution.

(d) United States Coast Guard. Nothing in this order is intended to limit the authority of the United States Coast Guard to enforce any Federal law, or install or maintain aids to navigation.

(e) Funding. This order shall be carried out subject to the availability of appropriated funds and to the extent permitted by law.

(f) Territorial Waters. Nothing in this order shall enlarge or diminish the jurisdiction or authority of the State of Hawai'i or the United States over submerged or other lands within the territorial waters off the coast of Hawai'i.

(g) Judicial Review. This order does not create any right or benefit, substantive or procedural, enforceable in law or equity by a party against the United States, its agencies, its officers, or any person.



THE WHITE HOUSE,

December 4, 2000.

Presidential Documents
Federal Register
Vol. 65, No. 236
Thursday, December 7, 2000



Appendix 2: Executive Order 13196 of January 18, 2001



The Masked Angelfish, *Genicanthus personatus*, is one of many endemic reef fish in the Northwestern Hawaiian Islands.

Photo Credit: James Watt

By the authority vested in me as President by the Constitution and the laws of the United States of America, including the National Marine Sanctuaries Act, (16 U.S.C. 1431 et seq.), and the National Marine Sanctuaries Amendments Act of 2000, Public Law 106-513, and in furtherance of the purposes of the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801 et seq.), Marine Protection, Research, and Sanctuaries Act (33 U.S.C. 1401 et seq.), Coastal Zone Management Act (16 U.S.C. 1451 et seq.), Endangered Species Act (16 U.S.C. 1531 et seq.), Marine Mammal Protection Act (16 U.S.C. 1362 et seq.), Clean Water Act (33 U.S.C. 1251 et seq.), National Historic Preservation Act (16 U.S.C. 470 et seq.), National Wildlife Refuge System Administration Act (16 U.S.C. 668dd-e.e.), and other pertinent statutes, it is ordered as follows:

Sec. 1. Preamble. On December 4, 2000, I issued Executive Order 13178 establishing the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve (Reserve) pursuant to my authority under the National Marine Sanctuaries Act, as amended by the National Marine Sanctuary Amendments Act of 2000 (Act). In establishing the Reserve, I set forth a number of conservation measures and created specific Reserve Preservation Areas to protect the coral reef ecosystem and related marine resources and species (resources) of the Reserve. The Act provides that no closure areas can become permanent without adequate notice and comment. Accordingly, I proposed to make permanent the Reserve Preservation Areas and initiated a 30-day comment period on this proposal. I also sought comment on the conservation measures for the Reserve. On my behalf, the Secretary of Commerce received the public comments and held seven public hearings, including six throughout Hawaii. After considering the comments expressed at the hearings and received in writing, I have determined to make permanent the Reserve Preservation Areas with certain modifications set forth below. Further, I have modified certain conservation measures to address concerns raised, particularly regarding commercial and recreational fishing within the Reserve. With this action, the establishment of the Reserve under the Act, including the conservation measures and permanent Reserve Preservation Areas, is complete. The Secretary of Commerce will manage the Reserve pursuant to Executive Order 13178, as modified by this order, under the Act. The Secretary shall also initiate the process to designate the Reserve as a National Marine Sanctuary, as required by the Act.



Sec. 2. Purpose. The purpose of this order is to amend Executive Order 13178, and to make permanent Reserve Preservation Areas, as modified below, to ensure the comprehensive, strong, and lasting protection of the resources of the Northwestern Hawaiian Islands.

Sec. 3. Amendments to Sections 7 of Executive Order 13178.

1. Section 7(a)(1) of Executive Order 13178 is hereby amended by revising the first sentence to read as follows:

“Commercial Fishing. All currently existing commercial Federal fishing permits and current levels of fishing effort and take, which also includes the non-permitted level of trolling for pelagic species by currently permitted bottom fishers, as determined by the Secretary and pursuant to regulations in effect on December 4, 2000, shall be capped as follows:”

2. Section 7(a)(1)(C) of Executive Order 13178 is hereby revised to read as follows:

“(C) The annual level of aggregate take under all permits of any particular type of fishing may not exceed the aggregate level of take under all permits of that type of fishing as follows:

- (1) Bottomfishing—the annual aggregate level for each permitted bottomfisher shall be that permittee’s individual average taken over the 5 years preceding December 4, 2000, as determined by the Secretary, provided that the Secretary, in furtherance of the principles of the reserve, may make a onetime reasonable increase to the total aggregate to allow for the use of two Native Hawaiian bottomfishing permits;
- 2) All other commercial fishing—the annual aggregate level shall be the permittee’s individual take in the year preceding December 4, 2000, as determined by the Secretary.”

3. A new section 7(a)(1)(F) is hereby added to Executive Order 13178 and reads as follows:

“(F) Trolling for pelagic species shall be capped based on reported landings for the year preceding December 4, 2000.”

4. Section 7(b)(4) is revised to read as follows:

(4) Discharging or depositing any material or other matter into the Reserve, or discharging or depositing any material or other matter outside the Reserve that subsequently enters the Reserve and injures any resource of the Reserve, except:

- (A) fish parts (i.e., chumming materia or bait) used in and during fishing operations authorized under this order;
- (B) biodegradable effluent incident to vessel use and generated by a marine sanitation device in accordance with section 312 of the Federal Water Pollution Control Act, as amended;
- (C) water generated by routine vessel operations (e.g., deck wash down and graywater as defined in section 312 of the Federal Water Pollution Control Act), excluding oily wastes from bilge pumping; or
- (D) cooling water from vessels or engine exhaust; and”.

Sec. 4. Amendments to Sections 8 of Executive Order 13178.

1. Section 8 of Executive Order 13178 is modified by substituting “provided that commercial bottom fishing and commercial and recreational trolling for pelagic species in accordance with the requirements of sections 7(a)(1) and 7(a)(2) of this order, respectively,” for “provided that bottomfishing in accordance with the requirements of section 7(a)(1)” everywhere the latter phrase appears in section 8.

2. Section 8(a)(1)(A) is modified by substituting “a mean depth of 25 fm” for “a mean depth of 10fm.”

3. Section 8(a)(1)(B) is modified by substituting “a mean depth of 25 fm” for “a mean depth of 20fm.”

4. Section 8(a)(1)(D) is modified by substituting “a mean depth of 25 fm” for “a mean depth of 10fm.”

5. Section 8(a)(1)(E) is modified by substituting “a mean depth of 25 fm” for “a mean depth of 20fm.”

6. Section 8(a)(1)(G) is modified by substituting “a mean depth of 25 fm” for “a mean depth of 50fm.”

7. Section 8(a)(1)(I) is revised to read “Kure Atoll.”

8. Sections 8(a)(2)(D) and (E) are hereby deleted and a new section 8(a)(3) is hereby substituted as follows:



“(3) Twelve nautical miles around the approximate geographical centers of
(A) The first bank west of St. Rogation Bank, east of Gardner Pinnacles, provided that commercial bottomfishing and commercial and recreational trolling for pelagic species in accordance with the requirements of sections 7(a)(1) and 7(a)(2) of this order, shall be allowed to continue for a period of 5 years from the date of this order; and
(B) Raita Bank, provided that commercial bottomfishing and commercial and recreational trolling for pelagic species in accordance with the requirements of sections 7(a)(1) and 7(a)(2) of this order, shall be allowed to continue for a period of 5 years from the date of this order; and
(C) Provided that both banks described above in (3)(A) and (3)(B) shall only continue to allow commercial bottomfishing and commercial and recreational trolling for pelagic species after the 5-year time period if it is determined that continuation of such activities will have no adverse impact on the resources of these banks.”

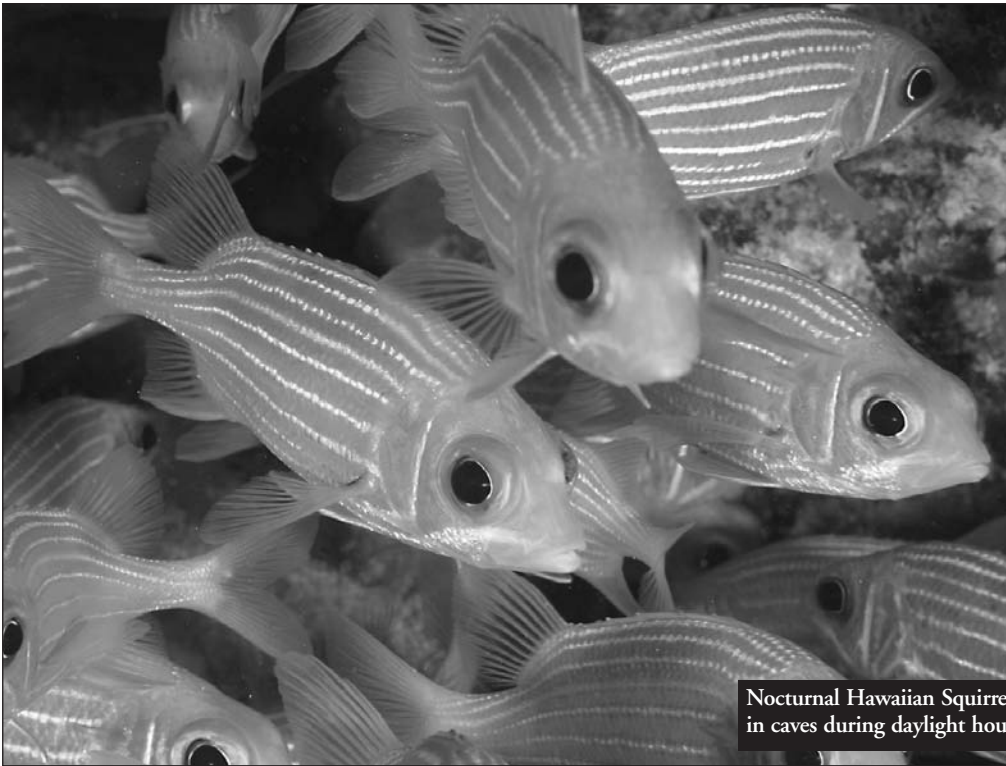
Sec. 5. Reserve Preservation Areas. The Reserve Preservation Areas, as modified in sections 3 and 4 of this order, are hereby made permanent in accordance with the Act.

Sec. 6. Judicial Review. This order does not create any right or benefit, substantive or procedural, enforceable in law or equity by a party against the United States, its agencies, its officers, or any person.

THE WHITE HOUSE,
January 18, 2001.

Presidential Documents
7395 Federal Register
Vol. 66, No. 15
Tuesday, January 23, 2001

Appendix 3: Coast Guard/NOAA Joint Position Statement on Enforcement in the Northwestern Hawaiian Islands



Nocturnal Hawaiian Squirrelfish hide in groups under ledges and in caves during daylight hours, and come out at night to forage.

Photo Credit: James Watt

National Oceanic and Atmospheric Administration and United States Coast Guard Joint Position Statement on Enforcement of the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve

The Northwestern Hawaiian Islands (NWHI) are a vast and remote chain of islands that are a part of the Hawaiian archipelago and provide habitat to numerous species found nowhere else on earth. These islands represent a nearly unspoiled ecosystem where habitats upon which marine species depend include both land and water. This area contains a number and variety of shallow and deep water coral reefs and supports more than 7,000 marine species, many of which are unique to the Hawaiian Islands chain. The area is rich in history and represents a place of cultural significance to the native Hawaiians. It is an area that must be carefully managed to ensure that the resources are not diminished for future generations. The Northwestern Hawaiian Islands are also the most remote archipelago in the world. This isolation has resulted in need for integrated resource management of this vast and exceptional marine environment.

The Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve (Reserve) was established by Executive Orders 13178 and 13196 on December 4, 2000 and January 18, 2001 respectively, pursuant to the National Marine Sanctuaries Amendments Act of 2000 (Amendments Act). The Reserve boundaries include all waters from 3-50 nautical miles offshore from Nihoa Island to Kure Atoll, except at Midway Atoll where the inner boundary of the Reserve is the seaward boundary of the Refuge. The Reserve is the largest conservation area under U.S. flag and the second largest marine protected area in the world – second only in size to the Great Barrier Reef in Australia. The purpose of the Reserve is the long-term, comprehensive conservation and protection of the coral reef ecosystem and related marine resources of the NWHI.

The Executive Orders provide a set of management principles (section 4) and conservation measures (section 7) that apply throughout the Reserve to protect Reserve resources. Moreover, the Executive Orders (section 8) establish 15 Reserve Preservation Areas (RPAs) within which all consumptive activities are prohibited, with some exceptions.

Nocturnal Hawaiian Squirrelfish hide in groups under ledges and in caves during daylight hours, and



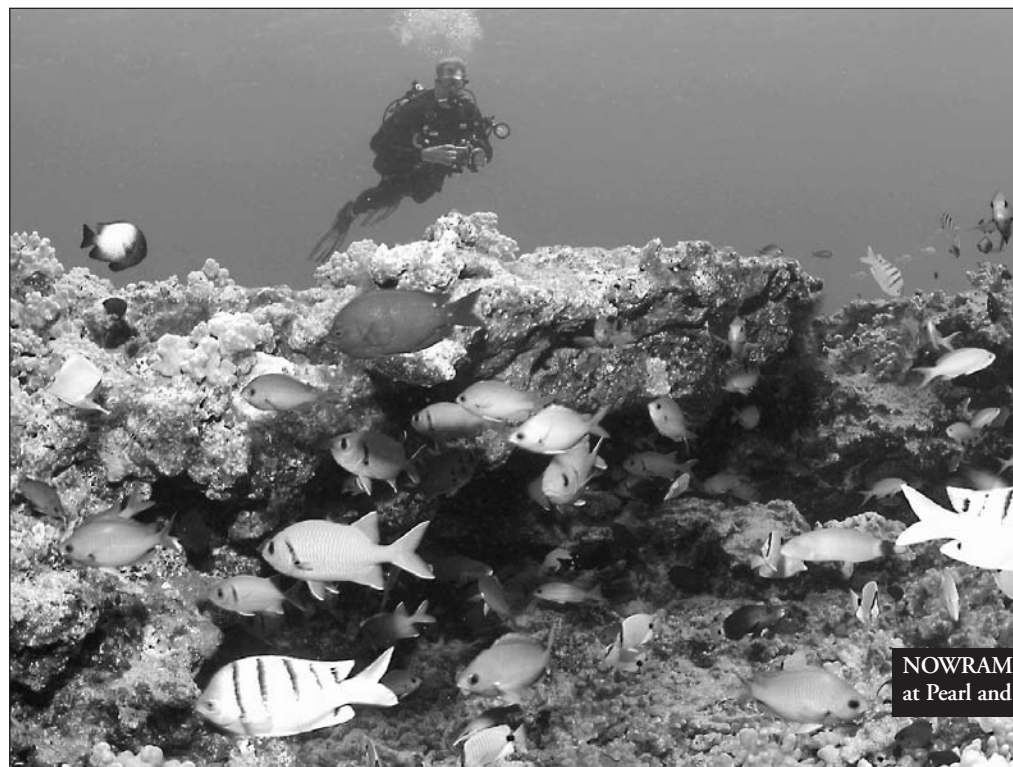


NOAA's Marine Sanctuary Program (NMSP), within NOAA's Ocean Service, administers the Reserve. Pursuant to the Amendments Act and the Executive Orders, the NMSP has initiated the process under the National Marine Sanctuaries Act (NMSA) to designate the Reserve as a National Marine Sanctuary. The NMSP is also in the process of finalizing a Reserve Operations Plan (ROP) to govern management of the Reserve pending completion of the designation process.

An integral component of Reserve operations, and the development of sanctuary alternatives during the designation process, is the design, establishment and implementation of enforcement and educational programs. The ROP includes an action plan that describes a variety of strategies that would form an enforcement infrastructure for the Reserve, and provide a foundation for a proposed sanctuary management regime. NOAA and the United States Coast Guard will continue devoting attention to the application of existing laws and regulations to maintain and protect the resources within the Reserve.

The United States Coast Guard, as one of its missions, conducts enforcement and educational activities to assist NOAA in administering laws such as the NMSA, Endangered Species Act, Magnuson-Stevens Fishery Conservation and Management Act, and the Marine Mammal Protection Act. NOAA and the USCG will work cooperatively on educational and enforcement programs to assist in the conservation and protection of Reserve marine resources. As opportunity arises, USCG and NOAA will provide educational materials and conduct outreach activities to inform the public and marine users of the Reserve, including the management principles, conservation measures, and RPAs as stated in the Executive Orders.

Appendix 4: Environmental Assessment for the Reserve Operations Plan for the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve



NOWRAMP diver explores reefs at Pearl and Hermes.

Photo Credit: James Watt

Purpose and Need For This Environmental Assessment

National Marine Sanctuary Program

The National Oceanic and Atmospheric Administration's (NOAA) National Marine Sanctuary Program (NMSP) is a national system of 13 sites that protect over 13,000 square nautical miles of marine resources and range in all sizes and shapes from 0.25 to 4,024 square nautical miles. The mission of the NMSP is to serve as the trustee for this system of marine protected areas, and to conserve, protect, and enhance their biodiversity, ecological integrity, and cultural legacy. Its goals are appropriate to the unique diversity contained within individual sites. They may include restoring and rebuilding marine habitats or ecosystems to their natural condition or monitoring and maintaining already healthy areas.

The National Marine Sanctuaries Act (NMSA) (16 U.S.C. 1431 et seq.) authorizes the Secretary of Commerce to designate and manage areas of the marine environment with nationally significant aesthetic, ecological, historical, or recreational values as National Marine Sanctuaries. The primary objective of this law is to protect marine resources, such as coral reefs, sunken historical vessels or unique habitats, while facilitating all "compatible" public and private uses of those resources. Sanctuaries, frequently compared to underwater parks, are managed according to Management Plans, prepared by the NMSP on a site-by-site basis.

Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve

The expansive coral reef ecosystem of the Northwestern Hawaiian Islands encompasses an array of scientific and historic objects found nowhere else on Earth. The coral reefs are the foundation of an ecosystem that hosts a distinctive array of marine mammals, fish, sea turtles, birds, and invertebrates, including species that are endemic, rare, threatened, and endangered.

On December 4, 2000, Executive Order 13178 was issued, establishing the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve (Reserve), to be managed by the Secretary of Commerce (Secretary). The Reserve was established pursuant to the National Marine Sanctuaries Amendments Act of 2000 (Act). The





Executive Order contains a number of conservation measures which restrict certain activities throughout the Reserve. As part of the establishment of the Reserve, the Executive Order also created fifteen Reserve Preservation Areas (RPAs) in which all consumptive or extractive uses are prohibited, with limited exceptions.

The area designated as the Reserve is 99,500 square nautical miles. It is approximately 1,200 miles long and 100 miles wide. The Reserve includes the marine waters and submerged lands of the Northwestern Hawaiian Islands and is adjacent to the seaward boundary of Hawai'i State waters and submerged lands, and the Midway Atoll National Wildlife Refuge. In addition, the Reserve includes the Hawaiian Island National Wildlife Refuge, to the extent that it extends beyond Hawai'i State Waters.

Need For Action

The Executive Order establishing the Reserve directs the Secretary to prepare a Reserve Operations Plan to govern the management of the Reserve pending its designation as a National Marine Sanctuary. While the establishment of the Reserve and the measures in the Executive Order are not subject to NEPA, an Environmental Assessment is being completed to evaluate the potential environmental impacts of the actions proposed in the Draft Reserve Operations Plan to implement the Executive Order. The first draft Reserve Operations Plan was released for public comment in March 2002 (67 FR 11997); more than 4500 public comments, most of them form letters, were received. The NMSP has considered the public comments received and worked with the Reserve Advisory Council to prepare the second draft Reserve Operations Plan, including this Environmental Assessment.

Description of Alternatives

Alternative A: Take No Action

Under this alternative, NOAA would not prepare a Reserve Operations Plan to govern the management of the Reserve pending its designation as a National Marine Sanctuary. Thus, the Executive Order would stand alone without any additional descriptions of issues, needs, projects, or programs to implement the Reserve and mandates of the Executive Order. For example, there would be no description of how the Reserve will participate in addressing the cleanup and prevention of marine debris, as directed by the Executive Order.

Alternative B: Propose the Reserve Operations Plan (Preferred)

This alternative would fulfill the directive of the Executive Order to prepare a Reserve Operations Plan to govern the management of the Reserve. The Reserve Operations Plan focuses on certain priority issues (as listed in the Executive Order), providing detailed descriptions of issues, needs, projects, and programs, and developing a comprehensive implementation approach for the Reserve. Full descriptions of the actions proposed to be taken under this plan are contained in the "Action Plan" section summarized here as:

- Operations: includes interagency coordination, activity and area identification, Reserve/Sanctuary Advisory Council operations, development of fishing caps, development of permitting procedures, and infrastructure development.
- Education and Outreach: encompasses all education, outreach, and interpretive projects.
- Native Hawaiian Cultural Resources: consists of all projects related to Native Hawaiian culture, uses, and locations.
- Maritime Heritage: contains projects related to maritime historic resources.
- Research and Monitoring: contains all projects related to research and monitoring.
- Mapping: covers all projects related to developing charts and maps of the NWHI.
- Response, Damage Assessment and Restoration: contains projects related to contingency planning, response and restoration.
- Marine Debris: consists of projects related to the removal of marine debris from the NWHI.
- Enforcement: includes air and sea support for existing enforcement operations and expansion of a vessel monitoring system.
- Sanctuary Designation: covers all projects related to the sanctuary designation process.



Description of the Affected Environment

Natural Resources

A Unique Coral Ecosystem

The extensive coral reefs of the NWHI encompass over 4,460 square miles of coral reef habitat. Reference NOAA Coral Reef Ecosystem Fishery Management Plan Final Environmental Impact Statement for more detail on coral ecosystems in NWHI. Between both closed and open atolls, Pearl and Hermes Reef has the most extensive lagoonal reefs less than three miles from shore; Gardner Pinnacles, Maro Reef, and Necker Island, the most extensive offshore reefs. Hawai'i is the only U.S. state that has true atolls.

The reefs are composed of at least 55 species of stony coral, eight species of soft coral, and one anemone species for a presently recognized total of 64 species. This diversity and species richness rivals that of the main Hawaiian Islands. Compared to other regions in the world, the diversity of coral species is low and is often attributed to the isolation of this island chain. However, the NWHI host an exceptionally high number of endemic corals and algae.

Within the NWHI, the reefs differ in coral cover and species organization. Coral cover outside of lagoons gradually declines to the northwest due to slower growth rates of some species and the increased frequency of storm disturbances. Past studies reveal mean coral cover ranging from 8% to 69% among the islands. The data from the NOWRAMP 2002 came up with similar coral cover rates 4.4%-64.1% among islands. However, within islands, the data revealed coral cover among sites varied even more, ranging from <1% to close to 100%. Coral species in the NWHI are slower growing when compared to most other reefs.

Climatic events play an important role in the ecosystem productivity in the northwestern chain. Declines in the productivity of seabirds, monk seals, reef fishes, and chlorophyll have been documented from the early 1980s to the present. While severe tropical storms or typhoons are rare, winter storms are common, resulting in a noticeable increase in winds and high seas that impact the reef system both negatively and positively. Problems associated with increased sea surface temperatures (SST) have also been reported in the NWHI. Sea surface temperature information obtained from NOAA demonstrated that water temperatures at Midway rose nearly 2 degrees centigrade over the usual summer maxima in August of 2002. Corresponding with this warm water event, substantial bleaching of corals was observed (a process whereby coral colonies lose their color due to the expulsion of symbiotic microscopic algae (zooxanthellae) from most coral tissues) on reefs at the three northwestern-most atolls, Kure, Midway and Pearl and Hermes.

These vast coral reef ecosystems support a wide array of marine species. While more than 7,000 marine species have been recorded in the Hawaiian Islands, half of the fish species at some of the islands exist only in the NWHI. The coral reefs are the foundation of expansive ecosystems that host an interdependent association of vertebrates (monk seals, reef and bottomfish, turtles, birds, sharks), invertebrates (corals, anemones, jellyfishes, mollusks, shrimps, crabs, lobsters, sea urchins, sea stars, and sea cucumbers), sea grasses, and algae. Because the reefs in the NWHI are among the few remaining large-scale, intact, predator-dominated reef ecosystems left in the world, they offer an opportunity to understand how unaltered ecosystems are structured, how they function, and how they can most effectively be preserved.

Importance to Marine Mammals

The NWHI ecosystems play an important role in supporting a host of marine mammals. Like the Hawaiian monk seals, Hawaiian spinner and bottlenose dolphins are resident species that occur within these ecosystems during the entire year. Transient species such as spotted dolphins, humpback whales, and numerous other cetaceans occur seasonally within the Reserve.

The Hawaiian monk seal - Nearly the entire world population of endangered Hawaiian monk seals is found in the NWHI. The first range-wide beach counts of monk seals occurred in the late 1950s. Due to a fifty percent decline discovered in the beach counts, the Hawaiian monk seal was listed as endangered throughout its range in 1976. NOAA Fisheries designated critical habitat for the Hawaiian monk seal from shore out to 20 fathoms in ten areas of the NWHI in May 1988. NOAA Fisheries believes these areas require special management consideration or protection now and in the reasonably foreseeable future. Currently, the mean number of adult seals observed in beach counts is about 375 seals. This number has remained essentially unchanged since 1993. Approximately 1,400 animals remain throughout the island chain.



Monk seals were believed to forage primarily on prey associated with the coral reefs. Although a number of different species are eaten, recent research has shown that individual seals are specialized in the various-benthic habitats where they feed and in the methods they use to locate and catch prey. Recent research on foraging patterns reveal that monk seals are capable of diving to depths greater than 1500 feet for prey items associated with precious gold coral beds found in deep waters in the subphotic zone. It is now known that Hawaiian monk seals typically range well outside of the currently designated critical habitat.

Given the current low population estimates of monk seals, and the limited nature of their breeding habitats, the importance of ongoing protection to improve monk seal habitats and available prey, such as bottom and reef fish, octopuses, eels and spiny lobsters, cannot be overstated.

Importance to Sea Turtles

The NWHI are an important nesting habitat for the threatened green sea turtle. Significant nesting sites exist on French Frigate Shoals and to a lesser degree on Laysan Island, Lisianski Island, and Pearl and Hermes Reef. The green sea turtle occupies three habitat types: open beaches, open sea, and feeding and sleeping grounds in shallow, protected waters. Upon hatching, the young turtles gradually crawl from the beach and swim over shallow reef areas and extensive shoal areas to the open ocean. When their shells grow 8-10 inches long, they move to shallow feeding grounds over coral reefs and rocky bottoms. Age at sexual maturity is estimated at 20-50 years. The green sea turtle was listed as threatened in 1978. Although the population has increased significantly since the 1970s, the total number of nesting females is still well below the historical levels of the late 1800s.

Although scattered low-level nesting occurs throughout the Hawaiian archipelago, over 90 percent of the nesting is at French Frigate Shoals. Some sandy islets within French Frigate Shoals have been identified as nesting habitat for adult females and near shore waters contain adult males that migrate to breed at this key site. Mating occurs in the water, yet both males and females arrive on land to bask in the sun. Approximately 200-700 adult green turtle females nest on French Frigate Shoals annually. Research indicates that the range of adult green turtles nesting at French Frigate Shoals is limited to the 1,500-mile stretch of the Hawaiian archipelago and to Johnston Atoll immediately to the south, where algal foraging pastures occur. While the green sea turtle is a resident species, the endangered leatherback, the endangered olive ridley, and the threatened loggerhead sea turtles are considered transient species that occur seasonally in this expansive area.

Importance to Fishes

The NWHI support numerous species of unique marine, reef, and shore fish and invertebrates that are also found in geographically distant ecosystems. It is believed that the NWHI provide a bridge to these ecosystems via associated seamounts and the island groups adjacent to them. The coral reefs around the NWHI support numerous species of reef fish. Some fish species commonly found on these reefs, such as the sling-jaw wrasse, the masked angelfish, and the knifefish are rare elsewhere in the archipelago. The total number of species in the region is unknown, but initial sampling indicates the presence of approximately 260 species at Midway alone.

Structurally, apex predators, such as sharks and jacks, dominate fish communities on the reefs in the NWHI. In addition, abundance and biomass estimates indicate that the reef community is characterized by fewer herbivores, such as surgeonfishes, and more carnivores, such as damselfishes, goatfishes, and scorpionfishes. The value of these exquisite reef communities extend beyond the intrinsic; they also have the potential to enhance fishing and hedge against fisheries collapses by potentially providing sources of recruits and propagules (part of an organism that can reproduce) to the main Hawaiian Islands. The rich and abundant biodiversity of the NWHI may play a critical role in supporting the genetic diversity of the entire Hawaiian archipelago. While preliminary evidence supports close biological and ecological linkages between the NWHI species and those in the main Hawaiian Islands, more research is necessary to clearly understand the sources and sinks and recruitment patterns between these two areas.

Importance to Seabirds, Water Birds, and Land Birds

The NWHI are home to millions of seabirds, many of which rely on the coral reef ecosystems for food and other habitat needs. Four endangered endemic bird species, which are not seabirds (Laysan duck, Laysan

finch, Nihoa finch, and Nihoa millerbird) breed on the islands, along with 14 million seabirds of 18 species.

Importance to Invertebrate Communities

The coral reefs of the NWHI support diverse communities of benthic macroinvertebrates. As many as 600 species of macroinvertebrates, largely mollusks, echinoderms, and crustaceans, were identified at French Frigate Shoals alone on the 2000 Northwestern Hawaiian Islands Reef Assessment and Monitoring Program (NOWRAMP 2000) expedition, with more than 250 species (not including marine snails) reported as new records.

Lobsters represent a vital link in the trophic food web of many other organisms in the near shore coral reef ecosystem. Excessive fishing likely led to the depletion of many local populations of spiny lobsters in the NWHI. Despite significant reductions in commercial fishing activities in the NWHI, local populations of spiny lobsters remain depressed, but common slipper lobsters have increased significantly.

Importance to Algal communities

Algae are an important component in maintaining the NWHI's ecological balance as a food source for a number of reef organisms, including the green sea turtle, and also serve as settling and attachment sites for small and cryptic reef species. Some 205 species of marine algae were identified in 1989 in the NWHI, including a number of newly identified deepwater species that were previously unknown. Since then, these numbers have nearly doubled and will continue to increase as the recent NOWRAMP collections are fully identified and recorded. A recent study conducted in 2001 by the Division of Aquatic Resources at Kure Atoll resulted in an increase in the total number of known algae species from 45 to 98 species. Fifty-three new algal species were reported for the atoll.

Native Hawaiian Cultural Foundation and Significance

Ku pākū ka pali o Nihoa i ka makani
The cliff of Nihoa stands as resistance against the wind.

The Executive Order (EO) ensures the comprehensive, strong, and lasting protection of the coral reef ecosystem and related marine resources and species (resources) of the Northwestern Hawaiian Islands (NWHI). The EO gives special recognition to Native Hawaiians and specifically refers to allowable actions such as culturally significant, noncommercial subsistence, cultural and religious uses within the Reserve that are consistent with long-term protection of NWHI marine resources.

Long before Western ships sighted the NWHI, Kānaka 'Ōiwi (Native Hawaiians) and other Polynesians journeyed in large double-hulled canoes to these resource-rich islands and atolls as they explored the vast Pacific Ocean. Physical remnants of wahi kūpuna (ancestral places) at Nihoa and Mokumanamana (Necker) islands indicate use of these islands and the surrounding oceans by the ancients. Oral traditions and archaeological finds confirm a relationship of the islands to ancestral Kānaka 'Ōiwi. Evidence indicates that the NWHI served as homes and places of worship for centuries.

Initial archaeological surveys done on the islands of Nihoa and Mokumanamana have shown that there is a high density of cultural material located on these small islands. On the island of Nihoa, where there are significant soil deposits, there are a total of 88 wahi kūpuna. On Mokumanamana, there are 52 wahi kūpuna, including habitation sites, rock shelters, agricultural terraces, and religious shrines. Several archaeological expeditions have removed numerous cultural remains from both of these islands. Many of these cultural remains are believed to have served subsistence and religious functions and attest to the use of these islands and the surrounding oceans by Native Hawaiian ancestors. Both Nihoa and Mokumanamana are recognized as culturally vibrant and are listed on the National Register of Historic Places.

Mele (song, chant) that have been passed down through Native Hawaiian oral traditions, refer to islands beyond the main Hawaiian Islands and recall the travels of seafaring ancestors on their way to and from the Pae 'Āina 'o Hawai'i (Hawaiian archipelago). In one significant huaka'i (journey), Pele, the Hawaiian goddess of fire and volcanoes, and her family migrate from their distant homeland to Ni'ihau in the main Hawaiian Islands. They travel by way of Polapola, Kuaihelani "where Kāne (Hawaiian god) hides the islands" and other places inhabited by gods including Mokumanamana (Necker Island). Further oral traditions also recall migrations of Native Hawaiians passing through the Northwestern shoals. These oral traditions also reveal the





presence of ancestors that predate the Pele migrations.

Use of the Hawaiian language was prohibited by the Republic of Hawai'i and may have contributed to the loss of some of the traditional names of the NWHI over time. Oral histories conducted to recover this information reveal that place names in Hawai'i are often referred to by multiple names. There is currently a difference of opinions among historians regarding the correct names of the islands and efforts are underway to identify, as accurately as possible, the original names. The following island names appear in various mele (song, chant) and mo'olelo (narratives): Kamokupapapa, Nihoa, Ha'ena, Ha'enakū, Ha'enamoe, Ha'enaala, Ha'ena'ē, Ha'enamauhoalalahiki, Laloiho, Laloa'e, Lalohele, Lalokona, Lalo'āniani, Kamole, Kapou, Pouhe'eua, Pouhe'elani, Manawainui, Manawaihiki, Kuaihelani, and Holanikū.

Recent written records clearly demonstrate the Kingdom of Hawai'i rulers' interest in Nihoa. In 1822 Queen Ka'ahumanu organized and participated in an expedition to explore the island of the ancient chants. King Kamehameha IV Alexander Liholiho traveled to Nihoa in 1857, to formally annex the NWHI for his Kingdom. Perhaps the most famous visit was made by Lydia Lili'uokalani (princess at the time) and her 200 person party that visited Nihoa on the ship Iwalani in 1885. Despite this establishment of formal ownership, other visits were made by representatives of the Kingdom of Hawai'i to reassert ownership claims as outside European explorers began to "re-discover" the NWHI.

In 1893, Queen Lydia Lili'uokalani was unlawfully overthrown by the self-proclaimed Provisional Government, made up of largely western business interests and missionary descendants, with the assistance of U.S. Minister John L. Stevens. In 1898, the NWHI, along with title of the main Hawaiian archipelago were collectively, but unlawfully, ceded to the United States.³

There is no question among historians that Native Hawaiians were the first discoverers of the 1,500 mile-long Hawaiian archipelago and continued to inhabit and survive in these islands for hundreds of years prior to Western contact. During this time, Native Hawaiians evolved a complex system of resource management and developed a specialized set of skills to survive on these remote islands with limited resources. Presently, Native Hawaiians continue to maintain their strong cultural ties to the ocean and continue to understand the importance of managing these islands as a whole, rather than separate from each other.

The Native Hawaiian people remain intimately connected to the Hawaiian archipelago on genealogical, cultural, spiritual and geological levels. Today, sovereignty of and responsibility for the Hawaiian archipelago continues to exist in the na'au (essence of being) of many Native Hawaiians. This position is reinforced by U.S. Public Law 103-150, a joint resolution of Congress that was signed by the President of the U.S. in 1993. Public Law 103-150 acknowledges the role of United States' officers in the overthrow of the Kingdom of Hawai'i and "apologizes to Native Hawaiians on behalf of the people of the United States" for the unlawful overthrow and the "deprivation of the rights of Native Hawaiians to self-determination."

In summary, the NWHI are intimately connected to Kānaka 'Ōiwi and the main Hawaiian Islands on genealogical, cultural, spiritual and historical levels. The natural, primordial elements (land, wind, rain) and creatures of the northwestern islands are considered primordial ancestors and therefore the older relatives of living Kānaka 'Ōiwi. Both share an interdependent, ohana (family-based) relationship that requires mālama (care) and kia'i (guardianship) for the older siblings who, in turn, provide for the well being of the younger. These traditions remind us of the time-honored Native Hawaiian value of kuleana (responsibility) to care for this unique, fragile place and its many resources through strong conservation and protection principles. The need to mālama ka pae 'āina (care for the archipelago) continues as we look toward the future.

*E iho ana o luna
E pii ana o lalo
E hui ana nā moku
E kū ana ka paia*

*That which is above shall be brought down
That which is below shall rise up
The islands shall come together
To form the walls of our nation*

Prophecy of Kapihe in Kona 18th Century

³Apology Bill (103-150) Sect (1): Resolved by the Senate and House of Representatives of the United States of America in Congress assembled,

(1) on the occasion of the 100th anniversary of the illegal overthrow of the Kingdom of Hawaii on January 17, 1893, acknowledges the historical significance of this event which resulted in the suppression of the inherent sovereignty of the Native Hawaiian people; (2) recognizes and commends efforts of reconciliation initiated by the State of Hawaii and the United Church of Christ with Native Hawaiians; (3) apologizes to Native Hawaiians on behalf of the people of the United States for the overthrow of the Kingdom of Hawaii on January 17, 1893 with the participation of agents and citizens of the United States, and the deprivation of the rights of Native Hawaiians to self-determination; (4) expresses its commitment to acknowledge the ramifications of the overthrow of the Kingdom of Hawaii, in order to provide a proper foundation for the reconciliation between the United States and the Native Hawaiian people; and (5) urges the President of the United States to also acknowledge the ramifications of the overthrow of the Kingdom of Hawaii and to support reconciliation efforts between the United States and the Native Hawaiian people.

U.S. History and Maritime Heritage of the Northwestern Hawaiian Islands

During the late 18th and early 19th centuries, European and American traders began to call at the main Hawaiian Islands, and by 1825 Honolulu became the most important port in the entire Pacific. During the 19th and 20th centuries, the NWHI were witness to a distinct series of extractive activities. These included whaling ships working in the vicinity of the NWHI, as well as the commercial exploitation of other marine and terrestrial wildlife. Hawaiian monk seals experienced mass hunting for their oil and pelts. Bird skins and feathers were also harvested.

Commercial fishing in the waters surrounding the NWHI began with the arrival of large schooners and other sailing ships that hailed from ports around the world. These vessels left the reefs and shoals with cargoes of shark meat, fins and oil, turtle shells and oil, and bêche-de-mer. By the early 1900's, the fishing range of the Honolulu-based "sampan" fleet extended to the NWHI. This fleet was established by Japanese immigrants who adapted fishing technology and skills developed in their homeland to the resources and sea conditions in Hawaii. Commercial harvesting of tuna, bottomfish, lobsters, and other marine animals in the NWHI continued through the twentieth century. For some species, such as the pearl oyster (*Pinctada galtsoffi*) and spiny lobster (*Panulirus marginatus*), fishing resulted in dramatic depletion.

Mineral resources were also exploited. Several of the NWHI islands were leased for a period of 25 years to the North Pacific Phosphate and Fertilizer Company for guano extraction. Development of land-based facilities supporting these commercial activities was most significant on Laysan Island, where a small community existed in the 1890s, but facilities were also established on Lisianski Island.

Unfortunately, the ill-charted NWHI presented a challenge to ships and sailors engaged in these commercial activities. The low inconspicuous reefs and atolls of the NWHI represented a significant navigational hazard and were frequently sites for shipwrecks. Crews were often stranded for many months, while they constructed smaller vessels from salvaged timbers and set out for rescue. Some vessels were lost with all hands. Marine salvage expeditions from the main Hawaiian Islands profited from the area.

Beyond natural and mineral resources, the geographical location of the NWHI itself proved to be a "valuable" commodity. From the beginning of the 20th century onward, the strategic location of Hawaii and the NWHI became increasingly important to commercial and military planners. The Spanish American War in 1898 led to the American colonization of Guam and the Philippines, as well as the unlawful annexation of the Hawaiian Islands. This greatly expanded American colonial presence made transpacific communication a priority. By 1903, the first transpacific cable and cable station was in operation and employees of the Commercial Pacific Cable Company settled at Midway. Tons of imported soil and numerous introduced plants significantly altered the landscape. In the 1930's, Pan American Airways "flying clippers" (seaplanes) were crossing the ocean, flying into Midway from Honolulu on their five-day transpacific passage. The U.S. Navy took an early interest in the strategic location of Midway, and in 1939, millions of dollars were awarded to the Pacific Naval Air Base (PNAB) Consortium, and construction of the naval air facility at Midway begun the following year.

Intense impact on the region occurred during the World War II period. French Frigate Shoals was the temporary staging site for Japanese seaplanes, as well as a U.S. naval air facility at a later point. The Navy built a base at Midway Atoll, dredging the reef to form a channel and harbor to create a major submarine refit and repairs base. Eastern Island had the main airfield in the early days of the war, while submarine and seaplane support operations were concentrated on Sand Island. Together, these areas comprised a vital center for submarine, surface fleet, and naval aviation operations. In fact, the Hawaiian Sea Frontier Forces stationed patrol vessels at most of the islands and atolls. Tern Island, in French Frigate Shoals, was initially developed as a naval air facility for staging aircraft from the main Hawaiian Islands.

In June 1942, the Battle of Midway took place in the seas to the north of this Pacific outcrop. Four Japanese aircraft carriers and one American carrier were sunk, and Japanese forces were forced to withdraw from the planned invasion. Though the majority of the battle took place between 100 to 200 miles to the north, an intense air fight was waged directly over and around the atoll itself. Training exercises before and after the Battle also took their toll. At least 67 naval aircraft, both American and Japanese, crashed or were ditched into near shore waters of Midway and Kure Atolls, many of them combat losses for both American and Japanese Navies. Many of these crash sites are war graves. This battle proved to be the most decisive





U.S. victory and was the turning point of World War II in the Pacific. Midway Atoll is designated as a National Memorial to the Battle of Midway. Nine defensive structures related to the Battle of Midway were designated a National Historic Landmark in 1986. Many others are eligible for placement on the National Register of Historic Places.

In the interim between 1944 until the late 1970's, the U.S. Coast Guard occupied Tern Island (French Frigate Shoals) and Eastern Island (Midway) and operated long-range navigational aid (LoRAN) stations. The Coast Guard also operated a LoRAN station at Kure Atoll, which was decommissioned in 1992.

All of these activities have left a scattered material legacy around and on the Islands, including shipwrecks, sunken naval aircraft, toxic waste sites and unexploded ordnance. Currently, there are 52 known shipwreck sites among the NWHI, the earliest dating back to 1822. This combined with known aircraft, gives a total of 119 potential maritime resource sites. Some of these represent environmental threats. Some consist chiefly of marine debris of little specific value. But many of these sites, as defined by State and Federal Preservation Law, are of historical and national significance. They are a physical record of past activities in the NWHI and embody unique aspects of Island and Pacific history.

In recent years, the Navy has phased out its presence at Midway Atoll, making way for the Midway Atoll National Wildlife Refuge, which assumed full custody and accountability following the Navy's departure. Today, Midway Atoll National Wildlife Refuge is the only remote NWHI site open to public visitation. This effort complements President Theodore D. Roosevelt's legacy of the Hawaiian Islands National Wildlife Refuge, which encompasses the eight easternmost islands in the chain and the surrounding reefs, for the protection of seabirds.

Current Human Activities

Today, few human activities occur in the Reserve area, which include submerged lands and waters of the NWHI and is adjacent to and seaward of the seaward boundaries of the Hawaii State waters and the Midway Atoll National Wildlife Refuge. However, there are limited human activities that do occur in the NWHI. None of the islands are inhabited, with the exception of Sand Island at Midway Atoll and year round field camps at Tern Island (French Frigate Shoals) and on Laysan Island. Researchers occasionally occupy the islands for limited periods of time and take part in research expeditions. In 1996, a limited ecotourism program opened on Midway Atoll National Wildlife Refuge. Research activities are one of the more predominant activities in Reserve waters, along with commercial fishing and transiting ships.

Over the last several years, the NWHI has experienced an increase in research activity. Several multi-agency research expeditions have been carried out in the NWHI with the goal of increasing the overall understanding of the NWHI, resulting in increased vessel traffic and increased potential impacts to the area. There is a fundamental need to balance increased research interests with the protection and long-term conservation of the NWHI.

Currently, one small commercial fishery in the NWHI is managed under a Fishery Management Plan developed by the WPRFMC and approved by NOAA Fisheries. The bottomfish fishery has two limited entry zones, the Hoomalu Zone, which ranges from Kure to French Frigate Shoals, with four active permits; and the Mau Zone, which ranges from French Frigate Shoals to Nihoa, with five active permits. Two permits, set aside under the Community Development Program for Native Hawaiians, have not been filled. Note: the NOAA Fisheries Draft Environmental Impact Statement for bottom fishing was released on October 17, 2003 to the public.

The major commercial crustacean (lobster) fishery in the NWHI was closed by NOAA fisheries in 2000, primarily as a "precautionary measure (see glossary) to prevent the potential of the fishery overfishing the spiny and slipper lobster resources in the NWHI. NOAA Fisheries scientists continue to conduct biological research to assess the health of the lobster stock.

The pelagic longline fishery is a limited-entry system with a maximum of 164 permits, about 100 of which are active. These vessels are prohibited from operating in a 185 kilometer wide corridor in the NWHI to protect monk seals and other species from unwanted interaction with the longline fishery. Trolling and handline fishing for pelagic species is allowed within the NWHI by NOAA Fisheries and the State of Hawaii and through special provisions in the EO.



Other Activities Recently Proposed in the NWHI

There has been occasional interest in the establishment of a commercial fishery for precious corals in the NWHI. However, none has come to realization due to economic constraints, as well as restrictions imposed in the precious coral fishery as a result of a final rule promulgated in 2002 by NOAA Fisheries (52 FR 11941, March 28, 2002) and provisions of EO 13 178 and 1319 that previously established the NWHI Coral reef Ecosystem Reserve.

Environmental Consequences of Proposed Action and Alternatives

Alternative A: Take No Action

Environmental Impacts

Under this alternative, no Reserve Operations Plan would be prepared and the Executive Order would stand alone as the management document for the Reserve. This action would be in direct conflict with the clear mandate of the Executive order to develop a Reserve Operations Plan.

There would be no environmental impacts beyond impacts expected from the establishment of the Reserve, a separate and distinct action done by Executive order. Taking no action and not developing a Reserve Operations Plan, however, would result in there not being a more detailed assessment and plan for coordination of management activities in the Reserve, nor would there be a plan for additional programs that could be developed such as those for education and outreach, or permitting. Additionally, there would be no plan to develop an infrastructure to support the Reserve, nor would there be an Operations Plan on which to build the sanctuary management plan during the designation process.

Socioeconomic Impacts

Taking no action would result in no additional socioeconomic impacts than those already associated with the creation of the Reserve. There would be no outlay of funds to develop infrastructure, education, research or other programs.

Alternative B: Propose this Reserve Operations Plan (Preferred)

Environmental Impacts

Development of the Reserve Operations Plan is not expected to have adverse impacts on the environment. The Reserve Operations Plan lays out a series of action plans focusing on management of priority issues pending the designation of a National Marine Sanctuary.

Full descriptions of the action proposed to be taken under the Reserve Operations Plan are contained in the "Action Plan" section, as summarized below:

- Operations: includes interagency coordination, activity and area identification, Reserve/Sanctuary Advisory Council operations, development of fishing caps, development of permitting procedures, and infrastructure development.
- Education and Outreach: encompasses all education, outreach, and interpretive projects.
- Cultural Resources: consists of all projects related to Native Hawaiian culture, uses, and locations.
- Research and Monitoring: contains all projects related to research and monitoring.
- Mapping: covers all projects related to developing charts and maps of the NWHI.
- Restoration: contains projects related to restoration.
- Response, Damage Assessment and Restoration: covers projects related to contingency planning and response.
- Marine Debris: consists of projects related to the removal of marine debris from the NWHI.
- Enforcement: includes air and sea support for existing enforcement operations and expansion of a vessel monitoring system.
- Sanctuary Designation: covers all projects related to the sanctuary designation process.

Preparing the Reserve Operations Plan would allow NOAA and its management partners to do a more detailed assessment and coordination of management activities in the Reserve. Most of the action plans provide for activities that are expected to result in beneficial long-term environmental impacts through low or no impact short-term activities such as assessments of damage response and restoration needs (e.g.,



Response, Damage Assessment and Restoration Action Plan); coordination and participation in existing efforts (e.g., Marine Debris Action Plan), development of education and outreach materials such as brochures (e.g., Education and Outreach Action Plan); literature searches and development of a Native Hawaiian cultural collections database (e.g., Native Hawaiian Cultural Resources Action Plan), and development of a vessel monitoring system and support an increase in air and sea support (e.g., Enforcement Action Plan).

Activities such as the development of fishing caps, as required under the Executive Order, permitting procedures, and the sanctuary designation process will be accompanied by the appropriate NEPA review at that time.

Further, the Reserve Operations Plan provides for the development of infrastructure, including staff. Offices will be established in existing buildings through lease or partnerships, and, therefore, little environmental impact from facility development is expected. The creation of additional programs such as for research, education, and outreach is also provided for; such programs are expected to have no detrimental environmental impacts by their conduct, and have positive benefits by increasing awareness and appreciation for the resources of the NWHI.

Additional programs for research, education and outreach will undergo NEPA analysis as determined on a case by case basis.

Socioeconomic Impacts

NOAA believes the proposed Reserve Operations Plan will result in no additional socioeconomic impacts than those already associated with the creation of the Reserve. Additional socioeconomic analysis as required under NEPA and other acts and executive orders would be prepared as necessary for specific actions, such as the development of fishing caps called for in the Operations Action Plan. The outlay of funds to develop infrastructure, including the establishment of offices and hiring of staff, is expected to have a small positive influence in local communities around those offices, by the expending of funds on office leasing and furnishing, supplies, local services, and other operational expenses and essentials.

Finding of No Significant Impact

NOAA Administrative Order (NAO) 216-6 (revised May 20, 1999) provides eleven criteria for determining the significance of the impacts of a proposed action. These criteria are discussed below with respect to the proposed action (Alternative B).

1. Impacts may be both beneficial and adverse— a significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial.

The proposed action is mandated by Executive Orders. None of the actions proposed in the Reserve Operations Plan result in significant effects above which already exist with the promulgation of Executive order 13178, as finalized by Executive order 13196. The proposed action has no substantive effect on the literal words of the Executive Order.

2. What is the degree to which public health or safety is affected by the proposed action?

Public health and safety will not be affected by the proposed action. The Reserve Operations Plan simply implements the Executive Orders and does not affect public health and safety.

3. Are there unique characteristics of the geographic area in which the proposed action is to take place?

The marine environment of the Northwestern Hawaiian Islands represents "truly a unique and special place, a coral reef ecosystem like no other place on earth..." according to Executive order 13178, which established the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve.



4. What is the degree to which effects on the human environment are likely to be highly controversial?

The proposed action, a Reserve Operations Plan, is being carried out through the mandates of existing Executive orders. While the Executive Orders themselves carry some controversy, the Reserve Operations Plan simply guides the implementation of words in the Executive Orders—words that are already self-executing.

5. What is the degree to which effects are highly uncertain or involve unique or unknown risks?

There are no effects, either highly uncertain or involving unique or unknown risks, that are made possible by the action at hand, which is the adoption of a Reserve Operations Plan for the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve.

6. What is the degree to which the action establishes a precedent for future actions with significant effects or represents a decision in principle about a future consideration?

The Reserve Operations Plan establishes guidelines for the operation of the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve. Since the Reserve and some surrounding areas are also being proposed as a National Marine Sanctuary, the Executive Orders establishing the Reserve also set some precedent for future action. The future action will be two-fold: 1) a decision will be made on a separate Environmental Impact Statement (EIS) under the National Environmental Policy Act, and 2) the "No Action" alternative for sanctuary designation will be the NWHI Coral Reef Ecosystem Reserve, as implemented by the Reserve Operations Plan. Additionally, the Reserve Operations Plan will form a large part of the foundation for all sanctuary management alternatives suggested in the EIS for the designation process.

7. Does the proposed action have individually insignificant but cumulatively significant impacts?

The proposed action is not expected to result in cumulative impacts.

8. What is the degree to which the action adversely affects entities listed in or eligible for listing in the National Register of Historic Places, or may cause loss or destruction of significant scientific, cultural, or historic resources?

The proposed action, a Reserve Operations Plan, is consistent with the Executive Orders as well as other laws and policies protecting significant scientific, cultural, and historic resources. No adverse effects are expected to these resources due to the proposed action.

9. What is the degree to which endangered or threatened species, or their critical habitat as defined under the Endangered Species Act of 1973, are adversely affected?

There are no adverse impacts contemplated to endangered or threatened species, or critical habitat for such species.

10. Is a violation of Federal, state, or local law for environmental protection threatened?

No laws protecting the environment are threatened by the proposed Reserve Operations Plan.

11. Will the *proposed* action result in the introduction or spread of a non-indigenous species?

In carrying out activities outlined in the Reserve Operations Plan, which include scientific research, marine debris removal, archaeological studies, recreation, commercial activities, or any other aspect of the Reserve Operations Plan, every reasonable attempt will be made to prevent the introduction or spread of non-indigenous species to the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve. Protocols to prevent the introduction or spread of non-indigenous species will be made mandatory to the extent of the powers available through the Executive Orders and other laws.



FONSI STATEMENT

NOAA has determined that the development of the Reserve Operations Plan will have no additional impacts on the human environment beyond those already entailed by the establishment of the Reserve, a separate and distinct action done by Executive Order. Further, the Reserve Operations Plan is intended to govern management of the Reserve pending the process to designate it as a National Marine Sanctuary. The sanctuary designation process is a comprehensive, multi-year process that includes preparation of an environmental impact statement and a long-term management plan, which will supplement or complement the Reserve Operations Plan. Because this and other (e.g., fishing caps) additional actions undertaken by NOAA in furtherance of the Executive Order, will all be supported by separate, individual NEPA documentation, and because of the nature of the impacts of the Reserve operations Plan, as discussed above, NOAA has determined that a finding of no significant impact is appropriate for the preparation of the Reserve Operations Plan.

Richard W. Spinrad, Ph.D.
Assistant Administrator for
Ocean Services and Coastal Zone Management

10/13/04

Date

Appendix 5: UNITED STATES PUBLIC LAW 103-150, 103d Congress Joint Resolution 19 Nov. 23, 1993



To acknowledge the 100th anniversary of the January 17, 1893 overthrow of the Kingdom of Hawaii, and to offer an apology to Native Hawaiians on behalf of the United States for the overthrow of the Kingdom of Hawaii.

Whereas, prior to the arrival of the first Europeans in 1778, the Native Hawaiian people lived in a highly organized, self-sufficient, subsistent social system based on communal land tenure with a sophisticated language, culture, and religion;

Whereas, a unified monarchical government of the Hawaiian Islands was established in 1810 under Kamehameha I, the first King of Hawaii;

Whereas, from 1826 until 1893, the United States recognized the independence of the Kingdom of Hawaii, extended full and complete diplomatic recognition to the Hawaiian Government, and entered into treaties and conventions with the Hawaiian monarchs to govern commerce and navigation in 1826, 1842, 1849, 1875, and 1887;

Whereas, the Congregational Church (now known as the United Church of Christ), through its American Board of Commissioners for Foreign Missions, sponsored and sent more than 100 missionaries to the Kingdom of Hawaii between 1820 and 1850;

Whereas, on January 14, 1893, John L. Stevens (hereafter referred to in this Resolution as the "United States Minister"), the United States Minister assigned to the sovereign and independent Kingdom of Hawaii conspired with a small group of non-Hawaiian residents of the Kingdom of Hawaii, including citizens of the United States, to overthrow the indigenous and lawful Government of Hawaii;

Whereas, in pursuance of the conspiracy to overthrow the Government of Hawaii, the United States Minister and the naval representatives of the United States caused armed naval forces of the United States to invade the sovereign Hawaiian nation on January 16, 1893, and to position themselves near the Hawaiian Government buildings and the Iolani Palace to intimidate Queen Liliuokalani and her Government;

Whereas, on the afternoon of January 17, 1893, a Committee of Safety that represented the American and European sugar planters, descendants of missionaries, and financiers deposed the Hawaiian monarchy and proclaimed the establishment of a Provisional Government;

Whereas, the United States Minister thereupon extended diplomatic recognition to the Provisional Government that was formed by the conspirators without the consent of the Native Hawaiian people or the lawful Government of Hawaii and in violation of treaties between the two nations and of international law;

Whereas, soon thereafter, when informed of the risk of bloodshed with resistance, Queen Liliuokalani issued the following statement yielding her authority to the United States Government rather than to the Provisional Government:

"I Liliuokalani, by the Grace of God and under the Constitution of the Hawaiian Kingdom, Queen, do hereby solemnly protest against any and all acts done against myself and the Constitutional Government of the Hawaiian Kingdom by certain persons claiming to have established a Provisional Government of and for this Kingdom.

"That I yield to the superior force of the United States of America whose Minister Plenipotentiary, His Excellency John L. Stevens, has caused United States troops to be landed a Honolulu and declared that he would support the Provisional Government.

"Now to avoid any collision of armed forces, and perhaps the loss of life, I do this under protest and impelled by said force yield my authority until such time as the Government of the United States shall, upon facts being presented to it, undo the action of its representatives and reinstate me in the authority which I claim as the Constitutional Sovereign of the Hawaiian Islands."

Done at Honolulu this 17th day of January, A.D. 1893;



Whereas, without the active support and intervention by the United States diplomatic and military representatives, the insurrection against the Government of Queen

Liliuokalani would have failed for lack of popular support and insufficient arms;

Whereas, on February 1, 1893, the United States Minister raised the American flag and proclaimed Hawaii to be a protectorate of the United States;

Whereas, the report of a Presidentially established investigation conducted by former Congressman James Blount into the events surrounding the insurrection and overthrow of January 17, 1893, concluded that the United States diplomatic and military representatives had abused their authority and were responsible for the change in government;

Whereas, as a result of this investigation, the United States Minister to Hawaii was recalled from his diplomatic post and the military commander of the United States armed forces stationed in Hawaii was disciplined and forced to resign his commission;

Whereas, in a message to Congress on December 18, 1893, President Grover Cleveland reported fully and accurately on the illegal acts of the conspirators, described such acts as an "act of war, committed with the participation of a diplomatic representative of the United States and without authority of Congress", and acknowledged that by such acts the government of a peaceful and friendly people was overthrown;

Whereas, President Cleveland further concluded that a "substantial wrong has thus been done which a due regard for our national character as well as the rights of the injured people requires we should endeavor to repair" and called for the restoration of the Hawaiian monarchy;

Whereas, the Provisional Government protested President Cleveland's call for the restoration of the monarchy and continued to hold state power and pursue annexation to the United States;

Whereas, the Provisional Government successfully lobbied the Committee on Foreign Relations of the Senate (hereafter referred to in this Resolution as the "Committee") to conduct a new investigation into the events surrounding the overthrow of the monarchy;

Whereas, the Committee and its chairman, Senator John Morgan, conducted hearings in Washington, D.C., from December 27, 1893, through February 26, 1894, in which members of the Provisional Government justified and condoned the actions of the United States Minister and recommended annexation of Hawaii;

Whereas, although the Provisional Government was able to obscure the role of the United States in the illegal overthrow of the Hawaiian monarchy, it was unable to rally the support from two-thirds of the Senate needed to ratify a treaty of annexation;

Whereas, on July 4, 1894, the Provisional Government declared itself to be the Republic of Hawaii;

Whereas, on January 24, 1895, while imprisoned in Iolani Palace, Queen Liliuokalani was forced by representatives of the Republic of Hawaii to officially abdicate her throne;

Whereas, in the 1896 United States Presidential election, William McKinley replaced Grover Cleveland;

Whereas, on July 7, 1898, as a consequence of the Spanish-American War, President McKinley signed the Newlands Joint Resolution that provided for the annexation of Hawaii;

Whereas, through the Newlands Resolution, the self-declared Republic of Hawaii ceded sovereignty over the Hawaiian Islands to the United States;

Whereas, the Republic of Hawaii also ceded 1,800,000 acres of crown, government and public lands of the Kingdom of Hawaii, without the consent of or compensation to the Native Hawaiian people of Hawaii or their sovereign government;

Whereas, the Congress, through the Newlands Resolution, ratified the cession, annexed Hawaii as part of the United States, and vested title to the lands in Hawaii in the United States;

Whereas, the Newlands Resolution also specified that treaties existing between Hawaii and foreign nations



were to immediately cease and be replaced by United States treaties with such nations;

Whereas, the Newlands Resolution effected the transaction between the Republic of Hawaii and the United States Government;

Whereas, the indigenous Hawaiian people never directly relinquished their claims to their inherent sovereignty as a people or over their national lands to the United States, either through their monarchy or through a plebiscite or referendum;

Whereas, on April 30, 1900, President McKinley signed the Organic Act that provided a government for the territory of Hawaii and defined the political structure and powers of the newly established Territorial Government and its relationship to the United States;

Whereas, on August 21, 1959, Hawaii became the 50th State of the United States;

Whereas, the health and well-being of the Native Hawaiian people is intrinsically tied to their deep feelings and attachment to the land;

Whereas, the long-range economic and social changes in Hawaii over the nineteenth and early twentieth centuries have been devastating to the population and to the health and well-being of the Hawaiian people;

Whereas, the Native Hawaiian people are determined to preserve, develop and transmit to future generations their ancestral territory, and their cultural identity in accordance with their own spiritual and traditional beliefs, customs, practices, language, and social institutions;

Whereas, in order to promote racial harmony and cultural understanding, the Legislature of the State of Hawaii has determined that the year 1993, should serve Hawaii as a year of special reflection on the rights and dignities of the Native Hawaiians in the Hawaiian and the American societies;

Whereas, the Eighteenth General Synod of the United Church of Christ in recognition of the denomination's historical complicity in the illegal overthrow of the Kingdom of Hawaii in 1893 directed the Office of the President of the United Church of Christ to offer a public apology to the Native Hawaiian people and to initiate the process of reconciliation between the United Church of Christ and the Native Hawaiians; and

Whereas, it is proper and timely for the Congress on the occasion of the impending one hundredth anniversary of the event, to acknowledge the historic significance of the illegal overthrow of the Kingdom of Hawaii, to express its deep regret to the Native Hawaiian people, and to support the reconciliation efforts of the State of Hawaii and the United Church of Christ with Native Hawaiians;

Now, therefore, be it

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled,



SECTION 1. ACKNOWLEDGMENT AND APOLOGY.

The Congress -

- (1) on the occasion of the 100th anniversary of the illegal overthrow of the Kingdom of Hawaii on January 17, 1893, acknowledges the historical significance of this event which resulted in the suppression of the inherent sovereignty of the Native Hawaiian people;
- (2) recognizes and commends efforts of reconciliation initiated by the State of Hawaii and the United Church of Christ with Native Hawaiians;
- (3) apologizes to Native Hawaiians on behalf of the people of the United States for the overthrow of the Kingdom of Hawaii on January 17, 1893 with the participation of agents and citizens of the United States, and the deprivation of the rights of Native Hawaiians to self-determination;
- (4) expresses its commitment to acknowledge the ramifications of the overthrow of the Kingdom of Hawaii, in order to provide a proper foundation for reconciliation between the United States and the Native Hawaiian people; and
- (5) urges the President of the United States to also acknowledge the ramifications of the overthrow of the Kingdom of Hawaii and to support reconciliation efforts between the United States and the Native Hawaiian people.

SEC. 2. DEFINITIONS.

As used in this Joint Resolution, the term "Native Hawaiians" means any individual who is a descendent of the aboriginal people who, prior to 1778, occupied and exercised sovereignty in the area that now constitutes the State of Hawaii.

SEC. 3. DISCLAIMER.

Nothing in this Joint Resolution is intended to serve as a settlement of any claims against the United States.

Approved November 23, 1993



Appendix 6: Bibliography

- Abbott, I. A. (1989). Marine algae of the Northwestern Hawaiian Islands. *Pacific Science* 43, 223-233.
- Aeby, G.S. Pers. comm. Interim Results from NOW-RAMP 2002 on Coral Cover Ranges in the NWHI. Correspondence to Malia Chow, May, 21, 2003.
- Antonelis, G. Pers. comm. Transient Marine Mammals in the NWHI. Correspondence to Marla Steinhoff. November 10, 2000.
- Arrival of the Manukawai--interesting account of her exploration. (1957). *The Polynesian*, Vol. 14.
- Atlas of the Shallow-Water Benthic Habitats of the Northwestern Hawaiian Islands, Draft. (2003) U.S. Dept. of Commerce, NOAA/NOS/NMSP.
- Balazs, G. H. (1976). Green turtle migrations in the Hawaiian Archipelago. *Biological Conservation* 9, 125-140.
- Balazs, G. H. (1983). Recovery records of adult green turtles observed or originally tagged at French Frigate Shoals, Northwestern Hawaiian Islands. U.S. Dept. Commerce, NOAA Technical Memorandum, NMFS, NOAA-TM-NMFS-SWFC 36. 42 pp.
- Balazs, G. H. (1985). Status and ecology of marine turtles at Johnston Atoll. *Atoll Resource Bulletin* 285, 1-46.
- Balazs, G.H. (1994). Homeward bound: satellite tracking of Hawaiian green turtles from nesting beaches to foraging pastures. Pg.205, 13th Ann. Symp. *Sea Turtle Biol. and Conserv.*, Feb. 23-27, 1993, Jekyll Island, Georgia.
- Barlow, J. (2003). Cruise Report: Hawaiian Islands Cetacean and Ecosystem Assessment Survey (HICEAS) DS-02-07, SWFSC Marine Mammal Cruise Numbers 1621 and 1622. NOAA National Marine Fisheries Service, Southwest Fisheries Science Center.
- Beckwith, M. (1970). *Hawaiian Mythology*, University of Hawai'i Press, Honolulu.
- Brainard, R. Pers. comm. Data from NOW-RAMP survey. Correspondence to Marla Steinhoff. November 27, 2000.
- Clapp, R. B. & Kridler, E. (1977). The natural history of Necker Island, Northwestern Hawaiian Islands. *Atoll Resource Bulletin*.
- Cleghorn, P. L. (1988). The Settlement and Abandonment of Two Hawaiian Outposts: Nihoa and Necker Islands. Bishop Museum Occasional Papers 28.
- DeMartini, E.E. and A.M. Friedlander. In review. Is localized reseeding, net upchain transport, or some post-settlement process causing the spatial pattern of endemism in the Northwestern Hawaiian Island reef fishes? *Mar. Ecol. Prog. Ser.*
- Dinardo and Marshall, (2001). Status of Lobster Stocks in the NWHI, 1998-2000. Southwest Fisheries Science Center Administrative Report H-01-04. Honolulu Laboratory, Southwest Fisheries Science Center, National Marine Fisheries Service, NOAA, Honolulu.
- Dizon, A. E. & Balazs, G. H. (1982). Radio telemetry of Hawaiian green turtles at their breeding colony. *Marine Fisheries Review* 44, 13-20.
- Elderedge, L.G., and S.E. Miller. (1994). Records of the Hawaii Biological Survey for 1994. Bishop Museum Occasional Papers 41: 3-18.
- Emerson, N. B. (1997). *Pele and Hi'iaka: a myth from Hawai'i*, `Ai Pohaku Press, Honolulu.
- Emory, K. P. (1928). The Archaeology of Nihoa and Necker islands. Bernice P. Bishop Museum Bulletin 53, 1-124.



- Fornander, A. (1887). Fornander Collection of Hawaiian Antiquities and Folk-lore: the Hawaiian account of the formation of their islands and origin of their race, with the traditions of their migrations, etc., as gathered from original sources., Bishop Museum Press, Honolulu.
- Friedlander, A. M. (1996). Assessment of the coral reef resources of Hawai'i with emphasis on waters of federal jurisdiction. Final report prepared for the Western Pacific Regional Fishery Management Council, pp. 66.
- Friedlander, A.M. and E.E. DeMartini. (2002). Contrasts in Density, Size, and Biomass of Reef Fishes between the Northwestern and the Main Hawaiian Islands: The Effects of Fishing Down Apex Predators. *Mar. Ecol. Prog. Ser.* 230:253-264.
- Friedlander and DeMartini, Fishes of the Northwestern Hawaiian Islands, manuscript in preparation.
- Goodman-Lowe, G. D. (1998). Diet of the Hawaiian monk seal (*Monachus schauinslandi*) from the Northwestern Hawaiian Islands during 1991-1994. *Marine Biology* 132: 535-546.
- Green, A. (1997). An assessment of the status of the coral reef resources, and their patterns of use, in the U.S. Pacific Islands. Final report prepared for the Western Pacific Regional Fishery Management Council. Western Pacific Regional Fishery Management Council.
- Grigg, R. W. (1982). Darwin Point, a threshold for atoll formation. *Coral Reefs* 1, 29-34.
- Grigg, R. W. (1983). Community structure, succession and development of coral reefs in Hawai'i. *Marine Ecology Progress Series* 11, 1-14.
- Grigg, R. W. (1993). Precious coral fisheries in Hawai'i and the U.S. Pacific Islands. *Marine Fisheries Review* 55, 50-60.
- Gulko, D. (1998). Hawaiian Coral Reef Ecology, Mutual Publishing, Honolulu.
- Hobson, E.S. (1984). The Structure of Reef Fish Communities in the Hawaiian Archipelago. In "Proceedings of the Second Symposium on Resource Investigations in the Northwestern Hawaiian Islands" (R. Grigg and K. Tanoue, eds.), Univ. Hawaii Sea Grant MR-84-01 Volume 1: 101-122.
- Hoff, R. Z., Ed. Oil Spills in Coral Reefs Resource Guide: Office of Response and Restoration, NOS/NOAA.
- Hunter, C. (1995). Review of coral reefs around American Flag Pacific Islands and assessment of need, value, and feasibility of establishing a coral reef fishery management plan for the Western Pacific Region. Final report prepared for the Western Pacific Regional Fishery Management Council, Honolulu.
- Johanos, T. C. & Baker, J. D. (2000). The Hawaiian monk seal in the Northwestern Hawaiian Islands, 1998. U.S. Dept. Commerce, NOAA Technical Memorandum, NOAA-TM-NMFS-SWFSC-292. 107 pp.
- Johnson, K. & Mahelona, J. K. (1975). Na Inoa Hoku: a catalogue of Hawaiian and Pacific star names, Toppallant Publishing Company, Honolulu.
- Judd, A. F. (1885). Stories obtained from an old man, Keo from Mana: Information on ancient heiau and famous religious stones of religious significance. Lahainaluna student compositions, Bernice Pauahi Bishop Museum.
- Juvik, S. P. & Juvik, J. P., Eds. (1998). Atlas of Hawai'i. 3rd edit. Honolulu: University of Hawai'i.
- Ka huaka'i maka'ika'i ia Nihoa. (1885). Ko Hawaii Pae `Aina. August 1.
- Ka Mo'olelo o Hi'iaikaipolipele. (1906). Ka Na'i Aupuni (November 30, 1905 - November 29, 1906) and Hawai'i Aloha (June 1, 1906 - October 17, 1906).
- Kawamoto, K. and S. Pooley. (2000). Preliminary Draft: Annual Report of the 1999 Western Pacific Lobster Fishery. Honolulu Laboratory, Southwest Fisheries Science Center, National Marine Fisheries Service, NOAA, Honolulu.
- Kai'aikawaha. (1835). Mo'olelo no nākanaka kahiko mai ka pōmai, a me ka po'e mōkūi hānau mai ai. Unpublished document, Bernice Pauahi Bishop Museum Collection, Lahainaluna. Student compositions. MS HI H. 107 Folder 2.



- Kamakau, S. (1868). Ka Mo`olelo o na Kamehameha. Ka Nupepa Ku`oko`a. February 1.
- Laur, R. M. (2000). External Program Review. NOAA NMFS SWFSC HL.
- Likens, G. E. (1992). The Ecosystem Approach: Its Use and Abuse. Excellence in Ecology, Book 3, International Ecology Institute, Oldendorf/Luhe, Germany.
- Manu, M. (1899). Ke kua nui weliweli ma waena o Pele-ke-ahi-a-loa me Waka-ke-aka-i-kawai: he mau kupua wahine kaeana. Ka Loea Kalai`aina. May 13 - December 30.
- Maragos, J. E. (1977). Order Scleractinia, stony corals. In Reef and Shore Fauna of Hawai`i, Section 1, Protozoa through Ctenophora (Devaney, D. & Eldredge, L., eds.), pp. 158-241. Bishop Museum Press, Honolulu.
- Maragos, J. E., Crosby, M. P. & McManus, J. W. (1996). Coral reefs and biodiversity: a critical and threatened relationship. *Oceanography* 9, 83-101.
- Maragos, J. and Gulko, D. (eds). (2002). Coral Reef Ecosystems of the Northwestern Hawaiian Islands: Interim Results Emphasizing the 2000 Surveys. U.S. Fish and Wildlife Service and Hawai`i Department of Land and Natural Resources, Honolulu, Hawai`i. 46 pp.
- Midway Atoll National Wildlife Refuge Homepage. (2003). U.S. Fish and Wildlife Service. <<http://midway.fws.gov/>>. Accessed June 4, 2003.
- Miller, S.E., and L.G. Eldredge. (1996). Numbers of Hawaiian Species: Supplement 1. Bishop Museum Occasional Papers 45: 8-17.
- Miller, S. L. & Crosby, M. P. (1998). The Extent and Condition of US Coral Reefs. <http://oceanservice.noaa.gov/websites/retiredsites/sotc_pdf/CRF.PDF>. Accessed June 4, 2003.
- Murakami, A. T. (1991). Konohiki fishing rights and marine resources. In Native Hawaiian Rights Handbook (MacKenzie, M. K., ed.), pp. 173-195. Native Hawaiian Legal Corporation/Office of Hawaiian Affairs, Honolulu.
- National Marine Fisheries Service. (2000a). Pacific Sea Turtles Research and Recovery. National Marine Fisheries Service, Honolulu Laboratory, Honolulu.
- National Marine Fisheries Service. (2000b). Third Year Reef Cleanup Cruise Gathers 25 More Tons of Debris. National Marine Fisheries Service.
- National Marine Fisheries Service and U.S. Fish and Wildlife Service. (1998). Recovery Plan for U.S. Pacific Populations of the Green Sea Turtle (*Chelonia mydas*).
- National Marine Sanctuary Management Plan Handbook. (2002). 3rd edit, National Marine Sanctuary Program.
- Parrish, F.A., K. Abernathy, G.J. Marshall, B.M. Buhleier, (2002). Hawaiian Monk Seals (*Monachus schauinslandi*) Foraging in Deepwater Coral Beds. *Mar. Mamm. Sci.* 18(1):244-258.
- Parrish, J.D., M.W. Callahan, and J.E. Norris. (1985). Fish trophic relationships that structure reef communities. *Proceedings of the 5th International Coral Reef Congress* 4: 73-78.
- Paty, J. (1857). Report of the exploring voyage of the schooner "Manuokawai," Capt. Paty. *Commercial Advertiser*. June 11.
- Poepoe, J. (1908-1911). Ka Mo`olelo ka`ao o Hi`iakaikapoli-o-Pele. Ke Ku`oko`a Home Rula.
- Randall, J.E. (1992). Endemism of fishes in Oceania. *UNEP Regional Seas Rep. Stud.* 147: 55-67.
- Randall, J. E., Earle, J. L., Pyle, R. L., Parrish, J. D. and Hayes, T. (1993). Annotated checklist of the fishes of Midway Atoll, Northwestern Hawaiian Islands. *Pacific Science* 47, 356-400.



- Return of the excursionists from Bird Island. (1885). The Daily Pacific Commercial Advertiser. July 27.
- Rohmann, S.O., Hayes, J.J., Newhall, R.C., Monaco, M.E. and Grigg, R.W. The Area of Potential Shallow-Water Coral Ecosystems in the United States. Manuscript in review.
- State of Hawai'i Department of Land and Natural Resources. (2000). The Northwestern Hawaiian Islands. <http://www.state.hi.us/dlnr/exhibits/nwhi/NWHI_1.htm>. Accessed October 28, 2000.
- Tava, R. & Keale, M. K. (1989). Ni'ihau: the traditions of a Hawaiian Island, Mutual Publishing, Honolulu.
- Walsh, William J., Okano, Ryan, Nishimoto, Robert, and Carman, Brent. (2002). Northwestern Hawaiian Islands/Kure Atoll Assessment and Monitoring Program, Final Report. DAR/DLNR, State of Hawai'i. Grant Number NA070A0457.
- Wells, S. (1998). Coral Reefs of the World, Vol. 1, UNEP and IUCN, Cambridge.
- Western Pacific Regional Fishery Management Council. (2000). Draft Fishery Management Plan for Coral Reef Ecosystems of the Western Pacific Region.
- Yen, D. (1969). Nihoa--1969. Bernice Pauahi Bishop Museum Archives, Honolulu.
- Ziegler, A. C. (1989). Search for Evidence of Early Hawaiian Presence on Lisianski Island, Hawaiian Islands National Wildlife Refuge. State of Hawai'i, Office of Hawaiian Affairs.



Appendix 7: Glossary

Action plan - a major section of a management plan containing related strategies and activities designed to address a specific issue or function.

Activity - specific actions that will be taken to carry out a strategy.

Atoll - a horseshoe-shaped or circular array of coral reefs containing a lagoon in the center and capping the perimeter of a submerged volcanic island.

Anthropogenic - caused by humans.

Assessment - the evaluation process used to measure the performance or effectiveness of a system and its elements.

Barrier reef - a reef running roughly parallel to shore and separated from it by a lagoon of considerable depth and width; it may lie a great distance from a continental coast and is often interrupted by passes or channels.

Best Management Practices - guidelines for minimizing impact to the NWHI.

Cetacean - an aquatic mammal of the order, Cetacea, including whales, porpoises and dolphins.

Coral - a general term used to describe a group of benthic cnidarians; usually indicates the presence of a calcium carbonate skeleton secreted by the animal.

Coral bleaching - a process whereby the coral colonies lose their color, either due to the loss of pigments by microscopic algae (zooxanthellae) living in symbiosis with their host organisms (polyps) or because these zooxanthellae have been expelled.

Coral reef - a wave-resistant structure resulting from skeletal deposition and cementation of hermatypic corals, calcareous algae, and other calcium carbonate-secreting organisms.

Darwin Point - With reference to reef development, a geographical limit beyond which corals and coralline algae, the main players in reef accretion, hindered by low sea surface temperatures, can no longer deposit enough CaCO₃ to compensate for subsidence of the volcanic basement. Reefs at latitudes higher than the Darwin Point will fail to remain at sea level and sink below the photic zone within which adequate calcification must occur.

Executive Order (EO) - Executive Order 13178, as amended by Executive Order 13196.

Ecosystem - a spatially explicit unit of the Earth that includes all of the organisms, along with all components of the abiotic environment within its boundaries.

Exclusive Economic Zone - An area beyond and adjacent to the Territorial Sea as defined in the Seas and Submerged Lands Act 1973 ('the SSL Act' - including the amendments to that Act made by the Maritime Legislation Amendment Act 1994). In the NWHI, the inner boundary of the exclusive economic zone of each island or atoll is adjacent to State waters and the outer limit is 200 nautical miles and seaward of State waters.

Fishing - fishing is both the recreation and sport of catching fish (for food or as a trophy), and the commercial business of catching or harvesting seafood (either fish or other aquatic life-forms, such as shellfish).

Goal - broad statements characterizing the general management responsibilities of the site.

Habitat - place or environment where a particular species lives.

Issue - the most pressing obstacle facing the site's capacity to achieve its goals and objectives.

Management plan - site-specific documents that the NMSP uses to manage individual Sanctuaries.

Monitor - to watch, keep track of, or check usually for a special purpose.



Nautical mile - (nmi, naut mi or NM) - a unit of distance used by all nations for air and sea travel. The nautical mile is defined to be the average distance on the Earth's surface represented by one minute of latitude. If you were to cut the Earth in half at the equator, you could pick up one of the halves and look at the equator as a circle. You could divide that circle into 360 degrees. You could then divide a degree into 60 minutes. A minute of arc on the planet Earth is 1 nautical mile. In the English measurement system, a nautical mile is equivalent to 1.1508 miles, or 6,076 feet.

Objective - statements that articulate in fairly general terms possible means by which each goal can be achieved.

Outcome - a succinct and concise statement that articulates a desired future for the site relative to a specific problem statement; whenever possible, the outcome statement should be stated in quantifiable (and therefore measurable) terms.

Patch reef - clump of coral colonies unattached to a major reef structure that has a defined reef slope, crest, and reef flat.

Performance measure - the specific measurement that demonstrates a strategy's ability to achieve the desired outcome and alleviate the stated problem.

Precautionary approach – management actions with “resource protection favored when there is a lack of information regarding any activity, to the extent not contrary to law”. (Executive Order 13178; Sec 4.b.)

Propagule – part of an organism that can reproduce.

Self-executing – carries the force of law and does not require implementing regulations to be enforceable.

Square miles - 1 square mile (miles²) is the equivalent of 640 acres.

Supplement and Complement -

supplement: "something that completes or makes an addition";

complement: "something that fills up, completes or makes perfect"

Reef crest - shallowest seaward margin of reef.

Reef slope - reef seaward of reef crest.

Strategy - the means by which a particular desired outcome can be achieved.

Telepresence - the experience of being fully present at a live real world location remote from one's own physical location created through the use of technology such as streaming media, web cams, and high speed Internet links.

Vision - a long-term projection of the site's overarching intentions; a broad, very general statement answering the question "Why are we here?"

Zooxanthellae - a group of dinoflagellates living symbiotically in association with one of a variety of invertebrate groups (e.g., corals).



Appendix 8: Acronyms and Abbreviations

ADA - Americans with Disabilities Act
DOC - Department of Commerce
DoD - Department of Defense
DOI - Department of the Interior
DOT - Department of Transportation
EO - Executive Order
FACA - Federal Advisory Committee Act
FMP - Fishery Management Plans
GIS - geographic information system
GPS - global positioning system
GSA - General Services Administration
HazMat - hazardous materials
HIHWNMS - Hawaiian Islands Humpback Whale National Marine Sanctuary
km - kilometer
LORAN – long range navigational aid stations
MOU - Memorandum of Understanding
NEPA - National Environmental Policy Act
NMFS - National Marine Fisheries Service, NOAA
NMAO - National Marine and Aircraft Operations
nmi - nautical miles
NMSA - National Marine Sanctuaries Act
NMSAA - National Marine Sanctuaries Amendment Act
NMSP - National Marine Sanctuary Program
NOAA - National Oceanic and Atmospheric Administration
NOS - National Ocean Service
NWHI - Northwestern Hawaiian Islands
OAR - Office of Oceanic and Atmospheric Administration, NOAA
PVS - Polynesian Voyaging Society
RAC - Reserve Advisory Council
RADS - Remote Acquisition of Depth Sounding
ROP - Reserve Operations Plan
ROV - remotely operated vehicle
RPA - Reserve Preservation Areas
USCG - United States Coast Guard
USGS - United States Geological Survey
USFWS - United States Fish and Wildlife Service
UXO - unexploded ordnance
VMS - vessel monitoring system
WPRFMC - Western Pacific Regional Fishery Management Council



Information Needs For Conservation Science and Management of the Northwestern Hawaiian Islands:

A product of the *I Ke Āmio O Nā Wa`a* Workshop

August 2004

U.S. Department of Commerce
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Cover photograph by James Watt/NOAA depicts an 'iwa (*Frigata minor*) on French Frigate Shoals, HI.



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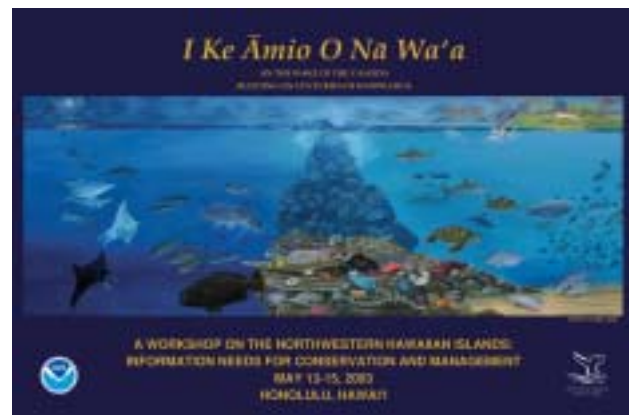
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Preface

Studies of geological, biological, and oceanographic processes in the Northwestern Hawaiian Islands (NWHI) date to the earliest Polynesian explorers. Relying on keen observational and analytical skills, Native Hawaiians collected environmental information and interpreted their observations using algorithms passed down from prior generations in chants and oral histories. These expert navigators and natural scientists regularly voyaged thousands of miles across open ocean to link remote islands and atolls with a culture whose existence depended on the acquisition, accumulation, and analysis of information about the oceanic environment. Based on centuries of observation, their style of natural resource management was characterized by the seamless integration of marine, coastal, and offshore environments, and recognized the flow of energy and nutrients among these habitats.

The gathering and use of information about our natural world continues to this day. Our reliance on the land and sea underscores the importance of acquiring and utilizing information about our environment in order to manage resources and our relationship with them in the best possible manner. In the NWHI, agencies that bear the responsibility for management of marine resources include the State of Hawai`i, the US Fish and Wildlife Service (USFWS), and NOAA Fisheries. With the establishment of the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve (NWHICRER) in 2000, NOAA's National Marine Sanctuary Program (NMSP) and the NWHICRER provide an umbrella under which coordinated research, management, and planning is encouraged and facilitated. Equipped with the best of both traditional and Western epistemologies and with an eye on the present and towards the future, cooperative multi-agency management in the NWHI proceeds with the long-term protection and conservation of its resources as a principal goal. While significant steps in reaching this goal will be the integration of people, use, and management, a primary key to success lies in the nature and quality of information upon which managers can base decisions. This assessment is designed to support this critical aspect of resource protection and management.

This document presents an analysis of results from a workshop held in May 2003 (*I Ke Āmio O Nā Wa`a*) focusing on information needs for management in the NWHI. It is intended to bring the workshop results into sharper focus and provide a basis for the development of a regional "action plan" for the NWHI to help coordinate characterization, research, and monitoring activities.



The name, *I Ke Āmio O Nā Wa`a* (In the Wake of the Canoes), was selected for the May 2003 workshop. For Native Hawaiians, the giving of a name, whether to a person, other living being, place, object, or even a significant gathering, conveys the giving of life beyond the literal. A carefully chosen name, distinct from a title or a literal description of an event,

gives that gathering a philosophical context for its existence. The title also embodies the goals of the workshop. In Hawai`i, an oceanic voyaging canoe is often used as a metaphor for an island, an isolated ecosystem that requires careful management to ensure the sustainability of its resources. The phrase "in the wake of..." is an acknowledgement that we follow and build upon the achievements of all that have come before us, from the earliest Polynesian navigators to the most recent research efforts. Finally, an image of canoes in forward motion suggests progress along multiple paths toward a common destination or goal.

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Introduction

In December 2002, the National Marine Sanctuary Program (NMSP) and the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve (NWHICRER) convened a meeting in Honolulu, HI, to discuss management needs, science, and the status of the existing information base on the Northwestern Hawaiian Islands (NWHI). In attendance were representatives of State and Federal agencies with jurisdictions or responsibilities in the NWHI, researchers representing the academic community, and representatives of non-governmental organizations and other stakeholder groups.

Participants noted that while research has been an ongoing activity in the NWHI (see Appendix IV for area map) for many years, a handful of noteworthy research initiatives or syntheses punctuated this long timeline of information gathering. Among these landmarks were the Tanager Expedition in 1923, the Smithsonian's Atoll Research Bulletin publications of the mid-1960, the Tripartite expeditions of the late 1970's and early 1980's, and the Tripartite Symposia resulting from those expeditions. Participants also recognized the increase in research interest in the NWHI in recent years, concurrent with the return of Midway Atoll to the USFWS and the issuance of Executive Orders 13178 and 13196 that established the NWHICRER and a system of Reserve Preservation Areas. The rate of accumulation of information on the NWHI, as well as the needs of managers for sound information on which to base management decisions, had both increased significantly.

Lastly, participants noted that a comprehensive review and assessment of the existing knowledge base for the NWHI had not occurred since the Tripartite Symposia nearly two decades ago. Thus, the consensus of the group was that an assessment of both the existing information base on the NWHI, as well as an identification of gaps in that information base, would be both timely and productive. A comprehensive workshop to identify information and science needs and resources for effective conservation and management of the NWHI was identified as an efficient means to achieve this end.

This assessment presents the results of a May 2003 workshop conducted for this purpose. The results are in a restructured format designed to facilitate the incorporation of information into planning and coordination of science and management activities in the NWHI. This format does not include any prioritization of workshop results beyond what was done by workshop participants during the workshop itself. Instead, this assessment documents an analysis of the workshop results conducted to:

Workshop and Assessment Highlights

- ❖ For the first time since the Tripartite Symposia in the 1980s, experts on the Northwestern Hawaiian Islands (NWHI) convened in May 2003 to discuss critical information needs related to long-term conservation of this enormous and important region.
- ❖ This assessment presents the results of the workshop in functional groups that should improve the ability of responsible agencies and other interested parties to plan, coordinate, and conduct conservation science and management activities in the NWHI.
- ❖ The intent of this assessment is to support the development of a regional action plan for the NWHI, which may call for joint planning and coordination of field efforts, periodic consultation and symposia, and regional integration of observations and information management.
- ❖ The results will also support the development of a draft environmental impact statement and draft management plan for the proposed designation of a NWHI National Marine Sanctuary.

- bring additional clarity to the original recommendations of the workshop participants;
- facilitate the incorporation of this information into on-going planning and coordination activities in the NWHI including NWHICRER operations and the development of an environmental impact statement and management plan for the proposed designation of a Northwestern Hawaiian Islands National Marine Sanctuary; and
- provide a basis for the development of a new regional action plan for coordinated science in the NWHI.

This assessment may also serve as a substantive reference of the pertinent issues of concern and relevant information needs that should be addressed to best support coordinated studies, management, and protection of the resources of the NWHI. Individual researchers, organizations, and agencies involved with any activities addressing the NWHI can use this information to support their work.

This needs assessment and all other products relating to the May workshop are available on the web at <http://www.hawaiiireef.noaa.gov>.

Workshop Overview, Planning, and Process

Overview

To help bring existing and emerging NWHI resource management questions into sharper focus - particularly with respect to research and investigations - NOAA's National Marine Sanctuary Program, the responsible office for the NWHICRER, hosted a workshop in Honolulu, HI in May 2003. The workshop was conducted in collaboration with regional partners, including NOAA Fisheries, US Fish and Wildlife Service (USFWS), the State of Hawaii (HI), the University of Hawaii (UH), the Bishop Museum, and the Western Pacific Regional Fishery Management Council. The purpose was to identify priority issues of concern and associated information and science needs across nine broad topic areas related to the long-term conservation and protection of natural resources and cultural legacy of the NWHI. Specific objectives for this workshop were to:

- ~ Take steps towards assisting all parties involved in the conservation management, protection, and study of resources in the Northwestern Hawaiian Islands in drafting a regional action plan for priority information needs.
- ~ Build the foundation for establishing similar priorities to support the current and future management of NOAA's NWHI Coral Reef Ecosystem Reserve.
- ~ Identify a specific set of recommendations on information needs associated with the characterization, monitoring, and research of the marine waters, habitats, and resources of the NWHI.
- ~ Draft associated strategies or actions across a broad set of disciplines and practices that includes hypothesis driven science as well as native cultural traditions.

Planning

A steering committee established by the NMSP began meeting in January 2003 to commence planning for the May 2003 workshop. This committee consisted of recognized experts and agency representatives with vested interest in the NWHI. Among their tasks was to compile a list of potential local, national, and international participants with expertise or experience relevant to management issues in the NWHI. The steering committee also contributed to the organizational structure of the workshop by reviewing the structural design of the workshop prepared by the NMSP and evaluating how this would generate the desired goals and outcomes. Further, steering committee members solicited preliminary lists of topics of concern from the agencies and groups represented on the committee. Each list documented roles, responsibilities, mandates, and or interests and concerns regarding the NWHI, as well as the conservation, protection, and management activities relating to these resources. These lists were used to generate a set of nine broad topic areas that would become the designations for working group topics during the workshop as well as provide background for participants.

Process

The three-day workshop was conducted in Honolulu, HI from May 13-15, 2003 to identify priority issues of concern, information needs, and strategies across nine broad topic areas related to the long-term conservation and protection of natural resources and the cultural legacy of the NWHI. Over 100 scientists and resource managers attended, representing a majority of the actively involved federal, state, and local agencies, universities, organizations, and interest groups.

The workshop opened with a three-hour public session highlighted by remarks from Hawaii's Governor Linda Lingle. This public session also included discussions by two panels; the first representing regional managers and the second representing regional field investigators. Complete transcripts of these discussions are available on the workshop website at <http://www.hawaiireef.noaa.gov>. Following the public meeting, participants were introduced to the structural and procedural design of the workshop and the expected outcomes. They were then separated into nine functional groups (termed topic areas) based on their expertise and professional interests in the NWHI (most workshop attendees participated in two workgroups). General descriptions of the working group topics are provided below.

1. Oceanographic Regime

Understanding the characteristics and qualities of the ocean and atmosphere that influence the region's resources.

2. Habitat Delineation

Determining the location and extent of biotic and abiotic components of the region's habitats, and relationships between habitat and living resources.

3. Living Marine Resources

Determining the dynamics of structure and function through assessments of status and trends in distribution, abundance, community composition, and relationships among living resources and their environment.

4. *Threatened, Endangered and Terrestrial Resources*

Determining distribution, abundance, community composition, and fitness of individuals and populations, and understanding the environmental influences on these parameters.

5. *Cultural Heritage*

Preserve and perpetuate ancestral relationships, activities and practices by understanding the characteristics, and qualities of traditional resource use by native Hawaiian populations, including conservation practices and ethics.

6. *Stresses on Living Resources*

Understanding and tracking fitness and factors affecting the fitness of individuals, populations, and communities.

7. *Commercial and Recreational Uses*

Determining impacts, intended and unintended, of natural resource extraction and use; identifying the effects of limiting or eliminating extraction, and the information necessary to select appropriate locations and sizes of areas established for such purposes; characterize and quantify the economic contributions of commercial and recreational activities in the region.

8. *Damage Assessment, Response and Restoration*

Understanding and responding to the physical, chemical and biological impacts of human activities such as vessel groundings, shipwrecks, spills, military activities, marine debris, entanglement, and strandings, and using the most appropriate means to minimize damage, clean, restore, or enhance recovery in degraded environments.

9. *History and Archaeology*

Understanding the history and material culture of human populations and activities, including economies, trade, and living conditions.

Each working group met during two separate sessions. During the first session, working group members defined and prioritized issues of concern within each topic area, and the associated information needs that would enable resource managers to better understand and address those issues. Workshop participants identified 119 issues of concern and 333 associated information needs across the nine topic areas (Table 1). The first session concluded with each working group prioritizing the issues of concern and information needs for use in the second session.

Table 1. Summary of participation and outcomes from each of the working groups. A complete record of the results is presented in Appendix I. A full record of the 99 strategies is available on the workshop website.

Workshop Topic	Number of Participants¹	Issues of Concern	Info Needs	Strategies
Oceanographic Regime	12	9	30	6
Habitat Delineation	21	15	39	15
Living Marine Resources	32	22	42	12
Threatened, Endangered & Terrestrial Resources	9	7	37	17
Cultural Heritage	15	13	24	8
Stresses on Living Resources	33	7	42	19
Commercial and Recreational Uses	19	16	52	8
Damage Assessment, Response, and Restoration	11	12	47	6
History and Archaeology	16	18	30	8
	Total	119	333	99

¹ Most workshop attendees participated in two topic-working groups.

During the second session, each working group developed preliminary science-based strategies to address the prioritized information needs developed during the first session. These strategies included objectives for addressing the needs, the type and location of work required to address the needs, the amount of time and money required, and potential partners and data holders. In many cases, information needs identified by a working group were similar or thematic in nature and were addressed with a single strategy. A total of 99 strategies were developed during the second session of the workshop (Table 1).

Analysis

The objective of this assessment was to characterize the workshop results in a way that could readily support the development of a NWHI regional science action plan, as well as support regional managers, scientists, and individuals with specific interests in the NWHI. It was also intended to support the operations of the NWHICRER and the possible designation of a NWHI National Marine Sanctuary. To accomplish this, it was necessary to organize needs in a way that could translate easily to operations, particularly with respect to short and long-term planning, funding decisions (e.g., developing annual operating plans), and organization of field activities. In the course of processing the information needs and associated strategies, no effort to filter or prioritize this data was made. All workshop results (Issues of concern, information, needs, and strategies) are presented in this assessment as they were recorded in the workshop.

The 119 issues and 333 information needs were first organized into functional categories based on their similarities. Needs of a similar type or based on common concerns (e.g., those related to human use) were grouped together. These categories were termed "Themes," and could represent general focus areas for planning, funding, and conducting science operations. The proposed Themes are described in Table 2.

Table 2. Theme titles and summary descriptions.

Theme ¹ Title	Description
Culture	Hawaiian cultural relationship to the NWHI
Ecosystem Characterization	Characterizing and understanding ecosystem resources and processes
History/Archaeology	Study of historical and archaeological resources
Tools	Improvement of capabilities for conducting science, resource protection, or mitigation
Monitoring	Monitoring status or trends of resources and processes, and the factors controlling them, through repeated observation and analysis
Use	Human use of and impacts to the environment

1. Note: Workshop results generated by each workshop Breakout Group were analyzed and recast into Themes that are more functional for management planning rather than issue-based.

The information needs within each Theme were further grouped into “sub-themes” representing needs with common requirements, such as activities, products, or analysis. For example, some involve field studies on particular aspects of the environment, such as habitat or water quality. Others require effort to develop ecosystem models. Still others call for improvements to existing technologies. The sub-themes (Table 3) will enable greater refinement of planning efforts resulting in improved coordination among partners in the management and research community working in the NWHI. Figure 1 shows the two-step process used to reorganize the workshop results. Figure 2 provides details for each step.

A number of results from the workshop were not included in the six Themes, as they did not appear to represent information needs as defined for this effort. They were grouped into a separate category termed “Other” (see Table 3 for the reasons for exclusion). They are legitimate issues and needs that should be addressed but were not incorporated into this analysis.

Figure 1. Overview of process used to analyze workshop results.

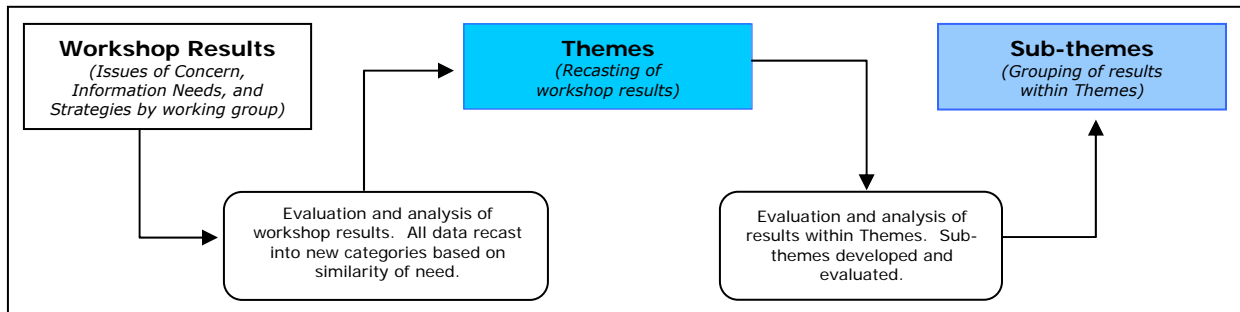
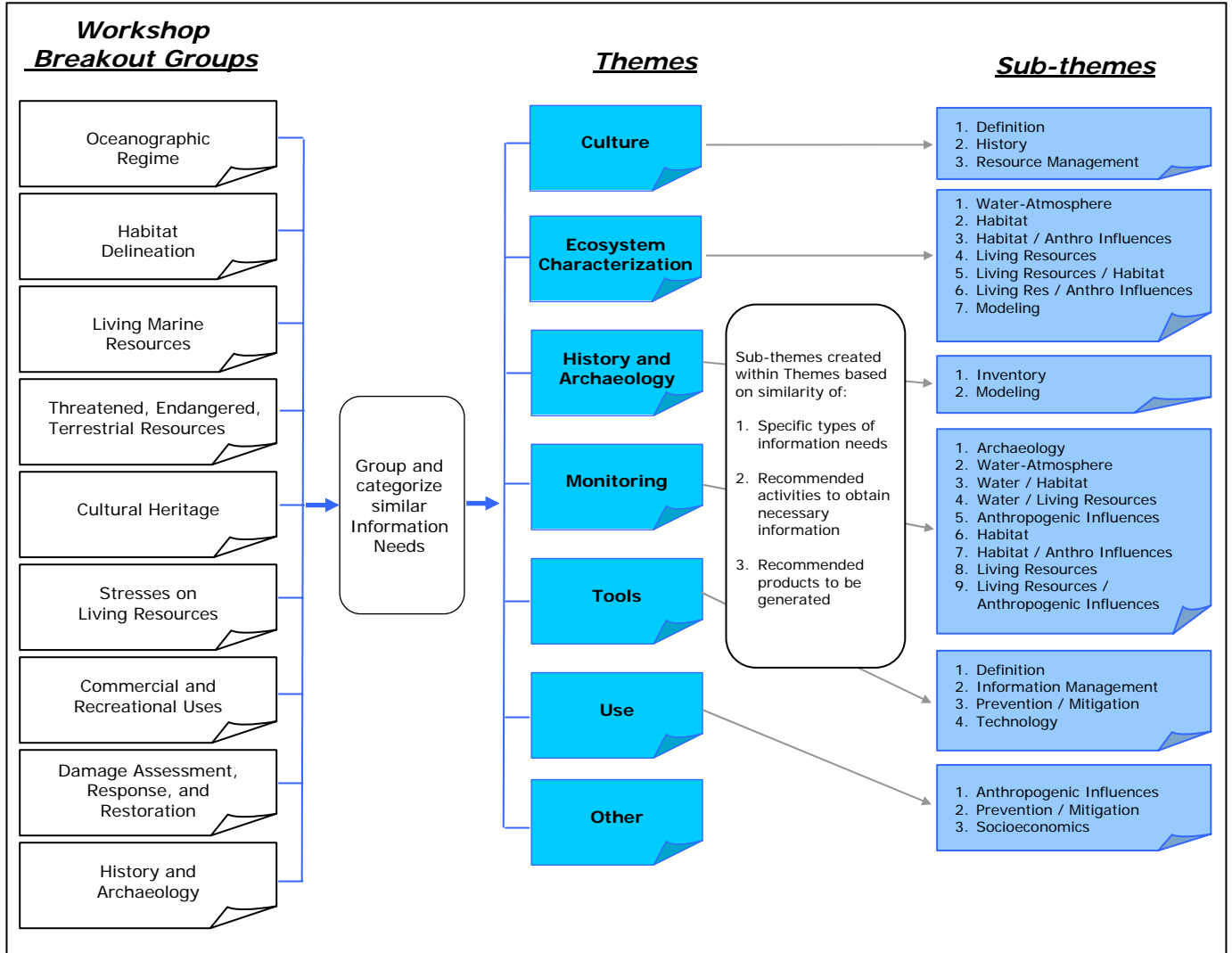


Figure 2. Analytical processing of original workshop results resulting in the creation of Theme/sub-theme Combinations.



Analysis of the workshop results revealed that for some Themes, sub-themes of information needs paralleled elements of a conceptual marine ecosystem framework with three primary compartments that describe the major structural and functional aspects of a marine ecosystem: water-atmosphere, habitat, and living resources (Figure 3). Some also addressed a fourth compartment pertaining to anthropogenic influences that affect ecosystem structure and function. Information needs associated with the Ecosystem Characterization, Monitoring, and Use Themes followed closely with the ecosystem framework. The other Themes (Tools, Culture, and History-Archaeology) contained some overlap with this framework, but other unique sub-themes as well (see Table 3).

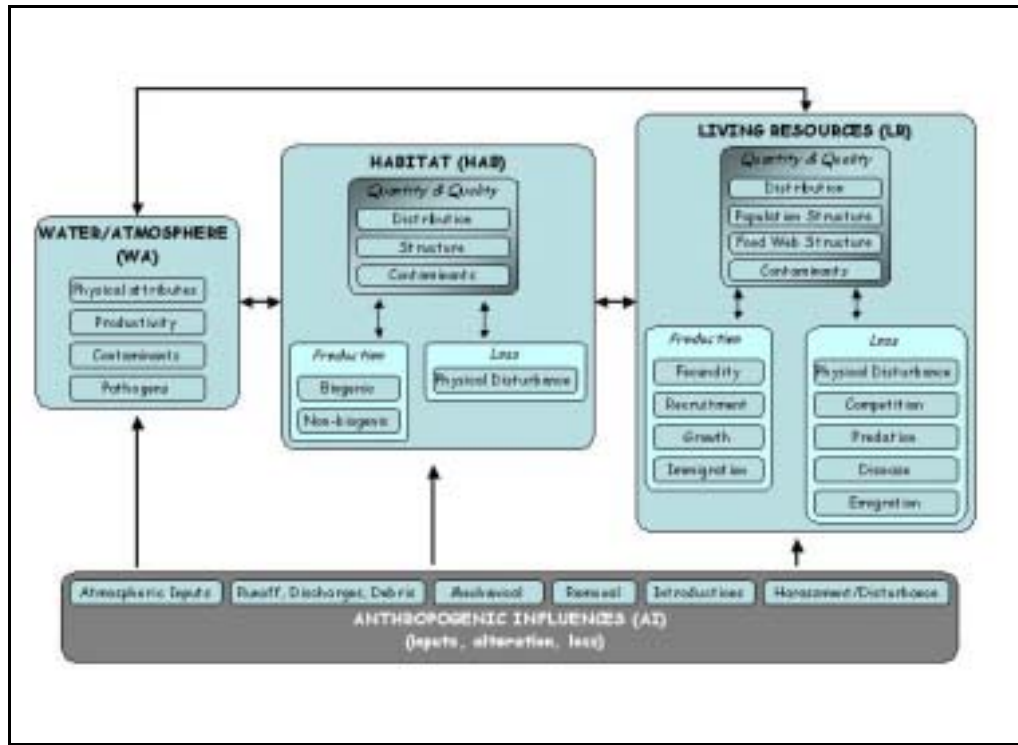
Table 3. Descriptions of sub-themes developed to categorize information needs across Themes. Shaded area at the bottom explains the reasons for excluding certain data from the assessment.

Sub-theme Descriptors	Abv	Definition
Anthropogenic Influences ¹	AI	Includes impacts associated with human use
Archaeology	AR	Study of material remains of past human life and activities
Definitions	DEF	Defining one or more aspects of a topic such as goals/objectives
Habitat ¹	HAB	Habitat status, production, and/or loss
History	HIST	Studying present and past native cultures
Information Management	IM	Organizing, managing, & mobilizing information for management
Inventory	INV	Inventories related to natural or historical resources
Living Resources ¹	LR	Living resource status, production, and/or loss
Modeling	MOD	Modeling ecosystem dynamics or predict likelihood of historical finds
Prevention and Mitigation	PM	Prevention or mitigation of human use impacts
Socioeconomics	SOC	Relating to, or involving a combination of social and economic factors
Technology	TECH	Improving existing or developing new technology
Water-Atmosphere ¹	WA	Physical processes related to water movement, water quality, and/or atmospheric processes
<i>Categories for excluded Information Needs ²</i>	<i>Abv</i>	<i>Explanation for Exclusion</i>
<i>Duplicative</i>	<i>DUP</i>	<i>Overarching need whose parts are addressed elsewhere</i>
<i>Outreach</i>	<i>OUT</i>	<i>Responsibilities of an outreach program</i>
<i>Policy</i>	<i>POL</i>	<i>Needs better addressed in a policy setting</i>
<i>Management</i>	<i>MGT</i>	<i>Management activities or requirements</i>
<i>Strategy</i>	<i>STRAT</i>	<i>Needs that more appropriately would be part of a strategy</i>

¹ Sub-themes related to a component of the conceptual marine ecosystem framework.

² Issues and needs excluded from evaluation and grouped into "Other" category.

Figure 3. Conceptual framework for a generalized marine ecosystem.



Thirteen sub-themes were identified to further characterize information needs within the six Themes (Tables 3 and 4). In some cases, multiple sub-themes applied. For example, some needs grouped in the Habitat (HAB) sub-theme made specific reference to anthropogenic influences (AI); therefore, two classifications were used to group these needs. In this case, the sub-theme designation HAB/AI was used. The analysis resulted in 28 separate sub-themes containing up to 51 information needs (Table 4). Note that some needs applied to multiple sub-themes, and are therefore duplicated in Appendix I (e.g., an information need on the “effects of invasive species on the ecosystem” could apply to sub-themes related to habitats, living resources, and water quality).

Finally, the workshop results within each Theme/sub-theme combination were retraced to the original working groups that identified them (Table 5). This crosswalk illustrated that the information needs in most Themes originated from multiple working groups, highlighting similar needs and gaps in the existing information base for the NWHI extending across a broad range of topics. Further, it suggests that there are fundamental aspects of the NWHI resources that are central to resource conservation, research, and management across many topic areas. It is possible, therefore, that these proposed Theme/sub-theme combinations provide a suitable and substantive basis for the organization of a regional action plan for the NWHI, mentioned earlier in this assessment.

Table 4. Proposed Themes, sub-themes, and number of associated issues, information needs, and strategies developed by workshop participants.

Theme <i>(Issues/Info Needs/Strategies)</i> ¹	Sub-theme or Combination ²	Issues of Concern	Info. Needs	Strategies ³
Culture (14/19/9)	DEF	6	9	6
	HIST	4	4	0
	RM	4	6	3
Ecosystem Characterization (92/132/73)	WA	11	14	8
	HAB	18	18	14
	HAB/AI	4	6	6
	LR	21	51	18
	LR/HAB	5	5	6
	LR/AI	11	15	10
	MOD	22	23	11
History & Archeology (10/12/2)	INV	8	10	2
	MOD	2	2	0
Tools (19/23/16)	DEF	1	1	1
	IM	4	7	3
	PM	9	12	11
	TECH	5	3	1
Monitoring (65/75/ 44)	ARCH	2	0	0
	WA	4	4	4
	WA/HAB	2	2	1
	WA/LR	4	5	2
	WA/AI	9	8	6
	HAB	5	4	2
	HAB/AI	14	20	11
	LR	11	13	9
LR/AI	14	19	9	
Use (24/42/15)	AI	15	33	13
	PM	2	4	1
	SOC	7	5	1
Other ⁴ (25/30/11)	MGT	7	9	1
	OUT	4	5	1
	POL	11	12	7
	STRAT	2	3	1
	DUP	1	1	1

¹ Some needs and strategies applied to multiple sub-themes and therefore appear more than once in Appendix 1.

² These abbreviations are also those used in Appendix I.

³ Some strategies applied to multiple information needs and appear more than once in Appendix I.

⁴ Sub-themes and counts for issues and needs excluded from evaluation and grouped into "Other" category.

Table 5. Apportionment of information needs identified by working groups among the six proposed Themes.

Proposed Theme	Workshop Topic Areas									Total
	Cultural Heritage	History & Archaeology	Living Marine Resources	Damage Assessment & Restoration	Comm. / Rec. Uses	Habitat Delineation	Oceanographic Regime	Threatened/Endang. & Terrestrial Species	Stresses	
Culture	15	3	1							19
Ecosystem Characterization			34	11	20	18	25	11	13	132
History/Archaeology		12								12
Tools		1	2	2	1	7		4	6	23
Monitoring			2	20	6	3	4	21	19	75
Use			1	4	24	8		1	4	42
<i>Other</i>	9	14	2		1	3	1			30
Total	24	30	42	37	52	39	30	37	42	333

Theme Descriptions

In this section, information needs and strategies are summarized for each Theme/sub-theme combination. These summaries document salient points and significant trends within each collection of information needs. Associated strategies are also described. For specific language of information needs see Appendix I, and for specific language regarding the strategies developed, visit the workshop website.

Theme: CULTURE

General Description

Three working groups identified 19 information needs relating to cultural aspects of the NWHI. Most (15) came from the Cultural Heritage working group. Given the importance of the historical relationship between the Hawaiian people and the NWHI, and the unique dependence of island people on natural resources, it is clear that this Theme warrants serious consideration and effort. It may be sensible to incorporate traditional knowledge and approaches into modern resource management in the region. It also is certainly critical to involve stakeholders in decision-making. But to do so requires that conservation and management objectives are clearly understood, that terms of art for social and natural sciences are defined and used consistently, and that there is a full appreciation for approaches to and effectiveness of historical resource management efforts.

The information needs identified from this working group are preliminary since members of the Native Hawaiian community were not adequately represented at this workshop. A similar workshop will be conducted in mid-2004 to bring the Native Hawaiian community together in order to identify information needs for resource management from a traditional knowledge perspective.

Sub-themes

Three sub-themes emerged among the information needs related to cultural heritage. The first focused on the needs for improved communication among stakeholders through clarification of terms, issues, and objectives commonly used. The second addressed the need to gather information on the past to better understand the relationships between Native Hawaiians and the NWHI. The third focused on the application of traditional knowledge and practices to modern resource management, where appropriate.

Definition (DEF) – Participants identified the need to improve communications among stakeholders through clarification of words, terms, and issues. They recommended clarifying and standardizing the use of terms related to resource conservation and management. Words and phrases such as “culture,” “heritage,” “history,” “sense of place,” “full participation,” “traditional ecological knowledge,” and even “Native Hawaiians” mean different things to different people, leading to some confusion and miscommunication. Standardizing these important terms is essential before unambiguous and agreeable direction for research and management can be achieved.

History (HIST) – Most information needs identified focused on the need to gather and organize historic information to better understand the relationships between Native Hawaiians and the NWHI. There is a critical need to document and preserve the historical relationship between Native Hawaiians and the NWHI in order to appreciate traditional insights that integrated subsistence, religious, and cultural values in resource management. These efforts may result in substantial influence regarding implementation of current resource management directives.



Management (MGT) – Information needs in this sub-theme are based on the application of traditional knowledge and practices to modern resource management. Some traditional conservation practices might be effectively applied to selected resource management activities; these potential connections need to be better understood. Further, these investigations should include evaluating how these practices can be perpetuated in a manner that is complementary to other social and natural sciences used for conservation. A key component of the successful application of traditional practices is the prediction of future resource uses and activities.

Strategies

A principal focus centered on coming to a common understanding about the meanings of phrases and conservation objectives, and ensuring people are included and continuously committed to these efforts. Seven strategies were developed, addressing two of the three sub-themes above. Nearly all involved social science approaches such as surveys, literature searches, and interviews. Suggested actions include consensus building among

diverse stakeholders, and a recommendation for the integration of social and natural sciences in a pilot effort to demonstrate the feasibility and value of such collaboration.

Definition (DEF) – Six strategies were developed. Each would require the collective involvement of the region's stakeholders. In all cases, success will require multi-organizational cooperation. Documents are proposed that will clearly define terms and phrases used throughout the resource management community and those involved in native cultures. Preparation of the documents would require a mix of conventional literature review and the oral acquisition of information about traditional native values and practices. It was anticipated that these documents could help reconcile differences in understanding among stakeholders.

History (HIST) – Though no specific strategies were proposed for the information needs in this sub-theme, it is clear that they will need to be developed. The information needs clearly called for documentation of historical practices and values through oral and written histories, and archaeological research, to more fully understand the relationship between Native Hawaiians and the NWHI. Subsistence practices, spiritual influences, and interpersonal approaches that affected how Native Hawaiians relate to their environment must be considered, both for the lessons they teach about resource management practices and to ensure that modern approaches are, to the extent possible, culturally appropriate and acceptable.

Management (MGT) – The principal objective is to increase the effectiveness of decisions by enhancing the roles of social sciences, consideration of traditional and modern cultural values, and participation of key individuals and groups in the process. One strategy calls for a pilot project that demonstrates the mechanisms by which social and natural sciences can work synergistically to address a problem. Its intent is to establish a social science program within the framework for management of the NWHI. Another involves investigating how and to what degree traditional practices and native cultures have been included in resource management in places other than the Hawaiian Islands. The third noted the need to predict future uses and activity levels for the region in order to prepare for expected changes.



Considerations for Next Steps

- Social sciences can and should have a significant role in the future protection and management of natural and cultural resources in the NWHI. Specifically, these types of efforts can:
 - ~ help us understand regional history;
 - ~ support current management with strategies based on historic practices;
 - ~ promote collaboration among Native Hawaiians and other trustees; and
 - ~ integrate information from the current social settings into the decision-making process.

- Further explore the issues and information needs identified in the workshop by the Culture working group, as many focused on needs relating to policy and outreach and were not evaluated in this assessment. These needs identified are significant and warrant additional consideration. See the Analysis section and Table 3 for more information.
- Develop strategies for the History sub-theme to promote the inclusion of this important aspect in future science and management activities.
- Continue the dialog from the Cultural working group with the Native Hawaiian community, as well as developing new and enhancing existing partnerships with Native Hawaiian organizations.
- Interested parties should attend the workshop (to be hosted by the NWHICRER) that will be conducted in mid-2004 and focus on identifying information needs for resource management from a traditional knowledge perspective.
- See the Discussion section for other considerations for next steps.

Theme: ECOSYSTEM CHARACTERIZATION

General Description

About 40% of all information needs identified at the workshop related in some way to the characterization of ecosystems of the NWHI, making it the largest of the six proposed Themes. Only two of the nine working groups (Cultural Heritage and History/Archaeology) did not specify information needs in this category.

Sub-themes

Many of the information needs for ecosystem characterization aligned well with the compartments of the ecosystem framework shown in Figure 1. Four broad sub-themes were identified, three of which match the ecosystem framework. These were Water-Atmosphere, Habitat, and Living Resources. The fourth contains a substantial number of information needs (23) related to modeling of ecosystems and processes. Numerous needs also required information on human activities and impacts.

Water-Atmosphere (WA) – Several issues of concern dominated this sub-theme, and the information needs reflected this. The issues included understanding ocean processes that influence populations of key species like commercially targeted fish as well as the distribution and dispersal of debris, pollutants, and invasive species. In a larger sense, a significant issue discussed was the connectivity among the NWHI and between the NWHI and the main Hawaiian Islands. The other involved improving our understanding of historical climate changes and significant catastrophic events (e.g., tsunamis and storms).

Habitat (HAB) – Broadly ranging habitat-related information needs were identified at the workshop. They included mapping at numerous spatial scales; habitat quantification and classification (based on type, but also to document sensitive areas or those places critical for certain life stages of key species); ground-truthing; collecting baseline data; and documenting terrestrial/marine connections and interactions. Needs

were also identified that related to human influences on habitats. Priority anthropogenic issues were the impacts of marine debris, and vessel operations (pollutants, alien species, lights, and anchoring), as well as the activities of organizations responsible for protecting resources and conducting research.

Living Resources (LR) – This is another extremely broad sub-theme with wide ranging needs. Over half the Ecosystem Characterization needs and over 20% of all needs identified at the workshop were grouped in this sub-theme. A majority indicated the need for basic information on living resources to support biogeographic assessments, the development of descriptive and predictive models for key species (e.g., commercial stocks, vulnerable, and alien species), and enhancing the effectiveness of marine protected areas. Some of the needs included information on life histories, disease impacts, movement, predator-prey relationships, population dynamics, stock identification, extinction thresholds, the effects of extreme events, and recovery potential. With respect to anthropogenic influences, information needs focused on improving understanding of the population dynamics of managed species, the effects of existing regulations, determining environmental sensitivity, and ranking threats. Several also had to do with identifying critical habitats for different life stages of key species.



Modeling (MOD) – The development of comprehensive ecosystem models was seen as necessary to support decision-making for resources of the NWHI. These will be needed principally to determine the probable impacts of management actions, and evaluate what ecosystem components and processes may change or be particularly sensitive to certain activities or natural environmental changes. In addition to data on ocean, habitat, and living resource structure and function, models should incorporate, to the extent possible, existing data and user knowledge of resource natural history and relationships of species to each other and to their habitats.

Strategies

Fifty separate ecosystem characterization strategies, some of which overlapped significantly, were recommended by seven of the nine working groups. There was widespread agreement as to the need to gather and make available existing information, collect new field and laboratory data, integrate across disciplines (particularly physical and biological), and develop decision tools (e.g., maps and ecosystem models) that support resource protection goals for the NWHI (Appendix I).

Water-Atmosphere (WA) – Seven strategies were developed to address a number of the information needs in this category. Most require field data on mechanisms that control the distribution and dispersal of key species, debris, pollutants, and alien species. Integrated observations involving both remote and in situ measurements were identified as necessary, as was multi-organization cooperation. Developing models that describe and predict patterns of movement at multiple spatial scales was

recommended, particularly to address questions about connectivity among the NWHI and between the NWHI and the main Hawaiian Islands. These would support a wide array of resource management decisions, including those related to commercial harvesting. Compilation of historical data would provide information to support models and address questions about climate change and the effects of acute catastrophic events, again necessitating multiple spatial and temporal scales.

Habitat (HAB) – Eighteen strategies were proposed, the majority of which clearly referenced the need for a large scale, multi-organizational effort to map and characterize terrestrial and marine habitats based on an agreed-upon classification that considers species associations and sensitivity. The strategies call for using both archived data and new information collected using appropriate platforms, followed by ground-truthing. They also indicate the need for collaboration with strategies related to living resource data collection and monitoring, as well as the need for improving information management and data quality assurance procedures. Vulnerability of habitats to particularly important anthropogenic influences that may cause undesired changes (e.g., marine debris as a vector for alien species introductions) should be considered in assessing environmental sensitivity, as should the distribution of on-going human activities, such as vessel traffic and research.

Living Resources (LR) – A comparatively large number of strategies (32) were developed to address the diverse information needs in this category. Seven of the nine working groups submitted strategies that are included in this sub-theme. Many strategies proposed by the different working groups overlapped to a large degree and could be combined. Most recommended field assessments, but the objectives and approaches varied considerably. Some targeted information on life histories for key species. Others focused on inventories, distributions, species interactions, population



and community dynamics, gene flow and dispersal, source-and-effect studies (contaminants, toxins, and diseases), and issues related to rehabilitation of stressed populations (e.g., translocation protocols and natural recovery potential). Risk assessments that involved identification of potential sources and transport vectors were recommended for certain stressors, including alien species, marine toxins (e.g., ciguatera), and debris. This work would be supplemented with laboratory analyses to better understand pathways and compare

impacts across taxa, and support geo-referenced assessments of environmental sensitivity. Work on living resources would also be conducted through literature review, expert consultation, and model development. Considerable data already exists for many information needs, allowing investigators to identify gaps and focus their efforts more effectively. Developing databases that 1) accommodate disparate historical data as well as information collected in the future, and 2) have universal access will be critical to effective utilization and dissemination among researchers and resource managers operating in the NWHI.

Modeling (MOD) – Two of the nine working groups identified 10 strategies that involved the development of models to describe ecosystem functions and relationships among

components. Some were recommended to support specific management actions, such as the establishment of marine protected areas or regulating extraction levels. Others were deemed necessary to describe connectivity within the Hawaiian archipelago. Thus, spatial and temporal scales varied among strategies. Nevertheless, most recognized the need to integrate observations on hydrodynamic, climatic, and biological systems, both historical and recent, in order to describe critical controlling processes (e.g., dispersal, recruitment, movement, predator/prey dynamics, extraction, and disturbance events). Models that deal with establishing protected areas should be able to inform decisions about not only where best to establish them, but also whether a few large areas or numerous smaller ones are likely to be more effective at meeting resource protection goals. It was also suggested that existing ocean/atmosphere models that describe the equatorial Pacific could be extended and adapted to the Hawaii region rather than developing new ones independently. Their utility, of course, would require the ability to scale the models to appropriately account for archipelago-wide, inter-island, or atoll-specific processes and questions. For nearly all strategies, it was recognized that substantial, but insufficient data already exist to support the development of functional models. It will be useful for identification of data gaps, but the effort will also require new field and laboratory data collection, enhancing integration between observing systems, and improving information management, access, and dissemination systems.

Considerations for Next Steps

- Further evaluation of the needs of these Theme/sub-themes combinations should be considered. The needs for ecosystem characterization are so broad that many separate efforts will be necessary to address them. Nevertheless, integration of efforts to the extent possible will be required to reduce costs and maximize output.
- Develop more comprehensive strategies to deal with the breadth of needs identified in this theme. Significant progress was made in developing focused strategies during the workshop; however, these must be enhanced with more detail and thorough planning. This will be necessary in order to properly address the recommendations developed during the workshop.
- Develop information management systems to support the execution and coordination of activities in the NWHI. These systems should focus on storage, access, and dissemination capabilities. It will be critical to make data available to the research community as soon as possible after results are generated. Many of the proposed strategies recognized the need for a multi-disciplinary approach in order to understand the functioning of NWHI ecosystems. Any failure to provide access to critical information would diminish the effectiveness of a regional research approach.
- Coordinate with any activities put into motion pursuant to recommendations included in the Tools/Information Managements sub-theme.
- Increase the level and frequency of interaction among investigators working in the NWHI. Providing regular opportunities for information transfer and planning to ensure efficiency in implementing regional activities may be one of the most important roles of the NWHICRER.
- See the Discussion section for other considerations for next steps.

Theme: HISTORY/ARCHAEOLOGY

General Description

Workshop participants pointed to fundamental needs to understand management responsibilities on historical and archaeological resources in the NWHI. Further, developing inventories of known resources and potential targets was discussed. Workshop participants from the like-titled working group developed twelve information needs and two strategies associated with History/Archaeology sub-theme. Many needs also developed by this group were not addressed in this assessment as they focused on needs pertaining to management, outreach, and policy. See the Analysis section and Table 3 for more information.



Sub-themes

Inventory (INV) – Information needs in this sub-theme emphasized understanding and fulfilling mandates to conduct inventories of historic resources. The most important recommendation was to improve the overall understanding of and commitment to inventorying and characterizing historic sites and other associated historic resources in the NWHI. This would include a careful documentation of existing mandates and how they apply to different types of historic resources as well as a detailed assessment of existing knowledge - a gap analysis to help establish priorities for future investments. A careful review of past management practices was also recommended as a component of an overall approach to managing historic resources in this region.

Modeling (MOD) - Developing a predictive model was recommended for supporting mandates to inventory and protect historic maritime sites and artifacts. This type of tool would also help establish priorities for field activities by indicating likely locations for characterization and associated management (e.g., documentation, enforcement, etc.).

Strategies

Inventory (INV) – Participants emphasized the importance of fulfilling mandates by evaluating existing information on historic resources and surveying/characterizing other historic resources as part of an overall management strategy. Besides suggesting a more systematic approach to documenting existing historic resources using GIS and other tools and conducting surveys for other resources, participants recommended a stronger integration of field activities such that mandates for historic documentation and characterization are better understood and more likely to be included as a component of all research and survey missions in the NWHI region. Participants saw conducting and creating the inventory of resources as a critical step in preserving, protecting, and managing historic resources, as well as defining agency responsibility. A key consideration in this strategy would include traditional cultural properties/sites along with historical archeological sites.

Modeling (MOD) - No strategies were developed under this sub-theme.

Considerations for Next Steps

- All activities implemented relative to this theme should incorporate the needs to:
 - ~ improve the overall understanding of management responsibilities for these resources as defined in existing laws and regulations; and
 - ~ promote more systematical and deliberate documentation of known sites, and surveying/characterization of other candidate sites.
- Conduct further evaluation of the issues and information needs identified in the workshop by the History/Archaeology working group that were not addressed in this assessment in order to link them to any future actions relative to this sub-theme. These needs identified are significant and warrant additional consideration. See the Analysis section and Table 3 for more information.
- Develop strategies for the Modeling sub-theme to encourage inclusion of this recommendation in future planning activities.
- Ensure that when limited resources are mobilized for field activities in this region, opportunities to conduct historic investigations in partnership with other research will increase.
- Encourage targeted investments that improve the overall understanding of existing resources, including improved access to information via GIS and other tools.
- See the Discussion section for other considerations for next steps.

Theme: MONITORING

General Description

Workshop participants strongly emphasized the need to monitor the condition and trends in NWHI resources and the processes affecting them. Seventy-five information needs were included in this Theme. Eight of the nine working groups listed either issues of concern or information needs related to monitoring. Most had to do with tracking the status of the resources themselves and human activities that impact resources, or determining the effect of human activities on the resources. It also was recognized that monitoring would be required to assess impacts of many suspected or known stressors. One working group listed and ranked these stressors as part of their deliberations (see Appendix III).

Sub-themes

Four sub-themes were evident in the workshop results. One involved monitoring of archaeological resources. The three others (Water-Atmosphere, Habitat, and Living Resources) matched three of the compartments of the ecosystem framework depicted in Figure 1. The needs associated with the main compartments of the ecosystem framework contained a variety of focus areas. For example, while some were fairly specifically focused on the status of living resources themselves, others addressed the need to track the status of more complex aspects of ecosystem condition such as the relationship between the living resources and their habitat, or the impacts of certain human activities on the living resources. Further, it must be recognized, that there was considerable overlap between

the needs, particularly among those that address the effects of human activities on natural resources. Thus, while separate sub-themes are proposed, complete separation of the strategies produced for each sub-theme is not reasonable.

Archaeology (ARCH) – Monitoring of archaeological assets was recommended to evaluate changes in the condition of these significant resources. This includes impacts caused by human activities, such as vandalism, research, restoration, and natural events (e.g., storms and structural degradation).

Water-Atmosphere (WA) – This sub-theme is a combination of a wide variety of needs. Some relate to regular gathering of information on basic oceanographic and weather conditions that affect water quality and, by extension, the habitats and living resources of the region. Others involve assessments of contaminant levels resulting from historical or extant human activities such as cruise ships or research activities. The remainder relate to specific linkages among living resources and natural and anthropogenic changes in water quality, such as factors affecting coral bleaching, and the impacts of invasive species on productivity, and the distribution and abundance of pathogens or ecotoxins. Also recommended were activities to identify specific indicators that can be used to predict, detect, or track changes.



Habitat (HAB) – Three main areas of need addressed in this sub-theme include trend assessments, impacts, and recovery. Participants identified the need to establish baseline information for many resources and to use monitoring activities to track changes and detect trends in the conditions of those resources. Fluctuations in these trends may be natural or anthropogenic; however, the ability to quantify them is critical. Further, trend assessments should support evaluations of the effectiveness of mitigation and prevention activities in responding to impacts and threats. Monitoring impacts to habitat, both natural and anthropogenic, was a recurring need within this sub-theme. Impacts stemming from marine debris (e.g., presence/absence, removal vs. non-removal), research activities, invasive species, and commercial activities, as well as storm and significant oceanographic events were all noted as requiring monitoring to support effective management. Similarly, these and other activities (see Appendix III) were recorded as being major sources of total habitat destruction and loss, processes that must be monitored. Remote sensing and advanced tracking systems were recommended as methods to track and monitor impacts to and destruction of habitat as well as establishing rates of occurrence and distribution of such events. Finally, information and an understanding of rates of recovery from habitat destruction and loss resulting from natural events, research, and commercial activities are necessary to inform restoration decisions and support incident or case management.

Living Resources (LR) – The living resource information needs that require monitoring stem from two overlapping groups of needs. One involves tracking the status of species without specifically considering anthropogenic influences. The other involves tracking particular species or activities expressly because of certain human behaviors or actions. The large number of information needs in this category reflect the diversity throughout the archipelago, and the importance of a wide variety of species, such as fished stocks or other key species (e.g., benthic algae, invasive species, or key components of a trophic assemblage), indicator species, or disease incidence and other indicators of stress, and the direct effects of the activities of concern (e.g., debris, sunken vessels, research, fishing, transiting vessels; see Appendix III).

Strategies

Below are summaries of the strategies prepared for the information needs related to monitoring.

Archaeology (ARCH) – No strategies were developed for the two information needs in this sub-theme, but the needs clearly call for regular field-based assessments at selected sites of archaeological significance to assess both natural and human caused disturbance. Supplemental measurements of certain environmental parameters would be required to distinguish between causes of disturbance and to select appropriate mitigation measures.

Water-Atmosphere (WA) – Ten strategies were proposed. Several recommended long-term, field-based measurements (in situ and remote) and/or compilations of historic information to establish baselines and input for models describing variation in the physical environment of the NWHI. Those containing field measurements invariably noted the need for multi-agency cooperation and linkages to regional observing systems, as they develop.

The need to identify and track species and measures that are indicative of potential or known stresses and threats (e.g., invasive species and sedimentation) was also noted in some strategies. There were also recommendations for risk assessments for the numerous types of human



activities that take place in the NWHI, along with appropriate monitoring of these activities. Coordination of these efforts with management to enhance prevention and mitigation through permit conditions, inspections, education, and other mechanisms was also recommended.

Habitat (HAB) – Thirteen strategies were prepared. A number of them overlapped with other monitoring sub-themes, particularly those relating to water and living resources. As with those sub-themes, some proposed multi-organizational cooperation in the collection of information over the long term using consistent protocols, and through acquisition of historical information, to establish baseline conditions and document trends for NWHI habitats. More targeted strategies were recommended as well, focusing on debris impacts, alien species, and vessels. In each case, the varieties of

threatening activity require risk assessment and evaluation. Recommended monitoring strategies included assessments on location (e.g., debris impacts), remote sensing (some effects of alien species), and tracking (vessels), as well as experimental work on certain impacts of alien species and debris.

Living Resources (LR) – The diversity of life in the NWHI and the variety of threats to certain species resulted in a high number of proposed strategies (17) being developed by the working groups. Most involved multi-organizational cooperation in field-based assessments, but some also included the collection of historical demographic data, the development of new indicator measures, and laboratory work (e.g., biomedical research on diseases). Stock assessments are necessary not only to track the condition of fished



species, but also to enhance the value of assessments in the main Hawaiian Islands, and to compare population dynamics and ecological controls between the two regions. It was also recommended that new, robust and valid fisheries-independent assessment methods be incorporated into future monitoring; both for fished stocks and to evaluate the effectiveness of specially protected areas. Such methods might incorporate important ecological controls, such as

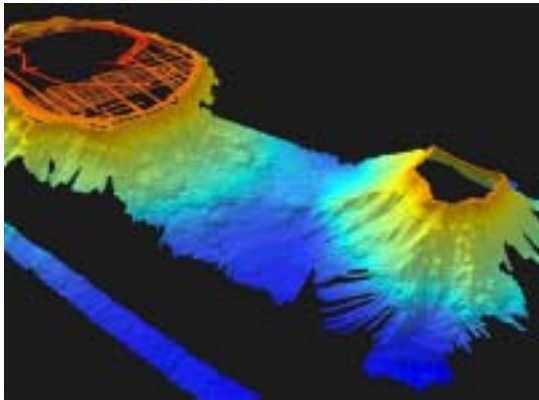
forage bases, competition, and habitat relationships. Similar considerations should be given to acquisition of demographic information on other species that are indicative of environmental quality or that require special monitoring (e.g., certain birds, plants, turtles, and monk seals). The future of these species can only be predicted and managed with a thorough understanding of key aspects of life history, such as reproductive dynamics, survivorship, and recruitment, as well as disease incidence and effects, predator-prey relationships, spatial and temporal variation among prey species, and foraging energetics. Strategies also recognized the need for investigations of disease pathology, impacts of debris ingestion and removal, and the effects of alien species introductions.

Considerations for Next Steps

- Ensure cooperation among the numerous organizations that operate in the NWHI. This should be more than the recognition of multiple authorities and acknowledgement of efforts among colleagues. Instead, steps towards joint development of project plans and sharing of responsibility for funding and action should be taken. This will require well-developed and integrated monitoring strategies.
- Information needs must be considered when planning and conducting monitoring activities in an area as vast and remote as the NWHI. Further, these needs cannot be addressed effectively by single entities. Maximizing the resources available from multiple agencies and organizations should be considered a priority.

- Encourage and explore multiple approaches to monitoring, in terms of ecosystem components, parameters assessed, and temporal and spatial scales. This was a consistent recommendation recorded during the workshop.
- Promote the development of long-term data sets generated using comparable protocols, as well as links to management, either for purposes of controlling events like disease outbreaks or species invasion, or in order to control human activities that are affecting resources.
- See the Discussion section for other considerations for next steps.

Theme: TOOLS



General Description

Workshop participants recognized that certain “tools” would need to be developed to address many of the issues of concern and information needs. The nature of these tools varied widely and included generating operational definitions or common terms (e.g., MPA, reserve), developing standards for monitoring and data collection, and constructing comprehensive data inventories and database frameworks. The Tools Theme is based on 26 information needs and 16 strategies. Half of the information needs stemmed from discussions in the Stresses and

Habitat Delineation working groups. The remainder was generated equally across the other six working groups. Because of the need for management of and access to historical data and the need to manage and disseminate information in coming years, information management prevailed as a common requirement across all working groups. Nine of the information needs identified at the workshop reflected a fundamental requirement for effective information management and efficient mechanisms for access and dissemination.

Sub-themes

Within the Tools Theme, all information needs and associated strategies were grouped into four sub-themes: Definitions, Information Management, Prevention and Mitigation, and Technology. Information Management and Prevention and Mitigation are the more substantive, and represent over 80% of the needs in this Theme.

Definitions (DEF) – This sub-theme addresses the need for clear and concise language and definitions of terms commonly used in the MPA arena. The single need in this sub-theme indicates that clear definitions and statement of goals and objectives concerning MPAs would enable interested parties to more readily collaborate and work towards a common goal. These definitions should apply to all MPAs in the NWHI. Further, clear language should be generated that lays out, in detail, the fundamentals of the regulatory regime of the NWHI.

Information Management (IM) – Workshop participants identified both basic and substantial information needs regarding information management. Nine information

needs focused on fundamentals of managing, providing access to and disseminating information. Conducting data synthesis activities to organize and assess existing data holdings, development of data standards, and development of infrastructure to enable reliable access and dissemination were among the most significant of the needs identified.

Prevention and Mitigation (PM) - During the workshop, 12 information needs pertaining to this sub-theme of Tools were identified. Participants focused on the need to develop methods of detection, prevention, mitigation, and eradication of invasive species and diseases in the NWHI. Other requirements were identified relative to methods to monitor and assess impacts of vessel traffic. Specific reference was made to vessels transiting to, from, and through the NWHI, as well as research activities conducted on and around the NWHI. The establishment of biological thresholds and impact control measures was identified as a priority for potential activities to be conducted in the region.

Technology (TECH) – Only three information needs identified were grouped in the Technology sub-theme. They involved evaluating and developing surveillance technology to monitor activities on and around the NWHI as well as enforce applicable regulations. Further, two issues of concern related to this sub-theme involved the need to increase collaboration between the scientific and fishing communities in the development of harvest technologies, reporting mechanisms, and methods of assessing stocks.

Strategies

The strategies associated with the Tools theme focused on products that would enhance the management and protection of NWHI resources as well as maximize the utility of data and information collected historically and in the future by all relevant parties.

Definitions (DEF) - Strategies recommended identifying goals and objectives for current and future marine protected areas. Such protected areas could be administered by various agencies (e.g., USFWS, NMSP, and NMFS). Information regarding the roles and responsibilities should be established and readily available. This effort could apply to any and all regulatory regimes.

Information Management (IM) – Executing broad data and information synthesis exercises to bring together as much of the current information as possible was identified as a critical first step. With a better understanding of what has been done and where, gap analyses and future planning efforts could proceed more efficiently.

Developing standards for future data generation was identified as critical. Standards would enable data from different programs (e.g., CRAMP), organizations and universities, and government bodies (e.g., Federal and State) to be compatible and thus more broadly applicable. Specific aspects to be addressed by standardization may include collection techniques, inventory methods, and metadata documentation.

Second to the issue of data standards, was the organization of data and data accessibility. Workshop participants indicated that there is a clear need to maintain up-to-date inventories and develop database infrastructures that will facilitate the

management and dissemination of information pertaining to the NWHI and the main Hawaiian Islands.

Prevention and Mitigation (PM) – Workshop participants generated 15 strategies within the sub-theme of prevention and mitigation. Within these, four main areas were addressed: invasive species, marine debris, infectious diseases, and vectors for these threats.

In several strategies, developing methods of controlling the transfer and introduction of invasive species proved significant. Suggested avenues of research included sterilization techniques (fumigants and autoclaves), monitoring records of authority, and maintaining and enforcing accurate records of visitation to the islands (both professional and recreational).

This sub-theme also includes strategies and recommendations on issues relating to infectious diseases and their impacts on a wide array of species including monk seals, marine and terrestrial birds, corals and fish. Partners in this work might include the State of Hawaii, the US Fish and Wildlife Service, or the World Wildlife Federation.



For the prevention and mitigation of marine debris and controlling associated impacts, suggested avenues of activity include assessing possible accumulation rates, and characterizing distributions, types, sources and potential. All mitigation efforts and programs should incorporate measures of effectiveness and cost/benefit evaluations.

Assessment of the potential vectors for invasive species and infectious diseases was also addressed. Vectors identified included vessels and passengers associated with research activities as well as commercial and recreational uses. For these vectors, tracking systems, modeling activities, and enhanced reporting requirements were listed as possible approaches to understanding the extent of potential influence.

Technology (TECH) – The single strategy developed focused on gathering information on vessel traffic to assess potential impacts on the resources of the NWHI. The strategy recommended developing surveillance and permitting systems that could generate information on activities, personnel numbers, cargo, and potential discharges or other impacts. Key partners include the State of Hawaii and NOAA agencies.

Considerations for Next Steps

- Recommendations from nearly every breakout group at the workshop included specific guidance to:
 - ~ develop standards and protocols for data collection and research methodologies;
 - ~ design and implement systems to effectively collect, manage, and distribute information to a wide audience of users; and

- ~ develop mechanisms to measure the effectiveness of existing or proposed guidelines, protocols, or methodologies.
- Fully addressing all of these during the workshop was not feasible; however, it was clear that strategies and proposed activities of every Theme presented in this assessment would benefit from considering aspects of information management, standards, and the use of common methodologies. Such considerations should be incorporated in all future planning and management activities whenever possible.
- Develop guidelines and methods to control the effects of anthropogenic activities, as well as develop methods of effective mitigation of these effects.
- Develop performance measures to evaluate progress and effectiveness of programs, regulations, or guidelines. This could play critical roles in virtually all activities and planning efforts.
- See the Discussion section for other considerations for next steps.

Theme: USE

General Description

The Use Theme stems from concern for the potential impacts and threats to the resources of the NWHI from commercial and recreational uses, and the need to develop methodologies to assess, monitor, and limit those threats and impacts. In total, forty-two information needs were identified. A majority came from the Commercial and Recreational Uses working group (24 of 42). Other significant contributions came from the Damage Assessment and Restoration and the Habitat Delineation working groups.



Sub-themes

The information needs within the Uses Theme have been grouped into three thematic categories. The most substantive is Anthropogenic Influences (33 information needs), and is based on the like-titled component of the ecosystem framework presented earlier in this report. The remaining sub-themes include Prevention and Mitigation, and Socioeconomics.

Anthropogenic Influences (AI) – Aspects of the 33 information needs included in this sub-theme were, in many cases, identified by several different working groups, indicating a wide spread recognition of their importance. In general, they confirmed the need for robust inventories and assessments of past and present human activities as well as predictions of future use, demand, and impacts. Attention was paid to three main areas of potential anthropogenic influences; fishing and harvesting, vessels, and threats.

As one of the main activities to take place around the NWHI, there was considerable interest in better understanding fishing and harvesting activities. Participants indicated the need to characterize impacts of various types of both commercial and recreational fishing, including allowable types, sources, intensity, and distribution for bottom fish, lobsters, and pelagic and recreational species. Assessing stock recovery times of both target and non-target species was also noted in several cases as a distinct need. The need for current stock assessment information (species, size, number, populations) was discussed. These assessments should be completed for current stocks but should be conducted based on past catch data and predicted future demand. This would enable managers and stakeholders to better understand the potential levels of demand and the magnitude of extraction as well as the associated activity. Further, potential impacts from illegal fishing for lobster, live fish, pelagic species, and others were identified as an information gap that should be addressed. This should include an analysis of recorded fishing and other violations of existing regulations.

Linked to nearly everything relating to humans in the NWHI is the issue of vessels. Past, present, and predicted data on vessel type, cargo, fuel capacity, destination, frequency of visits, total numbers and distributions were of interest to many working groups. Other characterizations and assessments that need be conducted would address potential threats from vessel activity including pollution, invasive species, groundings, and other impacts to the resources of the NWHI. Two reporting needs included 1) a vessel-reporting requirement that would provide data on vessel numbers, frequency, destination, anchorage, cargo, discharges, missions, and number of people; and 2) a vessel monitoring system (VMS) that could provide remotely sensed data on vessel location, duration, and activity.

Another consistent component of the Anthropogenic Influences sub-theme was that of actual and potential threats. Nearly all activities related to the presence of humans were identified as threats, including fishing, marine debris, toxics and other hazardous waste, research activities, military activities, and recreational impacts (consumptive and non-consumptive; see Appendix III). Characterizations of threats and assessments of potential impacts were identified as priority information needs by workshop participants.

Prevention and Mitigation (PM) – Four information needs related to prevention and mitigation were identified. Three focused on enforcement: assessing and evaluating the cost and effectiveness of the various enforcement measures, analyzing past violations documented in the NWHI, and developing new methods of enforcement. Other needs included maps delineating the jurisdictional boundaries around the NWHI and assessments of sources and mitigation of marine debris in the region.

Socioeconomics (SOC) – Five information needs fell into the socioeconomics sub-theme. They addressed the need to conduct analyses of the potential economic impacts of non-commercial uses as well as the potential socioeconomic impacts of current and future management actions.

Strategies

Thirteen strategies were developed to address information needs in the Use Theme. This pattern indicates the potential importance of these strategies as most addressed similar needs identified by many workshop participants in several working groups.

Anthropogenic Influences (AI) – Most strategies addressed three areas of concern: fishing, vessels and related traffic, and threats, including toxic materials and marine debris. Those that focused on fishing addressed information needs relating to legal and illegal commercial and recreational fishing for both target and non-target species. Participants proposed stock assessments, inventories of gear types, evaluations of impacts to target species and by-catch, and surveys of critical habitat for specific target species. Efforts to quantify the amount and significance of illegal fishing were proposed as well. Most Use related strategies included discussions of monitoring and tracking of vessel activity as well as enforcement of existing regulations. Vessels and vessel traffic were consistently cited with regard to the need to monitor activities and threats to NWHI resources. Characterizing potential threats of vessels as vectors for invasive species and pollution, and vessel groundings, were all deemed necessary. Most proposed work requires a combination of fieldwork and data processing/synthesizing efforts. Limited data sets appear to be available to support initial synthesis and evaluation. Those that were mentioned at the workshop are managed by NOAA Fisheries, the State of Hawaii, and several research institutions.



Prevention and Mitigation (PM) – Only one strategy was developed for this sub-theme, but it addressed seven information needs. It focused on monitoring vessel activity, a topic addressed in a majority of the working groups. Proposed steps included assessing historical records of vessel traffic and activities, collecting information on all current and future vessels transiting the NWHI, conducting analyses of potential threats associated with this traffic, and developing a permitting and monitoring system for future vessels traveling to or through the NWHI. The strategy requires fieldwork as well as data synthesis and analysis.

Socioeconomic (SOC) – One strategy was developed that related directly to socioeconomics. It addressed five information needs and focused on defining potential demand for recreational activities in the NWHI and the potential implications of these activities from a socioeconomic perspective. Suggested steps included assessing past recreational activities in the NWHI, and surveying current user groups and service providers regarding current and potential future uses. This is a data synthesis and analysis exercise as opposed to a field-oriented study.

Considerations for Next Steps

- Significant attention should be directed towards characterizing, monitoring and tracking issues stemming from commercial, recreational, and illegal fishing. Efforts to collect and evaluate data on fishery stocks for both target and non-target species should be made.
- Develop methodologies to assess, monitor, and limit threats and impacts (e.g., pollution, introduced species) from research activities and other sources of vessel traffic.

- Construct inventories and assessments of past and present human activities as well as predictions of future use, demand, and impacts to the resources of the NWHI.
- All work relating to the Use Theme should consider several key characteristics when evaluating activities including socioeconomic impacts, stresses to the natural or cultural resources, threats, potential damage, and subsequent mitigation and restoration requirements.
- See the Discussion section for other considerations for next steps.

Discussion and Next Steps

As mentioned earlier, the primary purpose of this assessment was to provide input for a multi-agency regional action plan for the NWHI. There are, of course, many ways to organize and evaluate the workshop results and move them into a regional action plan. Regional managers and planners may choose to recast this assessment to better suit their goals. Regardless, this assessment represents one of the possibilities for managing and applying the workshop results in research and management activities in the NWHI.

This assessment is also intended to promote the use of the workshop results by all parties interested in the NWHI. For example, the NMSP will be incorporating this information, to the extent possible, in the development of the environmental impact statement and issue based management plan for a possible NWHI National Marine Sanctuary. For these reasons, the original needs identified by workshop participants were retained (Appendix I) as well as reorganized into categories that better lend themselves to regional planning for conservation science, and NWHICRER or NMSP operations.

The organizational structure of the workshop results presented in this assessment separates information needs into new categories with common themes. However, some of these categories may need further refinement as several contain an extensive range of needs and suggested actions. For example, the Living Resource sub-theme under Ecosystem Characterization contains 51 information needs. This could present logistical or operational obstacles when trying to prepare strategies and action plans to address those needs. One of the more important steps in designing a regional action plan will be to determine the most practical groupings of information needs so strategies can be effectively implemented.

Another aspect of the results that will require attention pertains to the strategies developed during the workshop. A total of 99 strategies were developed addressing over 200 information needs. Workshop participants were instructed to provide as much information as possible in the time allotted regarding the general nature of what should be addressed for a particular need or set of needs. It was not intended for participants to develop comprehensive and detailed strategies for all of the information needs identified. While these strategies do contain some valuable information on how specific needs can/should be addressed, most of the strategies will need to be supplemented with more substantial information regarding objectives, methodologies, partnerships, resources required, and timeframes. Further, more attention to coordinating with existing agency and institutional activities, resources, and strategic plans will be necessary.

The organization of the workshop results presented in this assessment is based on similarities of issues and needs, not on priority. It also should be noted that issues of agency and institutional priority, as well as prioritization for planning purposes will need to be addressed when applying these results to any research or management activities. While workshop participants did prioritize issues and needs during the workshop, that step was designed to facilitate the creation of strategies for the most significant needs as determined by workshop participants. It was not intended to develop prioritized lists of activities and funding recommendations for agency planning purposes. Efforts to develop agency specific documents, or a multi-agency regional action plan will need to consider this.

In general terms, a regional action plan should include guidance and demonstrate commitments from key partners as well as recommendations to others on how to best support the work defined within the plan. This would likely include information about goals and objectives, funding and other resources required (e.g., equipment or personnel), scheduling, anticipated products, and, perhaps most important, responsibility for implementation among one or more of the associated regional organizations and agencies (NOAA Fisheries, U.S. Fish and Wildlife Service, Western Pacific Fisheries Management Council, Hawaii Department of Land and Natural Resources, etc.). Some of the possible outcomes from such a regional plan might include joint planning and coordination of cruises, annual science and research meetings, a regional information management system, and a joint planning committee. Key steps in the process of developing a regional action plan may also include aligning existing strategic plans and established operational priorities of regional partners with the identified information needs addressed in this assessment. The development of a regional action plan is not intended to supercede existing strategic plans or identified priorities of any agency or organization. Instead, it should focus on coordinating partner activities in order to maximize efficiency and effectiveness.

Appendix I: Themes, Sub-themes, and Workshop Results

This table categorizes workshop results (issues of concern, information needs, and strategies) into the planning components of Themes and sub-themes.

At the workshop, participants identified issues of concern within nine topic areas. Then they identified information needs required to better understand and address those issues and developed initial strategies that characterized actions necessary to address the information needs. These results are listed in the four columns of this table.

The shaded rows represent proposed Themes and sub-themes that can be used to develop plans for a coordinated multi-organizational approach to research and management in the NWHI.

In the process of categorizing the information needs and associated strategies into Theme and sub-theme combinations, no effort to filter or prioritize this data was made. All workshop results (issues of concern, information, needs, and strategies) are presented as they were recorded in the workshop.

Data in this table, as well as the associated strategies (referenced in the last column), are available on the web at <http://www.hawaiireef.noaa.gov>.

Topic	Issue of Concern	Information Need	Strategies
Culture: Definition			
Cultural Heritage	Who will define 'Cultural Heritage' for NWHI?		
Cultural Heritage	Respect & promote native Hawaiian sense of place, values, rights & responsibilities in NWHI; accessibility; connectivity; lineal	Definitions of terms from/with Native Hawaiians and are any of those terms (sense of place, values, rights, responsibilities) missing	Cultural-4
Cultural Heritage	Full participation of NH in the "process" of management	Identify/summarize definition of term: Native Hawaiian	Cultural-6
Cultural Heritage	Politics: how to ensure native Hawaiian issues will be part of mgmt/action plan	Identify Native Hawaiian issues	Cultural-4
Cultural Heritage	Respect & promote native Hawaiian sense of place, values, rights & responsibilities in NWHI; accessibility; connectivity; lineal	Review contemporary documents for attempts to achieve this objective	Cultural-4
Cultural Heritage	Full participation of NH in the "process" of management	Define what "full participation" means with input from Native	Cultural-5
Cultural Heritage	Developing an effective cultural science program	How different participants interpret cultural meaning of EO	Cultural-3
History/Archaeology	Boundaries surrounding the use of the terms- history, culture and heritage	List of and definition/use of the terms (history, culture, heritage) in various laws, reqs, rule at State/Federal etc. levels: A glossary	History-8
History/Archaeology	Boundaries surrounding the use of the terms- history, culture and	Comment or review from key stakeholders	
History/Archaeology	Boundaries surrounding the use of the terms- history, culture and	Identification of interested parties/stakeholders	History-6
Culture: History			
Cultural Heritage	Identifying historic and cultural activity; targeted cultural archaeology surveys		
Cultural Heritage	Assess accuracy of history		
Cultural Heritage	What was and is the relationship of native Hawaiians to NWHI?	Identify non-commercial, subsistence, religious and cultural	
Cultural Heritage	What was and is the relationship of native Hawaiians to NWHI?	Oral history/written history database (with bibliography), archaeological research (land and marine), oral history studies, translation of written Hawaiian materials and compile primary and historical documents	
Cultural Heritage	What was and is the relationship of native Hawaiians to NWHI?	Understanding native Hawaiian relationships to NWHI through experiential voyaging	
Living Marine Resources	MPA design and evaluation, including goals and design criteria, monitoring, and using hydrodynamic models for decisions about	Identify existing cultural and traditional knowledge through stakeholder input	
Culture: Resource Management			
Cultural Heritage	Access to information		
Cultural Heritage	Developing an effective cultural science program	Side by side social scientific investigations scientists and cultural (social and biological) practioners	Cultural-2
Cultural Heritage	Developing an effective cultural science program	Look at how other groups are integrating social science into natural resource management	Cultural-3
Cultural Heritage	Developing an effective cultural science program	Look at existing government policies/laws for incorporating TEK	Cultural-3
Cultural Heritage	Full participation of NH in the "process" of management	Identify key community leaders and seek participation	Cultural-6
Cultural Heritage	Developing an effective cultural science program	What types of uses/activities are being planned	Cultural-3
Cultural Heritage	Full participation of NH in the "process" of management	Identify how Native Hawaiians want to be involved	
Living Marine Resources	Understand traditional conservation practices		

Topic	Issue of Concern	Information Need	Strategies
Ecosystem Characterization: Habitat			
Comm/Rec Uses	Incomplete information on natural ecosystem characteristics (improve characterization)	Quantification of habitat (benthic, pelagic)	ComRec - 3
Habitat Delineation	Habitat classification		Habitat - 1
Habitat Delineation	Mapping to support management needs (e.g., RPA boundaries)		Habitat - 1
Habitat Delineation	Identifying appropriate spatial and temporal scales		Habitat - 1
Habitat Delineation	Representative and special habitats		
Habitat Delineation	Pelagic habitat mapping		
Habitat Delineation	Mapping of marine-terrestrial interactions		
Habitat Delineation	Baseline data for habitat monitoring	Baseline habitat data	Habitat - 13
Habitat Delineation	Priority areas	Integrate community to define mapping priorities	Habitat - 6??
Habitat Delineation	Baseline data for habitat monitoring	Inventory of existing data sets	Habitat - 13
Habitat Delineation	Priority areas	Mapping to support management needs: RPA boundaries	Habitat - 8
Habitat Delineation	Ecological significance of habitat	Linking visual and acoustic/spectral data	Habitat - 9
Habitat Delineation	Baseline data for habitat monitoring	Create information from data inventories	Habitat - 13
Habitat Delineation	Baseline data for habitat monitoring	Bathymetry, substrate, groundtruthing	Habitat - 10
Habitat Delineation	Ecological significance of habitat	Define habitats based on species	Habitat - 9
Habitat Delineation	Coordination of mapping efforts	Common data, map, and product standards	Habitat - 8
Habitat Delineation	Ecological significance of habitat	What are the habitats? (algae, coral)	Habitat - 9
Habitat Delineation	Priority areas	Mapping of sensitive areas (e.g., erosion, coral bleaching)	Habitat - 7
Living Marine Resources	Basic assessment (taxonomy) including habitat relationships	Comprehensive habitat inventory	LMR - 6
Living Marine Resources	MPA design and evaluation, including goals and design criteria, monitoring, and using hydrodynamic models for decisions about	Generate habitat maps (including abiotic and biotic features)	
Living Marine Resources	Biogeography, including connectivity within NWHI and between the NWHI and MHI including a focus on exploited species and endemics.	Habitat distribution/availability, especially that essential to reproduction, recruitment, and feeding	LMR - 5
Living Marine Resources	Development of functional relationship models, including information on trophic structure to facilitate ecosystem based management	Describe habitats within each ecosystem	LMR - 8
Oceanographic Regime	Current geomorphological and sedimentological processes influencing reefs and emergent lands		
Stresses	Natural stressors and climate change	Characterize vulnerable habitats and species, including synergistic effects and interactions	Stress-1,2
Threat/End. & Terr Res	Ability to detect change that requires management action	Habitat characterization data	Threatened-2
Ecosystem Characterization: Habitat / Anthropogenic Influences			
Damage Asses./Rest	Marine debris – habitat damage	Maps of locations of debris	Damage-2,3,6
Damage Asses./Rest	Vessel traffic and operations (lights, discharges of pollution, alien species, anchor damage, etc)	Baseline georeferenced habitat data in impacted area	Damage-6
Damage Asses./Rest	Vessel traffic and operations (lights, discharges of pollution, alien species, anchor damage, etc)	Updated accurate charts	
Damage Asses./Rest	Marine debris – habitat damage	Marine debris characterizations	Damage-1,3
Habitat Delineation	Coordination of mapping efforts	Agency activities and data holdings	Habitat - 1
Stresses	Debris impacts, including fishing and non-fishing debris	Characterize types, sources, impacts, frequencies, intensity, and distribution	Stress-9

Topic	Issue of Concern	Information Need	Strategies
Ecosystem Characterization: Living Resources			
Comm/Rec Uses	Extinction threshold for various species		
Comm/Rec Uses	Incomplete information on natural ecosystem characteristics (improve characterization)	Life history information on key species	ComRec - 1
Comm/Rec Uses	Incomplete information on natural ecosystem characteristics (improve characterization)	Trophic dynamics	ComRec - 3
Comm/Rec Uses	Lack of population and trophic structure information of economic and ecologically important species (pelagic and demersal)	Genetic and environmental marker data indicating transport	ComRec - 4
Comm/Rec Uses	Lack of population and trophic structure information of economic and ecologically important species (pelagic and demersal)	Life history parameters (age, growth, mortality, etc.)	ComRec - 4
Comm/Rec Uses	Incomplete information on natural ecosystem characteristics (improve characterization)	Spatial and temporal estimates of abundance	ComRec - 1
Comm/Rec Uses	Incomplete information on natural ecosystem characteristics (improve characterization)	Community metrics (e.g., species diversity)	ComRec - 3
Comm/Rec Uses	Incomplete information on natural ecosystem characteristics (improve characterization)	Species movement, migration, and dispersal	ComRec - 1
Comm/Rec Uses	Incomplete information on natural ecosystem characteristics (improve characterization)	Population replenishment and connectivity	ComRec - 4
Damage Asses./Rest	Extreme oceanographic atmospheric events	Physical/biological linkage between extreme events and ecosystems	
Habitat Delineation	Ecological significance of habitat	Basic biology by species/lifestage	Habitat - 9
Habitat Delineation	Priority areas	Mapping of invasive species for removal and restoration	Habitat - 6
Habitat Delineation	Priority areas	Mapping of biodiversity, particularly endemics	Habitat - 6
Living Marine Resources	Comparative role of top level predators in the NWHI versus MHI		
Living Marine Resources	Disease threats and vectors		
Living Marine Resources	Evaluate factors affecting resilience of habitat and biota		
Living Marine Resources	Biogeography, including connectivity within NWHI and between the NWHI and MHI including a focus on exploited species and endemics.	Patterns and scales of movement/dispersal at various life stages	LMR - 1,5
Living Marine Resources	Basic assesement (taxonomy) including habitat relationships	Comprehensive taxonomic list, including managed stocks	LMR - 6
Living Marine Resources	Development of functional relationship models, including information on trophic structure to facilitate ecosystem based management	Identify key species	LMR - 8,10
Living Marine Resources	Biogeography, including connectivity within NWHI and between the NWHI and MHI including a focus on exploited species and endemics.	Population structure and demography	LMR - 1
Living Marine Resources	Development of functional relationship models, including information on trophic structure to facilitate ecosystem based management	Basic life history information (e.g. growth, reproductive status, larval dispersal mechanisms, etc.)	LMR - 8,10
Living Marine Resources	MPA design and evaluation, including goals and design criteria, monitoring, and using hydrodynamic models for decisions about	Identify key biological considerations for species (e.g., spawning aggregations, population sizes, diversity, endemism, life histories)	LMR - 4
Living Marine Resources	Biogeography, including connectivity within NWHI and between the NWHI and MHI including a focus on exploited species and endemics.	Characterization of population genetic structure	LMR - 5
Living Marine Resources	Basic assesement (taxonomy) including habitat relationships	Identify vulnerable species (e.g. endemics, rare, listed [endangered, threatened, migratory], apex predators [fish, cetaceans, seals, birds], sensitive [range limited by temperature,	LMR - 6
Living Marine Resources	Biogeography, including connectivity within NWHI and between the NWHI and MHI including a focus on exploited species and endemics.	Population spatial distribution (connected or not), including genetics	LMR - 1
Living Marine Resources	Biogeography, including connectivity within NWHI and between the NWHI and MHI including a focus on exploited species and endemics.	Movement effects on distribution; dispersal and its genetic consequences	LMR - 1

Topic		Issue of Concern	Information Need	Strategies
	Living Marine Resources	Biogeography, including connectivity within NWHI and between the NWHI and MHI including a focus on exploited species and endemics.	Population sources, sinks for key species	
	Living Marine Resources	Biogeography, including connectivity within NWHI and between the NWHI and MHI including a focus on exploited species and endemics.	Basic life histories, with reproduction relative to population structure and function (viability), movement, dispersal	
	Living Marine Resources	Development of functional relationship models, including information on trophic structure to facilitate ecosystem based management	Prey data (e.g. stomach contents)	LMR - 8,10
	Living Marine Resources	Development of functional relationship models, including information on trophic structure to facilitate ecosystem based management	Consumption rates	LMR - 8
	Living Marine Resources	Biogeography, including connectivity within NWHI and between the NWHI and MHI including a focus on exploited species and endemics.	Temporal (seasonal to interdecadal) information on reproduction, dispersal, recruitment, survival, and population distribution	
	Living Marine Resources	MPA design and evaluation, including goals and design criteria, monitoring, and using hydrodynamic models for decisions about locations and sizes	Information on resistance and resilience of populations in various areas to select areas for MPAs that will have robust populations in the face of natural and anthropogenic stress	
	Living Marine Resources	Biogeography, including connectivity within NWHI and between the NWHI and MHI including a focus on exploited species and endemics.	Population vulnerability assessments, especially for endemics and isolated species	LMR - 1
	Living Marine Resources	Development of functional relationship models, including information on trophic structure to facilitate ecosystem based management	Spatial and temporal distribution of predators and prey	LMR - 8,11
	Living Marine Resources	Development of functional relationship models, including information on trophic structure to facilitate ecosystem based management	Abundance of trophic components	LMR - 8,11
	Oceanographic Regime	Stocks or management units of fished and other resources	Genetic data related to spatial criteria	
	Oceanographic Regime	Stocks or management units of fished and other resources	Life history information	
	Oceanographic Regime	Larval dispersal and recruitment	Spatial distribution of organisms	
	Oceanographic Regime	Stocks or management units of fished and other resources	Spatial distribution of organisms	
	Oceanographic Regime	Larval dispersal and recruitment	Environmental marker data (e.g., trace elements)	
	Oceanographic Regime	Connectivity (between MHI and NWHI, and between islands and banks within the NWHI)	Genetic data related to spatial criteria	Ocean - 6
	Oceanographic Regime	Larval dispersal and recruitment	Life history information	
	Oceanographic Regime	Connectivity (between MHI and NWHI, and between islands and banks within the NWHI)	Life history information	Ocean - 6
	Oceanographic Regime	Larval dispersal and recruitment	Genetic data related to spatial criteria	
	Oceanographic Regime	Larval dispersal and recruitment	Larval behavior	
	Stresses	Wildlife health, including diseases	Establish a baseline for types, prevalence, morbidity and mortality	Stress-16,18
	Stresses	Wildlife health, including diseases	Characterize threats according to likelihood of exposure and susceptibility	Stress-16,18
	Stresses	Wildlife health, including diseases	Identify threat posed by cumulative effects	Stress-17
	Stresses	Natural stressors and climate change	Compare relative environmental sensitivity across taxa	Stress-1
	Stresses	Wildlife health, including diseases	Establish epidemiology by type of disease, including life history, vectors and pathways	Stress-17
	Stresses	Wildlife health, including diseases	Determine potential contaminant sources (types, frequency, biogeochemical pathways) for selected contaminants.	
	Threat/End. & Terr Res	Species inventory		
	Threat/End. & Terr Res	Ability to detect change that requires management action	Sources of nutrients	Threatened-3
	Threat/End. & Terr Res	Recovery of critically endangered species	Limitations to reproductive success	
	Threat/End. & Terr Res	Recovery of critically endangered species	Inventory of unknown species	
	Threat/End. & Terr Res	Recovery of critically endangered species	Genetic information	

Topic	Issue of Concern	Information Need	Strategies
Ecosystem Characterization: Living Resources / Anthropogenic Influences			
Comm/Rec Uses	Evaluating the efficacy of management actions (spatial management)	Compare stocks and available habitat in MHI to NWHI	ComRec - 5
Comm/Rec Uses	Impacts of NWHI regulation on main Hawaiian Islands	Compare stocks and available habitat in MHI to NWHI	ComRec - 5
Comm/Rec Uses	Utilizing management results from NWHI to better manage MHI	Compare stocks and available habitat in MHI to NWHI	ComRec - 5
Comm/Rec Uses	Lack of population and trophic structure information of economic and ecologically important species (pelagic and demersal)	Long term monitoring of populations and fisheries	
Damage Asses./Rest	Alien species - terrestrial and marine	Threat ranking terrestrial/marine - by species	Damage-3,4
Damage Asses./Rest	Alien species - terrestrial and marine	Current inventory of all species in NWHI (alien and traditional) and origin points	Damage-4,6
Damage Asses./Rest	Alien species - terrestrial and marine	Current inventory of all species in main HI (alien and potentially invasive to NWHI) and origin points + Link to 3.7	Damage-4
Damage Asses./Rest	Vessel traffic and operations (lights, discharges of pollution, alien species, anchor damage, etc)	ESI index for marine as well as terrestrial (not current product) includes habitats of particular concern, cultural and historical areas, also active research sites	Damage-6
Living Marine Resources	Evaluate threats posed by aquatic nuisance species, including those in MHI, including understanding of vectors		
Stresses	Impacts of terrestrial and marine alien or invasive species	Characterize types, sources and vectors, frequencies, intensity, and distribution	Stress-3,4,6
Stresses	Impacts of terrestrial and marine alien or invasive species	Evaluate the likelihood for establishment of invasives	Stress-3,5
Threat/End. & Terr Res	Invasive species	Inventory of known invasive species	Threatened-13
Threat/End. & Terr Res	Invasive species	Distribution and abundance of known invasive species	Threatened-13
Threat/End. & Terr Res	Ability to detect change that requires management action	Sources of mortality	Threatened-4
Threat/End. & Terr Res	Recovery of critically endangered species	Identify threats to survival	
Threat/End. & Terr Res	Invasive species	Potential sources/vectors of invasive species	Threatened-14
Ecosystem Characterization: Living Resources / Habitat			
Comm/Rec Uses	Incomplete information on natural ecosystem characteristics (improve characterization)	Species habitat utilization by lifestage	ComRec - 1
Habitat Delineation	Mapping living resource distributions		Habitat - 15
Habitat Delineation	Priority areas	Mapping to refine EFH designation for existing FMPs	Habitat - 6
Habitat Delineation	Ecological significance of habitat	Juvenile spawning areas, movements	Habitat - 9
Habitat Delineation	Ecological significance of habitat	Interaction of habitat utilization (species crossing habitats)	Habitat - 9
Threat/End. & Terr Res	Recovery of critically endangered species	Habitat requirements	Threatened-9,17
Ecosystem Characterization: Modeling			
Comm/Rec Uses	Evaluation of probable impacts of management decisions prior to implementation		
Comm/Rec Uses	Evaluating the efficacy of management actions (spatial management)	Define risks associated with management decisions	
Comm/Rec Uses	Impacts of NWHI regulation on main Hawaiian Islands	Define risks associated with management decisions	
Comm/Rec Uses	Utilizing management results from NWHI to better manage MHI	Define risks associated with management decisions	

Topic		Issue of Concern	Information Need	Strategies
	Comm/Rec Uses	Incomplete information on natural ecosystem characteristics (improve characterization)	Synthesize existing data into spatially structured ecosystem model	
	Damage Asses./Rest	Vessel traffic and operations (lights, discharges of pollution, alien species, anchor damage, etc)	Oceanographic models	
	Habitat Delineation	Ecological modeling		
	Living Marine Resources	Relationships between ecosystems (e.g., nearshore and offshore) including endogenous and exogenous production		
	Living Marine Resources	Drawing on the knowledge of resource users (present and past) re: resources and relationship with their environment		
	Living Marine Resources	Climate change influences on key processes (e.g., coral growth).		
	Living Marine Resources	Evaluate the possibility and nature of discrete ecological subunits within the NWHI (e.g., Kure, Midway, and Pearl and Hermes as an ecological unit)		
	Living Marine Resources	Patterns and processes related to primary production and its changes on ecosystems		
	Living Marine Resources	Transferability of trophic and other data when so many species and so much biomass is endemic species		
	Living Marine Resources	Annual to decadal changes related to energy flow and ecosystem structure		
	Living Marine Resources	MPA design and evaluation, including goals and design criteria, monitoring, and using hydrodynamic models for decisions about locations and sizes	Connectivity (oceanographic data and models incorporating recruitment, larval dispersal, sources and sinks, habitat diversity, and requirements at all stages of species of concern)	LMR - 3
	Living Marine Resources	Development of functional relationship models, including information on trophic structure to facilitate ecosystem based management	Habitat requirements and relationships for each life history stage of key species	LMR - 8,11
	Living Marine Resources	Development of functional relationship models, including information on trophic structure to facilitate ecosystem based management	Understand oceanographic and climatic events (e.g. nutrients, reproductive cues)	LMR - 8,7
	Living Marine Resources	Development of functional relationship models, including information on trophic structure to facilitate ecosystem based management	Inter-specific relationships	LMR - 8,11
	Living Marine Resources	Development of functional relationship models, including information on trophic structure to facilitate ecosystem based management	Connectivity at all spatial scales and life history stages	LMR - 8,11
	Living Marine Resources	Development of functional relationship models, including information on trophic structure to facilitate ecosystem based management	Define and quantify impacts caused by extraction	LMR - 8,7
	Living Marine Resources	Development of functional relationship models, including information on trophic structure to facilitate ecosystem based management	Determine functional roles	LMR - 8,10
	Living Marine Resources	Development of functional relationship models, including information on trophic structure to facilitate ecosystem based management	Define and quantify biotic/abiotic components of each ecosystem	LMR - 8
	Living Marine Resources	Development of functional relationship models, including information on trophic structure to facilitate ecosystem based management	Describe controls and effects of oceanographic processes	LMR - 8,7
	Living Marine Resources	Development of functional relationship models, including information on trophic structure to facilitate ecosystem based management	Define management objectives for development of ecosystem models	LMR - 8
	Oceanographic Regime	Connectivity (between MHI and NWHI, and between islands and banks within the NWHI)	Hydrodynamic models	Ocean - 1
	Oceanographic Regime	Acute anthropogenic effects	Environmental sensitivity using data from hydrodynamic models, ocean/atmosphere models, empirical data, and life history	
	Oceanographic Regime	Larval dispersal and recruitment	Hydrodynamic models	Ocean - 6
	Oceanographic Regime	Connectivity (between MHI and NWHI, and between islands and banks within the NWHI)	Linked ocean/atmospheric models (past/present/future) using appropriate physical and chemical parameters	

Topic		Issue of Concern	Information Need	Strategies
	Oceanographic Regime	Impacts of climate change	Coupled hydrodynamic ecosystem models	Ocean - 2
	Oceanographic Regime	Connectivity (between MHI and NWHI, and between islands and banks within the NWHI)	Comprehensive empirical data (physical/chemical variables and process data) at appropriate spatial and temporal scales	Ocean - 3
	Oceanographic Regime	Impacts of climate change	Linked ocean/atmospheric models (past/present/future) using appropriate physical and chemical parameters	Ocean - 5
	Stresses	Impacts of research activities	Characterize vulnerability of habitats and species, including synergistic/cumulative impacts	
	Threat/End. & Terr Res	Carrying capacity for targeted species		
Ecosystem Characterization: Water-Atmosphere				
	Comm/Rec Uses	Lack of population and trophic structure information of economic and ecologically important species (pelagic and demersal)	Oceanographic studies of larval transport	ComRec - 4
	Comm/Rec Uses	Incomplete information on natural ecosystem characteristics (improve characterization)	Characterization of oceanography	
	Damage Asses./Rest	Extreme oceanographic atmospheric events	Complete oceanographic atlas	
	Living Marine Resources	Biogeography, including connectivity within NWHI and between the NWHI and MHI including a focus on exploited species and endemics.	Oceanographic patterns and processes	
	Oceanographic Regime	Larval dispersal and recruitment	Spatial and temporal patterns of currents within the archipelago at a range of scales	
	Oceanographic Regime	Impacts of climate change	Paleoclimate studies (cores, etc) longterm temporal	
	Oceanographic Regime	Stocks or management units of fished and other resources	Environmental marker data (e.g., trace elements)	Ocean - 4
	Oceanographic Regime	Effects of episodic natural effects	Compilation of data on historical catastrophic natural events	Ocean - 5
	Oceanographic Regime	Connectivity (between MHI and NWHI, and between islands and banks within the NWHI)	Paleoclimatic data (spatial primarily)	
	Oceanographic Regime	Larval dispersal and recruitment	Comprehensive empirical data (physical/chemical variables and process data) at appropriate spatial and temporal scales	
	Oceanographic Regime	Connectivity (between MHI and NWHI, and between islands and banks within the NWHI)	Environmental marker data (e.g., trace elements)	Ocean - 6
	Oceanographic Regime	Connectivity (between MHI and NWHI, and between islands and banks within the NWHI)	Spatial and temporal patterns of currents within the archipelago at a range of scales	Ocean - 1
	Stresses	Natural stressors and climate change	Characterize natural climate variation and oscillations (short and long-term)	Stress-1
	Stresses	Debris impacts, including fishing and non-fishing debris	Oceanographic processes that influence the distribution of debris	Stress-9,11
History / Archeology: Inventory				
	History/Archeology	Terrestrial vs. marine		
	History/Archeology	Defining and prioritizing the range of historical/archaeological resources we're talking about		
	History/Archeology	Battlefield at Midway (National Memorial)		
	History/Archeology	Status of informational sources		
	History/Archeology	Grave sites (other than battlefields)		
	History/Archeology	Status of inventory of resources and what laws have been applied (ongoing)	List of available resources	History-1
	History/Archeology	Realistically completing Federal mandate to inventory	List of available resources	History-1
	History/Archeology	Lack of coordination between natural scientists and social scientists in surveys, mapping	Review of natural science survey areas	
	History/Archeology	Lack of coordination between natural scientists and social scientists in surveys, mapping	Identify who, where and methods of surveys are being planned to incorporate historical/archaeological needs	History-3
	History/Archeology	Status of inventory of resources and what laws have been applied (ongoing)	Gap analysis	
	History/Archeology	Realistically completing Federal mandate to inventory	Gap analysis	

Topic		Issue of Concern	Information Need	Strategies
	History/Archaeology	Status of inventory of resources and what laws have been applied (ongoing)	Review of past management actions	
	History/Archaeology	Realistically completing Federal mandate to inventory	Review of past management actions	
	History/Archaeology	Status of inventory of resources and what laws have been applied (ongoing)	List of laws that have been applied and to which resources	
	History/Archaeology	Realistically completing Federal mandate to inventory	List of laws that have been applied and to which resources	
History / Archaeology: Modeling				
	History/Archaeology	Status of inventory of resources and what laws have been applied (ongoing)	Predictive model/survey design for candidate locations	
	History/Archaeology	Realistically completing Federal mandate to inventory	Predictive model/survey design for candidate locations	
Monitoring: Archaeology				
	History/Archaeology	Adverse effects of research, vandalism, and restoration on <u>historical/archaeological resources</u>		
	History/Archaeology	Environmental disturbance of excavated study sites		
Monitoring: Habitat				
	Damage Asses./Rest	Extreme oceanographic atmospheric events	Secondary anthropogenic (shipwreck movement and discharge) and natural (boulder movement) impacts	
	Habitat Delineation	Data synthesis (old and new), including metadata	Historical data on distribution of habitats	Habitat - 13
	Habitat Delineation	Baseline data for habitat monitoring	Repeat data collection	Habitat - 12
	Habitat Delineation	Baseline data for habitat monitoring	Shifting baseline	Habitat - 13
	Oceanographic Regime	Changing distribution and abundance of organisms and habitats		
	Threat/End. & Terr Res	Habitat loss		
Monitoring: Habitat / Anthropogenic Influences				
	Damage Asses./Rest	All gear impacts (commercial and research)		
	Damage Asses./Rest	Anthropogenic caused habitat shift		
	Damage Asses./Rest	Marine debris – habitat damage	Extent of the impacts of debris	Damage-1,2,3
	Damage Asses./Rest	Marine debris – habitat damage	Vector ecology - marine debris as a vector	Damage-1,3
	Damage Asses./Rest	Marine debris – habitat damage	Debris time at sea and origin	Damage-1
	Damage Asses./Rest	Marine debris – habitat damage	Rates of accumulation of debris	Damage-2,3
	Damage Asses./Rest	Alien species - terrestrial and marine	Understand rate and other parameters of habitat shifts	Damage-4
	Damage Asses./Rest	Marine debris – habitat damage	Fate of debris in lagoon	Damage-1,3
	Damage Asses./Rest	Marine debris – habitat damage	Surveillance of marine debris at sea (remote sensing)	Damage-1,2,3
	Damage Asses./Rest	Marine debris – habitat damage	Recovery for affected organisms and habitats	Damage-1,3
	Damage Asses./Rest	Marine debris – habitat damage	Baseline georeferenced habitat data in impacted area	

Topic		Issue of Concern	Information Need	Strategies
Damage Asses./Rest	Marine debris – habitat damage	Ecological impacts of marine debris removal v. non-removal	Damage-1,3	
History/Archaeology	Environmental threat from Heritage vessels			
Living Marine Resources	Evaluate the impact of humans on the ecosystems			
Oceanographic Regime	Chronic anthropogenic effects			
Stresses	Debris impacts, including fishing and non-fishing debris	Impact of debris, focusing on quantification of existing data over qualitative assessment	Stress-10	
Stresses	Impacts of vessels, including transiting vessels such as cruise ships	Evaluate impacts by types	Stress-7	
Stresses	Impacts of fishing, legal and illegal	Habitat and community impacts caused by various fishing (e.g., anchor damage, interactions with endangered and threatened species, by-catch)	Stress-14	
Stresses	Impacts of terrestrial and marine alien or invasive species	Determine ecosystem consequences of various types of alien and invasive spp.	Stress-5	
Stresses	Impacts of research activities	Characterize impacts by type		
Threat/End. & Terr Res	Human impacts	Assessing potential impacts of human activities	Threatened-8	
Threat/End. & Terr Res	Human impacts	Characterization of unknown impacts	Threatened-7	
Threat/End. & Terr Res	Human impacts	Efficacy of prevention and mitigation options	Threatened-7	
Threat/End. & Terr Res	Human impacts	Impacts on the ecosystem		
Threat/End. & Terr Res	Invasive species	Impacts of invasive species on the ecosystem	Threatened-12	
Monitoring: Living Resources				
Comm/Rec Uses	Evaluating the efficacy of management actions (spatial management)	Status of recovery of stocks	ComRec - 5	
Comm/Rec Uses	Impacts of NWHI regulation on main Hawaiian Islands	Status of recovery of stocks	ComRec - 5	
Comm/Rec Uses	Utilizing management results from NWHI to better manage MHI	Status of recovery of stocks	ComRec - 5	
Comm/Rec Uses	Evaluating the efficacy of management actions (spatial management)	Abundance, CPUE, SPR, inside and outside of no fishing areas	ComRec - 5	
Comm/Rec Uses	Impacts of NWHI regulation on main Hawaiian Islands	Abundance, CPUE, SPR, inside and outside of no fishing areas	ComRec - 5	
Comm/Rec Uses	Utilizing management results from NWHI to better manage MHI	Abundance, CPUE, SPR, inside and outside of no fishing areas	ComRec - 5	
Living Marine Resources	Seasonality of benthic algae and its influences			
Living Marine Resources	Long term monitoring of natural and human-caused variation at relevant spatial and temporal scales.	Decide on key taxa (e.g. endemics, commercially harvested, protected and endangered, spp that integrate information at relevant scales, variety of trophic levels, larvae)	LMR - 9	
Living Marine Resources	MPA design and evaluation, including goals and design criteria, monitoring, and using hydrodynamic models for decisions about locations and sizes	Evaluate effectiveness (e.g. pre-designation baseline, reference comparisons, time-series monitoring, well designed studies of cause and effect)	LMR - 12	
Oceanographic Regime	Changing distribution and abundance of organisms and habitats			
Stresses	Wildlife health, including diseases	Identify indicators of stress	Stress-17,18	
Threat/End. & Terr Res	Recovery of critically endangered species	Determination of predation rates on green sea turtle hatchlings in near shore, beach, and pelagic habitats	Threatened-15	
Threat/End. & Terr Res	Ability to detect change that requires management action	Long-term demographic data	Threatened-5	
Threat/End. & Terr Res	Recovery of critically endangered species	Characterization of monk seal prey population	Threatened-16	
Threat/End. & Terr Res	Invasive species	Pathogens	Threatened-10	
Monitoring: Living Resources / Anthropogenic Influences				
Damage Asses./Rest	Marine debris – organisms (entanglements, ingestibles and habitat)	Quantification of impacts (particularly endangered and protected species)	Damage-1,3	
Damage Asses./Rest	Marine debris – organisms (entanglements, ingestibles and habitat)	Linkage of source, size, and type to impact	Damage-1,3	
Damage Asses./Rest	Marine debris – organisms (entanglements, ingestibles and habitat)	Degradation time period and fate of types of debris	Damage-1,3	

Topic		Issue of Concern	Information Need	Strategies
	Damage Asses./Rest	Marine debris – organisms (entanglements, ingestibles and habitat)	Cascaded effects of marine debris on the entire ecosystem (trophic interaction)	Damage-1,3
	Damage Asses./Rest	Alien species - terrestrial and marine	Long-term monitoring	
	History/Archaeology	Environmental threat from Heritage vessels		
	Living Marine Resources	Evaluation of secondary impacts of research on marine living resources		
	Living Marine Resources	Evaluate the impact of humans on the ecosystems		
	Oceanographic Regime	Chronic anthropogenic effects		
	Stresses	Debris impacts, including fishing and non-fishing debris	Impact of debris, focusing on quantification of existing data over qualitative assessment	Stress-10
	Stresses	Impacts of vessels, including transiting vessels such as cruise ships	Evaluate impacts by types	Stress-7
	Stresses	Impacts of fishing, legal and illegal	Habitat and community impacts caused by various fishing (e.g., anchor damage, interactions with endangered and threatened species, by-catch)	Stress-14
	Stresses	Impacts of terrestrial and marine alien or invasive species	Determine ecosystem consequences of various types of alien and invasive spp.	Stress-5
	Stresses	Impacts of research activities	Characterize impacts by type	
	Stresses	Impacts of terrestrial and marine alien or invasive species	Distinguish natural range extensions from unnatural invasions	
	Stresses	Wildlife health, including diseases	Identify contaminant effects thresholds for selected biota.	
	Threat/End. & Terr Res	Human impacts	Assessing potential impacts of human activities	Threatened-8
	Threat/End. & Terr Res	Human impacts	Characterization of unknown impacts	Threatened-7
	Threat/End. & Terr Res	Human impacts	Efficacy of prevention and mitigation options	Threatened-7
	Threat/End. & Terr Res	Human impacts	Impacts on the ecosystem	
	Threat/End. & Terr Res	Human impacts	Impacts on native species	
	Threat/End. & Terr Res	Invasive species	Impacts of invasive species on the ecosystem	
	Threat/End. & Terr Res	Invasive species	Impact of invasive species on native species	Threatened-12
Monitoring: Water-Atmosphere				
	Damage Asses./Rest	Extreme oceanographic atmospheric events	Long-term oceanographic monitoring	
	Oceanographic Regime	Effects of episodic natural effects	Rapid response documentation and monitoring (remote and in situ)	Ocean - 5
	Stresses	Natural stressors and climate change	Characterize types of natural stressors; their baselines and temporal and spatial variations	Stress-1,2
	Threat/End. & Terr Res	Ability to detect change that requires management action	Long-term physical/environmental data	Threatened-1
Monitoring: Water Atmosphere / Anthropogenic Influences				
	History/Archaeology	Environmental threat from Heritage vessels		
	Living Marine Resources	Evaluate the impact of humans on the ecosystems		
	Oceanographic Regime	Chronic anthropogenic effects		
	Stresses	Impacts of vessels, including transiting vessels such as cruise ships	Evaluate impacts by types	Stress-7
	Stresses	Impacts of terrestrial and marine alien or invasive species	Determine ecosystem consequences of various types of alien and invasive spp.	Stress-5
	Stresses	Impacts of research activities	Characterize impacts by type	
	Stresses	Natural stressors and climate change	Assess anthropogenic effects that exacerbate natural impacts	Stress-1
	Threat/End. & Terr Res	Human impacts	Assessing potential impacts of human activities	Threatened-8
	Threat/End. & Terr Res	Human impacts	Characterization of unknown impacts	Threatened-7
	Threat/End. & Terr Res	Human impacts	Impacts on the ecosystem	
	Threat/End. & Terr Res	Invasive species	Impacts of invasive species on the ecosystem	Threatened-12

Topic	Issue of Concern	Information Need	Strategies
Monitoring: Water-Atmosphere / Habitat			
Damage Asses./Rest	Extreme oceanographic atmospheric events	Secondary anthropogenic (shipwreck movement and discharge) and natural (boulder movement) impacts	
Oceanographic Regime	Effects of episodic natural effects	Grain size analysis to determine frequency of energy changes (i.e., storm events)	Ocean - 5
Monitoring: Water-Atmosphere / Living Resources			
Damage Asses./Rest	Extreme oceanographic atmospheric events	Relationship of climatic effects to coral bleaching	
Damage Asses./Rest	Extreme oceanographic atmospheric events	Understanding NWHI coral bleaching	
Oceanographic Regime	Effects of episodic natural effects	Long term monitoring of physical and biological indicators	
Oceanographic Regime	Impacts of climate change	Long term monitoring of physical and biological indicators	Ocean - 4
Stresses	Natural stressors and climate change	Identify species that are appropriate indicators of stresses	Stress-1
Tools: Definitions			
Living Marine Resources	MPA design and evaluation, including goals and design criteria, monitoring, and using hydrodynamic models for decisions about locations and sizes	Define goals for MPAs (biodiversity conservation, fisheries rehabilitation, threatened and endangered spp protection, habitat rehabilitation, fisheries enhancement, etc.)	LMR - 2
Tools: Information Management			
Habitat Delineation	Data synthesis (old and new), including metadata	Historical data on distribution of habitats	Habitat - 13
Habitat Delineation	Data synthesis (old and new), including metadata	Infrastructure and funding to support data synthesis	Habitat - 11
Habitat Delineation	Data synthesis (old and new), including metadata	Metadata - evaluation of content and quality	Habitat - 13
Habitat Delineation	Data synthesis (old and new), including metadata	Development of data standards	Habitat - 12
Habitat Delineation	Data synthesis (old and new), including metadata	Identifying data gaps	Habitat - 13
Habitat Delineation	Baseline data for habitat monitoring	Database infrastructure	Habitat - 11
Living Marine Resources	Making data (historical and future) available and complementary		
Living Marine Resources	MPA design and evaluation, including goals and design criteria, monitoring, and using hydrodynamic models for decisions about locations and sizes	Existing data and information (historical) that can be used in MPA design	
Tools: Prevention and Mitigation			
Comm/Rec Uses	Past and future recreational use (consumptive and nonconsumptive): understanding scale and impacts	Development of harvest control strategies with appropriate biological	ComRec - 6
Damage Asses./Rest	Marine debris – habitat damage	Development of enforcement regulations	Damage-1,3
Stresses	Impacts of vessels, including transiting vessels such as cruise ships	Identify and evaluate prevention and mitigation methods, including penalty schedule based on habitat valuation.	Stress-8
Stresses	Debris impacts, including fishing and non-fishing debris	Identify and evaluate methods of mitigation	Stress-11
Stresses	Impacts of terrestrial and marine alien or invasive species	Identify and evaluate prevention and mitigation alternatives	Stress-4,6
Stresses	Impacts of research activities	Identify prevention and mitigation measures	
Stresses	Impacts of terrestrial and marine alien or invasive species	Identify early warning/detection alternatives	
Stresses	Wildlife health, including diseases	Identify detection, prevention and mitigation measures	Stress-17
Threat/End. & Terr Res	Invasive species	Methods of prevention of invasive species	Threatened-11
Threat/End. & Terr Res	Invasive species	Methods of control of invasive species	Threatened-14
Threat/End. & Terr Res	Invasive species	Methods of eradication of invasive species	Threatened-11
Threat/End. & Terr Res	Recovery of critically endangered species	Translocation methods	Threatened-17

Topic	Issue of Concern	Information Need	Strategies
Tools: Technology			
Comm/Rec Uses	Fusion of science with existing fisheries (onboard observers, better collection and analysis of fishery data, characterization of catch)		
Comm/Rec Uses	Understanding changes in fishing technology on standard assessments (e.g., CPUE)		
Damage Asses./Rest	Vessel traffic and operations (lights, discharges of pollution, alien species, anchor damage, etc)	Best management practices for ship ops (protocols for managing light, discharges, wildlife interactions, etc.)	Damage-5
Habitat Delineation	Threats to habitats (e.g., vessel traffic and activities, toxic chemicals)	Surveillance technology for enforcement	
History/Archaeology	Preservation/protection/enforcement (lack of management presence)	Evaluation of "technology" available to track visitation	
Use: Anthropogenic Influences			
Comm/Rec Uses	Past and future recreational use (consumptive and nonconsumptive): understanding scale and impacts	Characterization of recreational consumptive and nonconsumptive use	ComRec - 6
Comm/Rec Uses	Monitoring and enforcement of existing fisheries	Vessel traffic and activity reporting requirements	ComRec - 7
Comm/Rec Uses	Threat assessment of vessel traffic impacts (e.g., cruise ships, fishing, aquarium trade)	Vessel traffic and activity report requirements (type, location, time)	ComRec - 7
Comm/Rec Uses	Past and future recreational use (consumptive and nonconsumptive): understanding scale and impacts	Analysis of impacts of recreational consumptive and nonconsumptive use	ComRec - 6
Comm/Rec Uses	Monitoring and enforcement of existing fisheries	Vessel traffic monitoring (location, activity) by VMS, observers, etc.	ComRec - 7
Comm/Rec Uses	Threat assessment of vessel traffic impacts (e.g., cruise ships, fishing, aquarium trade)	Characterize threats from vessels and activities (e.g., human presence, research, effluents, species introductions)	ComRec - 7
Comm/Rec Uses	Past and future recreational use (consumptive and nonconsumptive): understanding scale and impacts	Survey interest levels in future use	ComRec - 6
Comm/Rec Uses	Monitoring and enforcement of existing fisheries	Estimates of CPUE of harvested species	ComRec - 8
Comm/Rec Uses	Threat assessment of vessel traffic impacts (e.g., cruise ships, fishing, aquarium trade)	Magnitude of extraction on individual species and ecosystem structure	ComRec - 8
Comm/Rec Uses	Monitoring and enforcement of existing fisheries	Analysis of records of fishing violations in NWHI	
Comm/Rec Uses	Threat assessment of vessel traffic impacts (e.g., cruise ships, fishing, aquarium trade)	Impacts of fishing gear	ComRec - 8
Comm/Rec Uses	Threat assessment of vessel traffic impacts (e.g., cruise ships, fishing, aquarium trade)	Response of species to fishing pressure	ComRec - 8
Comm/Rec Uses	Monitoring and enforcement of existing fisheries	Characterize commercial catch (species, size, number, pop. structure)	ComRec - 8
Comm/Rec Uses	Threat assessment of vessel traffic impacts (e.g., cruise ships, fishing, aquarium trade)	Characterize non-permitted fishing by foreign and domestic vessels	ComRec - 8
Comm/Rec Uses	Monitoring and enforcement of existing fisheries	Analysis of potential recreational uses (preemptive analysis)	
Comm/Rec Uses	Monitoring and enforcement of existing fisheries	Retrospective analysis of catch data (e.g., black pearl)	ComRec - 8
Damage Asses./Rest	Oil sources (terrestrial and marine)		
Damage Asses./Rest	Human visitation - terrestrial or shallow water areas		
Damage Asses./Rest	Vessel groundings (non-oil spill impacts)		
Damage Asses./Rest	All sources of hazmat (non-oil)		
Damage Asses./Rest	Military operations		
Damage Asses./Rest	Alien species - terrestrial and marine	Potential vector sources	Damage-3,4,6
Damage Asses./Rest	Vessel traffic and operations (lights, discharges of pollution, alien species, anchor damage, etc)	Vessel activity (number, frequency, destination, anchorage and identification of vessels, cargo, discharges, missions, no. of people)	Damage-5
Damage Asses./Rest	Vessel traffic and operations (lights, discharges of pollution, alien species, anchor damage, etc)	Fishing (collateral or recreational fishing by crew - not ship's mission - this can refer to a fishing vessel)	

Topic		Issue of Concern	Information Need	Strategies
	Damage Asses./Rest	Vessel traffic and operations (lights, discharges of pollution, alien species, anchor damage, etc)	Ship traffic and source quantities (reporting)	Damage-5
	Habitat Delineation	Threats to habitats (e.g., vessel traffic and activities, toxic chemicals)	Vessel traffic and activities	Habitat - 5
	Habitat Delineation	Threats to habitats (e.g., vessel traffic and activities, toxic chemicals)	Toxics, hazardous waste, unexploded ordnance	Habitat - 3
	Habitat Delineation	Threats to habitats (e.g., vessel traffic and activities, toxic chemicals)	Vessel groundings	Habitat - 5
	Habitat Delineation	Threats to habitats (e.g., vessel traffic and activities, toxic chemicals)	Tourism, particularly cruise ships (locations and activities)	Habitat - 5
	Habitat Delineation	Threats to habitats (e.g., vessel traffic and activities, toxic chemicals)	Marine debris	Habitat - 5
	Habitat Delineation	Threats to habitats (e.g., vessel traffic and activities, toxic chemicals)	Military activities	
	Habitat Delineation	Threats to habitats (e.g., vessel traffic and activities, toxic chemicals)	Fishing activities	Habitat - 4
	Habitat Delineation	Threats to habitats (e.g., vessel traffic and activities, toxic chemicals)	Research activities	Habitat - 5
	Stresses	Impacts of vessels, including transiting vessels such as cruise ships	Characterize types, sources, frequencies, intensity and distribution	Stress-7
	Stresses	Impacts of fishing, legal and illegal	Characterize allowable types, sources, intensity and distribution (bottomfish, recreational fishing, pelagic longline, lobsters, trolling, handline)	
	Stresses	Impacts of research activities	Characterize types, locations, and durations	
	Stresses	Impacts of fishing, legal and illegal	Characterize poaching types (lobster, live fish, pelagic, aquarium trade), sources, intensity and distribution	Stress-15
	Threat/End. & Terr Res	Human impacts	Inventory of human activity by time/location	Threatened-6
Use: Prevention and Mitigation				
	Comm/Rec Uses	Threat assessment of vessel traffic impacts (e.g., cruise ships, fishing, aquarium trade)	Analysis of violations in NWHI and in other regions	ComRec - 7
	Comm/Rec Uses	Monitoring and enforcement of existing fisheries	Map delineating jurisdictional boundaries	ComRec - 7
	Comm/Rec Uses	Monitoring and enforcement of existing fisheries	Cost effectiveness of enforcement measures	ComRec - 7
	Comm/Rec Uses	Threat assessment of vessel traffic impacts (e.g., cruise ships, fishing, aquarium trade)	Source and mitigation of marine debris	
Use: Socioeconomic				
	Comm/Rec Uses	Establishing social and economic baselines for NWHI		
	Comm/Rec Uses	Impacts of socio-economic activities in NWHI and relation to MHI		
	Comm/Rec Uses	Evaluating the efficacy of management actions (spatial management)	Socioeconomic assessment of management actions	
	Comm/Rec Uses	Impacts of NWHI regulation on main Hawaiian Islands	Socioeconomic assessment of management actions	
	Comm/Rec Uses	Utilizing management results from NWHI to better manage MHI	Socioeconomic assessment of management actions	
	Comm/Rec Uses	Past and future recreational use (consumptive and nonconsumptive): understanding scale and impacts	Analysis of potential economic impacts of non-commercial uses	ComRec - 6
	Living Marine Resources	MPA design and evaluation, including goals and design criteria, monitoring, and using hydrodynamic models for decisions about	Identify existing uses and potential conflicts (including socio-economic and cultural)	
Other: Duplicative				
	Living Marine Resources	Long term monitoring of natural and human-caused variation at relevant spatial and temporal scales.	Spatial and temporal variation of key taxa and indicator spp (abundance, distribution, population size distribution, recruitment, reproduction, community structure, biodiversity, health/condition/disease, habitat and water quality, human uses and activities)	LMR - 9
Other: Management				
	Comm/Rec Uses		Lobster fishery closure - clarification of Executive Order	
	History/Archaeology	Archaeological/historical resources and must be a resource management priority	Assessment of existing priority status (e.g. management plans, etc.)	History-4

Topic		Issue of Concern	Information Need	Strategies
History/Archaeology	Lack of coordination between natural scientists and social scientists in surveys, mapping	Identify potential for cross-disciplinary training of survey personnel	History-2	
History/Archaeology	Preservation/protection/enforcement (lack of management presence)	Ranking of priorities		
History/Archaeology	Preservation/protection/enforcement (lack of management presence)	Review of enforcement needs vs. capabilities	History-7	
History/Archaeology	Public interpretation and education	Identify linkage to ecosystem management		
History/Archaeology	Preservation/protection/enforcement (lack of management presence)	Management plan		
Living Marine Resources	MPA design and evaluation, including goals and design criteria, monitoring, and using hydrodynamic models for decisions about	Evaluate enforcement (viability, clarity of boundaries, commitment, resources)		
Oceanographic Regime	Acute anthropogenic effects	Contingency plan development		
Other: Outreach				
Cultural Heritage	Create sense of place			
Cultural Heritage	Communication/outreach			
History/Archaeology	Possible negative impacts to ecosystem management of publicity on potential spectacular finds			
History/Archaeology	Public interpretation and education	Identify outreach audience and venues/opportunities	History-5	
History/Archaeology	Public interpretation and education	Opportunities/locations for exhibits		
History/Archaeology	Public interpretation and education	Overview of existing outreach/education programs		
History/Archaeology	Public interpretation and education	Identify appropriate partners		
History/Archaeology	Public interpretation and education	Identify public current understanding and interest in the NWHI		
Other: Policy				
Comm/Rec Uses	Lack of clear, ecosystem-based definitions of conservation, management, and sustainable yield			
Cultural Heritage	Cultural issues often do not fit well into government framework			
Cultural Heritage	Politics: how to ensure native Hawaiian issues will be part of mgmt/action plan	Identify how Native Hawaiians want to be involved	Cultural-5	
Cultural Heritage	Full participation of NH in the "process" of management	Identify ways that other government include native cultures in decision-making process	Cultural-7	
Cultural Heritage	Developing an effective cultural science program	Training for natural resource managers	Cultural-1	
Cultural Heritage	Respect & promote native Hawaiian sense of place, values, rights & responsibilities in NWHI; accessibility; connectivity; lineal	Identify appropriate avenues for demonstrating respect and promotion of these concepts	Cultural-4	
Cultural Heritage	Politics: how to ensure native Hawaiian issues will be part of mgmt/action plan	Process to identify and include Native Hawaiian communities in process	Cultural-6	
Cultural Heritage	Respect & promote native Hawaiian sense of place, values, rights & responsibilities in NWHI; accessibility; connectivity; lineal	Identify ways that other governments respect and promote...	Cultural-7	
Cultural Heritage	Politics: how to ensure native Hawaiian issues will be part of mgmt/action plan	How to ensure Native Hawaiian rights/responsibilities receive equal or more structural/procedural recognition with respect to management of the Reserve		
Cultural Heritage	Developing an effective cultural science program	How government/groups are "persuading" government to support this with funds	Cultural-3	
Cultural Heritage	Politics: how to ensure native Hawaiian issues will be part of mgmt/action plan	Coordination of Native Hawaiian issues across multiple jurisdictions (e.g. terrestrial/USFWS)		
History/Archaeology	Position of social science in NWHI			
History/Archaeology	Issue of jurisdiction (e.g. Federal, State) and what laws apply/coordination			

Appendix II: Workshop Participants

Workshop Participants (111)

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Appendix III: Stresses

The following list of actual and potential stresses to the resources of the NWHI was developed by the Stresses on Living Resources working group at the May 2003 workshop. This step was not part of the original workshop process and the Stresses working group was the only group to take this approach. The result is an efficient method to determine issues of concern and information needs, and develop strategies regarding a very broad range of stresses.

The working group determined that issues of concern, information needs, and strategies to address these are relatively common across many stresses and that addressing these for each stress would be redundant. To avoid this and streamline their task, the group first established a master list of actual and potential stresses. The group then focused on the issues of concern, information needs, and strategies for these stresses in general terms such that for any stress identified in this table, the appropriate issues, needs, and strategies could be found in the workshop results.

Stresses Identified: Listed by ranked importance within issue of concern	
Rank	Source
1	Impacts of fishing, legal and illegal
1	Pelagic longline – Distant
2	Poaching
3	Lobsters
4	Bottom-fish
5	Aquarium trade
6	Pelagic trolling
7	Precious coral
7	Cultural subsistence fishing
8	Live fish (for food)
9	Recreational fishing
9	Artisanal
10	Squid jigging
10	Pearl oysters
2*	Sources & vectors of terrestrial & marine invasive & alien species
1	Fishing boats
2	Ecotourists, Ecotourist vessels
2	Cargo containers, personal gear
2	Grounded vessels
3	Research vessels/researchers /people
4	Marine debris
5	Cruise ships

Information Needs for Conservation Science and Management of the NWHI

5	Trespassers
6	Research activities, dive gear
6	Natural: Oceanographic currents, winds, hurricanes
7	Migratory biota (Birds, mammals, fish, etc)
7	Airplanes
8	Deliberate introductions
9	Floating instruments
2*	Wildlife health, including diseases
1	Contaminants
2	Microorganisms (viruses, bacteria, fungi, plankton)
3	Oil spills
4	Trauma
5	Toxic blooms
5	Parasites
3	Natural stressors and climate change
1	Elevated temperature
2	Storms
2	Sea level rise
3	Sediment shifting
4	UV increase
4	PDO (Pacific Decadal Oscillation)
5	Winter swells/waves
6	ENSO
7	Ocean acidification
8	Tsunamis
9	Drought
9	Tidal flux
10	Abnormal calms
11	Heavy rainfall
4	Debris sources
1	Trawlers – Distant
2	Cargo ships
2	Unknown sources
3	Drift Netters
4	Cruise ships
5	DOD
6	Long-liners
7	Research vessels/researchers/activities
8	Ecotourist vessels

Information Needs for Conservation Science and Management of the NWHI

8	Recreational fishers
8	Trappers
9	Trespassers
10	Grounded vessels
5	Impacts of vessels
1	Groundings
2	Bilge discharge
3	Garbage
4	Anchor impacts
5	Sewage
5	Ballast waste
5	Derelict vessels (long-term impacts)
6	Biofouling
7	Fuel leaks
7	Vectors of invasive delivery
8	Light
9	Contaminants (e.g., photographic chemicals)
10	Noise
11	Speed and marine mammal collisions
11	Tank washing
11	Pathogens
11	Loss of cargo overboard
11	Pathogens
12	Wake effects
12	Exhaust emissions
6	Research activities that may have impact
1	Research facilities and structures (tents, etc)
2	Collections (species, dredge)
3	Bioprospecting
4	Anchoring
5	Instrumentation (buoys, markers, transect lines)
6	Monk seals
7	Sea bird
8	Atmospheric
8	Use of chemicals
8	Human waste
9	Coral reefs
9	Coring
10	Sea turtles

Information Needs for Conservation Science and Management of the NWHI

10	Acoustics (high frequency)
11	Sub-bottom (low frequency)
12	Archeological
12	Diving
13	Fish
13	Sonar
14	Seaweed
14	Shark
14	Oceanographic
15	Marine mammals (cetaceans)
15	Geological
15	Mapping
15	Submersibles/ROVs
15	Air strips, planes
* These two groups of stressors tied in the voting process to rank importance.	

Appendix IV: Map of the Area

