Finding of No Significant Environmental Impact

The National Marine Fisheries Service (NMFS), Office of Protected Resources, Permits, Conservation and Education Division has prepared the attached Environmental Assessment (EA) for eleven scientific research permits/major amendments focusing on marine mammal and sea turtle species. The proposed action area includes U.S. territorial waters and high seas of the North Pacific Ocean (including the Gulf of Alaska and Bering Sea), Arctic Ocean (including the Chukchi Sea and Beaufort Sea), Southern Ocean (including waters off Antarctica), and foreign territorial waters of Mexico (Gulf of California only), Canada, Russia, Japan and the Philippines.

NMFS proposes to issue nine scientific research permits and two major amendments to existing permits pursuant to the Marine Mammal Protection Act of 1972, as amended (MMPA; 16 U.S.C. 1361 et seq.), and the Endangered Species Act of 1973, as amended (ESA; 16 U.S.C. 1531 et seq.). The primary objectives of the proposed actions are to improve understanding of management needs by collecting information on the basic biology, ecology and stock structure of these species in the designated action area. As several requested species are listed under the ESA, information collected would be used for management needs in recovering the species to the point that they can be removed from ESA listing. Scientific research permits are generally categorically excluded from the National Environmental Policy Act of 1969 (NEPA; 42 U.S.C. 4321 et seq.) requirements to prepare an EA or environmental impact statement (EIS) (NAO 216-6). However, as the proposed actions include takes of ESA-listed species, NMFS concluded that further environmental review was warranted to determine whether significant environmental impacts could result from issuance of the proposed scientific research permits and permit amendments. Therefore, this document evaluates the relevant effects of a variety of scientific research activities on ESA-listed species in the proposed action area under several alternate permitting options.

Having reviewed the EA, I have determined that this action would not have a significant impact on the quality of the human environment. Therefore, preparation of an EIS on the action is not required by Section 102(2)(c) of the NEPA or its implementing regulations.

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William T. Hogarth, Ph.D. Date
Assistant Administrator for Fisheries, NOAA

ENVIRONMENTAL ASSESSMENT

ON THE EFFECTS OF THE ISSUANCE OF ELEVEN NATIONAL MARINE FISHERIES SERVICE PERMITTED SCIENTIFIC RESEARCH ACTIVITIES ON MARINE MAMMAL AND SEA TURTLE SPECIES IN THE U.S. TERRITORIAL WATERS AND HIGH SEAS OF THE NORTH PACIFIC OCEAN (INCLUDING THE GULF OF ALASKA AND BERING SEA), ARCTIC OCEAN (INCLUDING THE CHUKCHI SEA AND BEAUFORT SEA), SOUTHERN OCEAN (INCLUDING WATERS OFF ANTARCTICA), AND FOREIGN TERRITORIAL WATERS OF MEXICO (GULF OF CALIFORNIA ONLY), CANADA, RUSSIA, JAPAN AND THE PHILIPPINES

June 2004

Lead Agency: USDC National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Office of Protected Resources

Responsible Official: William T. Hogarth, Ph.D.
Assistant Administrator for Fisheries

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Abstract: The National Marine Fisheries Service (NMFS), Office of Protected Resources, Permits, Conservation and Education Division proposes to issue nine scientific research permits and two major amendments to existing permits for takes of several marine mammal and sea turtle species in the wild, pursuant to the Marine Mammal Protection Act of 1972, as amended (MMPA; 16 U.S.C. 1361 et seq.), and the Endangered Species Act of 1973, as amended (ESA; 16 U.S.C. 1531 et seq.). Scientific research permits are generally categorically excluded from the National Environmental Policy Act of 1969 (NEPA; 42 U.S.C. 4321 et seq.) requirements to prepare an Environmental Assessment or Environmental Impact Statement (NAO 216-6). However, the research proposed under these actions includes direct takes of ESA-listed species. Therefore, this document evaluates the relevant effects of a variety of scientific research activities on the ESA-listed species and target non-listed species requested under the proposed research in the designated action area under several permitting options.

Summary

The purpose of this Environmental Assessment (EA) is for the National Marine Fisheries Service (NMFS) to consider the potential environmental impacts of issuing, pursuant to the Marine Mammal Protection Act of 1972, as amended (MMPA, 16 U.S.C. 1361 *et seq*.), and the Endangered Species Act of 1973, as amended (ESA; 16 U.S.C. 1531 *et seq*.):

1. Nine scientific research permits to the following individuals/organizations: Andrew Szabo (file no. 1029-1675), Dena Matkin (file no. 662-1661), Ann Zoidis (file no. 1039-1699), Jan Straley (file no. 473-1700), Kate Wynne (file no. 1049-1718), Fred Sharpe (file no. 716-1705), Cynthia Tynan (file no. 1035-1688), National Marine Mammal Laboratory (NMML) (file no. 782-1719), and Southwest Fisheries Science Center (SWFSC) (file no. 774-1714).
2. Two amendments to existing scientific research permits held by Jim Darling (file no. 753-1599) and Joe Mobley (file no. 642-1536).

The primary focus of the proposed activities involves the directed taking, for scientific research purposes, of several marine mammal and sea turtle species. The proposed action area includes U.S. territorial waters and high seas of the North Pacific Ocean (including the Gulf of Alaska and Bering Sea), Arctic Ocean (including the Chukchi Sea and Beaufort Sea), Southern Ocean (including waters off Antarctica), and foreign territorial waters of Mexico (Gulf of California only), Canada, Russia, Japan and the Philippines. Although the proposed activities also involve research on non-ESA listed species (see Appendix E for a complete list of species), the primary focus of the research is on ESA-listed marine mammal and sea turtle species. For large whale species these ESA-listed species include: humpback whales (*Megaptera novaeangliae*), blue whales (*Balaenoptera musculus*), fin whales (*Balaenoptera physalus*), sei whales (*Balaenoptera borealis*), North Pacific right whales (*Eubalaena japonica*), bowhead whales (*Balaena mysticetus*) and sperm whales (*Physeter macrocephalus*). Proposed activities also include takes of the Vaquita/Gulf of California Harbor Porpoise (*Phocoena sinus*) and incidental harassment of the ESA-listed Steller sea lion (*Eumetopias jubatus*). (Although research is not directed at the Steller sea lion, three of the proposed permits cover takes for incidental harassment of this species during killer whale (*Orcinus orca*) predation studies.) In addition, the SWFSC application requests takes for the following ESA-listed sea turtle species: Olive ridley *(Lepidochelys olivacea),* Green *(Chelonia midas),* Leatherback *(Dermochelys coriacea),* Hawksbill *(Eretmochelys imbricata),* Loggerhead *(Caretta caretta),* and Kemp's Ridley *(Lepidochelys kempii).* The SWFSC permit application also includes a request to import dead parts from the Flatback sea turtle *(Natator depressus)* native to Australia. All new permit and permit amendment actions noted in #1 and #2 above, if issued, would authorize the proposed research over a five-year period starting from the date of permit or permit amendment approval.

It is important to note that none of the research activities under the proposed action fall within the realm of public controversy. This is evidenced by the fact that: (1) none of the public comment periods for the proposed permits or amendments resulted in the submission of comments of concern from the public or reviewers; and (2) researchers would be using common and professionally accepted research protocols. Specifically in regards to tagging and genetic

sampling of cetacean calves, there would be no takes of large whale calves less than six months of age or females attending such calves, no takes of Northern right whale calves of any age, and except for skin swabbing of beluga whale calves and mothers (requested under file no. 782-1719), no takes of small cetacean calves less than one year of age. In addition, only one proposed permit action (NMML, file no. 782-1719) contains a request for accidental mortality of research animals, specifically beluga whales (*Delphinapterus leucas)* during capture, handling, and release activities (see page 47). However, additional mitigation measures would be included in this permit, if issued, to decrease the potential for accidental mortalities of research animals and NMFS authorization for accidental mortalities during these capture operations is not uncommon (see Sections 4 and 5).

In addition to the above, two of the proposed permit actions (Darling, file no. 753-1599-01 and Sharpe, file no. 716-1705) include playback experiments to explore humpback whales' ability to discriminate among various humpback whale vocalizations. During these playback experiments, whales would be exposed to playbacks of pre-recorded humpback whale songs, social sounds, and feeding calls at a maximum source level of 155 dB re 1 μPa at 1 m. Whales would also be exposed to synthesized sounds similar in frequency and average source level to normal humpback whale sounds, and to playback of blank tapes as a control. No playbacks of any sounds would exceed a maximum source level of 155 dB re 1 μPa at 1 m, which is below the maximum source levels estimated for vocalizing humpback whales. A detailed account of the proposed experiments and an analysis of their effects can be found beginning on page 35.

The National Environmental Policy Act of 1969 (NEPA; 42 U.S.C. 4321 *et seq*.), the Council on Environmental Quality's (CEQ) regulations at 40 C.F.R. Section 1508.27 and the NOAA Administrative Order 216-6 (NAO 216-6) require that NMFS make an initial determination as to whether the proposed activities are categorically excluded from further environmental impact review, or whether the preparation of an EA or Environmental Impact Statement (EIS) is necessary. Scientific research and enhancement permits are generally categorically excluded since, as a class, they do not have a significant effect on the human environment (NOAA Administrative Order Series 216-6, May 20, 1999). However, when a proposed action that would otherwise be categorically excluded is the subject of public controversy based on potential environmental consequences, has uncertain environmental impacts or unknown risks, establishes a precedent or decision in principle about future proposals, may result in cumulatively significant impacts, or may have an adverse effect upon ESA-listed species or their habitats, preparation of an EA or EIS is required. In this case, an EA has been prepared as portions of the proposed research activities focus on ESA-listed species, and NMFS must fully examine potential adverse effects on all ESA-listed species and target non-listed species in the proposed action.

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ENVIRONMENTAL ASSESSMENT

ON THE EFFECTS OF THE ISSUANCE OF ELEVEN NATIONAL MARINE FISHERIES SERVICE PERMITTED SCIENTIFIC RESEARCH ACTIVITIES ON MARINE MAMMAL AND SEA TURTLE SPECIES IN THE U.S. TERRITORIAL WATERS AND HIGH SEAS OF THE NORTH PACIFIC OCEAN (INCLUDING THE GULF OF ALASKA AND BERING SEA), ARCTIC OCEAN (INCLUDING THE CHUKCHI SEA AND BEAUFORT SEA), SOUTHERN OCEAN (INCLUDING WATERS OFF ANTARCTICA), AND FOREIGN TERRITORIAL WATERS OF MEXICO (GULF OF CALIFORNIA ONLY), CANADA, RUSSIA, JAPAN AND THE PHILIPPINES

SECTION 1 PURPOSE OF AND NEED FOR ACTION

1.1 Proposed Action

The National Marine Fisheries Service (NMFS) proposes to issue, pursuant to the Marine Mammal Protection Act of 1972, as amended (MMPA; 16 U.S.C. 1361 *et seq*.), and the Endangered Species Act of 1973, as amended (ESA; 16 U.S.C. 1531 *et seq*.): (1) nine scientific research permits to the following individuals/organizations: Andrew Szabo (file no. 1029-1675), Dena Matkin (file no. 662-1661), Ann Zoidis (file no. 1039-1699), Jan Straley (file no. 473-1700), Kate Wynne (file no. 1049-1718), Fred Sharpe (file no. 716-1705), Cynthia Tynan (file no. 1035-1688), National Marine Mammal Laboratory (NMML) (file no. 782-1719), and Southwest Fisheries Science Center (SWFSC) (file no. 774-1714).; and (2) two major amendments to existing scientific research permits held by Jim Darling (file no. 753-1599) and Joe Mobley (file no. 642-1536). The primary focus of the proposed activities involves the directed taking, for scientific research purposes, of several marine mammal and sea turtle species. The proposed action area includes U.S. territorial waters and high seas of the North Pacific Ocean (including the Gulf of Alaska and Bering Sea), Arctic Ocean (including the Chukchi Sea and Beaufort Sea), Southern Ocean (including waters off Antarctica), and foreign territorial waters of Mexico (Gulf of California only), Canada, Russia, Japan and the Philippines. Although the proposed activities also involve research of non-ESA listed species, the primary focus of the research is on ESA-listed marine mammal and sea turtle species. For large whale species these ESA-listed species include: humpback whales (*Megaptera novaeangliae*), blue whales (*Balaenoptera musculus*), fin whales (*Balaenoptera physalus*), sei whales (*Balaenoptera borealis*), North Pacific right whales (*Eubalaena japonica*), bowhead whales (*Balaena mysticetus*) and sperm whales (*Physeter macrocephalus*). Proposed activities also include takes of the Vaquita/Gulf of California Harbor Porpoise (*Phocoena sinus*) and incidental harassment of incidental harassment of the ESA-listed Steller sea lion (*Eumetopias jubatus*). Although research is not directed at the Steller sea lion, three of the proposed permits cover takes for incidental harassment of this species during killer whale (*Orcinus orca*) predation studies. In addition, the SWFSC application requests takes for the following ESA-listed sea turtle species: Olive ridley *(Lepidochelys olivacea),* Green *(Chelonia midas),* Leatherback *(Dermochelys coriacea),* Hawksbill *(Eretmochelys imbricata),* Loggerhead *(Caretta caretta),* and Kemp's Ridley *(Lepidochelys kempii)*. The SWFSC permit application also includes a request to import

dead parts from the Flatback sea turtle *(Natator depressus)* native to Australia. All new permit and permit amendment actions noted in #1 and #2 above, if issued, would authorize the proposed research over a five-year period starting from the date of issuance of permit or permit amendment approval. Section 1.1 of this Environmental Assessment (EA) provides more detailed descriptions of the proposed action.

It is important to note that none of the research activities under the proposed action fall within the realm of public controversy. This is evidenced by the fact that: (1) none of the public comment periods for the proposed permits or amendments resulted in the submission of comments of concern from the public or reviewers; and (2) researchers would be using common and professionally accepted research protocols. Specifically in regards to tagging and genetic sampling of cetacean calves, there would be no takes of large whale calves less than six months of age or females attending such calves, no takes of Northern right whale calves of any age, and except for skin swabbing of beluga whale calves and mothers (requested under file no. 782-1719), no takes of small cetacean calves less than one year of age. In addition, only one proposed permit action (NMML, file no. 782-1719) contains a request for accidental mortality of research animals, specifically beluga whales (*Delphinapterus leucas)* during capture, handling, and release activities (see page 47). However, additional mitigation measures would be included in this permit, if issued, to decrease the potential for accidental mortalities of research animals and NMFS authorization for accidental mortalities during these capture operations is not uncommon (see Sections 4 and 5).

In addition to the above, two of the proposed permit actions (Darling, file no. 753-1599-01 and Sharpe, file no. 716-1705) include playback experiments to explore humpback whales' ability to discriminate among various humpback whale vocalizations. During these playback experiments, whales would be exposed to playbacks of pre-recorded humpback whale songs, social sounds, and feeding calls at a maximum source level of 155 dB re 1 μPa at 1 m. Whales would also be exposed to synthesized sounds similar in frequency and average source level to normal humpback whale sounds, and to playback of blank tapes as a control. No playbacks of any sounds would exceed a maximum source level of 155 dB re 1 μPa at 1 m, which is below the maximum source levels estimated for vocalizing humpback whales. A detailed account of the proposed experiments and an analysis of their effects can be found beginning on page 35.

NMFS has permitted research activities in the proposed action area on the requested species, including 23 active scientific research permits. Of the eleven proposed permit actions considered under this EA, five involve the renewal of research from previously issued but expiring permits, two involve major amendments to currently active permits, and four involve the issuance of new permits to researchers that have not previously held a permit covering the proposed research (although all have worked under the supervision of experienced marine mammal researchers or under other NMFS scientific research permits). Although each permit or major amendment by itself would not likely lead to reduced fitness of any ESA-listed species in the affected action area, the sum of the authorized takes relative to the population sizes and the potential for repeated incidents of harassment per animal is of concern. Portions of the proposed action, such as aerial surveys, photo-identification and behavioral observation, would be expected to have a de minimis effect on ESA-listed species. Therefore, this EA seeks to analyze

any potential cumulative effects from this proposed research on ESA-listed species and target non-listed species.

1.2 Description of Proposed Permit and Amendment Actions

The following information provides a descriptive overview of the research purposes described under the proposed action. Appendix E further specifies the take numbers per species and activities requested under the proposed permit actions.

The following five applications involve the renewal of previously permitted research.

Dena Matkin (file no. 662-1661) requests a five-year scientific research permit to continue long-term population studies of humpback whales (*Megaptera novaeangliae*), and killer whales (*Orcinus orca*) in waters off Alaska. Following a killer whale predation event, the applicant also requests authorization to collect dead prey parts of the ESA-listed humpback whale and Steller sea lion (*Eumetopias jubatus*) and the following non-ESA listed cetacean and pinniped species: minke whales (*Balaenoptera acutorostrata*), harbor porpoise (*Phocoena phocoena*), Dall's porpoise (*Phocoenoides dalli*), harbor seals (*Phoca vitulina*), gray whales (*Eschrichtius robustus*), Pacific white-sided dolphins (*Lagenorhynchus obliquidens*), and Northern fur seals (*Callorhinus ursinus*). In addition, takes of live Steller sea lions (*Eumetopias jubatus*) are requested by harassment incidental to killer whale predation studies. This research has been previously authorized under NMFS Permit No. 662-1345 that expired on May 31, 2003.

Janice Straley (file no. 473-1700) requests a five-year scientific research permit to continue collecting: (1) long-term population data on humpback whales and fin whales (*Balaenoptera physalus*), (2) predation data on killer whales, and (3) depredation by sperm whales (*Physeter catodon*) on target fishery catch (longline fishing gear). Research would take place in waters off Alaska. Directly following killer whale predation events, the applicant requests authorization to collect dead parts of the ESA listed Steller sea lion and the following non-ESA listed cetacean and pinniped species: minke whales, harbor porpoise, Dall's porpoise, harbor seals, gray whales, Pacific white-sided dolphins, and Northern fur seals. In addition, takes of live Steller sea lions are requested by harassment incidental to killer whale predation studies. This research was previously authorized under NMFS Permit No. 473-1433-04 that expired on November 30, 2003.

Fred Sharpe (file no. 716-1705) requests a five-year permit to continue studies that examine the behavior and social structure of social foraging humpback whale groups through the use of photo-identification, behavioral observation, acoustic and video recording, playbacks and tagging. In addition, the applicant also requests takes of non-ESA listed killer whale. Research would take place in the waters off Alaska. Identification photographs would also be opportunistically taken in waters off Washington, as this is where the research vessel spends the winters. This research is currently authorized under NMFS Permit No. 716-1456 that expires on June 30, 2004.

National Marine Mammal Laboratory (NMML) (file no. 782-1719) requests a five-year scientific research permit to continue population assessment studies of various cetacean species throughout the U.S. territorial waters and high seas of the North Pacific Ocean (including the Gulf of Alaska and Bering Sea), Southern Ocean (including Antarctic waters), Arctic Ocean (including the Chukchi Sea and Beaufort Sea), and the foreign territorial waters of the Gulf of California (Mexico), Canada, Russia, Japan and Philippines. Takes are requested through a variety of research activities, including aerial and vessel surveys, photo-identification, behavioral observation, acoustic recording, tagging, biopsy sampling, capture/handling of beluga whales (*Delphinapterus leucas*), and incidental harassment. This permit request was previously included under permit no. 782-1438 (expiration date June 30, 2004) and permit no. 782-1510-02 (expiration date June 30, 2004). Permit no. 782-1510-02 is incorporated in the new proposed permit no. 782-1719.

Southwest Fisheries Science Center (SWFSC) (file no. 774-1714) requests a five-year scientific research permit to conduct pinniped, cetacean and sea turtle studies. The studies are to: (1) conduct population assessments for northern elephant seals (*Mirounga angustirostris*), California sea lions (*Zalophus californianus*), Steller sea lions, harbor seals, and northern fur seals to determine abundance, distribution patterns, length frequencies, and breeding densities, (2) determine the abundance, distribution, movement patterns, and stock structure of ESA-listed cetaceans, including bowhead whales (*Balaena mysticetus*), sei whales, blue whales, fin whales, Southern right whales, Northern right whales (*Eubalaena japonica*), and sperm whales in U.S. and international waters (currently authorized under NMFS Permit No. 774-1437 that expires on June 30, 2004), and (3) determine the abundance, distribution, movement patterns, stock structure and diet of marine turtles including Olive ridley (*Lepidochelys olivacea*), Green (*Chelonia midas*), leatherback (*dermochelys coriacea*), hawksbill (*Eretmochelys imbricata*), and loggerhead (*Caretta caretta*) in U.S. and international waters of the North Pacific and Southern Ocean. The SWFSC permit application also includes a request to import dead parts from the Flatback sea turtle *(Natator depressus)* native to Australia. Sea turtles would be sighted and photographed for species identification and captured for one or more of the following activities: (1) measure, weigh, sex, and flipper tag (up to 450 annually), (2) collect blood samples to determine sex of juveniles and reproductive status of adults, (3) collect stomach contents by lavage to identify prey items, (4) collect tissue biopsy samples for genetic analyses of stock identification, and (5) attach satellite tags to collect movement and dive behavior data. In addition, the proposed action includes authorization to import the collected samples (blood, stomach contents and tissue biopsy samples).

The following applications involve amendments to currently authorized permits.

Jim Darling (file no. 753-1599) requests a five-year amendment to his current NMFS Permit No. 753-1599-00 to continue testing hypothesized predictions about song function and quantify observations of song related to behavior patterns. Humpback whale song and control sounds would be played at levels to replicate the volume and quality of natural whale songs as closely as possible. Studies would be conducted on singing whales, non-singing male travelers, adult male/female pairs, and cow/calf pairs accompanied by escorts. The proposed amendment, if authorized, would continue for an additional five-year period. Research activities currently

authorized in the permit take place in waters off Hawaii, Alaska, Washington, Oregon and California and also involve the non-ESA listed gray whales. Current takes are authorized for vessel surveys, photo-identification, behavioral observation, acoustic recording, aerial photogrammetry, underwater observation, playbacks of whale songs, biopsy sampling (humpback whales only) and harassment incidental to all research activities. The Permit Holder is now requesting authorization to apply suction cup and implantable tags to humpback whales.

Joe Mobley (file no. 642-1536) requests a five-year amendment to his current NMFS Permit No. 642-1536-00 to allow tissue biopsy sampling and attachment of short-term bioacoustic suction-cup tags (B-probe) on several cetacean species in waters off Hawaii. Sampling would help to understand the population structure of various cetacean species and to assess the status, trends and potential human impacts to these species. The proposed amendment would be conducted in waters off Hawaii and, if authorized, would continue for an additional five-year period. The Permit Holder currently has authorization to conduct aerial and vessel-based surveys, behavioral observation, photo-identification, photogrammetry, and incidental harassment on humpback whales and several non-ESA listed cetacean species in waters off Hawaii.

The following four applications involve requests for first-time permits.

Andrew Szabo (file no. 1029-1675) requests a five-year scientific research permit to examine the behavior and conduct photo-identification of humpback whale mother/calf pairs on their summer feeding grounds in waters off Alaska and compare the maternal behavior of solitary and social foragers. The study would also attempt to identify differences in the early behavior of mother/calf pairs that may lead to the adoption of a particular foraging strategy in juveniles.

Ann Zoidis (file no. 1039-1699) requests a five-year scientific research permit to study sound production in humpback whales in waters off Hawaii. Takes are requested for above and below water photo-identification, behavioral observation, acoustic recording and incidental harassment. During these humpback whale studies, the applicant also requests takes of the following species: false killer whales (*Pseudorca crassidens*), pygmy killer whales (*Feresa attenuata*), short-finned pilot whales (*Globicephala macrorhynchus*), melon-headed whales (*Peponacephala electra*), bottlenose dolphin (*Tursiops truncatus*), spinner dolphins (*Stenella longirostris*), rough-toothed dolphins (*Steno bredanensis*), and spotted dolphins (*Stenella attenuata*).

Kate Wynne (file no. 1049-1718) requests a five-year permit to develop long-term sighting histories of individual humpback whales, fin whales, sperm whales, and sei whales to assess stock structure, life history parameters, feeding behaviors, social behaviors of feeding populations, and population estimates in waters off Alaska. Takes would occur by close approach for photo-identification, behavioral observation, passive acoustic recording, biopsy sampling, suction cup attachment of VHF/TDR tags, and harassment incidental to all research activities. Directly following killer whale predation events, the applicant requests authorization to continue collecting dead parts of the ESA listed Steller sea lion and the following non-ESA listed cetacean and pinniped species: minke whales, harbor porpoise, Dall's porpoise, harbor seals, gray whales, Pacific white-sided dolphins, and Northern fur seals. In addition, takes of live Steller sea lions are requested by harassment incidental to killer whale predation studies.

Cynthia Tynan (file no. 1035-1688) requests a five-year permit to conduct surveys of cetacean species in U.S. waters of the North Pacific with particular emphasis on assessing predator abundance in relation to variations in prey availability. Takes would occur by close vessel approach for shipboard line-transect surveys, photo-identification, and prey sampling using acoustic and net tows. Directed takes would occur on the following ESA-listed species: humpback whale, blue whale, fin whale, sei whale, Northern right whale, and sperm whale. Additional takes are requested for cetacean species not listed under the ESA, including: minke whale, gray whale, Baird's beaked whale (*Berardius bairdii*), Cuvier's beaked whales (*Ziphius cavirostris*), Stejneger's beaked whales (*Mesoplodon stejnegeri*), Hubb's beaked whale (*Mesoplodon carlhubbsi*), Pacific white-sided dolphins, Northern right whale dolphin (*Lissodelphis borealis*), Dall's porpoise, harbor porpoise, Risso's dolphin (*Grampus griseus*), short-finned pilot whale (*Globicephala macrorhynchus*), false killer whale (*Pseudorca crassidens*), pygmy sperm whale (*Kogia breviceps*), dwarf sperm whale (*Kogia simus*), and short-beaked common dolphin (*Delphinus capensis*).

1.3 Purpose and Need

The primary purpose of the NMFS scientific research and enhancement permitting program is to authorize takes of marine animals and/or endangered species for scientific purposes, to provide better understanding of their basic biology and ecology, and to evaluate the cause(s) of population decline in order to develop conservation and protective measures to ensure species recovery.

The need for the proposed action arises from several sources. First, NMFS has a responsibility to implement both the MMPA and ESA to conserve and recover threatened and endangered species under its jurisdiction, which includes species contained in the proposed action. The MMPA and ESA prohibit takes of threatened and endangered marine animals with only a few very specific exceptions, including for scientific research/enhancement purposes. Permit issuance criteria require that research activities are consistent with the purposes and polices of these Acts and that such activities would not have an adverse impact on the species or stocks.

A second reason for the proposed action is to gain additional information on the basic biology and ecology of endangered/threatened species in the proposed action area, with a focus on better understanding the potential adverse effects of human activities such as shipping, commercial fishing, and pollution on the species, and potential adverse modifications of their habitats from anthropogenic factors. This information is needed to establish protective measures that facilitate the continued recovery of the species and to help NMFS make science-based conservation and management decisions to protect and conserve these species and their habitats.

1.4 Related National Environmental Policy Act (NEPA) Documents

The following NEPA documents contain specific analyses relative to the proposed action and action area considered under this EA. Although the effects of close approach, biopsy sampling, and attachment of scientific instruments on marine animals under scientific research permits have been evaluated in previous EAs, associated Biological Opinions and permit annual reports, these analyses did not fully examine the synergistic or cumulative effects of all the proposed permitted research and other factors affecting individual animals and populations of the species in the proposed action area. In addition, some of the EAs were prepared more than five years ago and NMFS believes it important to evaluate the potential effects of the proposed research in consideration of any changes that may have occurred in the status of the species, the environment, or best available information on the potential effects since that time.

Environmental Assessment on the Effects of Biopsy Darting and Associated Approaches on Humpback Whales and Right Whales in the North Atlantic (NMFS 1992a). The EA was prepared in response to continued public controversy surrounding the biopsy darting of endangered cetaceans, apparent uncertainty about the effects on individual animals/populations of repeated approaches associated with the biopsy darting procedure, and the fact that several permits had previously been issued for the same procedure. Eliminating projectile biopsies from the proposed activities was designated as the No Action alternative. In addition to the Proposed Action and No Action alternatives, an "Alternative test methods" alternative was evaluated in which skin samples would only be collected non-intrusively via sloughed skin samples from free-ranging animals and biopsy samples from dead-at-sea and live/dead stranded whales. The preferred alternative was the proposed action of issuing permits to authorize projectile biopsy darting with mitigation measures intended to minimize the potential for adverse effects of the research on the whales. Finding of No Significant Impact (FONSI) was signed by the Acting Assistant Administrator for Fisheries on June 16, 1992, based on the best available information suggesting that careful approaches to whales, even repeated approaches, elicited only moderate or minimal reactions, and that most whales showed no observed change in behavior in response to biopsy darting. The alternative test methods were not chosen because the opportunistic nature of availability of sloughed skin samples from free-ranging whales and biopsy samples from dead-at-sea and live/dead stranded whales would not have fulfilled the research objectives. The No Action alternative was also found unsuitable because there was a critical management need for the genetic, pollutant, and demographic information that could only be obtained from biopsy samples.

Environmental Assessment on the Effects of Biopsy Darting, Suction Cup Tagging and Associated Approaches on Humpback Whales and Killer Whales in the Eastern North Pacific (NMFS 1994). The issues prompting preparation of the 1994 EA were the same as those stated for the 1992 EA on the effects of these activities. However, new applications for permits were received for research on species/stocks of whales that were not considered in the previous EAs. There were four alternatives considered in the EA. The No Action alternative was to deny the requests for permits, which would mean no biopsy darting of the proposed species/stocks. As with the previous EAs, the second alternative, Alternative Test Methods, involved obtaining skin

samples via collection of sloughed skin from free-ranging whales and biopsy samples from dead-at-sea and live/dead stranded whales. The third alternative was to issue the permits as requested by the applicants. The fourth alternative was to issue permits with modified techniques and special conditions intended to minimize the potential adverse effects of the research, including potential cumulative effects resulting from several researchers studying the same populations. Based on the best available information suggesting that the proposed action would have little if any short- or long-term effects on the subject whales and their populations a FONSI was signed by the Acting Assistant Administrator for Fisheries.

Environmental Assessment on the Effects of Satellite Tagging and Biopsy Darting of Large Whales (NMFS 1998a) was prepared in response to public comments received in relation to an application for a permit to biopsy sample and attach satellite tags to blue, fin, humpback, gray, right, bowhead (*Balaena mysticetus*), and sperm whales. There were three alternatives considered. The No Action alternative was to deny the permit. The second alternative was to use suction cups for tag attachment instead of implantable tags. The Acting Assistant Administrator for Fisheries signed a FONSI on the proposed action, to issue the permit as requested and with mitigation measures, on September 15, 1998. Information indicated that the reactions of whales were minimal to moderate with no long-term adverse effects.

Environmental Assessment on the Effects of Controlled Exposure of Sound on the Behavior of Various Species of Marine Mammals (NMFS 2000) was prepared in response to an application for a permit for scientific research involving exposure of marine mammals to low, mid, and high frequency sound, and in light of the high degree of public interest in acoustic experiments involving free-ranging whales. The primary research objective was to determine what characteristics of exposure to specific sounds evoke behavioral responses in marine mammals. The EA examined the environmental consequences of two alternatives: No Action (denial of the permit) and the Proposed Action (permit issuance), which included mitigation measures that would be instituted as part of the permit. The specific playback protocols examined involved exposure of animals to playbacks of low-power mid- to high-frequency active sonar designed to detect marine mammals. The proposed source levels for the playbacks were 160-180 dB re 1 μPa at 1 m, not to exceed 160 dB at the animal. Other characteristics of the signals included bandwidths of 100, 200, and 400Hz; pulse durations of 50, 100, 200, and 400ms; chirp upsweeps centered at 1, 2.5, 4, 8, and 12kHz; and a pulse repetition rate of not more than one ping per minute. A FONSI was signed on August 31, 2000, based on information indicating that the short-term impacts of conducting acoustic playback experiments on cetaceans would not result in more than temporary threshold shift in the hearing of some individual cetaceans, and that changes in the behavior (to avoid the sounds) of individual animals were expected to have negligible impacts on the animals.

Environmental Assessment of the Proposed Chase-recapture Experiment under the International Dolphin Conservation Program Act (NMFS 2001a): An EA was prepared by NMFS for a scientific research permit authorizing takes of up to 24,000 individual dolphins from several species by one or more of the following: chase, helicopter overflight, encirclement; and up to 540 dolphins are proposed to be sampled, examined, tagged, and released. The take estimates are based on a maximum of 60 sets during the entire two-month project, with up to nine dolphins

handled per set, and an average school size of about 400 dolphins. This request is per the International Dolphin Conservation Act that requires research consisting of population abundance surveys and "stress studies" be conducted by NMFS (MMPA, 304(a)(3)(c); 16 U.S.C. section 1414 (a)(3)(C). The Acting Assistant Administrator for Fisheries signed a FONSI on the proposed action, to issue the permit as requested and with mitigation measures, on August 1, 2001. This was based on sufficient information from published literature and other sources that the proposed activities may have little short-term effects and no long term on the dolphins stocks.

Environmental Assessment on the Application for a Scientific Research Permit Authorizing the Taking of Killer Whales, Dall's Porpoise, Harbor Porpoise, Minke, Gray, Humpback Whale by Unintentional Vessel Harassment in Puget Sound, Washington (NMFS 1990): An EA was prepared by NMFS for a scientific research permit to study the population biology of the killer whale in the Eastern North Pacific. The photographs collected are part of a long-term database that is critical to this study and serves as an important model for other regions of the world. The Assistant Administrator for Fisheries signed a FONSI on the proposed action, to issue the permit as requested on March 27, 1990. The proposed action is expected to result in no adverse effects from the photo-identification and scientific observation of these cetacean species.

Effects of NMFS Permitted Scientific Research Activities on Threatened and Endangered Steller Sea Lions (NMFS 2002): The EA was prepared in response to applications for five new permits and amendments to two existing permits that would have resulted in an unprecedented magnitude and intensity of research on these endangered marine mammals. The applications were largely related to substantial funding opportunities, made available through Congressional appropriations, that directed research on the population decline and to develop conservation and protective measure to ensure recovery of the species, as well as contribute immediate, short-term information relevant to adaptive fishery management strategies in the Bering Sea/Aleutian Islands and the Gulf of Alaska groundfish fisheries. The 2002 EA analyzed the effects on Steller sea lions and the environment of a variety of research activities including some of the immobilizing drugs and tissue sampling protocols proposed in the permit amendments by the Alaska SeaLife Center. The 2002 EA also analyzed the effects of collecting muscle biopsies. In June 2002, the Assistant Administrator for Fisheries signed a FONSI, which concluded that the issuance of the permits and amendments with mitigation measures and that would not significantly impact the human environment.

Effects of NMFS permitted scientific research activities to study the effects of anthropogenic sounds on marine mammals (NMFS 2003a): An EA was prepared by NMFS for a scientific research permit to collect information on the biology, foraging ecology, behavior, and communication of a variety of cetacean species with a focus on examining the effects of underwater noise on these aspects. A secondary objective is to test the efficacy of a new mid-high (1kHz-12kHz) frequency whale-finding sonar designed to be used in marine mammal conservation. On June 3, 2003, a FONSI was signed by the Chief, Permits, Conservation and Education Division, Office of Protected Resources.

Issuance of Scientific Research Permit #1303 to the National Marine Fisheries Service-Honolulu Laboratory (NMFS 2004b): An EA was prepared by NMFS for a scientific research

permit to collect information on the biology, foraging ecology, behavior, and efforts to reduce interactions between listed sea turtles and the Hawai'i-based longline fishery. The EA resulted in a FONSI that determined that issuance of the proposed permit, with all of its mitigating special conditions, would not significantly affect the quality of the human environment. This EA was proceeded by an Environmental Impact Statement developed for the implementation of the Fishery Management Plan for the Pelagic Fisheries of the Western Pacific Ocean. The FEIS was completed on March 31, 2001.

1.5 Decision and other agencies involved in this analysis

The Director, Office of Protected Resources, NMFS (Office Director) must decide whether authorizing the new permits and amendments would be consistent with the purposes and policies of the MMPA, ESA and their implementing regulations, including making certain the permitted activities would not operate to the disadvantage of any marine animal species. Pursuant to 50 CFR § 216.33 (d)(2) of the NMFS' regulations implementing the MMPA, Notice of Receipts for the proposed permit applications and amendments were published in the *Federal Register* for public comment, and the applications were sent to the Marine Mammal Commission (MMC) for review. In addition, where applicable, copies of the proposed actions were distributed to the NOAA National Marine Sanctuary Program, Hawaii State Department of Land and Natural Resources, Fish and Wildlife Service (Alaska), and Alaska Department of Fish and Game for review as portions of the proposed action would take place in the waters under the jurisdiction of these agencies.

1.6 Scoping Issues

In consideration of the recommendations of the MMC and their committee of scientific advisors, the National Marine Sanctuary Program, expert scientific reviewers, and NMFS' implementing regulations under the ESA and MMPA, NMFS recognizes the need for the agency to examine the necessity of current and potential authorized research for the target species in the proposed action area and whether this research, in combination with other activities, would have short or long-term direct or indirect effects on the endangered target species in the proposed action area.

The scope of this document includes review and consideration of current and pending authorized research covering the proposed target species and action area under the NMFS' scientific research permitting program. In addition, the scope of this EA includes review and consideration of the more common research tools used to study the target species in the proposed action area, including close vessel and aerial approaches for: photo-identification (above and below water), behavioral observation (above and below water), shipboard line-transect surveys, photogrammetry, tagging (intrusive and non-intrusive), biopsy sampling (includes skin and blubber biopsy and skin swabbing), passive acoustics (includes only recording of humpback sounds), active acoustics (see information beginning on page 35), handling of sea turtles for measurements and sampling, capture and sampling of beluga whales and harassment incidental to these research activities. Consideration of the potential effects of the proposed action on non-target ESA-listed species and any designated protected area or critical habitat also falls under the

scope of this EA.

In general, there has not been a considerable amount of public controversy regarding authorized or proposed takes for the target species in the proposed action area. However, there are some issues relevant to research activities that need additional review and consideration. The first is the use of more invasive research techniques (i.e., tagging and biopsy sampling) on marine mammals and sea turtles. The second is the authorization of accidental mortalities during research activities (see NMML, file no. 782-1719). The third is the use of active acoustics during playback experiments on humpback whales. Only two of the eleven proposed permit actions considered under this EA are requesting authorization for playback studies. During these playback experiments, whales would be exposed to playbacks of pre-recorded humpback whale songs, social sounds, and feeding calls at a maximum source level of 155 dB re 1 μPa at 1 m. Whales would also be exposed to synthesized sounds similar in frequency and average source level to normal humpback whale sounds, and to playback of blank tapes as a control. No playbacks of any sounds would exceed a maximum source level of 155 dB re 1 μPa at 1 m, which is below the maximum source levels estimated for vocalizing humpback whales. A detailed account of the proposed experiments and an analysis of their effects can be found beginning on page 35.

SECTION 2 ALTERNATIVES INCLUDING THE PROPOSED ACTION

This section describes the range of potential actions (alternatives) determined reasonable with respect to achieving the stated objective. Section three outlines any species, protected areas or critical habitat potentially affected by the proposed action. Section four summarizes the environmental consequences of the alternatives and section five summarizes the mitigation measures of the alternatives. Although there are several possible combinations of the proposed research activities that could be considered as alternatives, there is a limited range of alternatives that could reasonably achieve the goals that the proposed action intends to achieve while complying with environmental standards, including the MMPA and ESA. These include:

1. Alternative 1 (No Action or Status Quo): The proposed permits and amendments would not be issued. However, No Action does not mean that there would be no environmental consequences, because the existing environment is not static and scientific research activities already permitted would continue. The Status Quo is the baseline for rest of the analysis.
2. Alternative 2 (Proposed Action): The proposed permits and amendments would be issued as described in the submitted permit and amendment applications and as conditioned in the resulting permits and permit amendments. Existing permits would also continue to remain in effect.
3. Alternative 3 (Proposed action but no takes by invasive sampling): A third alternative consists of authorizing takes for only those research activities that do not involve intrusive sampling of animals (i.e., handling, tagging and biopsy sampling) and rely only on aerial and vessel surveys with associated photo-identification, behavioral observation, photogrammetry, passive acoustic recording, and playback of whale sounds. However, this alternative was eliminated from detailed study because there would be no way to collect physiological or genetic data needed to monitor health status or trends in reproductive rates.
4. Alternative 4 (Retraction of existing permits and no issuance of proposed action): A fourth alternative prohibits all intrusive research and any activities with the potential to disturb the target marine mammals and sea turtle species in the wild. This would include retraction of existing permits and no issuance of the proposed action. This alternative was eliminated from detailed study because it would not meet NMFS needs for collecting information that would lead to recovering ESA-listed species or monitoring marine mammal and sea turtle populations with respect to managing impacts from human activities as required by NMFS legal mandates. In addition, the alternative was eliminated from detailed study as no known major impacts have resulted from the existing permits.

SECTION 3 AFFECTED ENVIRONMENT

This section presents baseline information necessary for consideration of the alternatives, and describes the resources that might be affected by the alternatives, as well as environmental components that would affect the alternatives if they were to be implemented. The effects of the environmental consequences of alternatives are discussed in Section 4 and mitigation measures for those alternatives are discussed in Section 5.

The total proposed action area includes U.S. territorial waters and high seas of the North Pacific Ocean (including the Gulf of Alaska and Bering Sea), Arctic Ocean (including the Chukchi Sea and Beaufort Sea), Southern Ocean (including waters off Antarctica), and foreign territorial waters of Mexico (Gulf of California only), Canada, Russia, Japan and the Philippines. Ten of the eleven proposed permit actions would only involve research directed at the target species in the North Pacific Ocean. One proposed permit action (NMML, file no. 782-1719) would involve work in the North Pacific Ocean (including the Gulf of Alaska and Bering Sea), Arctic Ocean (including the Chukchi Sea and Beaufort Sea), Southern Ocean (including waters off Antarctica), and foreign territorial waters of Mexico (Gulf of California only), Canada, Russia, Japan and the Philippines. One proposed permit action (SWFSC, file no. 774-1714) would also involve research activities in the Southern Ocean.

The information in this section describes the marine mammals and sea turtles species specifically targeted for research. In addition to these species, a wide variety of marine species and habitats are found within the proposed action area. Where species are ESA-listed or critical/protected habitats occur within the action area, these species and habitats are described in advance of assessing the impact, if any, of the proposed research. This section also outlines several other species (both ESA-listed and non-ESA listed) that are target species for the proposed action or that may be indirectly affected by the proposed action. In addition, this section specifically focuses on the main marine protected areas where the majority of research activities would occur.

3.1 Marine Protected Areas

Executive Order 13158, issued on May 26, 2000, established Marine Protected Areas (MPAs) as tools to balance commercial and recreational activity with conservation. In addition to conserving natural, historic, and cultural marine resources, MPAs also provide protection for marine species and their habitats by managing human activities in certain areas. MPAs are located in state or federal waters of the U.S. The size and protection varies greatly depending on the objective for each site. There are three main categories for MPAs: Federal Fisheries Management Zones, Federal Threatened and Endangered Species Protected Areas, and Federal threatened Endangered Species Critical Habitats. At this time, NOAA is in the process of developing a Marine Managed Areas Inventory and will publish this inventory in the future.

3.1.1 National Marine Sanctuaries

There are 13 national marine sanctuaries created under the U.S. Marine Protection, Research and Sanctuaries Act of 1972. NOAA's National Marine Sanctuaries Program (NMSP) has regulations regarding low flights over a sanctuary or reserve and a permit is required for such activities in addition to NMFS' scientific research permit. All holders of NMFS's scientific research permits conducting work within a National Marine Sanctuary are required to obtain appropriate authorizations from and coordinate the timing and location of their research with the NMSP to ensure that the research would not adversely impact marine mammals, birds or other animals within the sanctuaries. In addition, permit actions including those in the proposed action are sent to the NMSP for review if research is to occur in sanctuary waters. This EA only pertains to the following National Marine Sanctuaries.

Channel Islands National Marine Sanctuary
The Channel Islands National Marine Sanctuary (1,658 square miles (1,253 nm^2)) was designated in September 1980 and is located 25 miles (22 nm) off the coast of Santa Barbara, California. The sanctuary encompasses the waters surrounding Anacapa, Santa Cruz, Santa Rosa, San Miguel and Santa Barbara Islands, extending from mean high tide to 7 miles (6 nm^2) offshore. Thirty four species of marine mammals including whales, dolphins, seals, sea lions and southern sea otters and 60 species of marine birds have been sighted sighted in the sanctuary. The marine mammals include blue, humpback and sei whales.

Cordell Bank National Marine Sanctuary
The Cordell Bank National Marine Sanctuary (526 square miles (397 nm^2) off the northern California coast was designated in 1989. The Cordell Bank is the dominant feature of the sanctuary and is approximately 9 miles long and 5 miles wide. Deep light penetration combined with upwelling nutrients leads to high productivity and abundant forage species such as krill. With this huge amount of krill this area is an important summer feeding ground for humpback whales, blue whales, pacific salmon and bottom fishes. There are 25 species of marine mammals and more than 47 species of seabirds found in this sanctuary.

Fagatele Bay National Marine Sanctuary
The Fagatele Bay National Marine Sanctuary was designated in April 1986 and is the smallest and most remote of all the national marine sanctuaries encompassing 163 acres (.25 square miles (.22 nm^2)). The Fagatele is the only true tropical coral reef in the National Marine Sanctuaries Program and is located on Tutuila, the largest island of American Samoa; its borders extend from Steps Point, the southernmost point of the island, to Fagatelle Point on the island's southwestern shore. During parts of the year, Fagatele's sheltered waters are a haven for threatened or endangered species such as the humpback and sperm whales, as well as the hawksbill and green sea turtles. The humpback whales inhabit these waters from June to September before migrating back to waters off Antarctic in the spring.

Gulf of the Farallones National Marine Sanctuary
The Gulf of the Farallones National Marine Sanctuary was designated in 1981 and encompasses 1,255 square miles (948 nm^2) off the northern and central California coast. Spring and early summer upwellings of cold, nutrient-rich waters create a highly productive ocean environment rich in plankton and other forage species. The Sanctuary supports an abundance of species (e.g., 33 species of marine mammals and 15 species of breeding seabirds). One fifth of California's harbor seals also breed within the sanctuary.

Hawaiian Islands Humpback Whale National Marine Sanctuary
The Hawaiian Islands Humpback Whale National Marine Sanctuary was designated in 1997 and encompasses areas on all the main Hawaiian Islands, including: the north shore of Kauai, the North and South Coast of Oahu, the 4-island area of Maui County, and the northwest portion of Hawaii. The sanctuary today protects approximately 1,400 square miles (1,217 nm^2) of water adjacent to the Hawaiian Archipelago. The sanctuary's goal is to promote comprehensive and coordinated management, research, education and long-term monitoring of the endangered humpback whale and its habitat.

The Hawaiian Islands constitute one of the world's most important habitats for endangered humpback whales. Nearly two-thirds of the North Pacific humpback whale population migrates to Hawaii each winter to breed, calve and nurse their young before returning north to summer in the colder waters of the Bering Sea. Other species of whales and dolphins, such as fin, minke, false killer, bottlenose, and spinner, also inhabit the Sanctuary. Sea turtles, sharks, monk seals, a thriving coral reef ecosystem, and diverse populations of seabirds are other important elements of Hawaii's marine environment.

Monterey Bay National Marine Sanctuary
The Monterey Bay National Marine Sanctuary was designated in 1992 and is the largest marine sanctuary in the National Marine Sanctuary Program. This sanctuary encompasses the waters of Monterey Bay and the adjacent Pacific Ocean off the central California coast covers over 5,300 square miles (4,024 nm^2) and is inhabited by 26 species of marine mammals, 94 species of seabirds, and 4 species of sea turtles.

Olympic Coast National Marine Sanctuary
The Olympic Coast National Marine Sanctuary was designated in 1994 and covers over 3300 square miles (2500 nm^2) of ocean waters off Washington State's peninsula coastline. More species of whales, dolphins, and porpoises spend time in these waters and more varieties of kelp are found here than anywhere else in the world. Twenty-nine species of marine mammals inhabit these sanctuary waters.

3.1.2 Other National Wildlife Refuges, National Seashores and State Parks

There are also other marine conservation areas that occur within the proposed action area. As the proposed action does not take place on shore or in estuarine habitats, this EA seeks only to consider those marine conservation areas that fall within the scope of the proposed action. Additionally, all holders of NMFS' scientific research permits conducting work within these

designated areas are required to contact the respective agency to obtain any additional authorizations required by that agency. The following outlines the main conservation areas where proposed activities may occur.

Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve

On December 4, 2000, the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve (Reserve) was created by Executive Order 13178. Establishment of the Reserve was finalized on January 18, 2001 by issuance of Executive Order 13196. This Executive Order modified Executive Order 13178 by revising certain conservation measures and making permanent the Reserve Preservation Areas with modifications. In addition, the Reserve and the National Marine Sanctuary Program have begun the process to designate the Reserve as a National Marine Sanctuary under the National Marine Sanctuaries Act. The seaward boundary of the Reserve is 50 nautical miles from the geographic centers of each island in the Northwestern Hawaiian Islands, as well as Maro Reef. The inland boundary of the Reserve is the seaward boundary of Hawaii State waters (3 nautical miles), or the seaward boundary of the Midway Atoll National Wildlife Refuge (10 nautical miles).

Midway Atoll National Wildlife Refuge

Midway became an "overlay" refuge in 1988, while still under the primary jurisdiction of the Navy. With the closure of Naval Air Facility Midway Island in 1993, there began a change in mission from national defense to wildlife conservation. Midway is one of the most remote coral atolls on earth. Nearly two million birds call it home for much of each year, including the world's largest breeding population of Laysan Albatross, or "gooney birds". Hawaiian monk seals, green sea turtles and spinner dolphins frequent Midway's crystal blue lagoon.

Alaska Maritime National Wildlife Refuge

The refuge includes over 3,000 islands, islets, rocks, pinnacles, and headlands from northwest Alaska into the Bering Sea and along 4,800 miles of Alaska's coastline and the Aleutian chain. Most of the refuge (2.64 million acres) is designated as wilderness and has the most diverse wildlife species of all the refuges in Alaska, including between 15 - 30 million birds (80% of all Alaska seabirds, including species of puffins, kittiwakes, murres, petrels, auklets, murrelets, and gulls) representing about 55 species. In addition to Steller sea lions, marine mammals such as harbor seals, walrus, sea otters, polar bears, and whales are also common within the refuge. Other animals within the refuge include bald eagles, peregrine falcons, bears, caribou, musk oxen, river otters, and foxes. Further, the refuge contains many Aleut archeological sites as well as remnants of the only World War II battles fought on U.S. soil. Military clearance is required to visit some islands of the Aleutian Chain (Adak, Shemya, Amchitka, and Atfu).

Glacier Bay National Park and Preserve

Glacier Bay National Park and Preserve commands a glacier-crowned, maritime wilderness that stretches northward from Alaska's inside passage to the Alsek River, encircling a magnificent saltwater bay. The 3.3 million acre park derives its name and much of its biological and cultural significance from this great bay, which harbors spectacular tidewater glaciers and a unique assemblage of marine and terrestrial life. To the south and east, the landscape fragments into the timbered islands and winding fjords of the Alexander Archipelago and the Tongass National

Forest. To the west, the Park's pristine outer coast opens to the Gulf of Alaska, and beyond to the Pacific Ocean and Asia. Marine waters make up nearly one fifth of the park. Humpback whales, an endangered species, are the subject of intensive, ongoing research in the park and surrounding waters of Icy Straits. Each summer 15-20 humpback whales regularly feed in park waters, concentrating in the lower part of the bay. Special regulations affecting vessel speed limits and travel routes in certain areas go into effect when large concentrations of whales are in the park.

Protection Island National Wildlife Refuge
Protection Island Refuge is located near the mouth of Discovery Bay in the Strait of Juan de Fuca in Jefferson County, Washington. Approximately 70 percent of the nesting seabird population of Puget Sound and the Strait of Juan de Fuca nest on the island, which includes one of the largest nesting colonies of rhinoceros auklets in the world and the largest nesting colony of glaucous-winged gulls in Washington. The island contains one of the last 2 nesting colonies of tufted puffins in the Puget Sound area. About 1,000 harbor seals depend upon the island for a pupping and rest area. This 364-acre island is covered by grass and low brush, with a small timbered area, high sandy bluffs for seabird nesting, and low sand spits on two ends of the island. A 200-yard buffer around the island is closed year round to protect wildlife resources. The 48-acre Zella M. Schultz Seabird Sanctuary (on the west end on the island) is managed by the Washington State Department of Fish and Wildlife.

3.1.3 Critical Habitats

The ESA provides for designation of "critical habitat" for listed species and includes physical or biological features essential to the conservation of the species. Critical habitats may require special management considerations or protection. Critical habitat designations affect only federal agency actions or federally funded or permitted activities. The three critical habitats that pertain to this EA are Critical habitat for Hawaiian monk seals which protects important foraging areas for monk seals, Critical habitat for Stellar sea lions which provides a three nautical mile buffer zone around Stellar sea lion rookery sites in Alaska and Critical Habitat of Steller's eider and Spectacled eider which protects the Alaska breeding population of Steller eider and Spectacled eider.

Critical Habitat for Hawaiian monk seals
Critical habitat for Hawaiian monk seals was first designated in 1986, to include all beach areas, lagoon waters, and ocean waters to a depth of 10 fathoms around Kure Atoll, Midway Atoll (except Sand Island), Pearl and Hermes Reef, Lisianski Island, Laysan Island, Gardner Pinnacles, French Frigate Shoals, Necker Island, and Nihoa Island. In 1988, the definition of critical habitat for Hawaiian monk seals was expanded to include Maro Reef and waters around existing habitat out to the 20-fathom isobath (Lavigne 1999).

Critical Habitat for Steller sea lions
Steller sea lion critical habitat includes a 20 nautical mile buffer around all major haulouts and rookeries, as well as associated terrestrial, air and aquatic zones, and three large offshore foraging areas. NMFS has implemented a complex suite of fishery management measures designed to minimize competition between fishing and the endangered population of Steller sea lions in critical habitat areas. Those management measures are the Steller sea lion protection measures.

Critical Habitat of Steller's eider and Spectacled eider
Critical habitat for the Alaska breeding population of Steller eider (*Polysticta stelleri*) includes breeding habitat on the Yukon-Kuskokwin Delta and four units in the marine waters of southwest Alaska, including the Kuskokwim Shoals in northern Kuskokwim Bay, and Seal Islands, Nelson Lagoon, and Izembek Lagoon on the north side of the Alaska Peninsula. Critical habitat for the Spectacled eider (*Somateria fischeri*) includes areas on the Yukon-Kuskokwim Delta, in Norton Sound, Ledyard Bay, and the Bering Sea between St. Lawrence and St. Matthew Islands.

3.1.4 Essential Fish Habitat

Congress defined Essential Fish Habitat (EFH) as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (16 U.S.C. 1802(10)). The EFH provisions of the Magnuson-Stevens Fishery Conservation and Management Act offer fishery resource managers a tool to conserve fish habitat. EFH has been designated for many harvested fish species within the action area. Details of the designations and descriptions of the habitats are available in the Pacific, West Pacific, and Alaska Fishery Management Plans. Activities that have been shown to affect EFH include disturbance or destruction of habitat from stationary fishing gear, dredging and filling, agricultural and urban runoff, direct discharge, and the introduction of exotic species.

3.2 Marine Species

The proposed action involves takes of many different marine mammal and sea turtle species, including some ESA-listed or MMPA-depleted species. In addition to these species that are the focus of the proposed research, the action area is inhabited by numerous other marine species including fish and invertebrates, sea turtles, sharks, and seabirds. The following provides a listing and description of species that can potentially be impacted by the proposed action, with particular emphasis on those target species that are listed under the ESA or listed as depleted under the MMPA.

3.2.1 Marine Mammal and Sea Turtle Species Directly Targeted for Research

ESA-listed species in the Action Area Directly Targeted for Research

Humpback whale (*Megaptera novaeangliae*)
Humpback whales occur throughout the world's oceans, generally over continental shelves, shelf breaks, and around some oceanic islands (Balcomb and Nichols 1978, Whitehead 1987). Humpback whales exhibit seasonal migrations between warmer temperate and tropical waters in winter and cooler waters of high prey productivity in summer. Their summer range includes coastal and inland waters from Point Conception, California, north to the Gulf of Alaska and the Bering Sea, and west along the Aleutian Islands to the Kamchatka Peninsula and into the Sea of Okhotsk (Tomlin 1967, Nemoto 1957, Johnson and Wolman 1984 as cited in NMFS 1991b). Humpback whales also summer throughout the central and western portions of the Gulf of Alaska, including Prince William Sound, around Kodiak Island (including Shelikof Strait and the Barren Islands), and along the southern coastline of the Alaska Peninsula. Japanese scouting vessels continued to observe high densities of humpback whales near Kodiak Island during 1965–1974 (Wada 1980). In Prince William Sound, humpback whales have congregated near Naked Islands, in Perry Passage, near Cheega Island, in Jackpot, Icy and Whale Bays, in Port Bainbridge and north of Montague Islands between Green Island and the Needle (Hall 1979, 1982; von Ziegesar 1984; von Ziegesar and Matkin 1986). The few sightings of humpback whales in offshore waters of the central Gulf of Alaska are usually attributed to animals migrating into coastal waters (Morris *et al*. 1983), although use of offshore banks for feeding is also suggested (Brueggeman *et al*. 1987).

Winter breeding areas are known to occur in Hawaii, Mexico, and south of Japan. Around the Hawaiian Islands, humpback whales are most concentrated around the larger islands of Maui, Molokai, Lanai, and Kahoolawe. Newborn and nursing calves with cows are seen throughout the winter and comprise 6 to 11 percent of all humpbacks sighted during aerial surveys. Humpbacks from the Mexican wintering grounds are found with greatest frequency on the central California summering ground (NMFS 1991). In the western Pacific, humpbacks have been observed in the vicinity of Taiwan, Ogasawara Islands, and Northern Mariana Islands (NMFS 1991).

Life history information
Humpback whale reproductive activities occur primarily in winter. They become sexually mature at age four to six. Female humpback whales are believed to become pregnant every two to three years. Cows nurse their calves for up to 12 months. The age distribution of the humpback whale population is unknown, but the portion of calves in various populations has been estimated at about 4 to 12% (Chittleborough 1965, Whitehead 1982, Bauer 1986, Herman *et al*. 1980, and Clapham and Mayo 1987). Sources and rates of natural mortality are generally unstudied, but potential sources of mortality include parasites, disease, predation (killer whales, false killer whales, and sharks), biotoxins, and ice entrapment.

Humpback whales exhibit a wide range of foraging behaviors, and feed on many prey types including small schooling fishes, krill, and other large zooplankton. Fish prey include herring, anchovy, capelin, pollock, Atka mackerel, eulachon, sand lance, pollack, Pacific cod, saffron cod, arctic cod, juvenile salmon, and rockfishes. In the waters west of the Attu Islands and south of Amchitka Island, Atka mackerel were preferred prey of humpback whales (Nemoto 1957). Invertebrate prey include euphausiids, mysids, amphipods, shrimps, and copepods.

Population status and trends
Three management units of humpback whales are recognized within the North Pacific: the eastern North Pacific, the central North Pacific stock, and the western North Pacific stock. Population estimates for the entire North Pacific have increased from 1,200 in 1966 to 6,000-8,000 in 1992. The annual growth rate implied by the estimates is 6 to 7 percent. (NMFS 2002a).

The eastern North Pacific stock is referred to as the winter/spring population in coastal Central America and Mexico which migrates to the coast of California to southern British Columbia in summer/fall (Steiger *et al.* 1991, Calambokidis *et al.* 1993). The estimate in California, Oregon and Washington waters is 1,177 (Barlow and Taylor, 2001).

The central North Pacific humpback whale stock is referred to as the winter/spring population of the Hawaiian Islands which migrates to northern British Columbia/Southeast Alaska and Prince William Sound west to Kodiak (Baker et al. 1990, Perry et al. 1990, Calambokidis *et al.* 1997). The population estimate for this stock is 4,005 (Calambokidis *et al.* 1997). The stock assessment report of October 31, 2001, suggests an increasing population size for this stock, but it is not possible to assess the rate of increase.

The western North Pacific Stock is referred to as the winter/spring population of Japan and probably migrates to waters west of the Kodiak Archipelago (the Bering Sea and Aleutian Islands) in summer/fall (Berzin and Rovnin 1966, Nishiwaki 1966, Darling 1991). This population is estimated to include around 400 individuals.

Blue Whale (*Balaenoptera musculus*)
Blue whales are found in tropical to polar waters worldwide. The International Whaling Commission (IWC) formally recognizes several management stocks, but stock differentiation for blue whales throughout the world still remains equivocal.

In the North Pacific, the IWC only recognizes one stock (Donovan 1991); however, strong evidence exists for a separate population that spends winter/spring in Mexican coastal waters and summer/autumn in California waters (Barlow *et al.* 1995). For management purposes under the MMPA, two stocks are considered to occur in U.S. waters of the North Pacific, the eastern North Pacific stock (California/Oregon/Washington) and the Hawaii stock. The best abundance estimate for this stock is 1,940 blue whales for California, Oregon and Washington resulting from averaging line transect (Barlow 1997) and a mark-recapture (Calambokidis and Steiger 1994) results. The population trend has some indication of an increase since 1979/80 (Barlow 1994), but this is not conclusive when compared to other studies.

Blue whales are extremely rare in Hawaii and there are no data available that estimate population size for the Hawaiian stock (Carretta *et al.* 2001). Twelve aerial surveys were flown from 1993-1998 off the main Hawaiian Islands and resulted in no sightings of blue whales. Wade and Gerrodette (1993) estimated a population of 1,400 blue whales in the ETP. No estimate of human-caused mortality of the Hawaiian stock is available because there are no reports of recent mortalities in the waters off of Hawaii due to human activities. The population status of the Hawaiian stock is unknown, but the Hawaiian stock is automatically considered strategic and depleted under the MMPA because blue whales are classified as endangered under the ESA.

Fin Whale (*Balaenoptera physalus*)
The fin whale occurs in all major oceans worldwide and seasonally migrates between temperate and polar waters (Gambell 1985). Several stocks have been suggested for both the Southern and Northern Hemisphere. However, whether the current stock boundaries define biologically isolated units is uncertain and confirmation or revision of such boundaries awaits further study. Available abundance estimates for fin whale stocks worldwide vary in their reliability, depending on the data available and the analytical techniques used. Fin whales in the Southern Hemisphere number approximately 103,000 (Gambell 1985). In the North Pacific, the IWC recognizes two stocks of fin whales, the east China Sea stock and the rest of the North Pacific (Donovan 1991). For management purposes under the MMPA, four stocks of fin whales are recognized in the U.S. waters: the California/Oregon/Washington stock, the Alaska stock (Northeast Pacific), the Hawaii stock, and the western North Atlantic stock.

Recently, 1,851 fin whales were estimated for waters off California, Oregon and Washington based on ship surveys in summer/autumn of 1993 and 1996 (Barlow and Taylor 2001). There is some indication that fin whales have increased in abundance in California coastal waters between 1979/80 and 1991 (Barlow 1991) and between 1991 and 1996 (Barlow 1997), but these trends are not significant. Because fin whales are listed as an endangered species under the ESA, this stock is automatically considered strategic under the MMPA. There are no abundance estimates for the Alaska or Hawaii stocks. The status of these stocks relative to optimal sustainable population is unknown and both stocks are considered strategic under the MMPA because the fin whale is listed as endangered under the ESA.

Sei Whale (*Balaenoptera borealis*)
The Sei whale is widely distributed in all oceans, although it is not found as far into polar waters as the other rorquals (Gambell 1985). Several stocks of sei whales have been identified, but updated estimates of the number of sei whales worldwide are not available. The Southern Hemisphere stock is thought to number 37,000 and the North Pacific stock about 14,000. The general lack of information regarding sei whales in the Atlantic has precluded the stocks there from being adequately assessed, but only a few thousand sei whales are thought to occur in the North Atlantic (Allen 1980). In the North Pacific, the IWC recognizes only one stock of sei whales (Donovan 1991), but some evidence exists for multiple populations (Masaki 1977; Mizroch *et al.* 1984; Horwood 1987). Lacking additional information on sei whale population structure, sei whales in the eastern North Pacific (east of longitude 180^{o}) are considered a separate stock for management purposes under the MMPA. Only one confirmed sighting of a sei

whale and 5 possible sightings (identified as sei or Bryde's whales) were made in California waters during extensive ship and aerial surveys in 1991, 1992 and 1993 (Hill and Barlow 1992; Carretta and Forney 1993; Mangels and Gerrodette 1994). Green *et al.* (1992) did not report any sightings of sei whales in aerial surveys off Oregon and Washington. There are no abundance estimates for sei whales along the west coast of the U.S. or in the eastern North Pacific. Under the MMPA, the stock is considered depleted and strategic as it is listed under the ESA.

North Pacific Right Whale (*Eubalaena japonica*)
Very little is known about the current North Pacific right whale population and it is not possible to reliably estimate minimum abundance. The population is thought to have numbered over 11,000 animals before exploitation (NMFS 1991). However, from 1958-1982 there were only 35 sightings of right whales throughout the central North Pacific and Bering Sea (Braham 1986). Only 29 sightings were made in the eastern North Pacific from 1900-1994 (Scarff 1986, Scarff 1991, Carretta *et al.* 1994). Aerial surveys in the southeastern Bering Sea in the late 1990s have resulted in the photographic documentation of 16 individual right whales. Analysis of biopsy samples indicated ten individual whales: nine males and one female (LeDuc and Perryman 2002).

Sperm whale (*Physeter macrocephalus*)
Sperm whales are widely distributed in the North Pacific, with the northernmost boundary extending from Cape Navarin (62^{o}N) to the Pribilof Islands. Movement into the northeastern Bering Sea and Arctic Ocean appears to be limited by the shallow continental shelf. Females and young tend to remain in tropical and temperate waters year-round, while males are thought to move north in the summer to feed in the Gulf of Alaska, Bering Sea and waters around the Aleutian Islands. There are three stocks for management purposes under the MMPA: the California/Oregon/Washington stock, the Hawaiian stock, and the North Pacific stock. The current estimates for abundance of the North Pacific stock of sperm whales are considered unreliable, as is information on trends in abundance (Hill and DeMaster 1998).

Bowhead whale *(Balaena mysticetus)*
The bowhead whale is distributed in seasonally ice-covered waters of the Arctic and near-Arctic, generally north of 54°N and south of 75°N in the western Arctic Basin (Moore and Reeves 1993). For management purposes, at least four geographic stocks are recognized (Mitchell 1977; Allen 1978). Three small stocks occur in the Okhotsk Sea, Hudson Bay/Davis Strait, and Spitzbergen, but only tens to a few hundred are found in each of these stocks and the status of each is not well understood (Zeh et al. 1994). The largest remnant population is the Western Arctic stock (also referred to as the Bering-Chukchi-Beaufort stock) which migrates from wintering areas (November to March) in the northern Bering Sea, through the Chukchi Sea in the spring (March through June), to the Beaufort Sea where they spend much of the summer (mid-May through September) before returning to the Bering Sea in the autumn (September through November) (Moore and Reeves 1993). One stock of bowhead whales, the western Arctic stock, is recognized in U.S. waters for management purposes under the MMPA. This stock is estimated to number 8,200 bowhead whales based on visual and acoustic data from 1993 (Zeh et al. 1995). Rare cases of rope or net entanglement have been reported from bowhead whales

taken in the subsistence hunt (Philo et al. 1993), but fisheries interactions with this stock are limited given its habitat. There are no recent records of mortality incidental to commercial fishery operations for this stock, though the fishery is all self-reported (Angliss et al. 2001). Direct takes of bowhead whales by Eskimos have occurred for at least 2,000 years (Stoker and Krupnik 1993). The average take of bowhead whales from 1995-99 has averaged 54 animals per year (Angliss et al. 2001). This level of human-caused mortality does not exceed the PBR (77) whales for this stock, nor does it exceed the IWC quota for 1996 of 67 animals. Bowhead whales of the western Arctic stock are classified as endangered under the ESA and thus classified as a strategic stock under the MMPA.

Vaquita/Gulf of California Harbor Porpoise (*Phocoena sinus*)
The vaquita is a relatively newly recognized species that is endemic to the Gulf of California (Rojas-Bracho and Jaramillo-Legorreta 2002). It is one of the world's most endangered cetacean species (Jefferson *et al.* 1993). The most recent published abundance estimate for this species is 567, based on a ship survey (Jaramillo-Legorreta *et al.* 1999). The Mexican government created the International Committee for the Recovery of the Vaquita (CIRVA) with the goal of developing a recovery plan based on the best available scientific information. CIRVA concluded that gillnets are the greatest threat to survival of the vaquita, with an estimated annual mortality of 39-84 (D'Agrosa *et al.* 2000). The vaquita is classified in the most critical conservation categories by the 1996 IUCN, the 1997 Convention on International Trade in the Endangered Species of Wild Fauna and Flora, and by the Mexican Government in 1994 (Rojas-Bracho and Jaramillo-Legorreta 2002). The IUCN concluded in 1996 that unless conservation efforts are increased substantially, the vaquita would likely go extinct. The vaquita is listed as endangered under the ESA.

Steller Sea Lion (*Eumetopias jubatus*)
Steller sea lions were listed as threatened under the ESA in 1990 (55 FR 12645, April 5, 1990) under an emergency rule, because the numbers of Steller sea lions observed on rookeries in Alaska had declined by 63% since 1985 and by 82% since 1960. A final rule was published on November 26, 1990 and the final listing became effective on December 4, 1990. In 1997, Steller sea lions were classified as two distinct population segments under the ESA. The segment of the population of Steller sea lions west of 144^{o}W longitude was listed as endangered, while the threatened listing was maintained for the remainder of the population in the United States (62 FR 24345, May 5, 1997). The reclassifications were primarily due to information that indicated two genetically differentiated population segments, a continued decline in abundance trends for the western stock, and population viability analysis models that predicted a 65-100% probability of extinction for the population from Kenai Peninsula to Kiska Island within 100 years if the trends continued. The cause of the continued decline is unknown, but the prevalent theory is that it is related to nutritional stress resulting from a change in the abundance and/or distribution of prey species caused by some combination of commercial fisheries activities and environmental changes (Alaska Sea Grant 1993; Loughlin 1998).

There has been no change in the population status and trends for either the eastern or western population of Steller sea lions since the preparation of the Environmental Assessment on the Effects of NMFS Permitted Scientific Research on Threatened and Endangered Steller Sea Lions

in 2002 (NMFS 2002b).

Green Sea Turtles (*Chelonia mydas*)
Green turtles are listed as threatened under the ESA, except for breeding populations found in Florida and the Pacific coast of Mexico, which are listed as endangered. Seminoff (2002) estimates that the global green turtle population has declined by 34% to 58% over the last three generations (approximately 150 years) although actual declines may be closer to 70% to 80%. Causes for this decline include harvest of eggs, subadults and adults, incidental capture by fisheries, loss of nesting habitat, and disease.

Green turtles are distinguished from other sea turtles by their smooth carapace with four pairs of lateral scutes, a single pair of prefrontal scales, four post-orbital scales, and a serrated upper and lower jaw. Adult green turtles have a light to dark brown carapace, sometimes shaded with olive, and can exceed one meter in carapace length and 200 kilograms (kg) in body mass. Females nesting in Hawaii averaged 92 cm in straight carapace length (SCL), while at the Olimarao Atoll off the State of Yap, Federated States of Micronesia, females averaged 104 cm in curved carapace length (CCL) and approximately 140 kg. Eastern Pacific green turtles are conspicuously smaller and lighter than their counterparts in the central and western Pacific. At the rookeries of Michoacán, Mexico, females averaged 82 cm in CCL, while males averaged 77 cm CCL (*in* NMFS and USFWS, 1998a). Nesting females at the Bramble Cay rookery in Queensland, Australia averaged 105.9 cm CCL (Limpus *et al*., 2001).

Green turtles are found throughout the world, occurring primarily in tropical, and to a lesser extent, subtropical waters. While some nesting populations of green turtles appear to be stable and/or increasing in areas of the Atlantic Ocean (e.g. Bujigos Archipelago (Guinea-Bissau), and Florida), declines of over 50% have been documented in the eastern and western Atlantic. Green turtles are also thought to be declining throughout the Pacific Ocean, with the exception of Hawaii, as a direct consequence of a historical combination of overexploitation and habitat loss (Eckert, 1993; Seminoff, 2002).

Hawksbill Sea Turtles *(Eretmochelys imbricata*)
The hawksbill turtle is listed as endangered under the ESA. Under Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the hawksbill is identified as "most endangered." This species is considered Critically Endangered by the International Union for the Conservation of Nature (IUCN) based on global population declines of over 80% during the last three generations (105 years) (Meylan and Donnelly 1999). Anecdotal reports throughout the Pacific indicate that the current population is well below historical levels. In the Pacific, this species is rapidly approaching extinction primarily due to the harvesting of the species for its meat, eggs, and shell, as well as the destruction of nesting habitat by human occupation and disruption (NMFS, 2001c).

The following characteristics distinguish the hawksbill from other sea turtles: two pairs of prefrontal scales; thick, posteriorly overlapping scutes on the carapace; four pairs of costal scutes; two claws on each flipper; and a beak-like mouth. The carapace is heart-shaped in very young turtles, and becomes more elongate or subovate with maturity. Its lateral and posterior

margins are sharply serrated in all but very old individuals. The epidermal scutes that overlay the bones of the shell are the tortoiseshell of commerce. They are unusually thick, and overlap posteriorly on the carapace in all but hatchlings and very old individuals. Carpacial scutes are often richly patterned with irregularly radiating streaks of brown or black on an amber background.

The hawksbill turtles occur in tropical and subtropical seas of the Atlantic, Pacific and Indian Oceans. In the U.S. Pacific Ocean, there have been no hawksbill sightings off the west coast. Hawksbills have been observed in the Gulf of California as far north as 29/N, throughout the northwestern states of Mexico, and south along the Central and South American coasts to Columbia and Ecuador. In the Hawaiian Islands, nesting occurs in the main islands, primarily on several small sand beaches on the Islands of Hawaii and Molokai. Two of these sites are at a remote location in the Hawaii Volcanos National Park.

Leatherback Sea Turtles (*Dermochelyts coriacea*)
The leatherback turtle is listed as endangered under the ESA throughout its global range. Increases in the number of nesting females have been noted at some sites in the Atlantic, but these are far outweighed by local extinctions, especially of island populations, and the demise of once large populations throughout the Pacific. Spotila *et al.* (1996) estimated the global population of female leatherback turtles to be only 34,500 nesting females; however, the eastern Pacific population has continued to decline since that estimate, leading some researchers to conclude that the leatherback is now on the verge of extinction in the Pacific Ocean (e.g. Spotila, *et al*., 1996; Spotila, *et al*., 2000).

Leatherback turtles are the largest of the marine turtles, with a CCL often exceeding 150 cm and front flippers that are proportionately larger than in other sea turtles and may span 270 cm on an adult (NMFS and USFWS, 1998a). In view of its unusual ecology, the leatherback is morphologically and physiologically distinct from other sea turtles. Its streamlined body, with a smooth, dermis-sheathed carapace and dorso-longitudinal ridges may improve laminar flow of this highly pelagic species. Leatherbacks nesting in the western Pacific are considerably larger than those nesting in the eastern Pacific. Adult females nesting in Michoacán, Mexico averaged 145 cm CCL (Sarti, unpublished data, *in* NMFS and USFWS, 1998a), while adult female leatherback turtles nesting in eastern Australia averaged 162 cm CCL (Limpus, *et al*., 1984, *in* NMFS and USFWS, 1998a).

Leatherback turtles are widely distributed throughout the oceans of the world, and are found in waters of the Atlantic, Pacific, and Indian Oceans, the Caribbean Sea, and the Gulf of Mexico with nesting aggregations in Mexico and Costa Rica (eastern Pacific) and Malaysia, Indonesia, Australia, the Solomon Islands, Papua New Guinea, Thailand, and Fiji (western Pacific). Leatherback turtles have the most extensive range of any living reptile and have been reported in all pelagic waters of the Pacific Ocean between 71°N and 47°S latitude and in all other major

pelagic ocean habitats (NMFS and USFWS, 1998a). For this reason, studies of their abundance, life history and ecology, and pelagic distribution are exceedingly difficult.

Globally, leatherback turtle populations have been decimated worldwide. In 1980, the leatherback population was estimated at approximately 115,000 (adult females) globally (Pritchard, 1982b). By 1995, this global population of adult females had declined to 34,500 (Spotila *et al.* 1996). Throughout the Pacific, leatherbacks are seriously declining at all major nesting beaches. The decline can be attributed to many factors, including fisheries interactions, direct harvest, egg collection, and degradation of habitat. On some beaches, nearly 100% of the eggs laid have been harvested. Eckert (1996) and Spotila *et al*. (1996) note that adult mortality has also increased significantly, particularly as a result of driftnet and longline fisheries.

Loggerhead Sea Turtles (*Caretta caretta)*
The loggerhead turtle is listed as threatened under the ESA throughout its range, primarily due to direct take, incidental capture in various fisheries, and the alteration and destruction of its habitat.
The loggerhead is characterized by a reddish brown, bony carapace, with a comparatively large head, up to 25 cm wide in some adults. They usually have five pairs of costal scutes, and three inframarginals without pores. Adult males have comparatively narrow shells, gradually tapering posteriorly, and long thick tales extending well beyond the edge of the carapace. Adults typically weigh between 80 and 150 kg, with average CCL measurements for adult females worldwide between 95-100 cm CCL (*in* Dodd, 1988) and adult males in Australia averaging around 97 cm CCL (Limpus, 1985, *in* Eckert, 1993). Juveniles found off California and Mexico measured between 20 and 80 cm (average 60 cm) in length (Eckert, 1993). Skeletochronological age estimates and growth rates were derived from small loggerheads caught in the Pacific high-seas driftnet fishery. Loggerheads less than 20 cm were estimated to be 3 years or less, while those greater than 36 cm were estimated to be 6 years or more. Age-specific growth rates for the first 10 years were estimated to be 4.2 cm/year (Zug, *et al*., 1995).

Loggerheads are circumglobal, inhabiting continental shelves, bays, estuaries, and lagoons in temperate, subtropical, and tropical waters. Major nesting grounds are generally located in temperate and subtropical regions, with scattered nesting in the tropics (*in* NMFS and USFWS, 1998b). In the Pacific Ocean, loggerhead turtles are represented by a northwestern Pacific nesting aggregation (located in Japan) which may be comprised of separate nesting groups (Hatase, *et al.*, 2002) and a smaller southwestern nesting aggregation that occurs in Australia (Great Barrier Reef and Queensland), New Caledonia, New Zealand, Indonesia, and Papua New Guinea.

Olive Ridley Sea Turtles (*Lepidochelys olivacea*)
Although the olive ridley is regarded as the most abundant sea turtle in the world, olive ridley nesting populations on the Pacific coast of Mexico are listed as endangered under the ESA; all other populations are listed as threatened.

Olive and Kemp's ridley are the smallest living sea turtles, with an adult carapace length between 60 and 70 cm, and rarely weighing over 50 kg. The olive ridleys are olive or grayish

green above, with a greenish white underpart, and adults are moderately sexually dimorphic (NMFS and USFWS, 1998c). They have an unusually broad carapace, a medium-sized head that is triangular in planar view, five to nine pairs of costal scutes and four inframarginals with pores.

Olive ridley turtles occur throughout the world, primarily in tropical and sub-tropical waters. The species is divided into three main populations, with distributions in the Pacific Ocean, Indian Ocean, and Atlantic Ocean. Nesting aggregations in the Pacific Ocean are found in the Marianas Islands, Australia, Indonesia, Malaysia, and Japan (western Pacific), and Mexico, Costa Rica, Guatemala, and South America (eastern Pacific). In the Indian Ocean, nesting aggregations have been documented in Sri Lanka, east Africa, Madagascar, and there are very large aggregations in Orissa, India. In the Atlantic Ocean, nesting aggregations occur from Senegal to Zaire, Brazil, French Guiana, Suriname, Guyana, Trinidad, and Venezuela.

Declines in eastern Pacific olive ridley populations have been documented in Playa Nancite, Costa Rica; however, other nesting populations along the Pacific coast of Mexico and Costa Rica appear to be stable or increasing, after an initial large decline due to harvesting of adults. Historically, an estimated 10 million olive ridleys inhabited the waters in the eastern Pacific off Mexico (NMFS and USFWS, 1998c). However, human-induced mortality led to declines in this population. Beginning in the 1960s, and lasting over the next 15 years, several million adult olive ridleys were harvested by Mexico for commercial trade with Europe and Japan. (NMFS and USFWS, 1998c). Although olive ridley meat is palatable, it was not widely sought after; its eggs, however, are considered a delicacy, and egg harvest is considered one of the major causes for its decline. Fisheries for olive ridley turtles were also established in Ecuador during the 1960s and 1970s to supply Europe with leather (Green and Ortiz-Crespo, 1982).

Kemp's Ridley Sea Turtle (*Lepidochelys kempii*)
Olive and Kemp's ridley are the smallest living sea turtles, with the weight of an adult generally being less than 45 kg and the straight carapace length around 65 cm. Adult Kemp's ridleys' shells are almost as wide as long. Coloration changes significantly during development from the grey-black carapace and plastron of hatchlings to the lighter grey-olive carapace and cream-white or yellowish plastron of adults. There are two pairs of prefrontal scales on the head, five vertebral scutes, five pairs of coastal scutes and generally twelve pairs of marginals on the carapace. In each bridge adjoining the plastron to the carapace, there are four scutes, each of which is perforated by a pore. This is the external opening of Rathke's gland which secretes a substance of unknown (possibly a pheromone) function. Males resemble the females in size and coloration. Secondary sexual characteristics of male sea turtles include a longer tail, more distal vent, recurved claws and, during breeding, a softened mid-plastron. Eggs are 34-45 mm in diameter and 24-40 g in weight. Hatchlings range from 42-48 mm in straight line carapace length, 32-44 mm in width and 15-20 g in weight.

The major nesting beach for Kemp's ridleys is on the northeastern coast of Mexico. This location is near Rancho Nuevo in southern Tamaulipas. The species occurs mainly in coastal areas of the Gulf of Mexico and the northwestern Atlantic Ocean. Neonatal Kemp's ridleys feed on the available sargassum and associated infauna or other epipelagic species found in the Gulf of Mexico. In post-pelagic stages, the ridley is largely a crab-eater, with a preference for portunid

crabs. Age at sexual maturity is not known, but is believed to be approximately 7-15 years, although other estimates of age at maturity range as high as 35 years.

The main threats from human impacts to the Kemp's Ridley are: destruction and disturbance in the nesting environment, entanglement and bycatch in fishing gear; pollution and debris; and dredging operations (NMFS website).

3.2.2 MMPA-Depleted Marine Mammal Species in the Action Area Directly Targeted for Research

Under the MMPA, a stock is designated as depleted when it falls below its optimum sustainable population. The MMPA defines optimum sustainable population as "the number of animals which would result in the maximum productivity of the population or the species, keeping in mind the optimum carrying capacity of the habitat and the health of the ecosystem of which they form a constituent element" (16 U.S.C. 1362). NMFS regulations have further defined optimum sustainable population as "a population size, which falls within a range from [the carrying capacity of the] ecosystem to the population level that results in maximum net productivity." Once stocks have been designated as depleted, a conservation plan is developed to guide research and management actions to restore the population. All marine mammals stocks/species listed under the ESA are also considered depleted under the MMPA. However, some marine mammal stocks have only been designated by NMFS as depleted under the MMPA, including: Eastern spinner dolphins (*Stenella longirostris orientalis*), North Pacific fur seals (*Callorhinus ursinus*), Northeastern offshore spotted dolphins (*Stenella attenuata*), coastal spotted dolphins (*Stenella attenuata graffmani*), Cook Inlet beluga whales (*Delphinapterus leucas*), North Pacific Southern Resident killer whales (*Orcinus orca*), and AT1 group of transient killer whales (Prince William Sound, Alaska). Research activities contained under the proposed action for these species would range from photo-identification and behavioral observation to biopsy sampling and captures for tagging. (See Appendix E for more information on takes requested under the proposed action for these species.)

3.2.3 Other Marine Mammal Species in Action Area Targeted for Direct Takes But Not Listed under the ESA or as Depleted Under the MMPA

Takes for several marine mammal species that are not listed under the ESA or depleted under the MMPA have been requested under the proposed action and have been considered under the ESA. (See Appendix E for more information on takes requested under the proposed action for these species.)

3.2.4 Other Species in Action Area NOT Directly Targeted for Research

Other species occur within the action area and were considered under this EA. However, research is not directed at these species and any impacts would be considered incidental to the proposed action. In some cases, these species are listed under the ESA. Some examples include: Chinook salmon, Puget Sound's population (*Oncorhynchus tshawytscha*), short-tailed albatross *(Phoebastria albatrus),* Stellers eider (*Polysticta stelleri*), spectacled eider (*Somateria fischeri*), Guadalupe fur seal (*Arctocephalus townsendi*), flatback sea turtle (*Natator depressus*), Hawaiian Monk Seals (*Monachus schauinslandi*), Northern sea otter *(Enhydra lutris kenyoni),* and Southern sea otter (*Enhydra lutris nereis*). In other cases, these non-target species are not listed under the ESA or designated as depleted under the MMPA. These include various species of marine mammals, plants, fish, sea birds and invertebrates.

SECTION 4 ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES

This section represents the scientific and analytic basis for comparison of the direct, indirect, and cumulative effects of the alternatives. Regulations for implementing the provisions of NEPA require consideration of both the context and intensity of a proposed action (40 CFR Parts 1500-1508). Thus, the significance must be analyzed in several contexts, such as society as a whole, the affected resources and regions, and the affected interests. Intensity refers to the severity of the impact and the following specific aspects that must be considered: (1) beneficial or adverse significant effects; (2) substantial adverse impact on public health and safety and/or involve highly toxic agents or pathogens; (3) affect on any unique characteristics of the geographic area; (4) controversial effects on the quality of the human environment; (5) involve highly uncertain effects or unique or unknown risks; (6) establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration; (7) result in cumulative adverse effects on target species or non-target species; (8) adversely affect 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; (9) result in substantial adverse impact on endangered or threatened species, marine mammals, or critical habitat of these species; (10) result in a violation of Federal, state or local law for environmental protection; (11) result in the introduction or spread of non-indigenous species; (12) allow substantial damage to the ocean and coastal habitats and/or essential fish habitat as defined under the Magnuson-Stevens Act and identified in Fishery Management Plans; (13) have substantial impact on biodiversity and ecosystem function within the affected area; and (14) result in significant social or economic impacts interrelated with significant natural or physical environmental effects.

The economic effects of the Alternatives are minimal and mainly involve the effects on the researchers involved in the research, as well as any industries that support the research, such as charter vessels and suppliers of equipment. The effects of all alternatives considered would likely be equally positive but minimal with respect to these entities.

The proposed action area includes U.S. territorial waters and high seas of the North Pacific Ocean (including the Gulf of Alaska and Bering Sea), Arctic Ocean (including the Chukchi Sea and Beaufort Sea), Southern Ocean (including waters off Antarctica), and foreign territorial waters of Mexico (Gulf of California only), Canada, Russia, Japan and the Philippines. Within this area, there are a number of marine protected habitats, designated critical habitat or essential fish habitat (many of which are described in Section 3). NMFS has considered whether the proposed action would result in any measurable impact to these resources. Given that the proposed research activities contained under the proposed action are directed at the target marine mammal and sea turtle species and not the physical environment, NMFS concludes that the proposed action would result in no measurable impact on the physical environment and these cultural and historic resources within the proposed action area. In addition, for activities occurring in foreign waters, NMFS would advise applicants that these other nations within the proposed action area may have additional requirements (e.g., permits) that researchers would need to meet in order to conduct research. Therefore, NMFS has determined that the proposed action is not likely to affect any marine sanctuaries, critical habitat, essential fish habitat or

marine protected areas because none of the proposed techniques have a measurable potential to alter any substrate or the marine environment in general.

The issue most relevant to the analysis of Alternatives is the potential for negative impacts on wildlife within the proposed action area. For species that are the focus of the proposed action (e.g., target species outlined in Section 3), this would mainly include any impacts from the proposed research activities. For species that are not the focus of research (e.g., non-target species outlined in Section 3), the potential exists for incidental harassment of these species that occur in the vicinity during the proposed action. However, the number is small and any harassment is not likely to have a measurable long-term effect on stocks or populations. As the likelihood of impacts to these non-target species is low, the following analysis of environmental consequences of the alternatives focuses primarily on the potential impacts of the proposed action for takes directed at target species as outlined in the proposed action. This includes ESA-listed and MMPA-depleted species of marine mammals and sea turtles.

4.1 Alternative 1 – No Action

Under the No Action Alternative, which describes the Status Quo conditions (baseline), the proposed permits and permit amendments would not be issued and the scientific research proposed in File Nos. 1029-1675, 662-1661, 1039-1699, 473-1700, 1049-1718, 716-1705, 753-1599, 1035-1688, 642-1536, 774-1714, and 782-1719 would not take place. Marine animals and sea turtles living within the action area would still be exposed to vessel traffic and anthropogenic effects, including existing permitted scientific research, that occur in those environments as part of the Status Quo. This includes a total of 23 permits that currently authorize takes on the same target species in the proposed action area. Takes in these permits occur by a variety of research and enhancement activities involving harassment, as defined under the MMPA, and take as defined under the ESA. Appendix E lists all permits currently authorized, and their combined take information for ESA-listed species, that would remain in effect under Alternative 1. A description of each activity authorized by these permits and those in the proposed action follows in section 4.2 under Alternative 2.

4.2 Alternative 2 – Proposed Action: Issue new permits and amendments as requested by applicants (Preferred Alternative)

Under this alternative, the proposed permits and amendments would be issued and the scientific research proposed in File Nos. 1029-1675, 662-1661, 1039-1699, 473-1700, 1049-1718, 716-1705, 753-1599, 1035-1688, 642-1536, 774-1714, and 782-1719 would take place. Therefore, these authorized takes would be in addition to those currently authorized. Detail on the takes requested in the proposed action can be found in Appendix E which provides an overview of the number of existing takes, proposed takes and a total number of takes that would exist should Alternative 2- Proposed Action (Preferred Alternative) be instituted.

For comparison purposes, takes across existing permits and those in the proposed action have been standardized into the following categories:

Marine Mammal Species

- Close approach by vessel or aircraft for shipboard and aerial line-transect surveys, photo-identification, photogrammetry, behavioral observation, passive acoustic recording and playbacks, collection of feces or sloughed skin, prey sampling and underwater observation
- Attachment of scientific instruments (tagging), both by implantable and suction cup tags [Note: This section excludes information on the tagging of beluga whales in waters off Alaska. Protocols and tag information for this species are contained in the Capture, Sampling, Tagging and Release of beluga whales in Alaska section below.]
- Biopsy sampling, including skin and blubber biopsy and swabbing
- Capture, Sampling, Tagging and Release of beluga whales in Alaska
- Import/export of parts collected during research activities
- Harassment incidental to research activities

Sea Turtle Species

- Close approach for photo-identification and capture/handling of sea turtles for various measuring and sampling techniques

Close approach by vessel or aircraft for shipboard and aerial line-transect surveys, photo-identification, photogrammetry, behavioral observation, acoustic recording and playbacks, collection of feces or sloughed skin, prey sampling and underwater observation: The tables in Appendix E specify the increase in the annual number of takes in this category through implementation of Alternative 2- Proposed Action (Preferred Alternative). As the proposed research methodologies in this category all involve close approaches by vessels and aircraft and no direct contact with the animal and as these close approaches have the greatest potential for disturbance (rather than the actual photo-identification, behavioral observation, etc.), the analysis of the effects of these methodologies mainly focuses on the known and potential impacts of close vessel and aerial approaches on the requested species during targeted scientific research.

In general, small boats, including inflatable-hulled boats, are often used to approach marine mammals *for photo-identification and behavioral observation* and as a prelude to further research (*e.g.*, to obtain biopsy samples or to apply a tag). When photographs are taken from boats, the animals would be approached closely enough to optimize photographic quality (i.e., well-focused images, utilizing at least one half of the slide viewing area). Single lens reflex or digital cameras equipped with telephoto lenses and high-speed film are usually used to collect photo-identifications. Distance for optimal approach varies with the species being photographed. Generally, large whales are approached within approximately 15-20 m. Smaller animals are approached within approximately 5-10 m. Photographs of bow-riding animals are also taken on an opportunistic basis from the bow of the main research vessel and these animals approach the vessel on their own. These photographs are the primary method of abundance estimation for many marine mammal species, and they are also used for stock identification.

The standard protocol for *aerial surveys* involves flying along predetermined transect lines at a set altitude (generally between 500-1,000 ft (152-304 meters) but as low as 300-500 ft (91-304

meters) for beluga whales and air speed while observers scan the water for signs of marine mammals. The survey plane descends and circles over the animal(s) to obtain photographs when an animal is sighted. Although traditionally fixed-wing aircraft are used for aerial surveys, some researchers employ helicopters, blimps and aerostats (tethered balloon) to conduct their research. Aerial surveys can cover larger distances in less time than vessels. Specifically for pinnipeds, surveys are generally flown in the higher range of the altitudes (e.g., greater than 500 ft (152 meters)) to avoid flushing the animals.

Vessel surveys using line-transect sampling methods would be used to collect data for estimating abundance of cetaceans (Barlow 1995, Moore et al. 2002, Buckland et al. 1993). Three to eight observers rotate through at least three positions (port and starboard observers, and a data recorder) during daylight hours and weather permitting (sea state is Beaufort 0-5 and minimal rain). Observers rotate every 30 or 40 minutes between the three positions and a rest period. Either 25x "bigeye" or 7x handheld binoculars are used. The port observer would survey from 10º right to 90º left of the trackline and the starboard observer from 10º left to 90º right of the trackline. The recorder would scan the entire 180º area forward of the ship, focusing primarily on the trackline, using 7x reticled binoculars to confirm sightings. The ship's global positioning system (GPS) unit or a handheld GPS would interface with a portable computer at the recorder's station. A standardized survey software program such as WinCruz would be used to collect standard line-transect information. The date, time, and position of the vessel are automatically entered into the survey program every 5 min and whenever data are entered by the recorder. At the start of each trackline, observer positions, and environmental conditions would be entered. Environmental conditions include sea state (Beaufort scale), swell height and direction, weather (rain, fog, no rain or fog, both rain and fog), horizontal and vertical positions of the sun, wind speed and visibility. Sighting information include cue (blow, splash, animal), method (binocular type or naked eye), vertical distance (taken from reticles in the binoculars), angle relative to the ship's heading (from an angle ring on the binocular mount or an angle board), species, and group size (best, high, and low count). Where appropriate, the line-transect effort is temporarily suspended to approach a group to facilitate species identification or group-size estimation, or to conduct photo-identification or biopsy sampling. Methods are similar to those used in small vessel methods. After obtaining this data, the vessel rejoins at the line transect point where it disengaged and continues with the survey. Line-transect data for the estimation of abundance are analyzed using DISTANCE sampling methods (Buckland et al. 1993; Thomas et al. 1998).

Photogrammetry is the technique of measuring objects (2D or 3D) from photo-grammes. These are commonly photographs but may also imagery stored electronically on tape or disk taken by video cameras, charge-coupled device (CCD) cameras or radiation sensors such as scanners. Images are generally taken from a high-speed aircraft flying at low altitudes. The camera is mounted in the belly of the aircraft and takes large-format, motion-compensated photographs. For these research activities, photographs are generally taken at altitudes between 500 and 700 ft (152-213 meters). When used from a vessel, it can assist researchers in measuring the approximate length of focal animals.

Four of the proposed permit actions, Ann Zoidis (file no. 1039-1699), Jim Darling, Ph.D. (file no. 753-1599), Joe Mobley, Ph.D. (file no. 642-1536) and NMML (file no. 782-1702) would

authorize *underwater photo-identification and behavioral observation* of humpback whales. Evidence of adverse effects resulting from this activity is not apparent. The central North Pacific humpback whale population appears to have increased since 1966 (Calambokidis, *et al.*, 1997). Any adverse effects of this activity would be minimized by the requirements in the permits (see below and Section 5: Mitigation section). Therefore, NMFS believes that disturbance from the presence of researchers in the water, within the context of the proposed permit actions, is not likely to adversely affect the likelihood that these whales would survive or recover in the wild. Adverse effects would be minimized by the requirement in the permits that the divers terminate their activity or approach if there are signs of adverse changes in or evasive behavior.

Collection of feces or pieces of skin naturally shed or sloughed is a non-invasive technique for acquiring tissue samples for genetic analysis. In the case of cetaceans, feces can be directly collected in the water column either directly from the vessel or by a diver in the water. For pinnipeds, feces (scat) can be collected directly from haul-out or rookery sites. Pieces of sloughed skin can aggregate in the wake behind a moving animal, the slick "footprint" after a whale submerges, or in the rough water following surface active behaviors such as breaching or social behaviors that often involve physical contact between whales. Skin can also be retrieved from the suction cup portion of scientific instruments temporarily attached to whales.

Six of the proposed permit actions include the *collection of prey samples* during the course of research. For Tynan (file no. 1035-1688), large whale prey sampling would occur by close approach of small-boat and collection of prey using dip nets or towed zooplankton nets. For NMML (file no. 782-1719) and the SWFSC (file no. 774-1714), prey sampling would occur using collection of feces. For Matkin (file no. 662-1661), Straley (file no. 473-1700) and Wynne (1049-1718), dead parts of marine mammals would be collected directly following killer whale predation events to identify the prey species, stock affiliation and sex through genetic analysis. Collection of dead prey parts would occur immediately following a killer whale predation event. These parts include small bits, fragments and pieces of skin, blubber and body. Researchers would observe the killer whales from distances exceeding 200m to determine where the whales move in relation to the distribution of potential prey. The approach is to first observe these predation events from a distance with high-powered binoculars. When whales change location remains of prey would be collected with a long handled dip net and either frozen or placed in vials of dimethyl sulfoxide or ethanol for later genetic analysis. In all permit applications including prey collection, takes of animals by harassment incidental to these activities has been requested with the potential for takes occurring by close vessel approach only. This is because the presence of the vessel in collecting the prey and dead parts may incidentally harass live animals present in the vicinity of the vessel.

In general, *acoustic recording* simply involves the use of hydrophone (underwater microphone). The hydrophone would be placed in the water directly off the vessel and sounds are then recorded and taped via an apparatus on the vessel. The actual presence of the hydrophone in the marine environment is not expected to have any impact on marine mammals or the marine environment. On occasion, researchers have noted some instances of animals investigating the hydrophone but NMFS is not aware of any documentation of the presence of a hydrophone, or similar recording device, resulting in any significant impact.

Playback experiments would occur under permits issued to Sharpe (file no. 716-1705) and Darling (file no. 753-1599), in which a total of 280 humpback whales annually on the Alaskan feeding grounds, and a total of 100 humpback whales annually on the Hawaiian breeding grounds respectively would be exposed to playbacks of pre-recorded humpback whale songs, social sounds, and feeding calls at a maximum source level of 155 dB re 1 μPa at 1 m. Whales would also be exposed to synthesized sounds similar in frequency and average source level to normal humpback whale sounds, and to playback of blank tapes as a control. No playbacks of any sounds would exceed a maximum source level of 155 dB re 1 μPa at 1 m, which is below the maximum source levels estimated for vocalizing humpback whales (Levenson 1972, cited in Tyack 1983). Sounds/songs would be projected from an underwater speaker, such as the Lubell LL-9162 Underwater Acoustic Transducer, which is hung over the side of a small vessel approximately 100 meters from the focal animal(s). Sound/song would then be projected from the speaker at a volume and quality as close to a real whale sound/song as possible. The playback system would be calibrated so precise levels of sound can be projected. The reaction of the different subject whales to the sounds/songs would then be measured, most often through behavioral observation and photo-identification/video recording of the subject animal(s) from a second vessel at that animal's location.

The source broadcast level would depend on the whale(s) distance from the playback vessel, but no whale would be exposed to received levels greater than 155 dB at 1 meter. The best estimate of maximum source levels from singing humpback whales is about 187 dB (W. Au pers. comm. 2003). At this source level, for a conspecific about 90 ft. (27 meters or approximately two whale lengths) away the received level would be 158 dB. Each playback trial lasts approximately 60 minutes and consist of three parts: 20 minutes pre-test passive observation, 20 minutes broadcasting of sounds or blank tape (control), and 20 minutes post-test phase monitoring of animal activity. This work generally requires at least two vessels: one with the playback equipment and another with the subject animal listening to the playback by hydrophone. All locations and distances would be determined by GPS. Further, the validity of the study depends on the controls established around the experiment. This would be done in two ways. First, the playbacks would be conducted when there is a reduced density of whales and activity in the region. Second, every effort would be made to document all whales in the vicinity of the subject whale at any trial. This would be accomplished with a minimum of a third vessel and hillside observer, and on a few occasions with a helicopter hovering over the experiment at 1,000 ft. (304 meters) to determine if other whales are present in a 1 km square around the playback.

No group of animals would be subject to more than one of the playback trials on a given day. Every attempt would be made to limit the total number of playbacks to any given whale to 15 during the season. It is anticipated that the different sounds would elicit varying responses from the animals. It is difficult to estimate how many animals would be unintentionally harassed during the course of the playbacks to target animals. However, the output of the playback system is sufficiently low that any measurable response from animals outside the 1.5 km radius playback zone would be unlikely.

Background on humpback vocalizations
Among the baleen whales, humpbacks are noted for their unusually large and varied vocal repertoire. Their sounds have been classified into three basic categories: songs, social sounds, and feeding calls. Songs consist of long, complexly structured, vocal sequences that are generally produced by males and are associated with reproductive activities on the subtropical wintering grounds (Payne and McVay 1971, Winn et al. 1970, Darling et al. 1983, Glockner 1983, Baker 1985). Social sounds typically consist of unpatterned whistles, grunts, and moans, are produced by both sexes, and are associated with groups of animals in both reproductive and feeding contexts (Tyack 1983, Silber 1986). By comparison, the humpbacks' feeding calls consist of a series of relatively uniform, trumpet-like blasts that are produced when feeding on schools of fish (Jurasz and Jurasz 1979, Baker 1985, D' Vincent et al. 1985).

As noted in Richardson et al (1995), the characteristics of underwater sounds produced by humpback whales are as follows:

Signal Type	Frequency Range (Hz)	Dominant Frequencies (Hz)	Source Level (dB re 1 μPa at 1 m)
Song components	30-8,000	120-4,000	144-174
Shrieks	---	750-1,800	179-181
Horn blasts	---	410-420	181-185
Moans	20-1,800	35-360	175
Grunts	25-1,900+	---	190
Pulse trains	25-1,250	25-80	179-181
Underwater blows	100-2,000	---	158
Fluke & flipper slap	30-1,200	---	183-192
Clicks	2,000-8,200	---	---

Humpback whales are less vocal in the summer feeding grounds than in the winter breeding grounds. In southeast Alaska, humpback whale sounds are at approximately 20-2,000 Hz, have median durations of 0.2-0.8 seconds and estimated source levels of 175-192 dB re 1 μPa-m (Thompson et al, 1986). These sounds mostly occur during feeding. Social sounds differ significantly from songs and feeding calls, and typically consist of unpatterned whistles, grunts, and moans (Thomson et al. 1977, Baker and Herman1984, Tyack 1983, Silber 1986).

In the Hawaii breeding grounds, Silber (1986) found that breeding social sounds were almost exclusively associated with aggressive encounters between adult males competing for social dominance or access to females and that these sounds were associated with high-energy behaviors such as breaching, flipper and tail slapping, ramming, and sub-surface bubbling. In the Alaska feeding grounds, social sounds are associated with feeding groups containing both sexes and all age classes (Sharpe, pers. obser.) and are also associated with disaffiliation, or occur during periods when group cohesion breaks down (Nilson et al. 1989).

Extensive research has been conducted on the winter song. In general, songs tend to be rhythmic, continuous, and produced principally by solitary males. Specifically, humpback song

components range from ≤ 20 Hz to 4 Hz and occasionally up to 8 Hz. Estimated source levels average 155 dB re 1 μPa and range from 144 to 177 dB (Thompson et al, 1979, Payne and Payne, 1985). Songs can be detected by hydrophone at distance of at least 13-15 km (Winn et al., 1975) and songs can last as long as 30 minutes and repeat up to a 22 hour period (Payne and McVay, 1971). There are several hypotheses concerning the song's function including spacing of singers, sexual advertisement and courtship, reproductive synchrony, and maintaining cohesion of migratory groups (see Payne and McVay 1971, Herman and Tavolga 1980, Tyack 1981, Darling 1983, Baker and Herman 1984).

While in the winter breeding grounds, humpback whale sounds produced in groups are markedly different than those of solitary animals. These social sounds are often indicative of antagonistic behavior among males competing for dominance and breeding access to females. These sounds extend from 50 Hz to ≥10kHz with most energy below 3kHz (Silber 1986).

Based on the proposed source levels and received levels, source levels of vocalizations produced by humpback whales, and the design of the experiments, any behavioral impacts to humpback whales are likely to be short-term and negligible. Therefore, NMFS does not believe disturbances from these activities are likely to reduce the reproduction, numbers, or distribution of these whale species and, consequently, are not likely to have a significant cumulative effect on any endangered species.

Potential Impacts of Research Activities in this Category

For all of these research activities, the presence of vessels can lead to disturbance of marine mammals although the animals' reaction is generally short-term and of a low impact. Several researchers have studied the short-term responses of humpback whales to disturbance (Baker et al. 1983; Bauer and Herman 1986; Hall 1982; Krieger and Wing 1984). Baker et al. (1983) described two responses of whales to vessels, including: (1) "horizontal avoidance" of vessels 2,000 to 4,000 meters away characterized by faster swimming and fewer long dives; and (2) "vertical avoidance" of vessels from 0 to 2,000 meters away during which whales swam more slowly, but spent more time submerged. Additional studies of baleen whales, specifically bowhead and gray whales have clearly documented a pattern of short-term, behavioral disturbance in response to a variety of actual and simulated vessel activity and noise (Richardson et. al, 1985; Malme et. al, 1983). Studies of bowhead whales revealed that these whales oriented themselves in relation to a vessel when the engine was on, and a significant avoidance response was invoked simply by turning the engine on, even at a distance of approximately 3,000 ft (900 m). Watkins *et al.* (1981) found that both fin and humpback whales appeared to react to vessel approach by increasing swim speed, exhibiting a startled reaction, and moving away from the vessel with strong fluke motions. Studies of humpback whales on their summering grounds, as summarized by Baker et al. (1983) and Baker and Herman (1987), and on their wintering grounds, as summarized by Bauer and Herman (1986), found similar patterns of disturbance in response to vessel activity. In addition, several researchers (including North Gulf Oceanic Society (NGOS), James Darling, and Janice Straley) noted in prior permit annual reports that most whales showed no reaction to their research vessels. For example, NGOS noted in their 1999 permit report that they observed signs that whales were disturbed in only 3 out of 51 encounters with whales (reactions from these encounters included breaching, slapping tail and

pectoral fin, and diving away from research vessel). In general, most permits under the proposed action utilize one or two research vessels. The proposed permits for NMML (782-1719) and the SWFSC (774-1714) may utilize more than two vessels at a time due to the nature of the proposed research and stock assessment activities. In addition, certain research activities, such as playbacks, would temporarily involve additional vessels. Therefore, up to 30 vessels would be engaged in research activities.

Disturbance of pinnipeds from aircraft and vessel traffic has been observed to have highly variable effects depending on the species (Calkins and Pitcher 1982). In studies of Steller sea lions, reactions ranged from none to complete and immediate departure from the haulout, i.e. a stampede. In most cases, the potential impact to the animal is limited mainly to disturbance with the animal still remaining at the haul out site. However, when Steller sea lions and other pinnipeds are frightened off rookeries, pups may be trampled, or even abandoned. Juvenile and adult animals can also be injured during stampedes as animals run over each other or slide or crash into cliff facings or underwater rocks in their haste to escape the presence of researchers. For these reasons, mitigation measures would be implemented in any proposed permit actions involving close vessel or aerial approaches to rookeries or haul outs (see Section five).

In general, NMFS has recognized that approaches to marine mammals by aircraft below certain altitudes could harass marine mammals. NMFS has imposed restrictions on these types of approaches as conditions in various permits. Based on reports from surveys of similar activities associated with Pacific Ocean populations of whales, about six percent of the individual whales surveyed under these reports showed behavior indicative of disturbance (e.g., diving or changing their behavior) coincident with the approach of aircraft. About seven percent of the humpback whales approached during aerial surveys changed their behavior coincident with the approach of aircraft. The approach of these whales by the aircraft did not appear to result in long-term changes in the whales' behavior that would suggest long-term adverse effects on individuals, pods, or populations. Therefore, NMFS has determined that disturbances from these activities would not have a significant cumulative on these species.

For pinnipeds, the incidence of stampedes in response to aerial surveys flown is not known. Researchers report that only a small percentage (less than 1%) of animals were observed to be affected by the survey planes, but the magnitude or type of response was not reported. As aerial surveys have the potential to flush animals or create stampedes, researchers propose mitigation measures to limit disturbance, such as maximum flight approach distances. In addition, none of the proposed permit actions involve the direct surveying of pinnipeds but rather focus on cetaceans. As such, the presence of aircraft near rookeries or haul out sites should be minimal. Therefore, NMFS has determined that disturbances from aerial overflights would not have a significant cumulative effect on these non-target species.

There is currently considerable concern over the effects of human-produced sounds on marine mammals. However, the source levels of the sounds produced under these proposed permit actions would be sufficiently low (less than 155 dB) and produced at a large enough distance from the animal (minimum 100 m) to not result in levels that are painful or overly disruptive to the animals. Previous tests indicate that the sounds produced by these proposed playback

equipments would be far less powerful and attenuate much more rapidly than other human sound sources in the study area such as cruise ships, tugs with barges, commercial fishing vessels and large pleasure craft.

Indirect indications are that baleen whales are most sensitive to low-frequency sounds. However, there is evidence that humpback whales reacted to sonar signals at 3.1-3.6 kHz (Richardson *et al*., 1995). Baleen whales were observed to react to sounds at frequencies up to 28 kHz, but did not respond to pingers and sonars at 36 kHz and above (Richardson *et al*., 1995). Indirect evidence suggests that baleen whales are most sensitive to frequencies below 1 kHz, but some can hear sounds up to much higher frequencies. If baleen whales have thresholds similar to other marine mammals, which range between 40 and 70 dB re 1µPa at the frequencies to which they are most sensitive, then baleen whales' ability to detect sounds is most likely limited by oceanic ambient noise (Richardson et al. 1995). Average ambient noise levels in the ocean are above 75 dB re 1µPa in all 1/3-octave bands below 1 kHz, even in quiet conditions (sea state 1) and without nearby industrial activities.

Specifically in regards to the playback experiments, a biological opinion (NMFS 2001b) on a proposed amendment involving playback experiments (Permit No. 981-1578) estimated that baleen whales might experience permanent loss of hearing after exposure to sounds at levels at or above 235dB re 1 µPa. It was also estimated that there was some risk of changes in hearing from prolonged exposure of animals to received levels of sounds above 160dB re 1 µPa. The biological opinion concluded that it was not likely that any baleen whales would experience significant effects based on the fact that sounds in the experiments would be brief, and that focal animals are likely to be exposed for only one experiment.

Previous similar playback experiments with humpback whales have not resulted in any reported reactions by the whales other than minor disturbance. For example, under Sharpe's prior permit (file no. 716-1456), relatively few changes in behavior or approaches to the playback speaker were noted. In addition, previous work done by Frankel, Herman, Mobley, and Clark on playbacks of various sources to humpback whales in waters off Hawaii indicate only transient effects to whales ranging from rapid approach to the playback vessel, to slight avoidance, to no reaction (Frankel and Clark 1998; Frankel and Clark 2000; Frankel and Clark 2002; Frankel, Mobley, and Herman 1995; Mobley, Herman, and Frankel 1988). The work in Hawaii indicated that some whales (not cows with calves) were attracted to playback of social sounds (sounds made by whales in competitive groups), but no whales approached, and the majority of whales moved away from song playbacks (Tyack, 1983). Baker and Herman (1984) found that song and synthetic sounds were played to humpbacks with no notable response to either. A 1988 study indicated that whales were attracted to playbacks of feeding sounds from Alaska and, like the Tyack (1983) study, social sounds from competitive groups. In a small percentage of trials (3 of 89), whales approached a song playback but this was a smaller percentage than responded to synthetic sounds (Mobley et al, 1988).

For all of the research activities in this category, NMFS concludes that, based on published information on the effects of these activities on large cetaceans and pinniped species, unpublished reports from previous research conducted by the permit applicants, and expert

advice of agency marine mammal biologists, close vessel and aerial approaches for these research activities, considered individually and as a group, are not likely to disrupt the migration, breathing, nursing, feeding, breeding, or sheltering behavior of marine mammals. Therefore, NMFS believes that disturbance from these activities is not likely to have a significant cumulative effect on these research animals.

Attachment of scientific instrument (tagging), both by implantable and suction cup tags: Appendix E specifies the increase in the annual number of takes in this category through implementation of the Alternative 2- Proposed Action (Preferred Alternative). Analysis of the effects of close vessel approaches that take place during tagging activities has been outlined above. The following information, therefore, focuses on the known effects and potential impacts of the actual attachment of scientific instruments by implantable or suction cup tags. These activities involve physical contact of some sort with the animal, and are generally categorized as having the potential to injure the animal. Tagging takes under the proposed action are only requested for cetacean species so the effects of tagging on pinnipeds are not considered under this EA. None of the proposed tagging devices include hazardous materials.

It is also important to note that no tagging would occur on large cetacean calves less than six months of age or females accompanying such calves. In addition, for North Pacific right whales, no calves of any age may be tagged and only females attending calves greater than six months of age would be tagged. For small cetaceans, no tagging would occur for calves less than one year of age. Therefore, tagging of these age classes and groupings are not considered under this EA.

A tag for remote deployment has three basic components: an instrument package, an attachment mechanism and a deployment system. All three components are integrated and each places design constraints on the other two. A variety of scientific instruments, such as VHF tags and satellite-linked time depth recorders, can be attached to marine mammals for collection of a wide-range of data including location, dive and movement patterns, and ambient noise levels. This information is then used to infer habitat use, migratory and foraging behavior, and habitat quality, which in turn is used to make management decisions for the conservation and recovery of a species. As with ultrasound measurements and photo-identification, it is necessary to closely approach the animal to ensure proper tag placement. Tag attachment can be and usually is performed concurrent with photo-identification. The duration of the tag placement can be from a few hours to a few days and ultimately the tag is released from the animal and retrieved by the researcher.
As research needs evolve, the instrument packages deployed would include new components and devices such as sensors to monitor and record vitals (respiration, cardiac function, and heart rate). Although the exact size and shape of a new or enhanced tag cannot be predetermined, the frontal area would be not greater than 1% of the frontal area of the animal and the total weight in water would be limited to 0.1% total body weight. Shapes would be streamlined to reduce drag as much as possible. If any of the changes exceed the dimensions listed above or require invasive techniques other than those described under the attachment mechanism section, then a modification to the permit would be required. NMFS believes that the flexibility in tag types described above is important in meeting research and management goals and does not consider this flexibility to have any significant impact on take levels.

Generally, tags are attached by crossbow, compound bow, rifles, spear guns, slingshot or throwing device or pole or jab spears. Attachments are temporary and occur through a suction cup device or implant (generally by mounting the instrument on an arrow tip or other device designed to penetrate the skin of the animal). The basic principle for tag delivery is to minimize the potential for disturbing the animals. For large, slow moving whales, a pole delivery system is used similar to that developed by Moore *et al* (2001). Specifically, a 10-12 m pole is cantilevered from the bow of a small boat and allows tag attachment via suction cups from a greater distance than is typically possible with typical pole deployments. In some settings, for example with beaked whales or bow-riding dolphins, it may be simpler to hand hold a 2-4 m pole to deploy the tag. Baird successfully attached tags to porpoises in Puget Sound (Hanson and Baird 1998) and pilot whales in the Mediterranean (Baird et al. 2002) using this approach. In some settings, such as with larger, fast-moving toothed whales that do not bow-ride, it is preferable to use a cross bow to apply the tag remotely. Baird (1994) for example, has found the cross bow to be the best attachment method for killer whales. For cross bow attachments, the slight loss of precision in location of attachment is outweighed by the ability to rapidly attach the tag remotely from a greater distance. Tags are attached on the dorsal surface of the animal behind (caudal to) the blowhole and closer to the dorsal fin than to the blowhole. This tag placement ensures that the tag will not cover or obstruct the whale's blowhole. Even if the suction cup were to migrate along the whale's body after placement, the movement would be toward the tail (*i.e.,* further away from the blowhole) due to the forward motion of the whale.

Tag Types

CRITTERCAM Tags (suction cup attachment)– Three of the proposed permit actions, Sharpe (file no. 716-1705), Straley (file no. 473-1700), and NMML (782-1719) would employ "CRITTERCAM" tags. CRITTERCAM is a recently developed tool for studying animal behavior and ecology in the marine environment. It is essentially a video camera on a suction cup. It has been used on pinnipeds, sea turtles, sharks, and sperm whales. Sharpe has already successfully used CRITTERCAM tags to examine foraging behavior of humpback whales. Straley has already used the CRITTERCAM to determine the mechanics of sperm whale depredation of fish caught on longline gear in the waters of Alaska.

The CRITTERCAM tag is neutrally buoyant and is attached with one to ten suction cups. Hi8 systems are 4 inches (10 cm) in diameter and 11 inches (28 cm) long and DV systems are 2.9 inches (7.4 cm) in diameter and 8 inches (20 cm) long. CRITTERCAM systems are packaged in cylindrical housings designed as a compromise between weight, pressure tolerance, robustness and low hydrodynamic profile. Housings are aluminum, titanium or composite materials, depending on the depths to which the study species dive. Each housing has a hydrodynamically optimized dome port and an outer pressure hull diameter of about 10 cm, the smallest possible cylindrical housing for the 8mm video recording deck. Housings are 20-30 cm long depending on configuration, with image-intensified systems being longer. Aluminum systems are tested to 1,000 psi (~600 meters depth), while titanium housings are tested to 3,500 psi (2,000 meter depth). A conical tail section of incompressible syntactic foam provides streamlining and buoyancy. Fully configured aluminum systems are slightly positively buoyant to enable recovery after detaching from the animal and floating to the surface (Marshall, 1998).

Attachment would involve close approach of a small vessel alongside the animal and the use of a four-meter pole to lower the device onto the dorsal region. An integral galvanic (Mg) pin in the suction cup would dissolve to release the system from the animal. The CRITTERCAM would be expected to remain attached for 24 hours or less and then would be retrieved by researchers. The hydrodynamic drag created by the instrument exerts an additional energetic demand on the animal. Over long periods this could result in reduced foraging success, increased metabolic load and resultant stress to the animal (Marshall 1998). However, the proportion of the hydrodynamic drag from the CRITTERCAM to the animal's size and weight is such that the energetic demand on the animal would likely be insignificant. Therefore, disturbance to the animal would occur only during the approach of the researchers and attachment of the CRITTERCAM and would be minimal after attachment.

Deployment trials to date have included attachments to various marine mammal, sea turtle, shark and penguin species. Results indicate that study animals generally exhibit little observable reaction to the CRITTERCAM. No incidences of harm to subject animals have been reported. A few significant reactions to the CRITTERCAM have been observed (Marshall 1998). When reactions were evident, it was almost always during tagging or a short period immediately after tagging. In the case of pinnipeds, a few animals seemed curious of the instrument and a few others reacted aggressively toward it for short periods. Some pinnipeds attempted to remove the CRITTERCAM by rolling on their backs after deployment. The reactions seemed to be correlated with the position of the instrument on the animal's back (Marshall 1998). For all species, there is little or no evidence observed that animals with CRITTERCAMs attached were rejected by conspecifics or targeted by predators (Marshall 1998). NMFS prepared an EA on the effects of suction cup tagging and associated approaches on humpback whales in May 1994. The EA concluded that sufficient information exists in the published literature and in other sources that suction cup tagging has little if any short- or long-term effects on individual animals, specifically humpback whales, or their populations.

Bprobe Tags or Acoustic Tags (suction cup or implantable attachments) – The research under the proposed permit amendment for Joe Mobley (file no. 642-1536) includes the use of Bprobe suction cup tags. These tags are designed to quantify acoustic stimuli experienced by a tagged subject as it moves through its environment and have previously been used on blue whales and Northern elephant seals (*Mirounga angustirostris*) (Burgess et al., 1998). The primary objective of the Bprobe attachment is to study singing humpback whales in order to understand the variation in song structure and singing duration of tagged whales. Following the deployment of a probe on a singer, a vertical 5-hydrophone array would be deployed in order to measure the source level of the whale and to "calibrate" the tag that would be in the near-field of the whale's acoustic radiating system. While the whale is not singing, the probe would record the level of song received by other singers in the area. A VHF radio transmitter built into the probe together with a YAGI antenna mounted on a small boat would allow short-term tracking of the whale's movements, dive patterns, and interactions with other whales. The tag is attached through 3" diameter suction cups with VHF transmitter imbedded in the suction cup with antennae protruding. The tags weigh less than 170 grams. Tags with an additional trailing radio package that may utilize VHF or satellite transmission would trail from a similar suction cup and weigh

less than 280 ounces. The Bprobes may contain the following components and devices: (1) satellite tag to provide long-range movements and positioning information; (2) sensors to monitor and record water temperature and water depth; (3) conductivity switch to control surface and underwater instrument activation; and/or (4) sensor to monitor and record vitals (respiration, cardiac function, and heart rate).

Short-term attachment is expected to be no more than three-four days duration. Tags would be deployed using a standard suction-cup attachment method. Attachment would be achieved by close approach using a long pole to make direct contact with the whale. However, if a method of attachment using solely suction cups is not successful, a small barb or dart (protruding no more three cm into the blubber) would be implanted as part of the tag to help anchor the tags. If pole attachment techniques are used, the pole would be four-eight meters in length, potentially necessitating approach to closer than four meters to attach the tag. If attachment is by crossbow, a Barnett Wildcat 170 pound bow or similar would be used and attachments would be made from distances of approximately six-eight meters. All attachments would be limited to the skin and blubber layer. Barb or dart tag attachment on cetaceans is increasingly used to attach data-recording and transmitting mechanisms, and there have never been any known long-term adverse impact issues with this attachment method (Mate and Harvey 1983, Goodyear 1993, Baird 1998, Mate et al. 1998).

In addition to the species already noted, several other cetacean species would be opportunistically tagged with Bprobes as a secondary research objective. These deployments would serve to collect information on population genetics, structure and ecology, and acoustic exposure of rarely studied cetacean species in waters off Hawaii. These species may include: fin whales, sei whales, Bryde's whales, killer whales, short-finned pilot whales, melon-headed whales, false killer whales, pygmy killer whales, spinner dolphins, pantropical spotted dolphins, striped dolphins, Risso's dolphins, rough-toothed dolphins, bottlenose dolphins, sperm whales, pygmy sperm whales, dwarf sperm whales, Baird's beaked whales, Cuvier's beaked whales, and Blainville's beaked whales.

Radio, Time Depth Recorder and Satellite Tags (suction cup or implantable attachment) – The proposed permit action for SWFSC (file# 774-1714) requests takes on an annual basis for radio tags, radio tags with time-depth recorder tags and satellite tags. The choice of tag or tags would depend on the primary research question being addressed. The tags proposed have been safely and successfully deployed on gray whales (Swartz *et al.* 1987), blue whales (Mate 1999) and humpback whales.

Radio tags allow for individual animals to be tracked and dive pattern data recorded, which, for example, provides the information to estimate dive times required to establish correction factors for estimating abundance. The radio tag consists of a radio transmitter and an antenna. The transmitter generally operates at 148 MHZ with a 30-millisecond pulse and 100 pulses/minute. The tags are 7.6 cm x 1.3 cm with a transmitting antenna approximately 40 cm. The tag with antenna weighs approximately 30 g.

The *time-depth-recorder tag* package is a recoverable unit that provides even more detailed data

on dive behavior because it records water temperature, depth and time. The time-depth-recorder (TDR) would consist of a 512L microcomputer made by Wildlife Computers, Woodinville, Washington. The TDR would provide a profile of the diving activity (e.g. position in the water column, dive depth, ascent/descent rates) of the animal. Time and depth were recorded by a time interval specified by the user. TDRs have been used successfully on over 15 species of marine mammals. The current model measures 9.5 cm x 2.5 cm x 1.3 cm and weighs 42 g. A release device would be incorporated in the tag package to enable recovery of the TDR. The device would either be a radio-activated release device, corrodible magnesium links or both. The radio-activated release device incorporated in the tag package is a small (5 cm x 2.5 cm) cylinder, which contains a piston that compresses cutting the link between the attachment device and the tag package. A VHF radio signal activates the device. Once the tag is released from its attachment, the radio tag is used to locate the tag for recovery. A one to three day corrodible magnesium link would be included as a secondary release device.

Satellite tags would be used to collect data on longer-term movements of animals as well as dive time and depth data. Satellite tags generally measure 14 cm x 9 cm x 3cm and weigh 450g (model SDR-T6 manufactured by Wildlife Computers). The tags would be housed in a smaller type of non-compressible foam structure. Research and development has demonstrated that this package can be effectively deployed and reliably collects data.

The time-depth-recorder, radio transmitter, and release device are all encased within a non-compressible foam housing. The housing is made of a mixture of glass microspheres and polyethylene resin such that the whole tag package is durable, lightweight and buoyant. The material has been tested to 1,000-psi pressure with no change in volume or flotation. Once the tag package is released, it would be recovered and the data downloaded. The dart tip would remain in the whale to be eventually discharged from the body. When it is discharged, the tag would be retrieved. Watkins *et al.* (1981) demonstrated that larger darts that penetrated 23 cm into the body migrate out within a few days and the wounds heal rapidly.

Attachment mechanism and potential effects of tagging activities

In general, the reactions of whales to close vessel approaches for tagging and biopsy sampling activities are minimal. A number of studies involving close approach of research vessels for biopsies and/or tagging of humpback whales indicate that the responses of the whales are generally minimal to non-existent when approaches were slow and careful, and when more pronounced behavioral changes occur, the effects appear to be short-lived (e.g. Gauthier and Sears, 1999; Weinrich *et al.* 1991, 1992; Clapham and Mattila, 1993; Clapham *et al.* 1993). In 1992, NMFS published two EAs on the effects of approaches, biopsies and radio tagging on several whale species based on available information, including the studies mentioned above. The findings in the EAs indicate that even when subjected to invasive biopsy and tagging procedures, a careful approach generally elicits at most a minimal and short-lived response from the whales (NMFS 1992a, 1992b).

Suction cup tags – For suction cup tags, no abrasion or intrusion into the skin of the whale would be caused by the attachment of the suction cup. In addition, the suction cup assembly would not remain attached to the whale for any significant length of time (generally less than one day). The suction-cup assembly would remain on the whale but likely releases within a few hours either due to pressure changes related to repeated dives by the whale, releasing with sloughed skin, or, whales can dislodge it by maneuvering rapidly, breaching, or rubbing the tag against a solid surface. The tag or remnant suction-cup assembly can migrate along the skin of the whale. However, there is no danger that the tag would migrate to cover the blowhole as the whale moves through the water (because the tag is attached caudal to the blowhole and drag would move it away from the blowhole and toward the fluke). The presence of the tag could produce some alteration in the normal behavior of the whales, including temporary interruption of feeding or mating activities. Although the suction cup assembly would create some hydrodynamic drag, the proportion of the assembly to the whale's size and weight is such that any additional energetic demand on the whale would likely be insignificant.

In general, it is not expected that the actual use of any suction-cup tags has a long-term, negative effect on the animals. Researchers have attached these non-invasive tags to a variety of cetaceans and with a variety of scientific instruments attached to the suction cups, including but not limited to DTAGs, time-depth recorders, satellite and radio tags, and CRITTERCAM. There has been no indication that the attachment of these tags has caused any pain to the tagged animal. In addition, if the tag bothers an animal, it can easily shake off the tag by rolling or shaking movements. The ease and speed with which some of the tagged animals can remove the tag if they are sensitive to it indicates little chance for stress from attachments.

Suction cup tagging procedures have been analyzed by NMFS in several previous EAs (see section 1.4 of this EA for more information) and biological opinions where findings resulted in no significant impact to the animals. These research methods have been used and evaluated by many different researchers. Exact dimensions and weights would vary with generation of tag, and whether or not a data logger is included with the transmitter. The ongoing trend is toward smaller and lighter tags. There are two examples of tags successfully used on humpbacks in Hawaii in recent year. Baird et al (2000) used a combination VHF and TDR tag weighing 400 grams that was attached by 8 cm suction cup. Mate et al (1998) used a satellite transmitter

(UHF) tag with dimensions 2.5 x 17 cm, weight of 495 grams, shot from a crossbow and attached by two subdermal barbs. Both studies reported minimal impact to the animals. The tags considered in this EA include those similar in size and attachment to the Baird et al (2000) tag. Tags are either deployed with a crossbow or manually applied via pole applicator to the back of the animal.

The non-invasive nature of suction cup tags eliminates the threat of infection. As attachment lines are absent, the risks from momentary entanglement or snagging are eliminated (Weinrich et al. 1992). The possibility of injury to an animal comes from the remote risk of the apparatus landing in or striking a sensitive part of the animal's body, such as the eye, mouth, or blowhole but there is no reason to believe that there is such a risk given the experience of the researchers.

Implantable tags – Although NMFS recognizes that implantable tags pose a greater potential for disturbance and are more invasive than suction cup tags, review of the annual reports on this type of research has shown that the effects of implantable tags are insignificant. These attachments are designed to be shot by crossbow, penetrate just below the surface of the blubber layer (not into muscle) and hold the tag for longer than the several day maximum common to suction cup techniques. The tags generally work their way out of the blubber in days to weeks after tagging. The size and weight of implanted tags vary with maker and/or generation, but all are cylindrical, ranging from 4-6 inches in length and .5 -1.5 inches width, and weigh approximately 500 grams.

Although the instruments attached to both suction cup and implantable tags would create hydrodynamic drag, the proportion of the tags to the whale's size and weight is such that the energetic demand on the whale would likely be insignificant. Past research and permit annual reports have shown that the chance of infection from the break in the epidermis from an implantable tag would also expected to be extremely low and insignificant. Disturbance to the animal would mainly occur during the approach of the researchers and attachment of the tags. This disturbance would not likely injure individual animals, particularly injuries that might affect the feeding, reproductive, or migratory behavior of the individual animal. Humpback whales tagged with implanted tags in Alaska showed a sudden startle response to the tag deployment, with a rapid vertical wave of the flukes in the air as if trying to hurry their dive (Watkins *et al.*1981). This disturbance is not likely to injure individuals, particularly injuries that might affect feeding, reproduction, or migratory behavior. The attached tag would not be expected to alter the behavior of the whale.

In addition, potential adverse effects of tagging are minimized by using the smallest possible instrument package, by using a smaller spear tip that minimizes penetration into the whale's blubber, by minimizing the velocity of the package at impact, and keeping the dart clean and coated with and antibacterial gel. Whales exhibiting behaviors indicating a negative reaction to the vessel such as aerial behaviors or tail slaps would not be approached. This would be done for the safety of the researchers as well as to minimize any adverse impacts to the individual whales from the proposed activities. Given reported reactions from whales in permit annual reports and research on the effects of suction cup and implantable tagging noted above, NMFS

does not believe disturbances from these activities are likely to reduce the reproduction, numbers, or distribution of these whale species. Therefore, NMFS believes disturbance from these activities is not likely to have a significant cumulative effect on any research animals.

Biopsy sampling, including skin and blubber biopsy, and swabbing: Appendix E specifies the increase in the annual number of takes in this category through implementation of the Alternative 2- Proposed Action (Preferred Alternative). Analysis of the effects of close vessel approaches has been discussed above. The following information, therefore, focuses solely on the known effects and potential impacts of the actual genetic sampling, whether skin, blubber or through swabbing. Unlike photo-identification, these activities involve physical contact with the animal and are generally categorized as having the potential to injure the animal.

In addition, under the Alternative 2- Proposed Action (Preferred Alternative), biopsy sampling takes were not requested for pinniped species and its effects on pinnipeds are not considered under this EA. No biopsy sampling takes would occur on large cetacean calves less than six months of age or females accompanying such calves. In addition, for North Pacific right whales, no calves of any age may be biopsy sampled and only females attending calves greater than six months of age would be sampled. For small cetaceans, no biopsy sampling would occur for calves less than one year of age. Under one proposed permit action (NMML, file no. 782-1719), genetic samples would be obtained from mothers and calves through skin swabbing but only during beluga whale capture studies where the animals are already immobolized. Therefore, biopsy sampling of these age classes and groupings are not considered under this EA.

Skin samples are used to study stock structure, identify species, determine gender, and establish genetic relatedness and levels of inbreeding, using molecular genetic tools such as automated DNA sequencing, Polymerase Chain Reaction, cloning, and genotypic (fragment size) analysis of microsatellite loci. As discussed above, sloughed skin is also a source of tissue for some of the genetic analysis. However, sloughed skin is not reliably available and collection is largely opportunistic. Blubber samples may be analyzed for lipid content, contaminant load, and induction of cytochrome P450-1A, a marker of contaminant exposure.

A variety of mechanisms, including crossbows, compound bows, dart guns, and pole spears are used to biopsy sample marine mammals. The animals to be sampled either approach the vessel on their own, are approached by the main research vessel during normal survey operations, or are approached by a small boat deployed from the main vessel. The biopsy sample is generally collected using a cross-bow from animals within approximately 5 to 30m of the bow of the vessel or small boat (Palsbøll *et al.* 1991). For small cetaceans, the tissue sampled is a small plug of skin and blubber, approximately 7mm in diameter and 20mm long collected from the area behind the blowhole and in front of the dorsal fin. The depth of biopsy tip penetration is controlled by a cushioned stop (25mm in diameter) of neoprene vacuum hose encircling the biopsy head. For large cetaceans, small samples (<1 gram) are generally obtained from free-ranging individuals using a biopsy dart with a stainless steel tip measuring approximately 4 cm in length with an external diameter of 9mm and is fitted with a 2.5 cm stop to ensure recoil and prevent deeper penetration. Biopsy darts may also be fired from a 67-kg-draw crossbow (Barnett WildCat XL) or similar at a range of 5-15 m, attempting to sample the flank near the dorsal fin

or peduncle area. In this case, the biopsy dart is made up of a 40-mm-long, 6-mm-diameter cylindrical stainless steel punch fitted with a dental broach (a barbed filament to hold a sample in place), attached to the end of a standard crossbow bolt (total weight 28.5 g). A cylindrical stopper set 2.5 cm back from the tip of the punch causes the bolt to rebound and float on the surface of the water following impact with the target.

Genetic swabbing involves the use of brillo or Velcro-like pads to swab the skin and remove any top layer skin cells to use for genetic analysis. As this procedure does not involve actual penetration into the skin and/or blubber areas, NMFS considers swabbing to be a much less invasive procedure than skin and blubber biopsy sampling and based on the known effects of skin and blubber biopsy sampling, any potential effects from swabbing can be considered to be minimal and not significant. [Note: Genetic swabbing would be used on beluga whale mother and calf pairs under the proposed permit action for NMML, file no. 782-1719. This would only occur if a mother/calf pair are accidentally collected during beluga whale capture, handling and release operations in waters off Alaska.]

Potential effects from biopsy sampling and swabbing

In general, the effects of biopsies on large whales have been studied in a variety of whale species including humpback, gray, minke, fin, blue, North Atlantic right (Eubalaena glacialis) and sperm whales. The studies examine the behavioral response of whales to biopsy procedures. As for the possibility of infection associated with biopsy sampling, no evidence has been seen at the point of penetration or elsewhere among the many whales resighted in days following the biopsy sampling (NMFS 1992a). Weinrich et al. (1991, 1992) measured a variety of quantitative and qualitative parameters to assess the reactions of humpback whales to biopsy procedures. They found that the few "strong reactions" (less than 6% in both studies) all involved unusual instances such as a biopsy dart retrieval line being snagged on a fluke. Observations in the days and years following darting indicated no long-term effects of the procedure. The researchers concluded that the biopsy procedure was momentarily painful or startling to the animals, but that there were no long-term effects.

In general, a number of studies involving the close approach of research vessels for biopsies and/or tagging humpback whales indicate that the responses of the whales are generally minimal to non-existent when approaches were slow and careful, and when more pronounced behavioral changes occur, the effects appear to be short-lived (e.g. Gauthier and Sears, 1999; Weinrich *et al.* 1991, 1992; Clapham and Mattila, 1993; Clapham *et al.* 1993). In 1992, NMFS published two EAs on the effects of approaches, biopsies and radio tagging on several whale species based on available information, including the studies mentioned above. The findings in the EAs indicate that even when subjected to invasive biopsy and tagging procedures, a careful approach generally elicits at most a minimal and short-lived response from the whales (NMFS 1992a, 1992b).

Gauthier and Sears (1999) studied the behavioral responses of minke, fin, blue, and humpback whales to biopsy samples taken with punch-type tips fired from crossbows. These whales showed no behavioral reaction to about 45 percent of successful biopsies. Behavioral responses in the remainder of the biopsies ranged from tail flicks, hard tail flicks, submerging below water

surface, or some combination of these responses. Humpback whales displayed more of these responses than fin or blue whales, but most individuals of these species resumed their normal behavior within a few minutes of the sample collection.

A study by Clapham and Mattila (1993) echo the conclusions of Weinrich *et al.* They found that 66.6% of humpback whales that had been biopsied showed no reaction or low-level reaction to the procedure. A study by Clapham *et al.* (1993) noted that studies on biopsy procedures showed no evidence of significant impact on cetaceans in either the short or long term.

Little information has been published regarding how sperm whales in particular respond to biopsies. One published study on this topic found that the animals always reacted by "startling" (Whitehead *et al.*, 1990); however this study made no mention of attempts to approach the animals slowly or quietly. Other studies involving biopsy sampling and tagging of whales indicate that whales often react to engine noise, and that slow and quiet approaches tend to minimize individual animals' reactions (Clapham *et al.*, 1993 and Watkins, 1981). It is possible then that the "startling" observed by Whithead *et al.* was the result of, or exacerbated by, the presence of the boat, but the study found no long-term effects of the biopsy procedure.

With the exception of the very unusual death of a single Common dolphin (*Delphinus delphis*) (Bearzi 2000), reactions of various species of cetaceans to biopsy darting have generally been mild (e.g., Whitehead et al., 1990; Weinrich et al., 1991, 1992; Barrett-Lennard et al., 1996; Weller et al., 1997). In general, biopsy samples can successfully be taken from about 90 percent of whales that are approached (Gauthier and Sears, 1999). Based on existing data, NMFS does not believe the proposed biopsy sampling would have long-term, adverse effects on the target species (NMFS, 1992a, 1992b, 1994, 1998a). Therefore, NMFS believes disturbances from these activities are not likely to have a significant cumulative effect on any research animals.

Capture, Sampling, Tagging and Release of beluga whales in Alaska: Appendix E specifies the annual number of takes in this category through implementation of the Alternative 2- Proposed Action (Preferred Alternative). The NMML proposed permit action (file no. 782-1719) would be the only permit under the proposed action requesting takes for beluga whale captures. Aside from this species, no other cetacean captures would occur under the proposed action.

Under the Alternative 2- Proposed Action (Preferred Alternative), all age and sex classes would be sampled although efforts would be made to avoid capturing mother/calf pairs or groups with mother/calf pairs present. If a mother/calf pair is captured, they would both be biopsy sampled and then released. However, the biopsy sampling would occur only by genetic swabbing (see previous biopsy sampling descriptions for more information on methods used in genetic swabbing). As this is the least invasive methods for collecting genetic samples and only involves brushing the skin with a brillo-like pad, NMFS is not concerned that the biopsy sampling of these calves would have any adverse impact to the animals or the mother/calf pair bond.

In addition, as outlined below and in Section 5- Mitigation measures, additional mitigation measures would be included in the protocol for capture operations on individuals from the Cook Inlet stock of beluga whales. This would further limit the potential for adverse impacts to the Cook Inlet stock of beluga whales, a stock listed as depleted under the MMPA.

Analysis of the effects of close vessel approaches has been discussed previously. The following information, therefore, focuses solely on the known effects and potential impacts of the capture, sampling, tagging and release of beluga whales in waters off Alaska. Unlike photo-identification, these activities involve physical contact with the animal and are generally categorized as having the potential to injure the animal.

Capture and release protocols: For *Cook Inlet beluga whales*, researchers would mainly utilize the tidal cycle as beluga whales are uniquely adapted to survive stranding for periods as long as a tidal cycle. This would allow researchers to capture and confine these animals in extremely shallow water or on shore. To limit the risk of prolonged stranding in Cook Inlet, an area with extreme tidal cycles of 9-10 meters, capture and tagging operations would be limited to the two hours before and six hours after low tide. This would limit any stranding that might occur to a maximum of four hours before the rising tide can free the animal. The estimated maximum time from capture to release (if the animal is stranded during an outgoing tide) is eight hours.

The following information below outlines the capture methods that would be used for all beluga whale captures in Alaska. Again, extra effort would be taken to use tidal cycles and the encirclement method in capturing Cook Inlet beluga whales. However, all capture options would be considered for individuals from all stocks.

Encirclement: This process would require the use of three or four vessels: a boat used to carry and deploy the net for whale captures (referred to as net boat- currently a 6.4 m Boston Whaler), the primary boat used to locate and isolate whales (currently a 5 m rigid hull inflatable), and one or two other boats, preferably inflatable, used to herd whales into the deployed net and to carry supplemental crew required for tag attachments. Net deployment techniques used in Cook Inlet were developed in 1999 (Ferrero et al. 2000). The net would be 200 to 350 m (670 ft to 1170 ft) in length by 4.6 m (15 ft) in height. The net would be composed of a 0.64 cm (0.25 in) or similar weight lead line, 3.8 cm (1.5 in) or similar diameter float line, and 50 cm to 80 cm (20 in. to 32 in.) stretch mesh of size 30 or similar weight twine. The net would be deployed from boxes set so that the net is deployed over the engine and stern of the boat.

Encirclement would only be attempted in sea states of Beaufort 2 or lower to assure the safety of the whale and the tagging crew. After whales are spotted, the animals would be approached slowly by one boat with the net boat close behind on the port side. Individual whales would be followed slowly for five or more surfacings to determine that the animal is isolated and not part of a mother/calf group. After finding an appropriate animal, it would be herded into shallow water (<3 m) with the net boat rapidly deploying the net, encircling both the primary boat and the whale. At the same time, the two small boats would speed to the location of the set to prevent the whale from leaving the net before the circle is closed. The boat within the net circle may attempt to chase the whale to force it to entangle, while the remaining boats systematically

check the net for entangled whales. If the target whale does not initially become entangled, the circle of the net would be slowly pulled tighter to force the whale into the net. However the whale would not be encircled for more than 10 minutes and would be allowed to escape if it has not yet entangled. If a single whale is caught, the captured animal would be measured and assessed to determine if it is suitable for tagging (snout to fluke notch length > 2.25 m, sufficient blubber thickness to accommodate the tag attachment pins, and determined not to be a member of a mother/calf group). If a single animal is caught and is determined to be unsuitable, a biopsy of the skin would be taken for identification and the animal would be quickly released. If a mother and calf are captured, both would be genetically sampled (the calf by skin swabbing) and released. If two whales are caught (neither a mother nor calf), one would be held if it satisfies the above criteria and the second would be biopsy sampled and released as quickly as possible. If three or more are captured, all would be biopsy sampled and released as quickly as possible.

If a suitable whale is captured, two of the smaller boats would come along each side of it and a hoop net would be secured over the head and one or more tail ropes would be secured around the tail stock. The beluga would be removed from the net as quickly as possible and transferred to a sling between the two boats. The sling consists of a large rectangle of heavy fabric with cut outs for the pectoral flippers or three or more individual straps two or more inches wide. The sling would be passed under the whale and over the pontoons of the inflatable boats and secured. The boats would be held apart by the hoop net at the head of the whale and one or more braces between the boats so that the boats do not press laterally against the whale. No straps or ropes would be used to pull the boats together to avoid lateral pressure on the whale. The sling would be tightened so that the whale is partially supported below but not lifted to any extent. The sling would be adjusted so that the head of the whale is even with or higher than the tail and the blowhole is well clear of wavelets that may break over the whale's head.

Alternatively, if water is shallow enough, the whale would be towed to the shallows using the hoop net and tail ropes. If necessary, a small portion of the net would be retained (the rest being cut away) to aid in securing the whale. The whale would be towed head first and at a speed no greater than three knots through the water. Once the whale is removed from the net, the net would continue to be monitored to ensure that no other whales are entangled and the net would be removed from the water within 15 minutes.

Capturing by hoop net: In some instances, a whale would be chased and captured by placing a hoop net over the head and pectoral fins and a tail rope around the tailstock. The hoop net would be made up of either a 10 to 20 mm metal solid stock or 15 to 40 mm diameter tubing of stainless steel, titanium or other non reactive substance rolled into a hoop with a 3 to 8 cm stretch mesh bag of 30 or greater weight twine that is 1 to 3 m deep and attached around the rim of the hoop, with the rim padded with 5mm thick foam or other padding. The tail rope would be a 2 to 4 m soft nylon rope 20 mm in diameter or narrower padded with 20 mm or larger garden hose covering the portion that would contact the whale. A 20 cm loop or carabineer is fixed at one end and the free end of the rope is passed through the closed loop to form a loop that can be cinched around the tailstock.
Other capture methods include: (1) physically blocking one or more whale's escape from shallow water and forcing them to strand; (2) herding a whale into a net that would be deployed

across its path so that it becomes entangled; (3) encircling a whale with a net so that it becomes entangled when it tries to escape; and (4) taking advantage of stranded or beached whales commonly occurring with the Alaska beluga whale stocks.

In Cook Inlet, the following rules would be observed for release of the whales to further avoid the potential for adverse impacts to these animals: (1) if after 10 minutes the encircled whale has not become entangled in the net, the net would be opened and the whale would escape; (2) the whale would be released within 30 minutes of encirclement if the whale is not secured in the sling or in shallows for tagging; (3) the whale would be released within 30 minutes of being secured. Thus, the total time that a whale would be handled is 60 minutes with no more than 30 minutes partially immobilized. Every effort would be made to take advantage of the tidal cycle and avoid stranding the whale during the capture and handling. If stranding does occur, a pool would be excavated around the whale as quickly as possible and one or more of the boats would be beached and filled with water to supplement the pool if it begins to dry out and provide water for wetting down the whale. A shade would also be constructed to help keep the whale cool. As noted previously, capture and tagging operations for individuals of this stock would be limited to the two hours before and six hours after low tide. This would limit any stranding that might occur to a maximum of four hours before the rising tide can free the animal. The estimated maximum time from capture to release (if the animal is stranded during an outgoing tide) is eight hours.

For the *western Alaska stock of beluga whales*, the following capture methods would be used: (1) chasing and capturing individual whales by placing a hoop net over the head and pectoral fins; (2) physically blocking one or more whales escape from shallow water and forcing them to strand; (3) herding a whale into a net that is deployed across its path so that it becomes entangled; (4) using a set net that is deployed so that whales swim into it and become entangled; (5) encirclement; or 6) taking advantage of stranded or beached whales are commonly employed on the western Alaska stocks. In some cases, whales would be captured and tagged in conjunction with a planned harvest conducting by routine Alaskan subsistence hunters.

Captured beluga would usually be tagged in shallow water. There would be no restrictions on capture relative to time of low tide. If appropriate and deemed safer for the animal, a beluga would be transferred to a sling between two boats for tagging. Where a net is deployed, it would either be removed after 15 minutes or checked from one end to the other and from top to bottom every 15 minutes. If the entire net is not visible from a single vantage point, one or more boats would travel the length of the net, and where waters are turbid, pull the net up until the lead line is visible. Captured belugas would be released as quickly as possible, but by no more than 120 minutes after capture.

<u>Research activities conducted during holding period</u>: The information below outlines research activities that would take place during the holding period (after an animal is captured but before it is released) for all stocks of beluga whales in Alaska.

For *tagging*, up to four holes would be bored in the region of the anterior terminus of the dorsal ridge using a coring device (trochar) at most 1 cm in diameter. *Biopsy samples* of skin and

blubber would be extracted from the corer and stored in DMSO, 10% formalin, and an RNA extraction solution or similar solution, or frozen. Each insertion and exit point for the trochars would be prepared by cleaning with an antiseptic wipe or equivalent. Rods of nylon or other non-reactive material, not greater than 1 cm in diameter and 50 cm in length would then be pushed through the holes, and attached to the wire cables or fabric flange or straps of the satellite tags or through bolt holes in the tag. The wire cables would be tightened to hold the tag against the back of the animal to minimize tag movement and drag but would not be put under significant tension to avoid pressure necrosis around the pin insertion points. The other attachment systems would be manipulated to achieve the best possible fit depending on their design. Excess rod would then be cut off. All equipment would be sterilized in cold sterile solution, alcohol or equivalent and kept in air and watertight containers prior to use. Trochars and rods would be coated with antiseptic gel prior to insertion, and each trochar would be only used for one hole before it is cleaned, sharpened and re-sterilized. Where more than one instrument is to be attached, the number of pins would be limited to four. Other instruments would be attached by cable to the attached tag or separately using suction cups following the design constraints under remote deployment.

Tags for attachment to belugas are designed to lay flat against the skin or straddle the dorsal ridge. The most common tags in use are constructed by Wildlife Computers of Redmond, Washington. They are composed of two or four batteries, a computer, a satellite transmitter with antenna, a pressure sensor, and a conductivity sensor all encased in a rigid polyurethane block with three wire cables extending from each side for bolt attachment. Alternatively the tag is glued to a flexible material saddle in place of the cables and the pins are passed through holes in the fabric to complete the attachment. The wire cables require two or three bolts for tag attachment. The fabric saddle requires two to four bolts. Tags are continually being modified to reduce hydrodynamic drag and increase longevity of the tag itself and its attachment to the whale. Current designs depend on the pins migrating out through the blubber and skin until the tag is lost. Once designs are shown to last longer than a year, a self release mechanism would be included in the attachment to insure that the tag does not remain permanently attached to the whale. Current tag designs weigh between 100 and 900 grams with maximum dimensions of 4 cm high by 12 cm wide by 20 cm long with a flexible wire antenna approximately 20 cm long.

Morphometric measurements, blowhole swabs, and a blubber biopsy for fatty acid signature analysis would be taken. Mucous samples from the blowhole would be collected using sterile cotton-tipped swabs. When the whale lifts its head for a breath, a swab would be quickly inserted into the blowhole and gently swiped around inside. The swab would be wrapped in aluminum foil, then placed in a labeled zip-lock plastic bag and stored with ice. The blubber biopsy would be taken using a T-handle coring device not greater than 1 cm in diameter. The biopsy would be taken at a point 10-30 cm off of the midline in the vicinity of the anterior terminus of the dorsal ridge. The corer would be inserted through the skin and pushed gently through the blubber until the muscle sheath is contacted. The maximum depth would then be marked on the corer and it would be withdrawn, the end capped and placed in an airtight bag. Samples would be frozen as soon as possible and kept frozen until analysis if possible. *Blood samples* would be taken using 1"-2", 16 to 20 gauge needles with a syringe or with a vacutainer. Up to 50 ml of blood would be drawn from veins on the fluke using standard sanitary techniques.

The fluke would be immobilized, a workable vein would be located, the area would be carefully swabbed with alcohol or equivalent and the needle would be inserted. No more than two sites would be attempted with a total of four needle sticks and the fluke would not be immobilized more than five minutes. Two primary types of samples would be collected: (1) a sample containing EDTA for a complete blood count and (2) a sample with serum separators for blood chemistry. Other samples would be taken as research indicates.

Potential effects from capture, handling and release of beluga whales

To date, the encirclement method has been attempted on over 40 beluga whales in Alaska. Of these, 23 were successfully tagged and released, four were mother/calf groups that were released, two were released because they were undersized, one was released because it was the second whale in a multiple capture, one drowned, and the remainder escaped without capture. The drowning occurred as a result of failure to follow established guidelines where the entire net was used to tow a whale shore, the towing lasted over 15 minutes, and when the whale was beached, a second previously undetected whale was found drowned in the net.

In August 2002, three of the whales tagged in Cook Inlet apparently died within two days of capture and tagging. Although no cause of death can be determined, the loss of three whales seems more than just coincidental and suggests that the deaths were a result of the capture and tagging process. A review of the incident report suggests that overly tight or prolonged confinement in the sling and septic conditions during the attachment surgery may have adversely impacted the whales. NMML has addressed these issues by establishing maximum time limits for handling the whales of 30 minutes in the sling and 60 minutes total from encirclement to release, and clarifying the rules for confinement in the sling to ensure that the whale is not pressed laterally between the boats and that the blowhole is held well above the water level. Steril procedures have also been reviewed with all co-investigators so that established aseptic procedures are followed.

Potentially adverse effects of the capture tagging operations would be minimized by using a highly competent field team, using the smallest possible instrument package, limiting the handling time and maintaining antiseptic conditions to the highest extent possible. NMML scientists involved in biopsy and tagging activities have had extensive experience with animals in the wild. Whales exhibiting behaviors indicating a negative reaction to the vessel such as aerial behaviors or tail slaps would not be approached. Whales exhibiting negative responses to capture or handling would be released if it is thought that their fitness might be compromised. This would be done for the safety of the researchers as well as to minimize any adverse impacts to the individual whales from the proposed research activities.

Tags attached on the dorsal ridge or fin would migrate posteriorly due to the force resulting from hydrodynamic drag of the tag as the animal moves through the water. As this occurs, tissue would be damaged on the posterior surface of the attachment pins and scar tissue would form at the anterior side where there is little pressure. Eventually the tag would pull out and detach. The animal would be left with a track of scar tissue through the dorsal ridge or fin. Several beluga have been observed with these scars one or two years after they were tagged and appeared (from a distance) to have healed completely and suffered no long-term physical

impairment. In July 2000, a whale was harvested in Point Lay, AK that had been tagged the previous year. The section of the dorsal ridge with the scars was examined and this indicated the track left in the skin by the tag had closed completely and the skin was well healed (pers. comm. Robert Suydam). As the dorsal fin is both a thermal regulatory structure and a control surface for movement and orientation, there would be concern that posterior migration of the tag could weaken the cartilage and sever nerves and circulatory structures.

Based on results from these captures under previous NMML permits, the mitigation measures outlined above and in Section 5- Mitigation Measures, and the fact that limitations to any accidental mortality would be imposed to keep any lethal removals within the stocks' Potential Biological Removal level, NMFS does not believe the proposed capture, handling, tagging, sampling and release studies would have long-term, adverse effects on the target species. Therefore, NMFS believes disturbances from these activities are not likely to have a significant cumulative effect on any research animals.

Import/export of parts collected during research activities: Appendix E specifies the proposed permit actions requesting authorization to import and/or export marine mammal and sea turtle parts collected under the proposed action. Marine mammal and sea turtle parts, specimens and biological samples may be taken, salvaged and/or imported/exported in conjunction with the activities described in the proposed action. The total number of parts, specimens or biological samples taken, salvaged and/or imported/exported over a five-year period is also listed by species in Appendix E.

Samples proposed for import would generally be stored in dimethyl sulfoxide and kept in Nalgene cryovials with a leak-proof gasket. They would either be hand carried in a cooler with ice packs or shipped via FedEx (or equivalent) in a cooler with dry ice. The coolers would be packed in sealed plastic bags with an absorbent material as an extra precaution for leakage even though the viles are sealed with a wax film as an extra precaution to preventing moisture loss and sample deterioration. Hemoglobin samples would be stored in Nalgene cryovials in saline solution and require no special handling. Blood plasma mixed with 12.5% trichloroacetic acid (to 6% solution) would be stored in Nalgene cryovials and shipped via FedEx (or equivalent) in sealed plastic bags within a cooler or hand carried in a cooler. No ice is required. The Material Safety Data Sheet for trichloroacetic acid presents no environmental hazards.

The SWFSC (the only permit application under the proposed action to request takes under the ESA for sea turtles) serves as the NMFS national sea turtle depository of tissue and DNA. The sea turtle molecular genetics program at the SWFSC conducts stock identification work in collaboration with all other NMFS sea turtle programs, as well as U.S. and foreign institutions.

Given that the import/export of parts collected during research involves only the transport of non-living parts, NMFS believes these activities are not likely to have a significant cumulative effect on any research animals.

Harassment incidental to research activities: Appendix E specifies that all of the proposed research actions contain requests for authorization of incidental harassment. This harassment

occurs solely through the presence of the research vessel or aircraft and occurs incidental to research activities that are not directed at these species or individual. In general, NMFS scientific research permits allow for unlimited takes by incidental harassment of species not listed under the ESA. For ESA-listed species, existing NMFS permits and requests under the proposed action provide for specific take limits in regards to incidental harassment. For example, several of the proposed permit actions, such as Straley (file no. 473-1700), Matkin (file no. 662-1661) and Wynne (file no. 1049-1718), request authorization to incidentally harass several cetacean and pinniped species as part of killer whale predation research, including ESA-listed species such as humpback whales, sperm whales, fin whales and Steller sea lions. In these circumstances of incidental harassment (and others as described in the permit and permit amendment applications), reactions by animals would be expected to be the same as described above in close vessel approaches for activities like photo-identification, behavioral observation, photogrammetry and collection of sloughed skin. Therefore, NMFS believes these activities are not likely to have a significant cumulative effect on any research animals or any animals incidentally harassed from these activities.

Close Approach for photo-identification and capture/handling of sea turtles for various measuring and sampling techniques: Appendix E specifies the proposed permit action requesting authorization for takes of ESA-listed sea turtles. The SWFSC (file no. 774-1714) requests takes of sea turtles opportunistically during marine mammal research proposed under the permit application. In addition to recording sightings data, biological samples would be collected from some turtles. The objectives of these activities are to record data on the geographic distribution of turtles at sea and to investigate their movements as well as the environmental and physiological factors that influence them. Sea turtles would be sighted and photographed for species identification and captured for one or more of following activities: (1) measure, weigh, sex, and flipper tag turtles captured (up to 450 annually), (2) collect blood samples of captured turtles to determine sex of juveniles and reproductive status of adults, (3) collect stomach contents by lavage to identify prey items, (4) collect tissue biopsy samples for genetic analyses of stock identification, and (5) attach satellite tags to collect movement and dive behavior data. In addition, the proposed action includes authorization to import the collected samples (blood, stomach contents and tissue biopsy samples).

- **Capture and handling**: Turtles that are captured for purposes of measuring, sexing, weighing and tagging would be captured using one of two methods. Turtles would be captured either from an inflatable raft, which reduces the danger of physical injury when handling these animals, or directly from the main research vessel (or one of its rigid hull inflatable boats equipped with an outboard motor). For raft captures, a swimmer would approach the animal from the water, grasp the carapace at the neck and tail and pull the head and flippers up out of the water. Turtles would also be captured directly from the research vessel or one of its rigid-hulled inflatable boats using a breakaway net taped to a 1.8 m x0.9 m metal frame lowered on a pole from the ship. Captures from the research vessel would only be used when a turtle itself approaches the vessel.

- **Measuring, weighing, sexing and flipper tagging**: For each turtle captured the following would be conducted-- standard carapace (both straight line and curved) and tail

measurements would be made as outlined in the Manual of Sea Turtle Research and Conservation Techniques. Each turtle would be double flipper tagged with inconel tag (one tag on each front flipper). PIT tagging would not be done. If a turtle with Fibropapillomatosis (FP) is observed, a separate set of sampling equipment would be used if the animal is handled.

- **Blood collection**: Captures would also include blood sampling to determine sex of juveniles and reproductive status of adults. Blood samples would be collected from the dorsal cervical sinuses with a syringe. The samples would be kept on ice for no more than two hours until they can be centrifuged. The separated serum would then be pipetted off and frozen. Hormone assays would follow the standard procedure.

- **Stomach contents collection**: Lavage would be conducted on a limited number of the turtles captured to identify prey items. Stomach contents would be collected by flushing the turtle's stomach with sea water, a method developed by the Center for Sea Turtle Research in Gainsville, Florida. A stiff tube is inserted into the esophagus to the pylorus. The turtle is held over a fine mesh screen and flushed with a continuous flow of water for approximately three minutes.

- **Tissue biopsy sample collection**: Biopsy sampling would also be conducted for genetic analyses of stock identification. Skin biopsies would be taken following the procedure outlined in Dutton and Balazs (1995). A small disk of skin measuring 6 mm in diameter would be collected from the hind flipper using a sterile Acu-punch 6 mm biopsy tool. For tissue samples at the SWFSC, molecular genetic tools such as automated DNA sequencing, Polymerase Chain Reaction (PCR), cloning, and genotypic (fragment size) analysis of microsatellite loci would be used.

- **Satellite tagging**: Satellite activities would follow procedures set forth in Balazs *et al.* (1996) for satellite tag attachment. This method entails holding the turtle in a prone position after capture by placing it in a plywood pen, a method which keeps the turtle in a natural position without the use of ropes, straps, or other means of binding in order to physically control flipper movement. A wet cloth is draped over the turtles eyes to block its vision, which often calms the turtle. The carapace is lightly sanded and thoroughly scrubbed and rinsed with fresh water. The area is then lightly wiped with and acetone-dampened cloth. Silicone Elastomer (Nephew and Nephew Rolyan Inc., Menomonee Falls, Wisconsin 53051) is used to create a mounting platform on the carapace for the transmitter. Silicone Elastomer is primarily used in human medicine as a splinting agent. The transmitter is then attached to the carapace using resin and fiberglass cloth as described in Balazs *et al.* (1996). Once the resin has cured the turtle is released. The satellite transmitter would eventually be shed through the normal surface flaking of the scutes. The satellite time-depth recorder that would be used is Model ST-3, a unit

measuring 10cm x 15cm x 3cm and weighing 822g. The transmitters are manufactured by Telonics (Mesa, Arizona).

No drugs would be used in conducting the activities proposed under the SWFSC permit application. Turtles would be held in the inflatable boat, suspended in a tire, on foam pads, or a wooden or plastic box. They would be kept under shade and periodically sprayed with water. This would be done in a manner to keep them calm (prevented from flailing and possibly harming themselves). Turtles would be held for approximately one hour for flipper tagging and collection of other biological samples. Turtles would be typically held 2 hours or less when satellite transmitters are being attached. Occasionally a group of turtles (e.g., 2-5) would be captured at the same time. In these rare cases turtles would be held longer as each one has a satellite transmitter attached. While most turtles captured as part of a group would typically be released in 2- 5 hours, it is possible that, due to logistics, a turtle would be held for up to 10 hours. Regardless of how long turtles are kept on the vessel, they would always be kept in enclosures that prevent them from injuring themselves or other turtles and kept in the shade, covered with towels and kept wet to prevent overheating. There has been no unintended mortality from these types of research activities on marine turtles when conducted by the SWFSC under past permits and no mortality is anticipated for the research activities proposed in this application nor would be authorized under the permit, if issued. The proposed research activities have been designed to limit the time a turtle is held and utilize the most humane sampling techniques.

Potential effects from close approach for photo-identification and capture/handling of sea turtles for various measuring and sampling techniques

Capturing, handling, tagging, measuring, weighing, blood sampling, and attaching tags can result in physiological effects on sea turtles. However, NMFS believes that the research as described in the proposed action would have a relatively low level of physiological effect on this species. The proposed action considered is not expected to have more than short-term effects on individual sea turtles. These effects are expected to be short-term because the take is non-lethal and previous experience with the type of proposed research activities has demonstrated that it is reasonable to expect that effects would be minimal. No accidental mortality takes are anticipated under the proposed research and none are authorized under the proposed permit. Based on past observations of similar research, the short-term effects from the proposed research activities are expected to dissipate within approximately a day. Biopsy sampling has been used as a standard procedure for nearly eight years in sea turtle research and there is no evidence of adverse effect (Dutton and Balazs 1995). Turtles can experience some discomfort during the application of external and/or internal tagging and biopsy sampling procedures and these procedures would produce some level of discomfort. The discomfort is usually short and highly variable between individuals (Balazs 1999). Most barely seem to notice, while a few others exhibit a marked response. However, NMFS expects that the small wound-site resulting from a tag applied to the flipper should heal completely in a short period of time. Also, when done

correctly, NMFS expects that individual turtles would experience no more than short-term stresses during the application of the PIT tags. The proposed tagging methods have been regularly employed in sea turtle research with little lasting impact on the individuals tagged and handled (Balazs 1999). During blood sampling, precautions would be taken to prevent a back and forth, or rocking movement of the needle once it is inserted. Turtles would not be moving during the procedure and the needle would be removed if the turtle starts to move. Attempts to extract blood would be limited to two on either side of the neck. Sample collection sites would always be sterilized with alcohol, or other antiseptic prior to sampling. NMFS expects that the collection of a blood sample would cause no additional stress or discomfort to the turtle beyond what was experienced during capture, collection of measurements, and tagging. Overall, the research proposed under the SWFSC permit application may cause short-term minor injury or stress to individual animals but would be unlikely to affect the future survival or reproduction of the individual. Additionally, the permit would contain specific handling and care procedures to minimize adverse effects of research on sea turtles.

NMFS believes the proposed research activities would not appreciably reduce any of the sea turtles' likelihood of survival in the wild. In particular, NMFS believes the proposed research would not affect adult turtles in a way that reduces their reproductive success; the survival of young turtles; or the number of young turtles that annually recruit into the breeding populations of the affected sea turtles. Therefore, NMFS believes these activities are not likely to have a significant cumulative effect on any research animals or any animals incidentally harassed from these activities.

4.3 Alternatives Considered but Eliminated from Detailed Study

4.3.1 Alternative 3 – Temporary moratorium on intrusive research on all target species in the action area

A primary factor in determining whether to authorize intrusive research on marine mammals and sea turtles listed under the ESA is whether the information expected to be gained would contribute to fulfilling a research need or objective identified in the species recovery plan or would contribute significantly to identifying, evaluating, or resolving conservation problems for the species. Under this alternative, all existing permits authorizing takes for target species contained in the proposed actions would be amended to suspend authorization for takes of an intrusive nature and no new permits for intrusive research activities would be granted for a given time. (This would exclude Permit No. 932-1489 which allows takes of stranded or distressed marine mammals under the NMFS' Marine Animal Health and Stranding Response Program.) This option would effectively limit research to activities such as photo-identification, behavioral observation, passive acoustic recording, active acoustic playbacks and aerial or vessel surveys conducted at a distance that does not have the potential to injure target marine mammals or sea turtles in the action area. While these methods would yield basic data on population abundance

and distribution, there would be no way to collect physiological or genetic data from such non-intrusive methods. Therefore, this alternative was not considered further because it fails to meet the objective of collecting information on the ecology and biology of ESA-listed and non listed marine mammal species and sea turtle species that would provide information needed to recover the species to the point they can be removed from ESA listing or protect against the need for future listings.

4.3.2 Alternative 4 – No Taking Alternative: Temporary moratorium on research of all target species in the action area

Under this alternative, there would be no takes of any target species in the proposed action through the action area, including a moratorium on all current scientific research and enhancement permits and denying future applications for a given time. The intent of a moratorium on such takes would be to eliminate any potential adverse effects of scientific research for a period of time. However, in the absence of at least some degree of population monitoring, it would be difficult to obtain data that could be used to evaluate whether or how activities such as commercial fishing, shipping, disease, or environmental fluctuations are affecting the population. As it is not likely that human activities such as vessel traffic and commercial fishing would cease within the range of the target species in the action area, and given that these human activities have been shown to adversely affect some of the target species in the action area (i.e., entanglement in fishing gear and ship strikes), at least some information on the population status is needed for fisheries management purposes and determinations of takes incidental to other activities. This alternative was not considered further because it would not meet the objective of collecting information on the ecology and biology of target species in the action area that would provide information to recover the species to the point they can be removed from ESA listing or protect against the need for future listings.

4.4 Comparison of Alternatives

The significance of the effects of an alternative is determined according to the context in which the action would occur and the intensity of the action. The context includes where the action would occur and what specific resources would be affected. The intensity of the action includes the type of impact (beneficial or adverse), the duration of the impact (short or long), the magnitude of the impact (minor versus major), and the degree of risk associated with the impact (high versus low level of probability of an impact occurring). The intensity of a given action is also determined relative to cumulative impacts.

Because there is little quantitative information on the effects of the various activities being analyzed on the environment, alternatives are compared largely in qualitative terms relative to the Status Quo. In total, four alternatives were considered under this EA: (1) Alternative 1- No Action or Status Quo; (2) Alternative 2- Proposed Action (Preferred Alternative); (3) Alternative 3- Proposed action but no takes by invasive sampling; and (4) Alternative 4- Retraction of existing permits and no issuance of proposed action. Alternatives 3 and 4 were eliminated from further detailed study as their implementation would result in an inability to collect physiological or genetic data needed to monitor health status or trends in reproductive rates, or would not meet NMFS needs for collecting information for recovering ESA-listed species and managing human activities. Therefore, Alternatives 1 and 2 were further studied. NMFS determined that Alternative 2 would be the Preferred Alternative for the following main reasons:

> Affected Physical Environment: In that some actions under all Alternatives would occur within designated critical habitat, marine sanctuaries and protected areas, essential fish habitat, and others as noted previously in Section 3, the context of all Alternatives is of similar importance. However, as all of the activities are directed at the target marine mammals and sea turtles and not the animals' habitat, they would equally be not likely to significantly impact the physical environment of the action area.
>
> Affected Human Socioeconomic Environment: Both Alternatives 1 and Alternative 2- Proposed Action (Preferred Alternative) would result in the same impacts to the human socioeconomic environment, mainly revenue generation through the creation of additional employment opportunities for research personnel, lodging and associated living costs of research personnel in the affected localities, and rentals of equipment needed for research (e.g., boats). As Alternative 2 would result in additional research projects and personnel, the economic benefits of this alternative would be greater than the Alternative 1- Status Quo. However, overall economic impacts would be expected to be minimal in respect to economic boosters (e.g., overall revenue generation of tourism industry) that already exist in the proposed action area.
>
> Effects to Target Species of Marine Mammals and Sea Turtles, Including ESA-Listed and

MMPA-Depleted Species: As outlined in Section 4.2, for all alternatives the potential for serious injury and/or long-term adverse effects on target species under the proposed action would be considered minimal. Alternative 2- Proposed Action (Preferred Alternative) would have a larger impact (although still considered minimal overall) as more takes on these species would be authorized than under any other alternatives. Under this alternative, it would be expected that target species would be affected by more intrusive procedures such as biopsy and biological sampling, tag attachment, and capture/handling. However, as stated above, there would be no tagging or biopsy sampling takes on large cetacean calves less than six months of age or females accompanying such calves. In addition, for North Pacific right whales, no calves of any age may be tagged or biopsy sampled and only females attending calves greater than six months of age would be tagged or sampled. For small cetaceans, no tagging or biopsy sampling would occur for calves less than one year of age, except for skin swabbing of beluga whale mothers and calves during capture operations proposed under NMML, file no. 782-1719.) These procedures would be expected to result only in short-term stress and discomfort and no long-term effects would be anticipated.

In addition, Alternative 2- Proposed Action (Preferred Alternative) would authorize the NMML permit (file no. 782-1719) that would include authorization for four accidental mortalities of beluga whales over the course of the permit. However, NMFS believes the mitigation measures associated with the capture, handling and release of the belugas would lessen the potential for these mortalities to occur. Also, if the four mortalities were to occur, this would still not exceed the potential biological removal for the affected beluga stocks and therefore would not be likely to have a significant cumulative effect on the affected beluga stocks.

The greatest potential adverse impact from the majority of the research activities is disturbance. There is little information available on the long-term impacts of disturbance from these types of activities on the target marine mammals and sea turtles. The scientific literature does indicate that disturbance such as that caused by close approach of vessels can disrupt vital functions such as feeding, mating, nursing, and resting, at least temporarily. It is reasonable to assume that if such disruptions of vital functions are chronic and persistent, they may result in population level effects. However, at present, there is no indication that research-related disturbance has had a long-term negative impact on the target marine mammals and sea turtles in the proposed action area.

Effects to Current Authorized Take Numbers and Duration of Takes: Alternative 2- Proposed Action (Preferred Alternative) would increase the number of permits, relative to Alternative 1- Status Quo. Therefore, this would increase the number of takes and the length of time for takes (i.e., longer time until permits expired) and the potential for adverse impacts through repeated harassment of the target marine mammals and sea

turtles compared to the Alternative 1- Status Quo. Under Alternative 1- Status Quo, the immediate impacts of all scientific research permits on target animals in the action area would end in January 31, 2007. Issuance of the proposed permits and amendments under Alternative 2- Proposed Action (Preferred Alternative) would extend the duration of these impacts into 2009. However, it would be reasonable to assume that many, if not all, of the current permit holders would request new five-year permits once their existing permits expire. The magnitude of potential impacts, both positive and negative, and probability of adverse impacts under Alternative 2- Proposed Action (Preferred Alternative) would therefore only somewhat greater than Alternative 1- Status Quo.

Effects to Non-Target Species, Including ESA-Listed and MMPA-Depleted Species: In that some actions under all alternatives would occur in the habitat of various species outlined in Section 3, the context of all alternatives is of similar importance. However, the main distinction between Alternative 1- Status Quo and Alternative 2- Proposed Action (Preferred Alternative) would be the duration and intensity of any impacts. All research methodologies and takes in the proposed action are already occurring under Alternative 1- Status Quo. Implementation of Alternative 2- Proposed Action (Preferred Alternative) would only mean more occurrences of these takes over a longer period of time. However, the research activities would not be directed at these species, any disturbance would be incidental to the research and there is no available information to date to suggest any significant impact on these species from the Status Quo. Therefore, it would not be expected that implementation of Alternative 2- Proposed Action (Preferred Alternative) would result in any significant level of disturbance beyond what already exists in Alternative 1- Status Quo and that any impacts would not have a significant cumulative effect on these non-target species.

Direct Effects to Cetacean Calves: Given the unobtrusive nature of takes defined as having the potential to disturb (e.g., photo-identification, behavioral observation, photogrammetry, acoustic recording and playbacks, import/export and collection of sloughed skin), all age and sex classes may be sampled including calves less than six months of age. For biopsy sampling and tagging, no takes would occur on large cetacean calves less than six months of age or females accompanying such calves. In addition, for North Pacific right whales, no calves of any age may be sampled or tagged and only females attending calves greater than six months of age would be sampled or tagged. For small cetaceans, no biopsy sampling or tagging would occur for calves less than one year of age, except for skin swabbing of beluga whale mothers and calved during capture operations proposed under NMML, file no. 782-1719. These conditions, and additional precautionary conditions, are included in the mitigation measures contained in each permit and permit amendment. Therefore, in regards to sampling young calves or females attending young calves, the potential magnitude of the impacts and probability of adverse impacts under Alternative 2- Proposed Action (Preferred Alternative) is

somewhat greater compared to Alternative 1- Status Quo. However, NMFS believes the mitigation measures would effectively minimize such adverse impacts.

4.5 Unavoidable Adverse Effects

The approach of the research vessel and aircraft, and associated noise, may cause disturbance to the target marine mammals and sea turtles, and other species that may be incidentally harassed, and temporarily interrupt normal activities such as feeding and mating. The effect on these target species would not be expected to exceed a potential for disturbance or to have a significant long-term effect on individuals or the population. In other words, while marine mammals and sea turtles may exhibit temporary startle and evasive behaviors in response to the activities of researchers, the impact to individual animals would not be likely to be significant because the reactions would be short-lived.

As discussed previously, the NMML permit (file no. 782-1719) would authorize up to four accidental mortalities of beluga whales during capture/handling/release activities over the course of the permit. However, NMFS believes the mitigation measures associated with the capture, handling and release of the belugas would lessen the potential for these mortalities to occur. Also, if the four mortalities were to occur, this would still not exceed the potential biological removal for the affected beluga stocks and therefore would not be likely to have a significant cumulative effect on the affected beluga stocks.

None of the other proposed permit actions would include authorizations for accidental mortality of target or non-target species. In addition, mitigation measures that would be included in these permit actions would be expected to lessen any potential for accidental mortality. However, NMFS recognizes that even under the best circumstances, using experienced research personnel and well-planned research methodologies, the potential for accidental mortality or serious injury would exist. To address this issue, NMFS would place conditions in the proposed permit actions requiring the Permit Holder to cease research activities immediately and contact NMFS should an accidental mortality or serious injury occur. NMFS would then review the circumstances and, where needed, consult with others to determine if the research methodology or qualifications of personnel are likely to lead to further incidences. If so, the Permit Holder would be required to amend the permit to include accidental mortality takes (which would require additional analysis of these takes prior to NMFS approval) or the specific research activities that resulted in the mortality(s) would no longer be authorized under the permit.

Individual animals may experience, to varying degrees, discomfort, pain, and stress as a result of the research activities. The degree to which an individual animal experiences stress, discomfort, or pain is dependent on a variety of factors including, but not limited to, age (young or old animals may be more susceptible to stress and injury), breeding status (lactating females may be more likely to react negatively to disturbance), and overall health. Because the research would involve wild animals that are not accustomed to being approached, the presence of researchers and vessels would unavoidably result in harassment of some animals. Because it is often difficult to assess the health status of an animal from a distance, or based on visual cues alone, it would not always be possible to determine, in advance, whether an individual animal is compromised and therefore predisposed to react negatively to the stress of close approach, tagging or biopsy sampling. However, the mitigation measures that would be imposed as permit conditions under the proposed action would be intended to reduce, to the maximum extent possible, the potential for adverse effects of the research on the target marine mammals and sea turtles and any other species that may be incidentally harassed.

4.6 Cumulative Effects

In addition to the synergistic or additive effects of the combination of research activities proposed, it is necessary to address whether the proposed action is "related to other actions with individually insignificant but cumulatively significant impacts." Cumulative impact is the impact on the environment, which results from the incremental impact of the action, when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Significance from the proposed action cannot be avoided if it is reasonable to anticipate a significant cumulative impact on the environment.

The baseline for this document includes the past and present impacts of state, Federal or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone consultations under Section 7 of the ESA, and the impact of contemporaneous state or private actions. The details of the wide variety of human activities and natural phenomena that may affect the resources within the action area are documented in the various recovery plans for target species listed under the ESA (see http://www.nmfs.noaa.gov/pr, NMFS Stock Assessment Reports, numerous biological opinions under the ESA prepared on federally-permitted fisheries and vessel operations (including dredging and disposal operations), and in an EIS on acoustic impacts from anthropogenic sound sources (*e.g.* U.S. Naval exercises)).

As discussed earlier in Section 4, NMFS has determined that the proposed action would not have a significant cumulative effect on either the human or marine environment. In addition, the proposed action is only directed at specific marine mammals and sea turtles and would not have

a significant cumulative effect on the human or marine environment surrounding other non-target species in the proposed action area. Further, NMFS has determined that the proposed action would not be likely to have significant cumulative effects on non-ESA listed or non-MMPA depleted target species, particularly as the current populations status of these species is not of concern. Therefore, the following analysis of cumulative effects focuses solely on target research species where directed takes are requested in the proposed action. The following analysis provides a brief summary of the past, present, and future human-related activities affecting these specific target species in the proposed action area.

Morality of Target Marine Mammal Species

Natural Mortality. Natural mortality in cetaceans, especially large whale species, is largely unknown. Although factors contributing to natural mortality cannot be quantified at this time, there are a number of suspected causes, including parasites, predation, red tide toxins and ice entrapment. For example, the giant spirurid nematode (*Crassicauda boopis*) has been attributed to congestive kidney failure and death in some large whale species (Lambertson et al 1986). A well-documented observation of killer whales attacking a blue whale off Baja, California proves that blue whales are at least occasionally vulnerable to these predators (Tarpy 1979). Evidence of ice entrapment and predation by killer whales has been documented in almost every bowhead whale stock although the percentage of whales entrapped in ice is considered to be small (Tomilin, 1957; Nerini et al., 1984; Philo et al., 1993). Other stochastic events, such as fluctuations in weather and ocean temperature affecting prey availability, may also contribute to large whale natural mortality.

Commercial Whaling and Subsistence Hunting. Large whale population numbers in the proposed action area have been impacted historically by commercial exploitation, mainly in the form of whaling. Prior to current prohibitions on whaling, such as the International Whaling Commission's 1966 moratorium, most large whale species had been depleted to the extent it was necessary to list them as endangered under the ESA. For example, from 1900 to 1965 nearly 30,000 humpback whales were taken in the Pacific Ocean with an unknown number of additional animals taken prior to 1900 (Perry *et al.* 1999). In addition, 9,500 blue whales were reported killed by commercial whalers in the North Pacific between 1910-1965 (Ohsumi and Wada 1972); and between 1914 and 1975, over 26,040 fin whales were harvested throughout the North Pacific (Braham 1991, as cited in Perry *et al*. 1999). Also, approximately 258,000 sperm whales in the North Pacific were harvested by commercial whalers between 1947 and 1987 (Hill and DeMaster 1999).

In the North Pacific, right whales were hunted from as early as the 1570's through 1980. The International Whaling Commission estimates that 15,451 right whales were taken by Japan in the North Pacific between 1840 and 1909. As a result, North Pacific right whales were rare by the end of the 19th century. North Pacific right whales were killed in this century by modernized

whaling fleets before they targeted other whale species. At least 123 additional right whales were taken in the North Pacific between 1910 and 1930 (Scarff, 1986). Between 1905 and 1937, only 24 North Pacific right whale kills are recorded for Alaska and British Columbia waters (Rice, 1974; Brueggeman *et al.*, 1984). Although this species has been legally protected in the North Pacific and throughout its entire range since 1949 under the Convention for the International Regulation of Whaling, at least 54 additional Western North Pacific right whales were taken intentionally between 1931 and 1982 (23 for scientific purposes (ten by soviet researchers and 13 by Japanese researchers), and one taken accidentally by whalers (Scarff, 1986).

Although commercial whaling no longer occurs with the target large whale species in the proposed action area, the historical impacts of whaling need to be considered as having a significant impact to large whale population numbers.

Today, subsistence hunting occurs with some cetacean and pinniped species. For example, the Russian aboriginals and the Makah Indian Tribes have traditionally hunted gray whales. Hunting of bowhead whales by Eskimos has occurred for at least 2,000 years (Stoker and Krupnik 1993). The Cook Inlet beluga whale stock has been hunted by Alaska Natives for subsistence uses, including food and traditional handicrafts with an average of 37 whales per year between 1994 and 1998 (64 FR 66901). The harvest of bowhead whales from 1995-99 has averaged 54 animals per year and does not exceed the Potential Biological Removal (77 whales) for this stock, nor does it exceed the IWC quota for 1996 of 67 animals (Angliss *et al.* 2001). Subsistence harvest also occurs with harbor seals and Steller sea lions by Alaska Natives. The mean annual subsistence take from the western U.S. stock of the Steller sea lion over the 4-year period from 1998 to 2002 was 176 (NOAA NMFS 2003). However, legal subsistence hunting is not considered to have a significant impact on current large whale and Steller sea lion populations in the proposed action area.

Entrapment and Entanglement in Commercial Fishing Gear. Entrapment and entanglement in commercial fishing gear is one of the most frequently documented sources of human-caused mortality in large whale species. For example, an estimated 78 rorquals were killed annually in the offshore southern California drift gillnet fishery during the 1980s (Heyning and Lewis 1990). From 1996-2000, 22 humpback whales of the Central North Pacific population were found entangled in fishing gear (Angliss et al. 2002). In 1996, a vessel from Pacific Missile Range Facility in Hawaii rescued an entangled humpback, removing two crabpot floats from the whale. The gear was traced to a recreational fisherman in southeast Alaska (R. Inouye, pers. comm.). To date, no sei whales mortality has been associated with any eastern North Pacific fisheries, but the true mortality rate must be considered unknown because of unobserved mortality. Sperm whale interaction with the longline fisheries in the Gulf of Alaska was first documented as an entanglement that occurred in June of 1997 (Hill and Mitchell 1998). Blue whales potentially interact with the offshore gillnet fishery, but no mortalities or serious injury were observed from

1994 to 1998 (Carretta *et al.* 2001).

The only fishery that is known to interact with fin whales is the offshore drift gillnet fishery. One fin whale death was observed in 1999 in the Bering Sea/Aleutian Island groundfish trawl fishery, and this resulted in an estimated average annual take from 1995-99 of 1.5 whales. As fin whales in the entire North Pacific are estimated to be less than 38% (16,625 out of 43,500) of historic carrying capacity, the estimated fishery mortality (1.5) is greater than 10% of PBR (0.32) and therefore cannot be considered insignificant (Mizroch *et al.* 1984). There was one fishery-related mortality observed for the Alaska stock, with a minimum estimated annual mortality of 0.6 for 1995-99 (Angliss *et al.* 2001). This cannot be considered insignificant since the status of the stock is unknown. Similar driftnet fisheries for swordfish and sharks exist along the entire Pacific coast of Baja California, Mexico and may take cetaceans and sea turtles.

Rare cases of rope or net entanglement have been reported from bowhead whales taken in the subsistence hunt (Philo *et al.* 1993), but fisheries interactions with this stock are limited because there is little commercial fishing in its habitat. There are no recent records of mortality incidental to commercial fishery operations for this stock, though the fishery is all self-reported (Angliss *et al.* 2001).

In addition to large whale entanglement and entrapment, many of the fisheries operating in the North Pacific have resulted in entanglements and entrapment of small cetaceans, seals and sea lions. These fisheries include gillnet, purse seine, longline, troll, pot, ring net, trap, handline and jig and have resulted in lethal takes of various pinniped and small cetacean species (NMFS 2003a). Aside from the documented cases of entrapment and entanglement, there is also concern that many marine mammals that die from entanglement in commercial fishing gear tend to sink rather than strand ashore thus making the exact impact of mortality difficult to accurately determine.

Ship Strikes. Collisions with commercial ships are an increasing threat to many large whale species, particularly as shipping lanes cross important large whale breeding and feeding habitats or migratory routes. The number of observed physical injuries to humpback whales as a result of ship collisions has increased in Hawaiian waters. On the Pacific coast, a humpback whale is killed about every other year by ship strikes (Barlow *et al*. 1997). From 1996-2002, Glacier Bay National Park reported eight humpback whales were struck by vessels in Alaskan waters. In 1996, a humpback whale calf was found stranded on Oahu with evidence of vessel collision (propeller cuts; NMFS unpub. data).

The average observed annual mortality due to ship strikes is 0.4 fin whales per year for the period 1994-98. (NOAA NMFS 2000). Overall, the incidences of ship strikes on large whales in the proposed action areas is difficult to quantify and no information is available on the number of large whales that have been killed or seriously injured by interactions by ship strikes outside of

U.S. waters in the North Pacific Ocean. In addition, no information is available on the number of marine mammals killed or seriously injured by ship strikes outside of U.S. waters in the North Pacific Ocean.

Habitat Degradation. Chronic exposure to the neurotoxins associated with paralytic shellfish poisoning (PSP) via contaminated zooplankton prey has been shown to have detrimental effects on marine mammals. Estimated ingestion rates are sufficiently high to suggest that the PSP toxins are affecting marine mammals, possibly resulting in lower respiratory function, changes in feeding behavior and a lower reproduction fitness (Durbin *et al.* 2002). Other human activities, including discharges from wastewater systems, dredging, ocean dumping and disposal, aquaculture and additional impacts from coastal development are also known to affect marine mammals and their habitat. In the North Pacific, extraction of mineral deposits, as well as dredging of major shipping channels pose a continued threat to the coastal habitat of right whales. Point-source pollutants from coastal runoff, offshore mineral and gravel mining, at-sea disposal of dredged materials and sewage effluent, potential oil spills, as well as substantial commercial vessel traffic, and the impact of trawling and other fishing gear on the ocean floor are continued threats to marine mammals in the proposed action area.

The impacts from these activities are difficult to measure. However, some researchers have correlated contaminant exposure to possible adverse health effects in marine mammals. Studies of captive harbor seals have demonstrated a link between exposure to organochlorines (*e.g.*, DDT, PCBs, and polyaromatic hydrocarbons) and immunosuppression (Ross *et al*. 1995, Harder *et al.* 1992, De Swart *et al.* 1996). Organochlorines are chemicals that tend to bioaccumulate through the food chain, thereby increasing the potential of exposure to a marine mammal via its food source. During pregnancy and nursing, some of these contaminants can be passed from the mother to developing offspring. Contaminants like organochlorines do not tend to accumulate in significant amounts in invertebrates, but do accumulate in fish and fish-eating animals. Thus, contaminant levels in planktivorous mysticetes have been reported to be one to two orders of magnitude lower compared to piscivorous odontocetes (Borell, 1993; O'Shea and Brownell, 1994; O'Hara and Rice, 1996; O'Hara *et al.*, 1999).

The impacts of noise pollution continue to be a growing concern. Animals inhabiting the marine environment are continually exposed to many sources of sound. Naturally occurring sounds such as lightning, rain, subsea earthquakes, and animal vocalizations (*e.g.,* whale songs) occur regularly. There is evidence that anthropogenic noise has substantially increased the ambient level of sound in the ocean over the last 50 years. Much of this increase is due to increased shipping as ships become more numerous and larger. Commercial fishing vessels, cruise ships, transport boats, airplanes, helicopters and recreational boats all contribute sound into the ocean. The military uses sound to test the construction of new vessels as well as for naval operations. In some areas where oil and gas production takes place, noise originates from the drilling and production platforms, tankers, vessel and aircraft support, seismic surveys, and the explosive

removal of platforms. Many researchers have described behavioral responses of marine mammals to the sounds produced by helicopters and fixed-wing aircraft, boats and ships, as well as dredging, construction, geological explorations, etc. (Richardson 1995). Most observations have been limited to short-term behavioral responses, which included cessation of feeding, resting, or social interactions. Several studies have demonstrated short-term effects of disturbance on humpback whale behavior (Baker *et al.* 1983; Bauer and Herman 1986; Hall 1982; Krieger and Wing 1984), but the long-term effects, if any, are unclear or not detectable. A habitat concern for cetaceans is the increasing level of anthropogenic noise that may affect their communication (Carretta *et al.* 2001).

Humpback whales seem to respond to moving sound sources, such as whale-watching vessels, fishing vessels, recreational vessels, and low-flying aircraft (Anon 1987, Beach and Weinrich 1989, Clapham *et al*. 1993, Tinney 1988, Atkins and Swartz 1989). Their responses to noise are variable and have been correlated with the size, composition, and behavior of the whales when the noises occurred (Herman *et al*. 1980, Watkins *et al*. 1981, Krieger and Wing 1986, Glockner-Ferrari and Ferrari 1985, Glockner-Ferrari 1990). Several investigators have suggested that noise may have caused humpback whales to avoid or leave feeding or nursery areas (Jurasz and Jurasz 1979, Glockner-Ferrari and Ferrari 1985, Glockner-Ferrari 1990, Salden 1988), while others have suggested that humpback whales may become habituated to vessel traffic and its associated noise (Watkins 1986, Belt *et al*. 1989).

The marine mammals, sea turtles, and their prey that occur in the proposed action area are regularly exposed to these types of natural and anthropogenic sounds. Marine mammals can be found in areas of intense human activity, suggesting that some individuals or populations may tolerate, or have become habituated to, certain levels of exposure to noise (Richardson 1995). However, the cumulative effects of these activities cannot be predicted with certainty. Impacts may be chronic like behavioral changes that can stress the animal and ultimately lead to increased vulnerability to parasites and disease. The net effect of disturbance is dependent on the size and percentage of the population affected, the ecological importance of the disturbed area to the animals, the parameters that influence an animal's sensitivity to disturbance or the accommodation time in response to prolonged disturbance (Geraci and St. Aubin 1980). However, given that additional acoustic impacts from the proposed research solely involve vessel noise and playbacks (see page 35) that are common sounds in the environment, the proposed research would contribute a negligible increment over and above the effects of the baseline activities currently occurring in the marine environment of the proposed action area.
Commercial and Private Marine Mammal Watching. In addition to the federal, private and commercial shipping operations, commercial and private vessels engaged in marine mammal watching also have the potential to impact marine mammals in the proposed action area. A recent study of whale watch activities worldwide has found that the business of viewing whales and dolphins in their natural habitat has grown rapidly over the past decade into a billion dollar (U.S. dollars) industry involving over 80 countries and territories and over 9 million participants

(Hoyt 2001). In 1988, a workshop sponsored by the Center for Marine Conservation and NMFS was held in Monterey, California to review and evaluate whale watching programs and management needs (CMC and NMFS 1988). Several recommendations were made to address concerns about the harassment of marine mammals during wildlife viewing activities including the development of regulations to restrict operating thrill craft near cetaceans, swimming and diving with the animals, and feeding cetaceans in the wild.

Since that time in waters off Hawaii and Alaska, NMFS has promulgated regulation at 50 CFR 224.103 that specifically prohibit: (1) the negligent or intentional operation of an aircraft or vessel, or the doing of any other negligent or intentional act which results in disturbing or molesting a marine mammal; (2) feeding or attempting to feed a marine mammal in the wild; and (3) approaching humpback whales closer than 100 yards (91.4 m). In addition, NMFS launched an education and outreach campaign to provide commercial operators and the general public with responsible marine mammal viewing guidelines which state that viewers should: (1) remain at least 50 yards from dolphins, porpoise, seals, sea lions and sea turtles and 100 yards from large whales; (2) limit observation time to 30 minutes; (3) never encircle, chase or entrap animals with boats; (4) place boat engine in neutral if approached by a wild marine mammal; (5) leave the water if approached while swimming; and (6) never feed wild marine mammals. In January 2002, NMFS also published an official policy on human interactions with wild marine mammals which states that:

> "*NOAA Fisheries cannot support, condone, approve or authorize activities that involve closely approaching, interacting or attempting to interact with whales, dolphins, porpoises, seals or sea lions in the wild. This includes attempting to swim with, pet, touch or elicit a reaction from the animals.*"

Although marine mammal watching is considered by many to be a non-consumptive use of marine mammals with economic, recreational, educational and scientific benefits, it is not without potential negative impacts. One concern is that animals may become more vulnerable to vessel strikes once they habituate to vessel traffic (Swingle *et al*. 1993; Wiley *et al*. 1995). Another concern is that preferred habitats may be abandoned if disturbance levels are too high. In the Notice of Availability of Revised Whale Watch Guidelines for Vessel Operations in the Northeastern United States (64 FR 29270; June 1, 1999), NMFS noted that whale watch vessel operators seek out areas where whales concentrate, which has led to numbers of vessels congregating around groups of whales, increasing the potential for harassment, injury or even the death of these animals. Several recent research efforts have monitored and evaluated the impacts of people closely approaching, swimming, touching and feeding marine mammals and has suggested that marine mammals are at risk of being disturbed ("harassed"), displaced or injured by such close interactions. Researchers are reporting boat strikes, disturbance of vital behaviors and social groups, separation of mothers and young, abandonment of resting areas, and habituation to humans (Kovacs and Innes 1990, Kruse 1991, Wells and Scott 1997, Samuels and

Bejder 1998, Bejder *et al.* 1999, Colborn 1999, Constantine 1999, Cope *et al.* 1999, Mann *et al.* 2000, Samuels *et al.* 2000, Boren *et al.* 2001, Constantine 2001, Nowacek *et al.* 2001). Although it remains difficult to quantify the cumulative impacts of marine mammal viewing activities in the proposed action area given that the target species are already impacted by viewing activities and vessels already present in the marine environment, the proposed research would contribute a negligible increment over and above the effects of the baseline activities currently occurring in the marine environment of the proposed action area.

Scientific Research. Marine mammals have been the subject of field studies for decades. The primary purposes of most studies are generally for monitoring populations and gathering data for behavioral and ecological studies. Over time, NMFS has issued dozens of permits for takes of marine mammals in the proposed action area by harassment from a variety of activities, including aerial and vessel surveys, photo-identification, remote biopsy sampling, and attachment of scientific instruments. One permit exists (NMFS Marine Mammal Health and Stranding Response Program, File No. 932-1489) authorizing takes of stranded or distressed marine mammals. The number of permits and associated takes by harassment indicate a high level of research effort relative to the population size of some endangered marine mammal species in the proposed action area. This is due, in part, to intense interest in developing appropriate management and conservation measures to recover these species. Given the number of permits, associated takes and research vessels and personnel present in the environment, repeated disturbance of individual marine mammals is likely to occur in some instances. It is difficult to assess the effects of such disturbance. However, NMFS has taken steps to limit repeated harassment and avoid unnecessary duplication of effort through permit conditions requiring coordination among permit holders. NMFS would continue to monitor the effectiveness of these conditions in avoiding unnecessary repeated disturbances.

It is also important to note that some of the marine mammal species in the proposed research are migratory and may transit in and out of U.S. waters and the high seas. NMFS does not have jurisdiction over the activities of individuals conducting field studies in other nations waters and cumulative effects from all scientific research on these species across the proposed action area cannot be fully assessed. However, where possible, NMFS attempts to collaborate with foreign governments to address management and conservation of these transboundary ESA-listed species.

Conclusions. All of the issues noted above are likely to have some level of impact on marine mammal populations in the proposed action area, particularly where ESA-listed (endangered and threatened) and MMPA depleted species are involved. Although commercial harvest no longer takes place and existing subsistence harvest is set by quotas, historic impacts from these activities still affects many of these populations. In addition, entanglement in fishing gear, ship collisions, habitat degradation, biotoxins, viewing pressures, scientific research and noise pollution continue to result in some level of impact to marine mammal populations in the proposed action area. However, the proposed research would contribute a negligible increment

over and above the effects of the baseline activities currently occurring in the marine environment of the proposed action area. In addition, while the effects of repeated or chronic disturbance from scientific research activities should not be dismissed, the potential benefits of information gained from the proposed action in reducing the effects of human activities on these species outweighs what is likely an overall small increase in harassment.

Mortality of Sea Turtle Species

The following is a description of known threats to sea turtle species in the proposed action area.

Overview of Risk Factors. Threats to sea turtles vary among the species, depending on their distribution and behavior. The value of their meat, eggs, shell or other parts plays an important role in the extent of directed harvest outside the U.S. All sea turtle life stages are vulnerable to human-induced mortality. On nesting beaches in many foreign nations, direct exploitation of turtles for meat, eggs, skin or shell, and other products takes place for both commercial markets and local utilization, and to a much lesser degree for traditional ceremonies. Nesting beach and in-water habitat degradation and destruction have occurred due to many factors, including coastal development, dredging, vessel traffic, erosion control, sand mining, vehicular traffic on beaches, and artificial lighting, which repels the adults and disorients the hatchlings. In areas where recreational boating and ship traffic is intense, propeller and collision injuries are not uncommon. Human alteration of terrestrial habitats can also change the feeding patterns of natural predators, thereby increasing predation on marine turtle nests and eggs. In addition, the hawksbill's dependence on coral reefs for shelter and food link its well-being to the healthy reefs. Destruction of reefs from pollution, and vessels anchoring, striking or grounding is a growing problem.

Petroleum and other forms of chemical pollution (pesticides, heavy metals, and PCB's) affect turtles throughout their marine and terrestrial habitats and have been detected in turtle tissues and eggs. Poisoning, as well as blockage of the gastrointestinal tract by ingested tar balls, has been reported. Low level chemical pollution, possibly causing immunosuppression has been suggested as one factor in the epidemic outbreak of a tumor disease (fibropapilloma) in green turtles. Plastics and other persistent debris discharged into the ocean are also recognized as harmful pollutants in the marine environment. Marine turtles such as leatherback turtles actively feed on jellyfish, and plastic bags floating in the water resemble such prey in form, color and texture. Hawksbills also eat a wide variety of debris such as plastic bags, plastic and styrofoam pieces, tar balls, balloons and plastic pellets. Ingested plastics can occlude the gut, preventing or hampering feeding, and causing malnutrition or starvation. Both entanglement and ingestion of this synthetic debris have been documented to cause sea turtle mortality (*in* NMFS and USFWS, 1998a-d).

Fisheries-related impacts. Very few non-U.S. fisheries in the Pacific Ocean are observed or monitored for bycatch. Rough estimates can be made of the impacts of coastal, offshore, and distant water fisheries on sea turtle populations in the Pacific Ocean by extrapolating data collected on fisheries with known effort that have been observed to incidentally take sea turtles. However, it is important to note that a straight extrapolation of these data represents a large degree of uncertainty and variability. Sea turtles are not uniformly distributed in time and space. In addition, observer coverage of a fishery may be very low, observers may not always be randomly assigned to vessels, or they may be placed on vessels that use fishing strategy that may be uncharacteristic of the fleet. Also, self reporting by fishermen in surveys and logbooks may contain biased or incomplete information. Lastly, any take estimates are hampered by a lack of data on pelagic distribution of sea turtles.

Direct harvest. In some localities outside the U.S., subsistence use of sea turtles is widespread. For example, between 1993 and 1996, Broderick (1997) investigated the subsistence harvest of green (and hawksbill) turtles by people from three different communities, Kia, Wagina, and Katupika on the Solomon Islands. At Kia, the majority of turtles are consumed for feasts, and the meat of the green turtle is more highly valued than that of the hawksbill. Broderick (1997) estimated that a minimum of 1,068 green turtles were harvested per year, and most were immature turtles.

By far the most serious problem hawksbill turtles face is the harvest by humans (NMFS and USFWS, 1998d). Turtles have been harvested for centuries by native inhabitants of the Pacific region. Many adults are taken for the shell, which has a commercial value, rather than food. Hawksbill generally are considered to taste poor, and infrequently are toxic to humans (NMFS and USFWS, 1998d). Until recently, tens of thousands of hawksbills were sacrificed each year to meet the demand for jewelry, ornamentation, and whole stuffed turtles (Milliken and Tokunaga *1987 in* Eckert, 1993). In 1988, Japan's imports from Jamaica, Haiti and Cuba represented some 13,383 hawksbills, and it is extremely unlikely that this volume could have originated solely from local waters (Eckert, 1993). Japan ceased the importation of turtle shell in 1992. Illegal domestic harvest of eggs and turtles continues in the United States, especially in Caribbean and Pacific island territories. Law enforcement, as well as conservation and management efforts, are hindered by diffuse nesting distributions and the remoteness of some nesting beaches (Eckert, 1993).

Scientific Research. Sea turtles have been the focus of field studies for decades. The primary purposes of most studies would generally be for monitoring populations and gathering data for behavioral and ecological studies. Over time, NMFS has issued dozens of permits for takes of sea turtles in the proposed action area by harassment from a variety of activities, including vessel surveys, photo-identification, biopsy sampling, capture/handling/release and attachment of scientific instruments. The number of permits and associated takes by harassment indicate a high level of research effort relative to the population size of some sea turtle species in the proposed action area. This is due, in part, to intense interest in developing appropriate

management and conservation measures to recover these species. Given the number of permits, associated takes and research vessels and personnel present in the environment, repeated disturbance of individual sea turtles would be likely to occur in some instances. It is difficult to assess the effects of such disturbance. However, NMFS has taken steps to limit repeated harassment and avoid unnecessary duplication of effort through permit conditions requiring coordination among permit holders. NMFS would continue to monitor the effectiveness of these conditions in avoiding unnecessary repeated disturbances.

It is also important to note that sea turtles species are migratory and may transit in and out of U.S. waters and the high seas. NMFS does not have jurisdiction over the activities of individuals conducting field studies in other nations waters and cumulative effects from all scientific research on these species across the proposed action area cannot be fully assessed. However, where possible, NMFS attempts to collaborate with foreign governments to address management and conservation of these transboundary ESA-listed species.

[Note: The SWFSC (file no. 774-1714) would be the only proposed permit action to include takes for sea turtles species. Therefore, the addition of sea turtles takes under the proposed action would be expected to be minimal.]

Conclusions. Subsistence harvest in waters of the proposed action area outside of the U.S., entanglement in fishing gear, ship collisions, habitat degradation, biotoxins, scientific research and other factors noted above would continue to result in some level of impact to sea turtle populations in the proposed action area. However, the proposed research would contribute a negligible increment over and above the effects of the baseline activities currently occurring in the marine environment of the proposed action area. In addition, while the effects of repeated or chronic disturbance from scientific research activities on sea turtles would have some short-term effect on the species, the potential benefits of using the information gained from the proposed action to reduce the effects of human activities on these animals outweighs what is likely an overall small increase in harassment.

Section 5 MITIGATION MEASURES

Existing mitigation measures in NMFS permits

In addition to measures identified by researchers in their applications and otherwise considered "good practice or protocol", all NMFS marine mammal and sea turtle research permits contain conditions intended to minimize the potential adverse effects of the research activities on the animals. These conditions are based on the type of research authorized, the species involved, information in the literature and from the researchers themselves about the effects of particular research techniques and the responses of animals to these activities. Specifically, the following conditions would be stated requirements in the permits and permit amendments:

- *General approach measures, including precautionary measures for young and females with young*. Researchers would exercise caution when approaching animals and must retreat from animals if behaviors indicate the approach may be interfering with reproduction, feeding, or other vital functions. For females with young, researchers would immediately terminate efforts if there is any evidence that the activity may be interfering with pair-bonding or nursing and would not position the research vessel between the female and calf/pup. Researchers may not biopsy sample or tag cetacean calves less than six months of age or females attending calves less than six months of age.

- *Photography and filming*. The Permit Holder and all researchers working under the proposed permits would obtain prior approval by the NMFS Permits Division for non-research related use of photographs, video and/or film that were taken to achieve the research objectives, that such activities would not influence the conduct of research in any way, and any film approved for use would include a credit, acknowledgment, or caption indicating that the research was conducted under a permit issued by NMFS under the authority of the MMPA and/or the ESA.

- *Accidental mortality and serious injury*. The proposed permit for NMML (file no. 782-1719) would include authorization for four accidental mortalities of beluga whales over the course of the permit. However, NMFS believes the mitigation measures associated with the capture, handling and release of the belugas, including those contained in the permit application and those that would be included in any issued permit, would lessen the potential for these mortalities to occur (see below). Also, if the four mortalities were to occur, this would not exceed the potential biological removal for the affected beluga stocks and therefore would not be likely to have a significant cumulative effect on the affected beluga stocks.

- Researchers must collect the net in two boats to get the net out of the water quickly.

- Closely examine the net to ensure during and after captures to see if more than one beluga was captured.

- Physically lift the float line to check for small belugas, realizing that a beluga could swim into the net after it has been examined.

For all other proposed permit actions, accidental mortality would not be authorized. If mortality or serious injury occurs, research activities would be suspended immediately until the protocol and handling procedures were reviewed and, if necessary, revised to the satisfaction of NMFS, so as to ensure that the risk of additional mortality is minimized.

- *Research personnel*. The Permit Holder would ultimately be responsible for all activities of any individual who is operating under the authority of the proposed permit. The Principal Investigator (PI) would share this responsibility. Addition of Co-investigators would be approved by NMFS. All research personnel would be required to serve a research function and would be qualified to perform that function.

- *Reporting conditions*. An annual report would be submitted and reviewed by NMFS for each year the permit is valid. Annual reports would include: (1) number of animals approached; (2) number of approach episodes conducted; (3) number of animals harassed; and (4) number of times each animal was harassed. In addition, the reports would include detailed descriptions of the animals' reactions, measures taken to minimize disturbance, research plans for the forthcoming year, and an indication as to when or if any results have been published or otherwise disseminated during the year. At the end of the proposed permit, the Permit Holder would submit a final report that includes: (1) a reiteration of the objectives and a summary of the results of the research and how they pertain to or further the research goals stated in the Permit applications and NMFS conservation plans; and (2) an indication of where and when the research results would be published.

- *Research in cooperation with commercial vessels*. The permits specifically would not authorize the conduct of research activities aboard or in cooperation with commercial marine mammal viewing vessels or aircraft while they are engaged in such commercial activity. Further, the permits would not authorize the cooperation with any vessel or aircraft carrying any nonessential passengers (i.e., not essential for the conduct of the research) who either pay a fee in return for being allowed onboard the vessel or aircraft, or who, prior to or after the trip, give "donations" to the Holder, PI, CI(s), or Research Assistant(s).

- *Research coordination*. Permit holders would be required to notify the appropriate NMFS Regional office at least 2 weeks in advance to coordinate the dates and locations of the authorized activities. Permit holders would also be required to coordinate with other researchers conducting the same or similar studies on the same species, in the same locations and at the same time.

- *Import/export of marine mammal parts*. No animal would be harassed or killed for the express purpose of providing specimens to be obtained and/or imported under the proposed permit actions. Parts imported under the authority of the proposed permits would be taken in a humane manner, and in compliance with the Acts and any applicable foreign law. Importation of marine mammal and sea turtle parts is subject to the provisions of 50 CFR parts 14, 216 and 222. Any specimen(s) of species listed in the Appendices to CITES would be accompanied by valid CITES documentation from the exporting country, and, in the case of Appendix-I species, from the U.S. Fish and Wildlife Service.

- *Biological samples*. All specimen materials collected or obtained under this authority would be maintained according to accepted curatorial standards. After completion of initial research goals, any remaining samples would be deposited into a *bona fide* scientific collection which meets the minimum standards of collection curation and data cataloging as established by the scientific community

- *Additional required permits.* Permit holders would be required to obtain appropriate authorizations needed from other state or Federal agencies and would be reminded that the NMFS permit does not provide authorization for requirements under another state or Federal agencies' jurisdiction. This would include obtaining necessary permits for research conducted in a National Marine Sanctuary, National Park, foreign country, etc.

Mitigation measures common to specific research activities

There are a number of measures that are considered "good practice or protocol" that are commonly followed by qualified, experienced personnel to minimize the potential risks associated with some of the research activities under the proposed action. Consistent with the issuance criteria requiring personnel authorized to take marine mammals or sea turtles under a permit to have qualifications commensurate with their duties, only qualified, experienced personnel with sufficient experience in the specific intrusive techniques would be allowed to perform intrusive procedures such as remote biopsy sampling and attachment of intrusive tags. Efforts would also be made to avoid duplicate sampling of known animals through sharing of sighting and photo-identification information among permit holders. The following outlines common mitigation measures associated with specific research activities and/or species.

Mitigation for close approach. To minimize disturbance and ensure adequate opportunities for

photo-identification, tagging, and sampling, permit holders would approach animal(s) gradually from behind or alongside, rather than head on. An approach is defined as a continuous sequence of maneuvers involving a vessel, aircraft, or researcher's body in the water, including drifting, directed toward an animal(s) for the purposes of conducting authorized research which involves one or more instances of coming closer than 100 yards (91.4 meters) to a large whale(s) or 50 yards (45.7 meters) to a small cetacean(s), seal(s), sea lion(s) or sea turtle(s). Researchers would approach at slow speeds, avoid making sudden changes in speed or pitch, and avoid using reverse gear. The amount of time spent in close proximity to an animal(s) would be limited to the minimum necessary to meet research objectives. Whenever possible, four-stroke engines would be used, as they are quieter than two-stroke engines. The proposed permit actions would also state that researchers must leave the vicinity of an animal(s) if the animal(s) show a response to the presence of the research vessel or aircraft. Approaches to an individual animal would be limited to three per day and efforts to approach an individual would be discontinued if the animal displays avoidance behaviors, such as a change in its direction of travel or departures from normal breathing and/or dive patterns. Only personnel with extensive experience operating vessels near animals would be involved in the vessel approaches.

Mitigation for collection of dead parts following killer whale predation event. Three proposed permit actions involve the collection of dead parts directly following a killer whale predation event (see Straley (file no. 473-1700), Matkin (file no. 662-1661) and Wynne (file no. 1049-1718)). These parts, the remains of feeding bouts, would be fragments of floating skin and blubber, and occasionally an uneaten body organ. In order to avoid harassment and otherwise effect the predation event, transient killer whales would be followed at distances exceeding 200m, observed where they move in relation to the distribution of sea lions and other potential prey. The approach would be to first observe these predation events from a distance with high-powered binoculars. When whales leave, remains of prey would be collected for genetic analysis to determine prey species. Researchers would not move close to whales or prey until it is clear that the kill has been made and bits or discarded pieces of prey are suspected to be present and the killer whales are done feeding. Parts would be collected with a long handled dip net and either frozen or placed in vials of dimethyl sulfoxide or ethanol for later genetic analysis.

Additionally, the proposed research under Cynthia Tynan (file no. 1035-1688) would involve the collection of large whale prey, such as krill and plankton. Prey samples would be collected using a dip net or plankton tow but not in the presence of feeding whales.

Mitigation for incidental harassment of Steller sea lions. Three proposed permit actions involve the incidental harassment of Steller sea lions during killer whale predation studies. The proposed permit actions for Jan Straley (file no. 473-1700), Dena Matkin (file no. 662-1661) and Kate Wynne (file no. 1049-1718) are requesting authorization for this activity. These takes are not considered as directed takes under this EA. All of these takes are for harassment incidental to killer whale predation studies and would generally result from the presence of the research

vessel in the vicinity of live animals after a fresh kill. For the ESA-listed Steller sea lions, each permit application requests authorization for 100 annual takes as it is possible that a predation event could occur near or directly outside a Steller sea lion rookery and live animals could potentially be incidentally harassed. Although predation could happen very close to a rookery (within ½ nm), sea lions typically remain hauled out when killer whales are near rookeries (land is their safety zone) and flushing would be expected to be minimal.

Mitigation for tag attachment and biopsy sampling. In addition to the precautions required for close approach described above, measures to minimize the effects of attaching scientific instruments would include the use of stoppers to reduce the force of impact and limit the depth of penetration of the tips of subdermal tags. It would also be common practice to disinfect arrow and biopsy tips between and prior to each use, to minimize the risk of infection and cross contamination. The tag size would be kept to the minimum needed to collect the desired data to minimize the potential for increased energetic costs of or behavioral responses to larger tags. Suction cup mounted tags would be placed behind the whale's blowholes so that there is no risk of any migration of the suction cup resulting in obstruction of the blowhole. A take would be considered to have occurred with any *attempt* made to tag or biopsy dart an animal from either a crossbow, airgun or pole, even if that attempt is unsuccessful. In addition, no biopsy sampling or tagging takes would occur on large cetacean calves less than six months of age or females accompanying such calves. In addition, for North Pacific right whales, no calves of any age may be tagged or sampled and only females attending calves greater than six months of age would be tagged or sampled. For small cetaceans, no tagging or biopsy sampling would occur for calves less than one year of age, except for skin swabbing of beluga whale mother and calves during capture operations proposed by NMML, file no. 782-1719.

Mitigation for exposure to playbacks. A particular playback trial would be suspended if the exposed whales show strong reactions, as indicated by sustained breaching and other activities commonly associated with stressed or agitated whales. In addition, playback experiments would be limited to one take per animal group per day.

Mitigation for humpback whale research in Hawaii and Alaska. Given the 100 yard (91.44 m) approach restriction to humpback whales in Hawaii and Alaska and NMFS' concerns over unqualified or excessive personnel involved in the research, these permits contain additional mitigation measures to limit the presence of any unnecessary or excessive research personnel. NMFS makes a clear distinction between permitted researchers closely approaching whales and other vessels that closely approach and violate the approach regulation. Hawaii humpback researchers would be required to fly a yellow pendant when involved in research activities. [Note: NMFS is currently considering whether this same flag condition would apply to humpback whale research in Alaska. However, the research in Alaska does not occur in such a concentrated area as in Hawaii. In addition, fewer members of the public are present to observe research vessels closely approaching whales and thus interpret these close approaches as

appropriate for the public to also pursue. So, the concern over clearly distinguishing research vessels from private vessels is less in Alaska than in Hawaii.]

Mitigation for capture, handling, sampling and release of beluga whales in waters off Alaska. Given the more intrusive nature and potential for injury during capture operations, the following mitigation measures would be imposed on the NMML proposed permit action (file no. 782-1719) during research activities that capture, handle, sample and release beluga whales in waters off Alaska, particularly in regards to the MMPA-depleted stock of Cook Inlet beluga whales.

All age and sex classes would be sampled although efforts would be made to avoid capturing mother/calf pairs or groups with mother/calf pairs present. If a mother/calf pair is captured, they would both be biopsy sampled and then released. However, the biopsy sampling would occur only by genetic swabbing (see previous biopsy sampling descriptions for more information on methods used in genetic swabbing). As this is the least invasive method for collecting genetic samples and only involves brushing the skin with a brillo-like pad, NMFS is not concerned that the biopsy sampling of these calves would have any adverse impact to the animals or the mother/calf pair bond.

The following mitigation measures were submitted with the incident report after the beluga drowning mortality in Bristol Bay in May of 2002 and would be included in any further capture operations:

- collect the net in two boats instead of just the net boat, to get the net out of the water quickly.
- examine the net close to any captured beluga to see if more than one beluga was captured
- physically lift the float line to check for small belugas, realizing that a beluga could swim into the net after it has been examined.

In all cases where a net is deployed, it would either be removed after 15 minutes or checked from one end to the other and from top to bottom every 15 minutes. If the entire net is not visible from a single vantage point, then one or more boats would travel the length of the net, and where waters are turbid, pull the net up until the lead line is visible.

Further, for Cook Inlet beluga whales, the following rules would be observed for release of whales:

- if after 10 minutes the encircled whale has not become entangled in the net, the net would be opened and the whale allowed to escape
- if within 30 minutes of encirclement the whale is not secured in the sling or in shallows for tagging, it would be released

- regardless of the sampling protocol, the whale would be released within 30 minutes of being secured.

Thus, the total time that a whale would be handled is 60 minutes with no more than 30 minutes partially immobilized. Every effort would be made to avoid stranding the whale during the capture and tagging. If stranding does occur, a pool would be excavated around the whale and one or more of the boats would be beached and filled with water to supplement the pool and keep the whale wet. A shade would also be constructed to help keep the whale cool. To limit the risk of prolonged stranding in Cook Inlet, capture and tagging operations would be limited to the two hours before and six hours after low tide. This would limit any stranding that might occur to a maximum of four hours before the rising tide can free the animal. The estimated maximum time from capture to release (if the animal is stranded during an outgoing tide) is eight hours.

For all stocks of beluga whales in waters off Alaska, potential adverse effects of the capture and tagging operations would be minimized by using a highly competent field team, using the smallest possible instrument package limiting the handling time and maintaining antiseptic conditions to the highest extent possible. NMML scientists involved in biopsy and tagging activities would have extensive experience with animals in the wild. Whales exhibiting behaviors indicating a negative reaction to the vessel such as aerial behaviors or tail slaps would not be approached. Whales exhibiting negative responses to capture or handling would be released if it is thought that their fitness might be compromised. This would be done for the safety of the researchers as well as to minimize any adverse impacts to the individual whales from the proposed research activities.

To minimize adverse effects various tactics would be employed, including:

- if the tag is attached near the anterior margin of the dorsal fin then a wide band or strap would be placed across the anterior margin and attached to the pins on either side to prevent the posterior migration of the tag.
- a release mechanism such as dissolving nuts would be used to release the tag at the end of its useful life so that the tag would not need to migrate to the posterior margin of the fin to release.
- the tag would be placed close to the posterior margin so that the migration path of the pins comprises less than half of the width of the fin.

Mitigation for sea turtle research. The following requirements are contained in the SWFSC (file no. 774-1714) proposed permit to address mitigation measures during sea turtle research:

Sea Turtle Handling and Resuscitation Requirements. The Permit Holder, Principal Investigator,

Co-investigator(s), or Research Assistant(s) acting on the Permit Holder's behalf would use care when handling live animals to minimize any possible injury, and appropriate resuscitation techniques would be used on any comatose turtle prior to returning it to the water. Whenever possible, stressed or injured animals would be transferred to rehabilitation facilities and allowed an appropriate period of recovery before return to the wild. An experienced veterinarian, veterinary technician, or rehabilitation facility would be named for emergencies. All turtles would be handled according to procedures specified in 50 CFR 223.206(d)(1)(i). In addition, sea turtles would be protected from temperature extremes of heat and cold, and kept moist during sampling. The turtle would be placed on pads for cushioning, this surface would be disinfected between turtles, and all materials would be removed that could be accidentally ingested.

During release, turtles would be lowered as close to the water's surface as possible to prevent potential injuries. The Permit Holder, Principal Investigator, Co-investigator(s), or Research Assistant(s) acting on the Permit Holder's behalf would carefully observe newly released turtles and record observations on the turtle's apparent ability to swim and dive in a normal manner. If a turtle is not behaving normally within one hour of release, the turtle would be recaptured and taken to a rehabilitation facility. Resuscitation (as described at 50 CFR 223.206(d)(1)(i)) would be attempted on sea turtles that are comatose or inactive, and sea turtles being resuscitated would be shaded and kept moist but under no circumstance be placed into a container holding water.

When handling and/or tagging turtles displaying fibropapilloma tumors and/or lesions, researchers would use the following procedures: (1) clean all equipment that comes in contact with the turtle (tagging equipment, tape measures, etc.) with a mild bleach solution, between the processing of each turtle, and (2) maintain a separate set of sampling equipment for handling animals displaying fibropapillomas tumors and/or lesions.

Biopsy sampling. Sterile techniques would be used at all times and a new biopsy punch would be used on each turtle. Turtles brought on-board the vessel for sampling would have the sample area swabbed with alcohol or Betadine, before and after the sample is collected, to protect against infection. Samples would be collected from a rear flipper, between two toes, approximately one inch from the distal end of the toe. Turtles too large to bring on-board for sampling would be sampled using a pole-biopsy in the location most safely and easily accessed by the researcher/observer (usually the 2. flipper). Samples would be collected from anywhere on the limbs or neck, avoiding the head and would be collected from the carapace of the leatherback turtle if necessary.

Tagging, Weighing and Measuring. All tags would be cleaned (e.g., oil residue) and disinfected before being used. All turtles would be examined for existing tags, including PIT tags, before attaching or inserting new ones. If existing tags are found, the tag identification numbers would be recorded and included in the annual report.

For satellite tags, the total weight of transmitter attachments would not exceed 5% of the body mass of the animal. Each attachment would be made so that there is no risk of entanglement. The transmitter attachment would either contain a weak link (where appropriate) and would have no gap between the transmitter and the turtle that could result in entanglement. The lanyard length (if used) would be less than ½ of the carapace length of the turtle. It would include a corrodible, breakaway link that would corrode and release the tag-transmitter after the tag-transmitter life is finished. Adequate ventilation around the head of the turtle would be provided during the attachment of satellite tags or attachment of radio/sonic tags if attachment materials produce fumes. To prevent skin or eye contact with harmful chemicals used to apply tags, turtles would not be held in water during the application process. The proposed permit would not authorize the tagging of nesting female turtles, only turtles captured at-sea may be tagged.

Netting. Nets used to catch turtles would be large enough to diminish bycatch of other species; approximately 18 inch stretched mesh size is recommended. Highly visible buoys would be attached to the float line of each net such that they are spaced at an interval of every 10 yards or less. Each float would be attached to the net as it is being deployed. Nets would be checked at least every 30 minutes, and more frequently whenever turtles or other bycatch organisms were observed in the net. The float line of all nets would be observed at all times for movements that indicate an animal has encountered the net. When this occurs, the net would be immediately checked. "Net checking" would be defined as a complete and thorough visual check of the net either by snorkeling the net in clear water or by pulling up on the top line such that the full depth of the net is viewed along the entire length. If water temperatures are equal to are or greater than 30^{o}C, nets would be checked at least every twenty minutes. Nets would not be put in the water when marine mammals are observed within the vicinity of the research, and the marine mammals would be allowed to either leave or pass through the area safely before net setting is initiated. Should any marine mammals enter the research area after the nets have been set, the lead line would be raised and dropped in an attempt to make marine mammals in the vicinity aware of the net. If marine mammals remain within the vicinity of the research area, nets would be removed.

Aerial Surveys. All surveys would not be flown below 500' (153m) to minimize disturbance to listed sea turtles.

Accidental Mortality and Serious Injury. The permit would include a requirement that if a sea turtle is seriously injured or dies during capture or sampling, the Permit Holder must cease research immediately. In addition, the Permit Holder must notify the Office of Protected Resources, Permits, Conservation and Education Division by phone (301-713-2289) within two days of the event and submit a written report describing the circumstances surrounding the event within two weeks. The Permit Holder must send this report to the Chief, Permits, Conservation and Education Division, F/PR1, 1315 East-West Highway, Silver Spring, MD 20910. The Permit Holder, in consultation with NMFS, must re-evaluate the techniques that were used and those techniques must be revised accordingly to prevent further injury or death. After review of

these circumstances, NMFS may suspend authorization of research activities or amend the Permit in order to allow research activities to continue.

Blood Sampling. Blood samples would be taken by experienced personnel that have been authorized under the proposed permit. New disposable needles would be used on each animal. Care would be taken to ensure no injury results from the sampling. If an animal cannot be adequately immobilized for blood sampling, efforts to collect blood would be discontinued. Attempts (needle insertions) to extract blood would be limited to two on either side of the neck. Sample collection sites would always be sterilized with alcohol, or other antiseptic prior to sampling.

Protection of Bottom Habitat and Other Species. The applicant would take all necessary precautions to avoid damaging bottom habitat when setting nets and boat anchor while capturing turtles. All incidentally captured species (fishes, jellyfish, etc.) captured in the net would be released alive as soon as possible.

SECTION 6 CONSIDERATION OF NOAA AND CEQ SIGNIFICANCE CRITERIA

NOAA Administrative Order 216-6 (NAO 216-6) and the Council on Environmental Quality's (CEQ) regulations at 40 C.F.R. Section 1508.27 identify criteria for determining the significance of the impacts of an action for purposes of NEPA. The criteria are addressed as follows:

1. *Are there expected beneficial or adverse significant effects?* The proposed action would result in research that may contribute to better management and/or recovery of the species, and the proposed action would not be expected to result in any significant adverse effects. The research procedures to be used have been well-tested and follow professionally accepted protocols. There would be no expected significant effects from the proposed action.

2. *Can the action be reasonably expected to have a substantial adverse impact on public health and safety and/or involve highly toxic agents or pathogens?* The proposed action would authorize scientific research on marine mammal and sea turtle species and would not have a substantial adverse impact on public health and safety. Although the nature of the research raises the potential for injury or mortality of involved personnel (i.e., boat or plane accidents), the impacts would be expected to be minimal and insignificant. In addition, the proposed action would not involve the use of any toxic agents or pathogens.

3. *Will the action affect any unique characteristics of the geographic area*? The proposed action would not affect any unique characteristics of the geographic area. It is directed specifically at the target marine mammal and sea turtle species.

4. *To what degree are the effects on the quality of the human environment expected to be highly controversial?* Notices of Receipt for all of the permit and permit amendment applications under the proposed action were published in the *Federal Register* to allow other agencies and the public the opportunity to review and comment on the actions. In addition, where applicable, copies of the applications were sent to other Federal and state agencies for review. None of these governmental agencies objected to the issuance of the proposed permit actions. A small number of comments were received on various applications, and where appropriate, suggestions for limiting potential impacts were incorporated into the permit or amendment. As all of the proposed research activities are common and widely used, no portions of the proposed action would be expected to be controversial in nature.

5. *To what degree are the effects highly uncertain or involve unique or unknown risks*? There are no highly uncertain effects or effects that involve unique or unknown risks.
6. *To what degree would the action establish a precedent for future actions with significant*

effects or represents a decision in principle about a future consideration? The research activities described in the proposed action are not new and therefore would not affect any future decisions or set a precedent.

7. *Can the action be reasonably expected to result in cumulative adverse effects that could have a substantial effect on the target species or non-target species?* The proposed action would contribute a negligible increment over and above the effects of the baseline activities currently occurring in the marine environment of the proposed research. Effects would only likely be short-term and non-significant. Non-target species would potentially be affected by the research (i.e, disturbance from vessel noise or presence of research personnel), but these potential impacts would be expected to be minimal and insignificant. No cumulative adverse effects that would have a substantial effect on the target or non-target species would be expected.

8. *To what degree will the action adversely affect 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 would not affect any entities listed in or eligible for listing in the National Register of Historic Places nor cause loss or destruction of significant scientific, cultural or historic resources.

9. *Can the action be reasonably expected to have a substantial adverse impact on endangered or threatened species, marine mammals, or critical habitat of these species*? Two Biological Opinions (Section 7 of the ESA) were written to cover all the proposed permits under the proposed action, and their analysis concluded that the proposed action would not likely jeopardize the continued existence of any ESA-listed species and would not be likely to destroy or adversely modify designated critical habitat. In addition, all proposed permit actions listed in this EA would contain mitigation measures to minimize the effects of the research and to avoid unnecessary stress to any ESA-listed species.

10. *Will the action result in a violation of Federal, state or local law for environmental protection?* The proposed action would not result in any violation of these laws.

11. *Will the action result in the introduction or spread of non-indigenous species?* The proposed action would not remove nor introduce any species. Therefore, it would not result in the introduction or spread of non-indigenous species.

12. *Can the action be reasonably expected to allow substantial damage to the ocean and coastal habitats and/or essential fish habitat (EFH) as defined under the Magnuson-Stevens Act and identified in Fishery Management Plans?* The proposed action would involve only vessel and aerial based research activities directed at marine mammals and sea turtles, including photo-identification, above and below water behavioral observation, photogrammetry, capture, handling, and measuring of sea turtles and certain stocks of beluga whales, acoustic recordings and playbacks, biopsy sampling, and tagging. As the proposed action would not be directed at the physical environment and the best available information suggests that the physical environment would not be effected, NMFS believes that the proposed action would not significantly impact any national marine sanctuary, marine protected area, coral reef, ocean and coastal habitats, or EFH.

13. *Can the action be reasonably expected to have a substantial impact on biodiversity and ecosystem function within the affected area (e.g., benthic productivity, predator-prey relationships, etc.)?* The effects of the proposed action on target and non-target species and their habitat, coral reef ecosystems, EFH, marine sanctuaries, and marine animals was considered. No substantial impact on biodiversity and ecosystem function within the affected area would be expected. The proposed action is meant to further study the species' role in their ecosystem and provide guidance for further management efforts to improve understanding of the species and our management of its habitat.

14. *Are significant social or economic impacts interrelated with significant natural or physical environmental effects?* No significant natural or physical environmental effects would be expected as a result of the proposed action. Socioeconomic benefits would be expected to be minimal and mainly arise from the creation of job opportunities and the generation of local revenue for lodging and other research related costs.

SECTION 7 APPLICABLE LAWS

National Environmental Policy Act
NMFS prepared this EA in accordance with the National Environmental Policy Act.

Endangered Species Act
Two biological opinions were issued covering the proposed activities described in this EA involve the directed taking, for scientific research purposes, of several ESA-listed marine mammal and sea turtle species in the proposed action area. The first biological opinion was issued on June 4, 2004 and covered nine of the proposed permit actions, including: Andrew Szabo (file no. 1029-1675), Dena Matkin (file no. 662-1661), Ann Zoidis (file no. 1039-1699), Jan Straley (file no. 473-1700), Kate Wynne (file no. 1049-1718), Fred Sharpe (file no. 716-1705), Cynthia Tynan (file no. 1035-1688), Jim Darling (file no. 753-1599) and Joe Mobley (file no. 642-1536). The second biological opinion was issued on June 30, 2004 and covered the two additional proposed permit actions from NMML (file no. 782-1719) and the SWFSC (file no. 774-1714). Both biological opinions concluded that the Alternative 2- Proposed Action (Preferred Alternative) would not jeopardize the continued existence of ESA-listed species or affect critical habitat in the proposed action area. In addition, the Alternative 2- Proposed Action (Preferred Alternative) would be intended to collect information that would be used for management needs in recovering the species to the point that they can be removed from ESA listing.

Marine Mammal Protection Act
The preferred alternative for this EA is consistent with the purposes and policies of the MMPA. The preferred alternative is intended to collect information that would be used for management needed to recover the species to the point that they can be removed from ESA listing

Paperwork Reduction Act
This proposed action does not contain a collection-of-information requirement for the purposes of the Paperwork Reduction Act.

Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA)
The area affected by the preferred alternative has been identified as Essential Fish Habitat (EFH) under the MSFCMA for species in the in the North Pacific Ocean, including U.S. territorial waters and the high seas. NMFS has determined that there would be no significant impact on EFH pursuant to 50 CFR 905.

SECTION 8 RECOMMENDATION

It is recommended that the proposed actions be determined not to have a significant impact on the quality of the human environment and that the preparation of an environmental impact statement not be required.

Prepared by: _____ _____

Jill Lewandowski — Date
Fishery Biologist
Permits, Conservation and
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_____ _____

Patricia Lawson — Date
Fishery Biologist
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Recommended by: _____ _____

Stephen L. Leathery — Date
Chief-Permits, Conservation and
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Office of Protected Resources

SECTION 9 LIST OF AGENCIES CONSULTED

The following agencies were consulted while preparing this EA:

Alaska Department of Fish & Game
Hawaii Department of Land and Natural Resources
Marine Mammal Commission
National Marine Fisheries Service reviewers
National Ocean Service – National Marine Sanctuaries Program

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APPENDIX A: GLOSSARY OF TERMS AND ACRONYMS

DEFINITION OF TERMS COMMONLY FOUND IN SCIENTIFIC RESEARCH PERMITS

acute behavioral response - Repeated, prolonged or excessive instances of behavior, brought on by any act or omission of the researcher and manifested by, among other actions on the part of the whale, a rapid change in direction or speed; escape tactics such as prolonged diving, underwater course changes, underwater exhalation, or evasive swimming patterns; interruptions of breeding, nursing, or resting activities, attempts by a whale to shield a calf from a vessel or human observer by tail swishing or by other protective movement; or the abandonment of a previously frequented area.

applicant - Person, institution, or agency who is applying for and will be ultimately responsible for all activities of any individual who is operating under the authority of the permit.

approach - a continuous sequence of maneuvers (episode) involving a vessel, aircraft, or researcher's body in the water, including drifting, directed toward a whale or group of whales for the purposes of conducting authorized research which involves one or more instances of coming closer than 100 yards to that large whale or group of whales or 50 yards to small cetaceans, seals, sea lions and sea turtles.

attempt - An effort made to accomplish some permitted activity. For example, a tag or biopsy dart deployment from either a crossbow, airgun or pole.

bona fide research - Scientific research on marine mammals conducted by qualified personnel, the results of which: 1) likely would be accepted for publication in a refereed scientific journal; 2) are likely to contribute to the basic knowledge of marine mammal biology or ecology; or 3) are likely to identify, evaluate or resolve conservation problems. Research that is not on marine mammals, but that may incidentally take marine mammals, is not included in this definition.

Border Ports - Requires an Exception to Designated Port permit to use these ports.

1) Alaska - Alcon
2) Idaho – Eastport
3) Maine - Calais, Houlton, Jackman
4) Massachusetts - Boston
5) Michigan - Detroit, Port Huron, Sault Sainte Marie
6) Minnesota - Grand Portage, International Falls, Minneapolis-St. Paul
7) Montana - Raymond, Sweetgrass
8) New York - Buffalo-Niagra Falls, Champlain

9) North Dakota - Dunseith, Pembina, Portal
10) Ohio - Cleveland
11) Vermont - Derby Line, Highgate Springs
12) Washington - Blaine, Sumas
13) Arizona - Lukeville, Nogales
14) California - Calexico, San Diego-San Ysidro
15) Texas - Brownsville, El Paso, Laredo

Co-Investigator, CI - The on-site representative of a principal investigator who has qualifications comparable to the PI and is able to work independently of the PI.

Designated Ports - U.S. Customs ports of entry that are designated for the importation or exportation of wildlife; they are:

1) Los Angeles, CA
2) San Francisco, CA
3) Miami, FL
4) New York, NY
5) Dallas/Fort Worth, TX
6) Portland, OR
7) Baltimore, MD
8) New Orleans, LA
9) Honolulu, HI
10) Chicago, IL
11) Seattle, WA
12) Boston, MA
13) Atlanta, GA
14) Newark, NJ

DPS - Distinct Population Segment. A Distinct Population Segment is a portion of a species or subspecies population or range. The Distinct Population Segment is generally described geographically instead of biologically, such as "all members of XYZ species that occur north of 40E north latitude."

ESA: Endangered Species Act of 1973 (16 U.S.C. § 1532-1544). This Act requires federal consultation before any major federal action impacting threatened or endangered species is undertaken, outlaws the taking of such species, and provides for acquisition of habitat to protect threatened and endangered species.

ESU - Evolutionary Significant Unit. A section of a population that is 1) reproductively isolated from other conspecific population units or 2) represents an important component in the evolutionary history of a species.

flipper tag - plastic or metal tag attached to the flipper of a sea turtle, phocid or otaniid. These tags are attached by piercing a hole through the flipper and permanently clipped shut.

handling time - The amount of time that an animal is physically handled (i.e. weighed, measured, tagged, biopsied, etc.).

harass(ment) - To disrupt the normal behavior or prior activity of a whale by any act or omission. This disruption of normal behavior may be manifested by, among other actions on the part of the whale, a rapid change in direction or speed; escape tactics such as prolonged diving, underwater course changes, underwater exhalation, or evasive swimming patterns; interruptions of breeding, nursing, or resting activities, attempts by a whale to shield a calf from a vessel or human observer by tail swishing or by other protective movement; or the abandonment of a previously frequented area.

hard parts - Any bone, tooth, baleen, treated pelt, or other part of a marine mammal that is relatively solid or durable.

holding time - The time from capture to the time of release.

humane - The method of taking, import, export, or other activity which involves the least possible degree of pain and suffering practicable to the animal involved.

intrusive research - A procedure conducted for bona fide scientific research involving: A break in or cutting of the skin or equivalent, insertion of an instrument or material into an orifice, introduction of a substance or object into the animal's immediate environment that is likely either to be ingested or to contact and directly affect animal tissue (i.e., chemical substances), or a stimulus directed at animals that may involve a risk to health or welfare or that may have an impact on normal function or behavior (i.e., audio broadcasts directed at animals that may affect behavior). For captive animals, this definition does not include: 1) A procedure conducted by the professional staff of the holding facility or an attending veterinarian for purposes of animal husbandry, care, maintenance, or treatment, or a routine medical procedure that, in the reasonable judgement of the attending veterinarian, would not constitute a risk to the health or welfare of the captive animal; or 2) A procedure involving either the introduction of a substance or object (i.e., as described in this definition) or a stimulus directed at animals that, in the reasonable judgement of the attending veterinarian, would not involve a risk to the health or welfare of the captive animal.

Level A harassment - Any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal or marine mammal stock in the wild.

Level B harassment - Any act of pursuit, torment, or annoyance which has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering by which does not have the potential to injure a marine mammal or marine

mammal stock in the wild.

live car - A tank of flowing and/or oxygenated water on a boat or shore where fish are placed to keep them alive.

MMC: Marine Mammal Commission. The MMPA established the MMC, which is composed of three members appointed by the President for three-year terms. The MMC was created to provide scientific advice and recommendations to the Secretaries of Commerce and the Interior, who share responsibilities under the MMPA. The MMC was required to establish a Committee of Scientific Advisors with which to consult on studies, recommendations, research programs, and permit applications for scientific research. The MMC has access to all studies and data compiled by federal agencies on marine mammals and must coordinate its efforts to avoid duplication of research.

MMPA: Marine Mammal Protection Act (16 U.S.C. §§ 1361-1421h). This law, which became effective in 1972, prohibits taking and importation of marine mammals without a permit. The Act established a federal responsibility to conserve marine mammals, with management authority vested in the Department of Commerce for cetaceans and pinnipeds other than walrus. The Department of the Interior is responsible for all other marine mammals, including sea otters, walrus, polar bear, dugong, and manatee.

Net checking - a complete and thorough visual check of the net either by snorkeling the net in clear water or by pulling up on the top line such that the full depth of the net is viewed along the entire length.

NMFS - National Marine Fisheries Service, Office of Protected Resources, Permits, Conservation and Education Division. All permitting activities go through this office.

Permit Holder - Person, institution, or agency who is ultimately responsible for all activities of any individual who is operating under the authority of the permit.

PIT tag - Passive integrated transponder tags. These tags are internally read by scanning with a special reader.

Principal Investigator, PI - The individual primarily responsible for the taking, importation, exportation, and any related activities conducted under a permit issued for scientific research or enhancement purposes. The PI must have qualifications, knowledge and experience relevant to the type of research activities authorized by the permit.

Rehabilitation - Treatment of beached and stranded marine mammals taken with the intent of restoring the marine mammal's health and, if necessary, behavioral patterns.

Research Assistant, RA - Individual who works under the direct supervision of the CI or PI, and who is authorized to record data and/or serve as safety observer and/or boat tender. The RA is not authorized to carry out underwater observations and/or photography. The qualifications and experiences of the RA must be commensurate with his/her assigned responsibilities. If the RA is to operate a boat, they must be licensed and/or professionally trained and experienced in maneuvering vessels around marine mammals.

Sanctuary net - a fish net that holds water during transfer.

Trot line - A fishing line that lays on the bottom of the river or bay, usually with smaller lines off it. Bait is attached at various points along the line.

Soft parts - Any marine mammal part that is not a hard part, e.g. blood, blubber, or other tissue samples. Soft parts do not include urine or fecal material.

Stranded marine mammal - A marine mammal specimen under the jurisdiction of the Secretary of Commerce, if: 1) the specimen is dead and is on a beach or shore, or is in the water within the Exclusive Economic Zone of the U.S.; or 2) the specimen is alive, and is on a beach or shore and is unable to return to the water, or is in the water within the Exclusive Economic Zone of the U.S. where the water is so shallow that the specimen is unable to return to its natural habitat under its own power.

Take - To harass, hunt, capture, collect, or kill, or attempt to harass, hunt, capture, collect, or kill any marine mammal (as defined in the MMPA). To **harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct (as defined in the ESA).** This includes, without limitation, any of the following: The collection of dead animals, or parts thereof; the restraint or detention of a marine mammal or endangered species, no matter how temporary; tagging a marine mammal; the negligent or intentional operation of an aircraft or vessel, or the doing of any other negligent or intentional act which results in disturbing or molesting a marine mammal; and feeding or attempting to feed a marine mammal in the wild.

Take table - An outline, by species, age, and possibly sex, of the type of activity(ies) authorized, the number of takes per activity, the number of takes per individual, and the location of takes and activity(ies).

Appendix B Federal Permits, Licenses, and Statutory Authority Necessary To Implement a Permit

National Environmental Policy Act. NMFS prepared this EA in accordance with the National Environmental Policy Act and has determined that the preferred alternative would not have a significant impact on the quality of the human environment.

Marine Mammal Protection Act permits. A moratorium on the taking of marine mammals in U.S. waters and by U.S. citizens on the high seas was established with passage of the Marine Mammal Protection Act of 1972, as amended (MMPA; 16 U.S.C. 1361 *et seq*.). The MMPA provides that this moratorium on taking of marine mammals can be waived for specific purposes, if the taking will not disadvantage the affected species or stock. Section 104 of the MMPA allows for issuance of permits to take marine mammals for the purposes of scientific research or to enhance the survival or recovery of a species or stock. These permits must specify the number and species of animals that can be taken, and designate the manner (method, dates, locations, etc.) in which the takes may occur.

Endangered Species Act permits. Section 9 of the Endangered Species Act of 1973, as amended (ESA; 16 U.S.C. 1531 *et seq*.) and Federal regulations pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption. Permits to take ESA-listed species for scientific purposes (or for the purpose of enhancing the propagation or survival of the species) may be granted pursuant to Section 10 of the ESA and in accordance with NMFS' implementing regulations. Two Biological Opinions (signed June 4, 2004 and June 30, 2004) concluded that the Alternative 2- Proposed Action (Preferred Alternative) would not be likely to jeopardize the continued existence of any ESA-listed species or critical habitat.

One Hundred Yard Approach Regulation to Humpback Whales in Hawaii and Alaska. As disturbance by humans and vessels may be one of the human-related factors impeding recovery of some species of large whales, including humpback whales, NMFS promulgated regulations restricting vessel approach to humpback whales in Hawaii and Alaska (50 CFR §224.103) with the goal of minimizing human-induced disturbance. With certain exceptions, the rules prohibit boats from approaching any humpback whale in Hawaii and Alaska closer than 100 yards (91.4 meters) or any aircraft closer than 1,000 feet (304.8 meters). Exceptions for closer approach are provided when: (a) compliance would create an imminent and serious threat to a person, vessel, or aircraft; (b) a vessel is restricted in its ability to maneuver around a 100 yard (91.4 meters) perimeter of a whale; (c) a NMFS-authorized vessel is investigating or involved in the rescue of an entangled or injured whale, or (d) the vessel is participating in a permitted activity, such as a research project. Thus, a MMPA/ESA research permit is required for activities such as photo-

identification, aerial surveys, attachment of scientific instruments, or collection of tissue samples when these activities require approaching humpback whales in Hawaii and Alaska closer than 100 yards (91.4 meters).

Convention on International Trade in Endangered Species of Flora and Fauna (CITES). Signed in 1973, in response to an urgent need to control commercial trade in rare wildlife worldwide, the CITES restricts or prohibits trade in live or dead wildlife and their parts for those species listed on three appendices, which are based on the level of species endangerment. The ESA implements the CITES treaty for the United States. Thus, it is unlawful to trade or possess any specimens traded in violation of CITES. However, species and parts listed in the appendices may be imported and exported with a valid CITES permit obtained from the U.S. Fish and Wildlife Service, Office of Management Authority. For endangered species, a permit issued under Section 10 of the ESA is also required for import and export. Holders of MMPA/ESA permits for scientific research issued by NMFS are responsible for obtaining the appropriate CITES permits following receipt of their NMFS permit and prior to any import or export of species listed on the CITES appendices.

Executive Order 12612
This EA does not contain policies with federalism implications sufficient to warrant preparation of a federalism assessment under E.O. 12612.

Native exceptions. 50 CFR 216.23 states that any Indian, Aleut, or Eskimo who resides on the coast of the North Pacific Ocean or the Arctic Ocean may take any marine mammal without a permit, if such taking is for subsistence and for purposes of creating and selling authentic native articles of handicraft and clothing.

APPENDIX C OVERVIEW OF PROCESS FOR OBTAINING A NMFS SCIENTIFIC RESEARCH PERMIT UNDER MMPA AND ESA

Persons seeking a special exception permit for scientific research must submit a properly formatted and signed application to the Chief, Permits, Conservation and Education Division, Office of Protected Resources. The applicant must describe the species to be taken, the manner and duration of the takes, the qualifications of the researchers to conduct the proposed activities, as well as provide justification for such taking. Upon receipt, applications are reviewed for completeness according to the specified format and for compliance with regulations specified at 50 CFR §216.33. An initial determination is made as to whether the proposed activity is categorically excluded from the need to prepare an EA or EIS. A Notice of Receipt of complete applications must be published in the Federal Register. This Notice invites interested parties to submit written comments concerning the application within 30 days of the date of the Notice. At the same time, the application is forwarded to the MMC and their committee of scientific advisors, and other expert reviewers for comment. In addition, if endangered species are likely to be affected by the proposed activities, the Permits Division must consult with NMFS Endangered Species Division (or the U.S. Fish and Wildlife Service if species under their jurisdiction are involved) for informal or formal consultation under Section 7 of the ESA. At the close of the comment period, the applicant may need to respond to requests for additional information or clarification from reviewers. If the proposed activities do not meet the criteria for a categorical exclusion, the appropriate environmental documentation (EA or EIS) must be prepared and is subject to public comment. If all concerns can be satisfactorily addressed and the proposed activity is determined to be in compliance with all relevant issuance criteria, the Office Director would issue a permit.

MMPA regulations regarding issuance of Scientific Research Permits (SRPs)
The regulations promulgated at 50 CFR §216.33, §216.34, and §216.41 specify criteria to be considered by the Office Director in making a decision regarding issuance of a permit or an amendment to a permit. Specifically, §216.33(c) requires that the Office Director (a) make an initial determination under NEPA as to whether the proposed activity is categorically excluded from preparation of further environmental documentation, or whether the preparation of an environmental assessment (EA) or environmental impact statement (EIS) is appropriate or necessary; and (b) prepare an EA or EIS if an initial determination is made that the activity proposed is not categorically excluded from such requirements. The permit issuance criteria listed at §216.34 require that the applicant demonstrate that:

(1) The proposed activity is humane and does not present any unnecessary risks to the health and welfare of marine mammals.

(2) The proposed activity is consistent with all restrictions set forth at §216.35 and any purpose-specific restrictions as appropriate set forth at §216.41, §216.42, and §216.43.

(3) The proposed activity, if it involves endangered or threatened marine mammals, will be conducted consistent with the purposes and policies set forth in section 2 of the ESA.

(4) The proposed activity by itself or in combination with other activities will not likely have a significant adverse impact on the species or stock.

(5) The applicant's expertise, facilities, and resources are adequate to accomplish the proposed research.

(6) If a live animal will be held captive or transported, the applicant's qualifications, facilities, and resources are adequate for the animals' proper care and maintenance.

(7) Any requested import or export will not likely result in the taking of marine mammals or marine mammal parts, beyond those authorized by the permit.

In addition to these requirements, the issuance criteria at §216.41(b) require that applicants for permits for scientific research and enhancement must demonstrate that:

(1) The proposed activity furthers a *bona fide* scientific or enhancement purpose.

(2) If the lethal taking of marine mammals is proposed:

(a) Non-lethal methods for conducting the research are not feasible; and

(b) For depleted, endangered, or threatened species, the results will directly benefit that species or stock, or will fulfill a critically important research need.

(3) Any permanent removal of a marine mammal from the wild is consistent with any applicable quota established by the Office Director.

(4) The proposed research will not likely have significant adverse effects on any other component of the marine ecosystem of which the affected species or stock is a part.

(5) For species or stocks designated or proposed to be designated as depleted, or listed or proposed to be listed as endangered or threatened:

(a) The proposed research cannot be accomplished using a species or stock that is

not designated or proposed to be designated as depleted, or listed or proposed to be listed as threatened or endangered;

(b) The proposed research, by itself or in combination with other activities will not likely have a long-term direct or indirect adverse impact on the species/stock;

(c) The proposed research will either:

(i) Contribute to fulfilling a research need or objective identified in a species recovery or conservation plan, or if there is no conservation or recovery plan in place, a research need or objective identified by the Office Director in stock assessments established under MMPA Section 117;

(ii) Contribute significantly to understanding the basic biology or ecology of the species or stock, or to identifying, evaluating, or resolving conservation problems for the species or stock; or

(iii) Contribute significantly to fulfilling a critically important research need.

ESA regulations regarding issuance of SRPs

NMFS' regulations implementing the ESA at 50 CFR §222.308(b) provide that "Permits for marine mammals shall be issued in accordance with the provisions of part 216, subpart D of this chapter" as outlined in the previous subsection of this EA. In addition to these issuance criteria under the MMPA, NMFS' regulations implementing the ESA at 50 CFR §222.308(c) require that the following criteria be considered in determining whether to issue a permit for scientific purposes for takes of endangered species:

(1) Whether the permit, if granted and exercised, will not operate to the disadvantage of the endangered species;

(2) Whether the permit would be consistent with the purposes and policy set forth in section 2 of the ESA;

(3) Whether the permit would further a *bona fide* and necessary or desirable scientific purpose or enhance the propagation or survival of the endangered species, taking into account the benefits anticipated to be derived on behalf of the endangered species;

(4) Whether alternative non-endangered species or population stocks can and should be used;

(5) Whether the expertise, facilities, or other resources available to the applicant appear adequate to successfully accomplish the objectives stated in the application; and

(6) Opinions or views of scientists or other persons or organizations knowledgeable about the species, which is the subject of the application or of other matters germane to the application.

Under Section 7 of the ESA, the Permits Division, as a Federal action agency, is required to determine whether issuance of a permit may affect listed species or critical habitat. If it is determined that issuance of a permit may adversely affect listed species or adversely modify critical habitat, the Permits Division must formally consult with the Endangered Species Division. In requesting this consultation, the Permits Division is required to provide the best scientific and commercial data available for an adequate review of the effects of the proposed permit on listed species and critical habitat (50 CFR §402.14). Although both the MMPA and ESA definition of a "take" include harassment, the ESA does not define harassment. However, harassment has been defined in BiOps prepared during consultations on issuance of marine mammal research permits, as injury to an individual animal or population of animals resulting from a human action that disrupts one or more behavioral patterns that are essential to an individual animal's life history or to the animal's contribution to a population, or both. Particular attention is given to the potential for injuries that may manifest themselves as an animal that fails to feed successfully, breed successfully (which can result from feeding failure), or complete its life history because of changes in its behavioral patterns. In the latter two of these examples, the injury to an individual animal could be injurious to a population because the individual's breeding success will have been reduced.

APPENDIX D REQUESTED PERMIT TAKE TABLES FOR ISSUANCE OF ELEVEN NATIONAL MARINE FISHERIES SERVICE PERMITTED SCIENTIFIC RESEARCH ACTIVITIES (ESA-LISTED SPECIES ONLY)

The following tables outline the takes requested for target marine mammal and sea turtle species by the applicants. For amendments to applications, the corresponding take table outlines the existing authorized takes as well as the newly requested takes.

For all permits, unless otherwise noted, takes per individual animal will be limited to three takes per day. In addition, all age and sex classes would be sampled through Level B take types (photo-identification, behavioral observation, video and acoustic recording, playbacks, collection of dead parts, import/export of parts, etc.). However, no biopsy sampling takes would occur on large cetacean calves less than six months of age or females accompanying such calves. In addition, for North Pacific right whales, no calves of any age may be sampled or tagged and only females attending calves greater than six months of age would be sampled or tagged. For small cetaceans, no biopsy sampling or tagging would occur for calves less than one year of age, except for skin swabbing of beluga whale mothers and calves during capture operations proposed by NMML, file no. 782-1719.

In addition, the following terms apply for all permit take tables below:

"Harassment" is considered to be the disruption by any act or omission of the behavior of an animal immediately prior to the act or omission (i.e., rapid change in direction or speed; escape tactics such as prolonged diving; underwater course changes; underwater exhalation or evasive swimming patterns; interruptions of breeding, nursing, or resting activities; attempts to shield a calf/pup from a vessel or human observer by tail swishing or by other protective movements; or by the abandonment of a previously frequented area).

An "approach" is described as a continuous sequence of vessel maneuvers (episode), including drifting, directed toward a whale or group of whales for the purpose of conducting authorized research which involves one or more instances of coming closer than 100 yards to that whale or group of whales.

An "attempt" is defined as a tag deployment from a crossbow, pole, etc.

Dena Matkin (file no. 662-1661)

Species	# Animals Taken Annually by Close Approach for Photo-ID, Behavioral Observation, Passive Acoustic Recording, and/or Incidental Harassment (during population studies)	# Dead Parts Collected Annually (during killer whale predation studies) and # Samples Exported Annually (for all studies)	# Animals Taken Annually by Incidental Harassment (during killer whale predation studies)
Humpback whales *Megaptera novaeangliae*	100	unlimited	50
Killer whales *Orcinus orca*	400	0	unlimited
Steller sea lions *Eumetopias jubatus*	0	unlimited	100
Minke whales *Balaenoptera acutorostrata*	0	unlimited	unlimited
Harbor porpoise *Phocoena phocoena*	0	unlimited	unlimited
Dall's porpoise *Phocoenoides dalli*	0	unlimited	unlimited
Harbor seal *Phoca vitulina*	0	unlimited	unlimited
Gray whale *Eschrichtius robustus*	0	unlimited	unlimited
Pacific white-sided dolphin *Lagenorhynchus obliquidens*	0	unlimited	unlimited
Northern fur seal *Callorhinus ursinus*	0	unlimited	unlimited

Fred Sharpe (file no. 716-1705)

Species	# Animals Taken Annually by Close Approach for Photo-identification, Behavioral Observations, Acoustic and Video Recording, Playback Studies, and/or Incidental Harassment	# Attempts Annually by Tagging (suction cup)
Humpback whale (*Megaptera novaeangliae*)	930	54
Killer whale *(Orcinus orca)*	400 (no animals requested/authorized for playback studies)	----

Andrew Szabo (file no. 1029-1675)

Species	# Animals Taken Annually by Close Approach for Photo-identification, Behavioral Observations, Video Recording, Passive Acoustic Recording, and/or Incidental Harassment
Humpback whale (*Megaptera Novaeangliea*)	250

Ann Zoidis (file no. 1039-1699)

Species	# Animals Taken Annually by Close Approach for above and below water photo-identification, behavioral observation, video and acoustic recordings, and harassment incidental to these activities
Humpback whales *Megaptera novaeangliae*	1250
False killer whales *Pseudorca crassidens*	15
Pygmy killer whales *Feresa attenuata*	15
Short-finned pilot whales *Globicephala macrorhynchus*	30
Melon-headed whales *Peponacephala electra*	15

Bottlenose dolphins *Tursiops truncatus*	50
Spinner dolphins *Stenella longirostris*	50
Rough-toothed dolphins *Steno bredanensis*	50
Pantropical spotted dolphins *Stenella attenuata*	50

Janice Straley (file no. 473-1700)

Species	**# Animals Taken Annually by Close Approach for Photo-identification, Behavioral Observation, Passive Acoustic Recording, and/or Incidental Harassment (during population studies)**	**# Attempts Annually by Suction Cup Tagging**	**# Attempts Annually by Biopsy Sampling**	**# Dead Parts Collected Annually (during killer whale predation studies) and # Samples Exported Annually**	**# Animals Taken Annually by Incidental Harassment (during killer whale predation studies)**
Humpback whales *Megaptera novaeangliae*	1,000	0	200	unlimited	100
Killer whales *Orcinus orca*	1,000	0	60	unlimited	unlimited
Minke whales *Balaenoptera acutorostrata*	20	0	0	unlimited	unlimited
Gray whales *Eschrichtius robustus*	20	0	0	unlimited	unlimited
Fin whales *Balaenoptera physalus*	50	0	0	unlimited	0
Sperm whales *Physeter catodon*	50	25	60	unlimited	0
Harbor porpoise *Phocoena phocoena*	0	0	0	unlimited	unlimited

Steller sea lions *Eumetopias jubatus*	0	0	0	unlimited	100
Dall's porpoise *Phocoenoides dalli*	0	0	0	unlimited	unlimited
Harbor seals *Phoca vitulina*	0	0	0	unlimited	unlimited
Pacific white-sided dolphin *Lagenorhynchus obliquidens*	0	0	0	unlimited	unlimited
Northern fur seals *Callorhinus ursinus*	0	0	0	unlimited	unlimited

Jim Darling (file no. 753-1599-01)

Species	Annual Takes for Close Approach, Photo-ID, Behavioral Observation, Passive Sound Recording, Aerial Photogrammetry, Underwater Observation and Harassment Incidental to all Research Activities	Annual Takes or Attempts by Biopsy Sampling	Annual Takes by Active Acoustic Playbacks	Annual Takes or Attempts by Tagging Using Suction Cup and Implantable Tags
Humpback whale *Megaptera novaeangliae*	3,900	100	100	50
Gray whale *Eschrichtius robustus*	400	0	0	0

Joseph Mobley, Jr. (file no. 642-1536)

Species	# Animals taken annually by close approach for photo-identification, behavioral observation and videography, aerial surveys and photogrammetry, and harassment incidental to these activities	# Animals taken annually by suction cup tagging (bioacoustic)	#Animals taken annually by biopsy sampling
Humpback whales *(Megaptera novaeangliae)*	440 (includes underwater photo-id and behavioral observations)	40	80
Fin whales *(Balaenoptera physalus)*	30	5	10
Sei whales *(Balaenopters borealis)*	30	5	10
Sperm whales (*Physeter macrocephalus*)	220	20	40
Spinner dolphins *Stenella longirostris*	220	20	40
Pantropical spotted dolphins *Stenella attenuata*	220	20	40
Striped dolphins *Stenella coeruleoalba*	320	20	40
Short-finned pilot whales *Globicephala macrorhynchus*	520	20	40
Bottlenose dolphins *Tursiops truncatus*	520	20	40
Melon-headed whales *Peponacephala electra*	220	20	40
Rough-toothed dolphins *Steno bredanensis*	120	20	40
Blainville's beaked whales *Mesoplodon densirostris*	70	20	40
Cuvier's beaked whales *Ziphius cavirostris*	70	20	40
Killer whales *Orcinus orca*	30	5	10
False killer whales *Pseudorca crassidens*	70	20	40
Risso's dolphin Grampus griseus	70	20	40
Dwarf/Pygmy sperm whales *Kogia spp.*	70	20	40
Baird's beaked whale *Berardius bairdii*	70	20	40
Bryde's whales *Balaenoptera edeni*	30	5	10

Cynthia Tynan (file no. 1035-1688)

Species	# Animals Taken Annually by Close Approach for Photo-identification, Behavioral Observation, Transect Surveys, and/or Incidental Harassment	# Dead Parts Collected Annually
Humpback whales *(Megaptera novaeangliae)*	700	unlimited
Blue whales (*Balaenoptera musculus*)	200	unlimited
Fin whales (*Balaenoptera physalus)*	700	unlimited
North Pacific right whales (*Eubalaena japonica*)	50	unlimited
Sei whales (*Balaenoptera borealis)*	200	unlimited
Sperm whales *(Physeter catodon)*	200	unlimited
Steller sea lion *(Eumetopiad jubatus)*	100 (Steller sea lion takes by Incidental Harassment only)	unlimited

Kate Wynne (file no. 1049-1718)

Species	# Animals Taken Annually During Close Approach for Photo-identification, Behavioral Observation, Passive Acoustic Recording, and/or Incidental Harassment (during population studies)	# ATTEMPTS Annually by Suction Cup Tagging	# ATTEMPTS Annually by Biopsy Sampling	# Dead Parts Collected Annually (during killer whale predation studies) and # Samples Exported Annually	# Animals Taken Annually by Incidental Harassment (during killer whale predation studies)
Humpback whales Megaptera novaeangliae	1,000	60	150	unlimited	20
Killer whales *Orcinus orca*	1,000	0	200	unlimited	unlimited
Minke whales *Balaenoptera acutorostrata*	50	0	10	unlimited	unlimited

Gray whales *Eschrichtius robustus*	50	0	10	unlimited	unlimited
Fin whales *Balaenoptera physalus*	1,000	60	150	unlimited	20
Sperm whales *Physeter catodon*	50	0	10	unlimited	20
Sei whales *Balaenoptera borealis*	50	0	10	unlimited	20
Harbor porpoise *Phocoena phocoena*	0	0	0	unlimited	unlimited
Steller sea lions *Eumetopias jubatus*	0	0	0	unlimited	100
Dall's porpoise *Phocoenoides dalli*	0	0	0	unlimited	unlimited
Harbor seals *Phoca vitulina*	0	0	0	unlimited	unlimited
Pacific white-sided dolphin *Lagenorhynchus obliquidens*	0	0	0	unlimited	unlimited
Northern fur seals *Callorhinus ursinus*	0	0	0	unlimited	unlimited

SWFSC (file# 774-1714)

Table 1 - Pinniped Studies: Level B harassment on Northern elephant seals [NES] (*Mirounga angustirostris*), California sea lions [CSL] (*Zalophus californianus*), Steller sea lions [SSL] (*Eumetopias jubatus*) and [HS] harbor seals (*Phoca vitulina richardsi*) may be taken annually. Animals may be harassed more than once during a field season.

Species	# animals per year	# takes per animal/yr	Activity	Location
SSL	30,000	6 x	aerial photographic surveys (500 ft or higher)	CA, OR, WA, AK (eastern stock only)
SSL	3,000	3 x	Incidental harassment during CSL aerial/ground surveys	CA
CSL	275,000	4 x	incidental harassment from scat and spew collections[†]	CA
CSL	275,000	6 x	Aerial photographic surveys, ground and/or vessel surveys	CA, OR, WA
HS	99,000	3 x		
NES	90,000	3 x		
NFS	11,000	3x		

[†] Collection of scats/spew will occur on CSL haulouts only. No harbor seals or Steller sea lions will be incidentally harassed during these activities.

Table II - Cetacean Studies: The following number of animals, by species, may be taken annually by the means identified in the Table. Aerial surveys may be flown at 500 ft or higher.

Species (common name) (Scientific name)	Locations/ Stocks	Photo-ID/ Photo-grammetry	Biopsy	Tagging:		Aerial/boat surveys/ Incidental harassment for all research activities
				radio tag or radiotag w/ time-depth recorder	satellite tag	
Bowhead whale Balaena mysticetus	North Pacific, Arctic Ocean	50	20	--	--	200
sei whale Balaenoptera borealis	Pacific Ocean (U.S. EEZs and ETP)	200	100	25	25	1,000
blue whale Balaenoptera musculus	Pacific Ocean (U.S. EEZs and ETP)	200	100	25	25	1,000
fin whale Balaenoptera physalus	Pacific Ocean (U.S. EEZs and ETP)	200	100	25	25	1,000

southern right whale Eubalaena australis	Southern Hemisphere	20	10	--	--	200
northern right whale Eubalaena japonica	North Pacific	20	10	4	4	50
sperm whale Physeter macrocephalus	Pacific Ocean (U.S. EEZs and ETP)	1,000	100	25	25	1,000
humpback whale Megaptera novaeangliae	Pacific Ocean (U.S. EEZs and ETP)	200	100	25	25	1,000
Vaquita Phocoena sinus	Gulf of California	50	10	--	--	200
Minke whale Balaenoptera acutorostrata	Pacific Ocean (U.S. EEZs and ETP)	200	100	--	--	1,000
Bryde's whale Balaenoptera edeni	Pacific Ocean (U.S. EEZs and ETP)	200	100	25	25	1,000
Arnoux's beaked whale Berardius arnuxii	Southern Ocean	20	10	--	--	200
Baird's beaked whale Berardius bairdii	North Pacific	100	10	25	25	1,000
pygmy right whale Caperea marginata	Southern Ocean	20	10	--	--	200
Commerson's dolphin Cephalorhynchus commersonii	coasts of South America	20	10	--	--	200
Chilean dolphin Cephalorhynchus eutropia	coast of Chile	20	10	--	--	200
Hector's dolphin Cephalorhynchus hectori	coastal waters of New Zealand	20	20	--	--	200
beluga whale Delphinapterus leucas	North Pacific, North Atlantic	200	50	--	--	1,000
long-beaked common dolphin Delphinus capensis	Pacific Ocean (U.S. EEZs and ETP)	10,000	50	--	--	20,000
short-beaked common dolphin Delphinus delphis	Pacific Ocean (U.S. EEZs and ETP)	10,000	50	--	--	4,000
gray whale Eschrichtius robustus	North Pacific (eastern)	500	50	--	--	1,000

pygmy killer whale Feresa attenuata	Pacific Ocean (U.S. EEZs and ETP)	200	20	--	--	1,000
short-finned pilot whale Globicephala macrorhynchus	Pacific Ocean (U.S. EEZs and ETP)	100	20	--	--	400
long-finned pilot whale Globicephala melas	Southern Ocean	100	20	--	--	400
Risso's dolphin Grampus griseus	Pacific Ocean (U.S. EEZs and ETP)	1,000	20	--	--	1,000
southern bottlenose whale Hyperoodon planifrons	Southern Ocean	20	10	--	--	200
Longman's beaked whale Indopacetus pacificus	Indian Ocean, Pacific Ocean	20	10	--	--	200
pygmy sperm whale Kogia breviceps	Pacific Ocean (U.S. EEZs and ETP)	20	20	--	--	200
dwarf sperm whale Kogia simus	Pacific Ocean (U.S. EEZs and ETP)	20	20	--	--	200
Fraser's dolphin Lagenodelphis hosei	Pacific Ocean (U.S. EEZs and ETP)	1,000	20	--	--	2,000
Peale's dolphin Lagenorhynchus australis	South American Coasts	20	10	--	--	1,000
hourglass dolphin Lagenorhynchus cruciger	Southern Hemisphere	20	10	--	--	1,000
Pacific white-sided dolphin Lagenorhynchus obliquidens	North Pacific	600	50	--	--	2,000
dusky dolphin Lagenorhynchus obscurus	Southern Hemisphere	20	10	--	--	1,000
northern right whale dolphin Lissodelphis borealis	North Pacific	100	10	--	--	2,000
southern right whale dolphin Lissodelphis peronii	Southern Hemisphere	20	10	--	--	1,000

beaked whales Mesoplodon spp.	Pacific Ocean (U.S. EEZs and ETP)	100	50	--	--	1,000
killer whale Orcinus orca	Southern Hemisphere Pacific Ocean (U.S. EEZ and ETP	200	100	--	--	1,000
melon-headed whale Peponocephala electra	Southern Ocean Pacific Ocean (U.S. EEZs and ETP)	200	50	--	--	1,000
spectacled porpoise Phocoena dioptrica	Southern Hemisphere	20	10	--	--	200
Harbor porpoise Phocoena phocoena	North Pacific, North Atlantic	200	20	--	--	1,000
Burmeister's porpoise Phocoena spinipinnis	South American Coasts	20	10	--	--	200
Dall's porpoise Phocoenoides dalli	North Pacific (Alaska stock)	200	50	--	--	2,000
Dall's porpoise Phocoenoides dalli	North Pacific (CA/OR/WA stock)	200	50	--	--	2,000
false killer whale Pseudorca crassidens	Southern Ocean Pacific Ocean (U.S. EEZs and ETP)	500	100	--	--	1,000
pantropical spotted dolphin Stenella attenuata	Pacific Ocean (U.S. EEZs and ETP)(offshore, northeastern stock)	10,000	100	--	--	40,000
pantropical spotted dolphin Stenella attenuata	Pacific Ocean (U.S. EEZs and ETP)(offshore, western/southern stock)	10,000	100	--	--	40,000
pantropical spotted dolphin Stenella attenuata grafmani	Pacific Ocean (U.S. EEZs and ETP)(coastal stock)	10,000	100	--	--	40,000
striped dolphin Stenella coeruleoalba	Pacific Ocean (U.S. EEZs and ETP)	5,000	100	--	--	20,000
spinner dolphin Stenella longirostris longirostris	Pacific Ocean (U.S. EEZs and ETP)(whitebelly stock)	10,000	100	--	--	40,000

spinner dolphin Stenella longirostris oreinetalis	Pacific Ocean (U.S. EEZs and ETP)(eastern stock)	10,000	100	--	--	40,000
spinner dolphin Stenella longirostris centroamericana	Pacific Ocean (U.S. EEZs and ETP)(Central American stock)	10,000	100	--	--	40,000
rough-toothed dolphin Steno bredanensis	Hawaii stock	250	20	--	--	1,000
rough-toothed dolphin Steno bredanensis	CA/OR/WA stock	250	20	--	--	1,000
Shepherd's beaked whale Tasmacetus shepherdi	Southern Ocean	4	4	--	--	40
bottlenose dolphin Tursiops truncatus	Pacific Ocean (U.S. EEZs and ETP)	5,000	100	--	--	20,000
Cuvier's beaked whale Ziphius cavirostris	Pacific Ocean (U.S. EEZs and ETP)	500	20	--	--	1,000

Table III - Sea Turtles Studies: The following sea turtles may be taken, by species, in the North Pacific, opportunistically during cruises/studies in Table II. Activities in column 3 and 4 are a subset of animals captured in column 2.

Species (common name) (Scientific name)	**Measure, weigh, sex, flipper tag, biopsy and blood collection**	**Measure, weigh, sex, flipper tag, biopsy, blood collection and lavage**	**Measure, weigh, sex, flipper tag, biopsy, blood collection and satellite tag**
Olive ridley Lepidochelys olivacea	300 [NTE 1000 in 5 years]	50/300	15/300
Green Chelonia midas	100	10/100	10/100
Leatherback Dermochelys coriacea	10	0	0
Hawksbill Eretmochelys imbricata	20	0	5/20
Loggerhead Caretta caretta	20	10/20	10/20

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Table 1 - Large Whale (Endangered Species) Assessments. Animals may be taken annually not to exceed the maximum number over a five year period, i.e., takes are cumulative each year.

Species Common Name Scientific Name	Location [Stock]	Directed AnnualTakes (Activities include incidental harassment and collection of sloughed skin)				
		Aerial Survey NTE 500ft	Vessel Surveys/ Photo-ID	Biopsy Sample↑	Biopsy/ Tagging Attempts	Tag↑
Humpback whale *Megaptera novaeangliae*	Western North Pacific	1,000	1,000	300	3	10
	Central North Pacific	5,000	5,000	1,500	3	10
	Eastern North Pacific	2,000	2,000	600	3	10
	Antarctica	500	500	100	3	10
Blue whale *Balaenoptera musculus*	North Pacific	2,000	2,000	600	3	10
	CA/Mexico	500	500	150	3	10
	Antarctica	100	100	10	3	10
Fin whale *Balaenoptera physalus*	North Pacific	3,000	5,000	1500	3	10
	US West Coast	500	500	150	3	10
	Antarctica	1000	1000	400	3	10
Sei whale *Balaenoptera borealis*	North Pacific	1,000	1,000	300	3	10
	Antarctica	500	500	100	3	10
Bowhead whale *Balaena mysticetus*	Alaskan and Canadian waters	7,700 NTE 300 ft	500	5	3	10
No. Pacific right whale *Eubalaena japonica*	North Pacific and Arctic Oceans	200	200	50	3	2
Southern right whales *Eubalaena australis*	Antarctica		200	50	3	1
Sperm whale *Physeter macrocephalus*	North Pacific	8,000	5,000	500	3	10

↑ Biopsy and tagging takes are a subset of animals taken during boat surveys and photo-id activities.

Table 2. Beluga Whale Assessment - Animals may be taken annually not to exceed the maximum number over a five year period, i.e., takes are cumulative each year.

Species	Location [Stocks]	Directed Takes (Activities include incidental harassment)			
		Level B		Beluga Captures	
		Aerial Surveys	Vessel Surveys	Photo-ID/ Biopsy Sample	Tag
Beluga whale *Delphinapterus leucas*	Gulf of Alaska (incls. Cook Inlet, Yakutat and Prince William Sound	unlimited	unlimited	30	10
	Bristol Bay	unlimited	unlimited	10	10
	Norton Sound	unlimited	unlimited	10	10
	Kotzebue Sound	unlimited	unlimited	10	
	Beaufort Sea (incls. Pt. Lay)	unlimited	unlimited	30	10
Up to four (4) accidental mortalities inclusive of all locations					

Table 3. Small Cetacean Assessments - Animals may be taken annually not to exceed the maximum number over a five year period, i.e., takes are cumulative each year.

Species Common Name Scientific Name	Location [Stock] (Range-wide incls. North Pacific, HI and AK)	Directed Takes (Activities include incidental harassment and collection of sloughed)				
		Aerial Surveys	Vessel Surveys	Photo-ID	Biopsy Sample	Tag
Harbor porpoise *Phocoena phocoena*	US west coast, Canada and Alaska	unlimited	5,000	5,000	50	
Dall's porpoise *Phocoenoides dalli*	U.S. West Coast, Canada and Alaska	unlimited	1,000	1,000	50	
Gray whale *Eschrichtius robustus*	U.S. West Coast, Canada and Alaska	5,000	5,000	5,000	50	10
Minke whale *Balaenoptera acutorostrata*	Range-wide	unlimited	200	200	20	10
Killer whale *Orcinus orca*	Range-wide	unlimited	5,000	5,000	100	10
Baird's beaked whale *Berardius bairdii*	Range-wide	unlimited	5,000	5,000	50	10
Cuvier's beaked whale *Ziphius cavirostris*	Range-wide	unlimited	5,000	50	50	10
Pacific white-sided dolphin *Lagenorhynchus obliquidens*	Range-wide	unlimited	unlimited	50	50	10

Northern right whale dolphin *Lissodelphis borealis*	Range-wide	unlimited	unlimited	50	50	10
Stejneger's beaked whale *Mesoplodon stejnegeri*	North Pacific	unlimited	unlimited	50	50	10
Pilot whale *Globeicephala macrohynchus*	North Pacific	unlimited	unlimited	50	50	10
Bottlenose dolphin T*ursiops truncatus*	Range-wide	unlimited	unlimited	50	50	10
Mesoplodont beaked whale *Mesoplodon* spp	Range-wide	unlimited	unlimited	50	50	10
Risso's dolphin Grampus griseus	Range-wide	unlimited	unlimited	50	50	10
Long-beaked common dolphin *Delphinus delphis*	Range-wide	unlimited	unlimited	50	50	10
Short-beaked common dolphin *Delphinus capensis*	Range-wide	unlimited	unlimited	50	50	10

APPENDIX E TOTAL NUMBER OF CURRENT AND PROPOSED TAKES PER ESA-LISTED LARGE WHALE SPECIES IN THE PROPOSED ACTION AREA, AS OUTLINED IN ALTERNATIVE 2, PROPOSED ACTIONS/PREFERRED ALTERNATIVE

Species	Current	Proposed
Sei whales *(Balaenoptera physalus)*		
Audiometric & sonocular on stranded animals	15	0
Photo-ID, Behavioral Observation, Passive Acoustic, Aerial Photogrammetry, and Underwater Observation.	1255	2020
Biopsy	260	520
Tagging	15	65
Incidental Harassment	5145	2680

Species	Current	Proposed
Blue whales (*Balaenoptera musculus*)		
Audiometric & sonocular on stranded animals	15	0
Photo-ID, Behavioral Observation, Passive Acoustic, Aerial Photogrammetry, and Underwater Observation.	4235	3050
Biopsy	445	860
Tagging	105	80
Incidental Harassment	5825	3750

Species	Current	Proposed
Fin whales (*Balaenoptera physalus)*		
Audiometric & sonocular on stranded animals	15	0
Photo-ID, Behavioral Observation, Passive Acoustic, Aerial Photogrammetry, and Underwater Observation.	4345	2670
Biopsy	474	710
Tagging	55	125
Incidental Harassment	5825	7030

Species	Current	Proposed
Bowhead whales (*Balaena mysticetus)*		
Audiometric & sonocular on stranded animals	15	0
Photo-ID, Behavioral Observation, Passive Acoustic, Aerial Photogrammetry, and Underwater Observation.	765	550
Biopsy	129	25
Tagging		10
Incidental Harassment	1250	7900

Species	Current	Proposed
North Pacific right whales (*Eubalaena japonica*)		
Audiometric & sonocular on stranded animals	15	0
Photo-ID, Behavioral Observation, Passive Acoustic, Aerial Photogrammetry, and Underwater Observation.	2255	250
Biopsy	195	60
Tagging	35-60	10
Incidental Harassment	2325	440

Species	Current	Proposed
Southern right whales (*Eubalaena australis*)		
Audiometric & sonocular on stranded animals		
Photo-ID, Behavioral Observation, Passive Acoustic, Aerial Photogrammetry, and Underwater Observation.		220
Biopsy		60
Tagging		1
Incidental Harassment		400

Species	Current	Proposed
Sperm whales *(Physeter catodon)*		
Audiometric & sonocular on stranded animals	15	0
Photo-ID, Behavioral Observation, Passive Acoustic, Aerial Photogrammetry, and Underwater Observation.	3030	7050
Biopsy	1224	720
Tagging	55	95
Incidental Harassment	245	9,190

Species	Current	Proposed
North Pacific Humpback whales *(Megaptera novaeangliae)*		
Audiometric & sonocular on stranded animals	15	
Photo-ID, Behavioral Observation, Passive Acoustic, Aerial Photogrammetry, and Underwater Observation.	25015	17480
Biopsy	1674	3180
Tagging	80	240
Incidental Harassment	9275	13310
Critter-cam	18	18
Unintentional playback exposure	400	280
Playback of sound	545	100
Dead parts	430	unlimited

Species	Current	Proposed
Loggerhead (*Caretta caretta*)		
Measure	727	40
Weigh	605	40
Photograph	122	
Flipper tag	727	40
Passive Integrated Transponder	5	
Blood sample	5	40
Tissue sample	722	40
Incidental	722	
Entangle net	5	
Necropsy	600	
Lavage		10

Species	Current	Proposed
Leatherback (*Dermochelys coriacea*)		
Measure	261	10
Weigh	100	10
Photograph	161	
Flipper tag	261	10
Passive Integrated Transponder	100	
Blood sample	100	10
Tissue-skin sample	261	10
Satellite transmitter/tag	100	
Fat sample	100	
Incidental	161	

Species	Current	Proposed
Hawksbill (*Eretmochelys imbricata*)		
Measure	70	25
Weigh	40	25
Photograph		
Flipper tag	70	25
Passive Integrated Transponder	30	
Satellite transmitter/tag	40	5
Tissue-skin sample	70	20
Hand capture	40	
Encircle net	30	
Necropsy	40	
Bloom sample		25

Species	Current	Proposed
Olive ridley (*CaLepidochelys olivacea*)		
Measure	147	365*
Weigh	105	365*
Photograph	42	
Flipper tag	147	365*
Passive Integrated Transponder	5	
Blood sample	5	365*
Radio tag	5	
Sonic tag	5	
Satellite transmitter/tag	55	15
Tissue-skin sample	142	
Entangle net	5	
Incidental	142	
Necropsy	100	
Lavage	5	50

*Not to exceed 1000 in 5 years

Species	Current	Proposed
Green (*Chelonia midas*)		
Measure	173	120
Weigh	90	120
Photograph	13	
Flipper tag	173	120
Passive Integrated Transponder	120	
Blood sample	50	120
Radio tag	10	
Sonic tag	15	
Satellite transmitter/tag	47	10
Tissue-skin sample	123	
Lavage	30	10
Entangle net	50	
Encircle net	70	
Incidental	53	
Necropsy	40	

APPENDIX F LIST OF EXISTING PERMITS AUTHORIZING DIRECTED TAKES FOR SAME ESA-LISTED, LARGE WHALE SPECIES IN THE NORTH PACIFIC OCEAN

Permit Number	Permit Holder	Expiration Date
774-1437	NMFS – SWFSC	June 30, 2004
782-1438	NMFS- NMML	June 30, 2004
545-1488	North Gulf Oceanic Society (Craig Matkin)	March 31, 2004
393-1480	Glockner-Ferrari	May 30, 2004
716-1456	Sharpe	June 30, 2004
731-1509	Baird	July 31, 2004
924-1484	Green	August 31, 2004
369-1440	Mate	October 31, 2004
540-1502	Cascadia Research Collective	November 30, 2004
587-1472	Salden	December 31, 2004
945-1499	Glacier Bay National Park and Reserve	January 1, 2005
642-1536	Mobley, Jr.	May 31, 2005
707-1531	University of Hawaii at Manoa	August 31, 2005
821-1588	Texas A&M University	September 30, 2005
638-1519	Kleckhefer	November 30, 2005
545-1562	North Gulf Oceanic Society (Dena Matkin)	December 30, 2005
753-1599	Darling	January 1, 2006
931-1597	Ridgway	May 15, 2006
751-1614	Ocean Alliance	January 31, 2007
1190	Pacific Island Region	March 31, 2005
1296	Michael Laurs	July 31, 2006
1297	Peter Dutton	May 31, 2006
1199	Guam Department of Agriculture	April 30, 2005