UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
PROGRAM PLANNING AND INTEGRATION
Silver Spring, Maryland 20910

APR 25 2011

To All Interested Government Agencies and Public Groups:

Under the National Environmental Policy Act (NEPA), an environmental review has been performed on the following action.

TITLE: Environmental Assessment for Issuance of a Scientific Research Permit for Cetacean Studies in Pacific, Arctic and Atlantic Oceans

LOCATION: Pacific, Arctic and Atlantic Oceans

SUMMARY: NMFS proposes to issue scientific research Permit No. 14245 to authorize research during vessel and aerial surveys of 33 species of cetacean and eight species of pinnipeds. Research activities would include photo-identification, observation, biological sampling, tagging, captures, and a suite of procedures performed during capture. A small number of accidental mortalities would be authorized for capture work. The purpose of the research is to evaluate trends, abundance and distribution of marine mammals over long periods of time for scientific and management purposes. Individual animals could experience short-lived harassment, injury or death, in a minor number of cases. However, impacts from the research would be minimal to populations and species.

RESPONSIBLE OFFICIAL: James H. Lecky
Director, Office of Protected Resources
National Marine Fisheries Service
National Oceanic and Atmospheric Administration
1315 East-West Highway, Room 13821
Silver Spring, MD 20910
(301) 713-2332

The environmental review process led us to conclude that this action will not have a significant effect on the human environment. Therefore, an environmental impact statement will not be prepared. A copy of the finding of no significant impact (FONSI) including the supporting environmental assessment (EA) is enclosed for your information.

Although NOAA is not soliciting comments on this completed EA/FONSI we will consider any comments submitted that would assist us in preparing future NEPA documents. Please submit any written comments to the responsible official named above.

Sincerely,

Paul N. Doremus, Ph.D.
NOAA NEPA Coordinator

Enclosure

**UNITED STATES DEPARTMENT OF COMMERCE**
**National Oceanic and Atmospheric Administration**
NATIONAL MARINE FISHERIES SERVICE
Silver Spring, MD 20910

# Environmental Assessment for Issuance of a Scientific Research Permit for Cetacean Studies in the Pacific, Arctic and Atlantic Oceans

April 2011

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

**Responsible Official:** James H. Lecky, Director, Office of Protected Resources

**For Further Information Contact**: Office of Protected Resources
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Silver Spring, MD 20910
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**Location**: Pacific, Atlantic and Arctic Oceans

**Abstract**: The National Marine Fisheries Service (NMFS) proposes to issue a scientific research permit to the NMFS National Marine Mammal Laboratory (Responsible Party: John Bengtson, Ph.D.) for takes of marine mammals 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 (ESA; 16 U.S.C. 1531 *et seq.*). The permit would be valid for five years from the date of issuance and would authorize research on 33 species of cetaceans and the incidental harassment of nine species of pinnipeds. The purpose of the research is to continue studies that evaluate trends, abundance, distribution, movement patterns, habitat use, health and stock structure of cetaceans in U.S. and international waters over long periods of time. Vessel and aerial surveys would be conducted for abundance estimation and distribution using line transect survey methods, photo-identification surveys, feeding studies, biological sampling, tagging, captures, and a suite of procedures associated with captures. A small number of unintentional mortalities would be authorized for capture activities. The permit would also authorize the salvage of cetacean parts collected during research.

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# CHAPTER 1 PURPOSE OF AND NEED FOR ACTION

## 1.1 DESCRIPTION OF ACTION

In response to receipt of a request from the National Marine Fisheries Service (NMFS), National Marine Mammal Laboratory (NMML; Responsible Party: John Bengtson, Ph.D.) (File No. 14245), NMFS proposes to issue a scientific research permit that authorizes takes[1] by harassment[2] of marine mammals in the wild pursuant to the Marine Mammal Protection Act of 1972, as amended (MMPA; 16 U.S.C. 1361 *et seq.*), the regulations governing the taking and importing of marine mammals (50 CFR Part 216), the Endangered Species Act of 1973 (ESA; 16 U.S.C. 1531 *et seq.*), the regulations governing the taking, importing, and exporting of endangered and threatened species (50 CFR Parts 222-226), and the Fur Seal Act of 1966 (FSA; 16 U.S.C. 1151 *et seq.*).

### 1.1.1 Purpose and Need

The primary purpose of the permit is to provide an exemption from the take prohibitions under the MMPA and ESA to allow takes by Level A and B harassment of marine mammals, including endangered species, for *bona fide*[3] scientific research. The need for issuance of the permit is related to NMFS's mandates under the MMPA and ESA. Specifically, NMFS has a responsibility to implement both the MMPA and the ESA to protect, conserve, and recover marine mammals and threatened and endangered species under its jurisdiction. The MMPA and ESA prohibit takes of marine mammals and threatened and endangered species, respectively, with only a few very specific exceptions, including for scientific research and enhancement purposes. Permit issuance criteria require that research activities are consistent with the purposes and policies of these federal laws and will not have a significant adverse impact on the species or stock.

### 1.1.2 Need for Proposed Research and Research Objectives

Under the ESA and MMPA, NMFS is responsible for the conservation and recovery of most endangered and threatened marine mammals. Scientific research is an important means of gathering valuable information about these species and is necessary to conserve them and promote their recovery. The research activities and data collection and analysis conducted by the NMML are for the protection, management, and recovery of protected resources. The objectives

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[1] Under the MMPA, "take" is defined as to "harass, hunt, capture, kill or collect, or attempt to harass, hunt, capture, kill or collect." [16 U.S.C. 1362(18)(A)] The ESA defines "take" as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." The term "harm" is further defined by regulations (50 CFR §222.102) as "an act which actually kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation which actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns including breeding, spawning, rearing, migrating, feeding, or sheltering."

[2] "Harass" is defined by regulation (50 CFR §216.3) as "Any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing a disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering but does not have the potential to injure a marine mammal or marine mammal stock in the wild (Level B harassment)."

[3] The MMPA defines bona fide research as "scientific research on marine mammals, the results of which – (A) likely would be accepted for publication in a refereed scientific journal; (B) are likely to contribute to the basic knowledge of marine mammal biology or ecology; or (C) are likely to identify, evaluate, or resolve conservation problems."

of the research are to evaluate trends, abundance, distribution, movement patterns, habitat use, health and stock structure of cetaceans in U.S. and international waters over long periods of time.

The proposed research would continue research that has been conducted since 2004 under Permit No. 782-1719. The take numbers requested for some species are higher than those currently authorized, but are needed to: 1) ensure a high enough sample size to conduct the best and most thorough population assessments possible, 2) to allow for a statistically significant number of takes when no data are obtained (most often due to bad weather leading to approaches with no biopsy or tagging success or poor quality photographs), and 3) to allow for a variety of research objectives which alternate from one year to the next.

## 1.2 OTHER EA/EIS THAT INFLUENCE SCOPE OF THIS EA

The NMML has been authorized to conduct similar research since 2004 under Permit No. 782-1719. The issuance of this permit and subsequent amendments has been analyzed under numerous National Environmental Policy Act (NEPA; 42 U.S.C. 4321 *et seq.*) documents. The following NEPA documents contain analyses relevant to cetacean research similar in nature, magnitude, and scope to the Proposed Action. Each assessment resulted in a finding of no significant impact to the environment:

- *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* (NMFS 2004).

- *Supplemental Environmental Assessment on the Effects of the Issuance of One National Marine Fisheries Service Permit Amendment for Scientific Research Activities on Humpback Whales on the Winter Breeding and Nursing Grounds of Hawaii (Calves)* (NMFS 2005a).

- *Supplemental Environmental Assessment on the Effects of the Issuance of Nine National Marine Fisheries Service Permit Actions for Scientific Research Activities on Marine Mammal Species in the U.S. Territorial Waters and High Seas of the Eastern, Central, and Western North Pacific Ocean, with a Primary Focus on the Waters Off Hawaii and from California Northward to Southeast Alaska (Including Gulf of Alaska and Aleutian Islands), and Including Foreign Territorial Waters of Japan* (NMFS 2005b).

- *Environmental Assessment on the Effects of the Issuance of Four National Marine Fisheries Service Scientific Research Permits and Three Permit Amendments on the Eastern North Pacific Southern Resident Killer Whale (Orcinus orca) and Other Marine Mammals in the U.S. Territorial Waters, Exclusive Economic Zones, and High Seas of the Eastern North Pacific Ocean along the Coast of the U.S. from Southeastern Alaska to Central California, and Coastal Inlets and Estuaries of These States* (NMFS 2006a).

- *Supplemental Environmental Assessment on the Issuance of Two National Marine Fisheries Service (NMFS) Permit Amendments for Scientific Research Activities on Large Whale Species in the North Pacific and Southern Ocean* (NMFS 2006b).

- *Supplemental Environmental Assessment on the Issuance of a National Marine Fisheries Service (NMFS) Permit Amendment for Scientific Research Activities on Selected Non-ESA Listed Species in the North Pacific Ocean* (NMFS 2007a).

- *Environmental Assessment for the Issuance of a National Marine Fisheries Service Scientific Research Permit and a Permit Amendment for Vessel and Aerial Surveys of Beluga Whales in Cook Inlet, Alaska* (NMFS 2009).

## 1.3 SCOPING SUMMARY

The purpose of scoping is to identify the issues to be addressed and the significant issues related to the Proposed Action, as well as identify and eliminate from detailed study the issues that are not significant or that have been covered by prior environmental review. An additional purpose of the scoping process is to identify the concerns of the affected public and Federal agencies, states, and Indian tribes. Council on Environmental Quality (CEQ) regulations implementing NEPA do not require that a draft Environmental Assessment (EA) be made available for public comment as part of the scoping process.

The MMPA and its implementing regulations governing issuance of special exception permits for scientific research (50 C.F.R. §216.33) require that, upon receipt of a valid and complete application for a new permit, NMFS publish a notice of receipt in the *Federal Register*. The notice summarizes the purpose of the requested permit and invites interested parties to submit written comments concerning the application. Note, NMML's application included capture research and associated mortalities for Cook Inlet beluga whales (*Delphinapterus leucas*); however, that portion of the request is not being considered for permitting at this time and is not analyzed here. The application was made available for public review and comment for 30 days (75 FR 22119, and 75 FR 81970 for a supplemental request to also authorize take of narwhals, *Monodon monoceros*). No substantive public comments were received. The application was sent to the Marine Mammal Commission for review at the same time during each comment period, pursuant to 50 CFR §216.33 (d)(2). Comments received on the application were considered as part of the scoping for this EA.

For the original permit application, the Marine Mammal Commission (MMC) that NMFS

- defer consideration of this scientific research permit until an Institutional Animal Care and Use Committee (IACUC) has reviewed the proposed research activities and has found them to be consistent with Animal Welfare Act (AWA) requirements;

- withhold authorization for any future amendment of the permit pending IACUC review and approval of all the research activities covered by the permit and all requested changes;

**Response:** The NMFS Science Board has moved to adopt IACUCs, pursuant to the AWA, as standard procedure for NOAA Fisheries Service science facilities conducting research on marine mammals. Efforts have been made to create and train Regional IACUCs, but the final IACUC policy has not yet been signed. In a memorandum dated November 9, 2009, James W. Balsiger, Ph.D., Acting Assistant Administrator for Fisheries, directed NMFS Science Centers to include a NMFS IACUC assurance statement, signed by the Regional IACUC chair, with all applications submitted after December 31, 2009, for permits or amendments to permits to conduct scientific research on marine mammals. Because this application was received prior to this date, the application was processed without the NMFS IACUC assurance statement. All subsequent requests, including the narwhal request that was later received as part of the Proposed Action, are required to have IACUC review and approval. The narwhal request was accepted because it had IACUC approval.

- defer action on this permit as it pertains to North Pacific right whales until NMFS resolves how to best comply with National Environmental Policy Act (NEPA) and has prepared the necessary environmental analyses;

  **Response:** On October 17, 2005, NMFS issued a notice of intent to voluntarily prepare an EIS (70 FR 60285) for issuance of permits for research on Northern right whales, in order to consider long-range planning needs and efficiencies in the permitting process. The EIS is not related to any permit action that resulted in a finding of significant impacts. In accordance with NEPA and its implementing regulations at 40 CFR Section 1506.1, nothing precludes NMFS from issuing permits in the interim while the EIS is being developed. NMFS is evaluating the applicant's request for right whale research to determine whether the action would result in significant impacts to the species or other portions of the environment.

- before authorizing tagging activities involving calves and their mothers, (1) obtain information from NMML on how it will determine calf age, (2) be satisfied that NMML has provided adequate justification for biopsy sampling and tagging non-neonate calves and females accompanied by such calves, particularly for ESA species; and (3) be satisfied that post-tagging monitoring will be adequate to determine the impact of tagging on these animals;

  **Response:** NMML provided a detailed response to reviewer comments noting how calf age would be determined and justification for sampling and tagging calves and their mothers (See internal comments memo for more information). NMML's proposed humpback whale tagging project, which would not target any animals younger than juveniles, in the Atlantic would directly seek to look at the long-term impacts of tagging and would conduct post-tagging monitoring as part of the study design. This is one of the first permitted projects specifically designed to analyze the effects of implantable tags. Given the nature of the project and NMML's collaboration with other whale researchers in the Atlantic to conduct this work, PR1 is satisfied that the monitoring will be adequate.

- withhold authorization for biopsy sampling or tagging any female cetacean accompanied by a neonate calf; and

  **Response:** For capture research (of beluga whales, Dall's porpoises, and harbor porpoises), NMML would immediately release a mother with a calf of any age as it is their intent to only target and hold one animal at a time for processing. Therefore, for captures, females with calves would not be biopsy sampled or tagged. Beyond capture research, NMFS expects that encounters of a female with a neonate calf would be an infrequent, if not, rare occurrence. Per the applicant's request, the permit would be conditioned so that females with neonates may be biopsy sampled but not tagged. The proposed permit also would include conditions to mitigate the potential for effects to the mother-calf bond during all research. These conditions were developed in past consultation with the MMC and have been successfully used to authorize research on this sex class for other past permits, including the applicant's current permit, No. 782-1719-09. Further, the annual reports for these permits have not indicated any problems (such as serious injury or death) from sampling or tagging females with neonates that would warrant the MMC's recommendation.

- condition the permit, if issued, on a requirement the investigator to (1) take all steps necessary to ensure that activities to be done under the permit and those of other permit holders who might be carrying out research on the same species in the same areas are coordinated to avoid unnecessarily duplicative research and unnecessary disturbance of animals; and (2) obtain all necessary permits under the Convention on International Trade in Endangered Species of Wild Fauna and Flora before importing samples into or exporting them out of the United States.

  **Response:** All researchers are required to notify the appropriate NMFS Regional Office in advance of research as well as work with other researchers to prevent duplication as much as is practicable. NMML has a history of collaborating with other marine mammal researchers and has identified other Permit Holders that they are actively collaborating with to coordinate research activities. To that end, NMML has withdrawn all proposed research in the Southern Ocean, deciding instead to conduct any work there collaboratively under the NMFS Southwest Fisheries Science Center's research permit. NMML has the necessary permits for import and export of samples.

For the narwhal request, in a letter dated January 27, 2011, the MMC recommended approval of the request, stating that it is consistent with the purposes and policies of the MMPA.

No substantive comments were received from the public on the Proposed Action.

## 1.4 APPLICABLE LAWS AND NECESSARY FEDERAL PERMITS, LICENSES, AND ENTITLEMENTS

This section summarizes federal, state, and local permits, licenses, approvals, and consultation requirements necessary to implement the proposed action, as well as who is responsible for obtaining them. Even when it is the applicant's responsibility to obtain such permissions, NMFS

is obligated under NEPA to ascertain whether the applicant is seeking other federal, state, or local approvals for their action.

### 1.4.1 National Environmental Policy Act

NEPA was enacted in 1969 and is applicable to all "major" federal actions significantly affecting the quality of the human environment. A major federal action is an activity that is fully or partially funded, regulated, conducted, or approved by a federal agency. NMFS issuance of permits for research represents approval and regulation of activities. While NEPA does not dictate substantive requirements for permits, licenses, etc., it requires consideration of environmental issues in federal agency planning and decision making. The procedural provisions outlining federal agency responsibilities under NEPA are provided in the CEQ's implementing regulations (40 CFR Parts 1500-1508).

NMFS has, through NOAA Administrative Order (NAO) 216-6, established agency procedures for complying with NEPA and the implementing regulations issued by the CEQ. NAO 216-6 specifies that issuance of scientific research permits under the MMPA and ESA is among a category of actions that are generally exempted (categorically excluded) from further environmental review, except under extraordinary circumstances. 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 endangered or threatened species or their habitats, preparation of an EA or Environmental Impact Statement (EIS) is required.

While issuance of scientific research permits is typically subject to a categorical exclusion, as described in NAO 216-6, NMFS is preparing an EA for this action to provide a more detailed analysis of effects to ESA-listed species. This EA is prepared in accordance with NEPA, its implementing regulations, and NAO 216-6.

### 1.4.2 Endangered Species Act

Section 9 of the ESA, as amended, and Federal regulations pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption such as by a permit. 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(a)(1)(A) of the ESA.

NMFS has promulgated regulations to implement the permit provisions of the ESA (50 CFR Part 222) and has produced Office of Management and Budget (OMB)-approved application instructions that prescribe the procedures necessary to apply for permits. All applicants must comply with these regulations and application instructions in addition to the provisions of the ESA.

Section 10(d) of the ESA stipulates that, for NMFS to issue permits under section 10(a)(1)(A) of the ESA, the Agency must find that the permit: was applied for in good faith; if granted and exercised will not operate to the disadvantage of the species; and will be consistent with the purposes and policy set forth in Section 2 of the ESA.

Section 2 of the ESA sets forth the purposes and policy of the Act. The purposes of the ESA are to provide a means whereby the ecosystems upon which endangered and threatened species depend may be conserved, to provide a program for the conservation of such endangered species and threatened species, and to take such steps as may be appropriate to achieve the purposes of the treaties and conventions set forth in Section 2(a) of the ESA. It is the policy of the ESA that all Federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of the ESA. In consideration of the ESA's definition of conserve, which indicates an ultimate goal of bringing a species to the point where listing under the ESA is no longer necessary for its continued existence (i.e., the species is recovered), exemption permits issued pursuant to Section 10 of the ESA are for activities that are likely to further the conservation of the affected species.

Section 7 of the ESA requires consultation with the appropriate federal agency (either NMFS or the U.S. Fish and Wildlife Service) for federal actions that "may affect" a listed species or adversely modify critical habitat. NMFS issuance of a permit affecting ESA-listed species or designated critical habitat, directly or indirectly, is a federal action subject to these Section 7 consultation requirements. Section 7 requires federal agencies to use their authorities in furtherance of the purposes of the ESA by carrying out programs for the conservation of endangered and threatened species. NMFS is further required to ensure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any threatened or endangered species or result in destruction or adverse modification of habitat for such species. Regulations specify the procedural requirements for these consultations (50 Part CFR 402).

### 1.4.3 Marine Mammal Protection Act

The MMPA prohibits takes of all marine mammals in the U.S. (including territorial seas) with a few exceptions. Permits for *bona fide* scientific research on marine mammals, or to enhance the survival or recovery of a species or stock, issued pursuant to Section 104 of the MMPA are one such exception. 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. NMFS has sole jurisdiction for issuance of such permits and authorizations for all species of cetacean, and for all pinnipeds except walrus[4].

NMFS may issue a permit or authorization pursuant to Section 104 of the MMPA to an applicant who submits with their application information indicating that the taking is required to further a bona fide scientific purpose. An applicant must demonstrate to NMFS that the taking will be consistent with the purposes of the MMPA and applicable regulations. If lethal taking of a marine mammal is requested, the applicant must demonstrate that a non-lethal method of conducting research is not feasible. NMFS must find that the manner of taking is "humane"[5] as defined in the MMPA. In the case of proposed lethal taking of a marine mammal from a stock listed as "depleted" NMFS must also determine that the results of the research will directly benefit the species or stock, or otherwise fulfill a critically important research need.

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4 The U.S. Fish and Wildlife Service has jurisdiction for walrus, polar bears, sea otters, and manatees.
5 The MMPA defines humane in the context of the taking of a marine mammal, as "that method of taking which involves the least possible degree of pain and suffering practicable to the mammal involved."

NMFS has promulgated regulations to implement the permit provisions of the MMPA (50 CFR Part 216) and has produced OMB-approved application instructions that prescribe the procedures (including the form and manner) necessary to apply for permits. All applicants must comply with these regulations and application instructions in addition to the provisions of the MMPA.

### 1.4.4 National Marine Sanctuaries Act (NMSA)

The NMSA (32 U.S.C. 1431 *et seq.*) authorizes the Secretary of Commerce to designate and manage areas of the marine environment with special national significance. The National Marine Sanctuary Program, operating under the NMSA and administered by NOAA's National Ocean Service (NOS) has the authority to issue special use permits for research activities that would occur within a National Marine Sanctuary. Obtaining special use permits is the responsibility of individual researchers. However, as a courtesy, the Office of Protected Resources notifies the NOS when proposed research would occur in or near a National Marine Sanctuary.

### 1.4.5 Convention on International Trade in Endangered Species of Wild Fauna (CITES)

CITES is an international agreement between governments with the goal of ensuring that international trade in specimens of wild animals and plants does not threaten their survival. All import, export, re-export and introduction from the sea of species covered by CITES has to be authorized through a licensing system. In the United States, the U.S. Fish and Wildlife Service is the Management Authority for CITES. Obtaining CITES permits is the responsibility of individual researchers.

### 1.4.6 Animal Welfare Act (AWA)

The AWA (7 U.S.C. 2131 – 2156) sets forth standards and certification requirements for the humane handling, care, treatment, and transportation of mammals. Enforcement of these requirements for non-federal facilities is under jurisdiction of the U.S. Department of Agriculture's Animal and Plant Health Inspection Service. Each research facility is required to establish an IACUC which reviews study areas and animal facilities for compliance with the AWA standards. The IACUC also reviews research protocols and provides written approvals for those that comply with AWA requirements. For federal research facilities, the head of the federal agency is responsible for ensuring compliance with the AWA requirements. It is the responsibility of the researcher to seek and secure IACUC reviews and approvals for their research.

### 1.4.7 Fur Seal Act

The FSA is applicable to all research permit applications requesting takes of northern fur seals in the Pribilof Islands, Alaska. The FSA requires the Secretary to conduct research on North Pacific fur seal resources as necessary for the United States to meet its obligations under the Interim Convention on the Conservation of North Pacific Fur Seals. The Secretary must permit, subject to necessary terms and conditions, the taking of fur seals for educational, scientific or exhibition purposes. [16 U.S.C. § 1154]

# CHAPTER 2 ALTERNATIVES INCLUDING THE PROPOSED ACTION

This chapter describes the range of potential actions (alternatives) determined reasonable with respect to achieving the stated objective. This chapter also summarizes the expected outputs and any related mitigation of each alternative. One alternative is the "No Action" alternative where the proposed permit would not be issued. The No Action alternative is the baseline for rest of the analyses. The Proposed Action alternative represents most of the research proposed in the submitted application for a permit, with standard permit terms and conditions specified by NMFS.

## 2.1 ALTERNATIVE 1 – NO ACTION

Under the No Action alternative, Permit No. 14245 would not be issued. This alternative would eliminate any potential risk to the environment from the proposed research activities. However, it would not allow the research to be conducted and the opportunity would be lost to collect information that would contribute to better understanding the species that NMFS is responsible for conserving and recovering under the ESA and MMPA.

This alternative would not affect any existing NMFS research permits or future requests for permits or amendments. Current research permits would remain active and NMFS would continue to evaluate new permit requests as they are received, including requests from the applicant.

## 2.2 ALTERNATIVE 2 – PROPOSED ACTION (ISSUANCE OF PERMIT WITHOUT CAPTURE RESEARCH ON COOK INLET BELUGA WHALES)

Under the Proposed Action alternative, a five-year research permit would be issued for activities as proposed by the applicant, with the permit terms and conditions standard to such permits as issued by NMFS. NMML proposes to conduct research projects on 33 species of cetaceans in U.S. and international waters. Research would occur in the Pacific, Arctic and Atlantic Oceans. Specific species, take activities and numbers are listed in Appendix A. Research in the Atlantic Ocean would be limited to aerial and vessel-based research on humpback whales (*Megaptera novaeangliae*). The purpose of the research is to continue studies that evaluate trends, abundance, distribution, movement patterns, habitat use, health and stock structure of cetaceans in U.S. and international waters over long periods of time. Vessel and aerial surveys would be conducted for abundance estimation and distribution using line transect survey methods, photo-identification surveys, feeding studies, biological sampling, tagging, captures, and a suite of procedures associated with captures. A small number of unintentional mortalities would be authorized for capture activities. The permit would also authorize the salvage of cetacean parts collected during research. Note that as part of their application NMML requested capture activities and mortalities for the endangered Cook Inlet stock of beluga whales. However, NMFS is not considering authorizing takes for capture research or mortalities of the Cook Inlet stock at this time.

### *Action Area*

Research would be authorized to occur in U.S. and international waters of the Pacific, Arctic and Atlantic Oceans. Research in the Pacific would include studies in the U.S. waters of Hawaii, Alaska, California, Oregon and Washington as well as international waters. Research could occur throughout the Arctic Ocean. In the Atlantic, research would occur mainly in the Gulf of

Maine but could also take place along the U.S. Exclusive Economic Zone (EEZ) from Maine to Florida, Puerto Rico, and the U.S. Virgin Islands.

***Permit Duration***

For the Proposed Action, the permit would be valid for five years from the date of issuance, and would expire on the date specified in the permit. NMFS would consider issuing a single one-year extension of the permit if the permit holder submits a request in writing before the expiration of the permit and in sufficient time for processing prior to expiration. The request to extend the permit would be considered a modification, pursuant to NMFS regulations at 50 CFR §222.306, and as such would have to be accompanied by full justification and supporting information, and formatted in accordance with NMFS permit application instructions. As with any modification to a permit, the extension of the permit duration would be subject to the same issuance criteria as the original application, including the requirements that the taking will not operate to the disadvantage of the species and will be consistent with the purposes and policies of the ESA.

If granted, a one-year extension of the permit would only allow "takes" of marine mammals that were not used in the last year of the permit; these remaining takes would be carried forward into a sixth permit year. The extension would not change any other terms or conditions of the permit. NMFS does not consider a one-year extension of this nature to represent a substantial change to the Proposed Action that involves changes in environmental impacts. As such, NMFS would not prepare a supplemental EA for the one-year extension unless there were significant new circumstances or information relating to environmental impacts (e.g.,, a change in the status of the target species, listing of new threatened or endangered species in the project area).

***Activities***

Vessel and aerial surveys are the primary tools used by NMML to estimate abundance and distribution of marine mammals. Animals would be taken during large and small vessel surveys, aerial surveys and photogrammetry, photo-identification, biological sampling, tagging, captures, and a suite of procedures during capture. Species and take numbers are listed in Appendices A and B. Research would occur during any month of the year.

*Level B harassment* would occur during vessel surveys, aerial surveys, aerial photogrammetry, and photo-identification activities. Sloughed skin or feces would be collected from the water with a small dip net. Collection of feces or sloughed skin would only result in Level B harassment if a large cetacean is within 100 yards or a small cetacean is within 50 yards of the vessel. *Level A harassment* would occur via biopsy sampling, tagging, and captures and subsequent procedures in conjunction with vessel surveys.

**Aerial Surveys**

NMML would conduct aerial surveys for abundance estimation and distribution using line transect survey methods, aerial photo-identification surveys, feeding studies using aerial photography, and searching for target species to aid vessel work in feeding and tagging studies. Survey areas would include the North Pacific Ocean, as well as the Gulf of Alaska, Bering Sea, Chukchi Sea, Beaufort Sea, Arctic Ocean, Gulf of California, and international waters, and the North Atlantic. Survey design varies with the type of study and the species of interest. Examples of surveys include the Bowhead Whale Aerial Survey Project (BWASP), operational

primarily in the Beaufort Sea since 1982 and the Chukchi Offshore Monitoring in Drilling Area (COMIDA), started in 2008. Survey altitudes would range from 300 to 1,500 ft. Surveys would be conducted mostly during late spring and summer, when weather is optimal or to maximize comparisons to previous surveys, but takes would be authorized to occur in any season as needed to meet research objectives. The aircraft would circle over animals to confirm species identification and to estimate group size. All age and sex classes would be harassed.

Typically an Aero Commander 680 or NOAA twin otter would be used, with twin-engines, high-wings, and more than 6-hour flying capability. Smaller planes such as single engine float planes could be used for nearshore surveys. Survey design varies depending on the species of interest and the type of study being conducted.

Surveys would consist of predetermined broad scale transects that provide equal probability of detection within the survey area and would be coordinated with vessel studies to assist in locating a species of interest for photo-id and tagging studies. In addition, small scale exploratory surveys would be flown to investigate areas of interest (i.e. shelf breaks, isobaths and historical areas of high density sightings). Exploratory surveys also may be flown to relocate whales either detected visually or acoustically and to provide aerial support during satellite tagging events by the shipboard survey.

Line transect surveys are used for abundance and distribution studies in both inshore and offshore waters for a variety of cetaceans. These surveys would be flown along predetermined transects at altitudes appropriate for the species of interest (from 300 to 1,500 ft) and a speed from 90 to 120 knots. During surveys, most animals would only have a single overpass when encountered. However, the plane may circle for rare sightings, identification, photography and better group size assessments. Accordingly, there may be several passes over an individual cetacean while photographing it. Groups of small cetaceans could be circled or flown over a second or third time as part of the experimental design.

NMML also has developed a survey design for cetacean species or stocks that reside in a relatively small area whose extent can be surveyed in one day. The design includes a complete survey of the area on subsequent days which provides multiple counts of the population. For this type of survey, a trackline is flown through the animals' range and when a group is located, multiple counts are made of the group by observers on the aircraft while also being videotaped to provide a correction factor for the observer counts. The survey would be generally flown at 800 ft but could go as low as 300 ft. An example of this type of survey is the continued aerial monitoring of the endangered population of beluga whales that reside year-round in Cook Inlet, Alaska. In order to maximize the opportunities of an accurate count, multiple passes are made until observers have at least four good counts. This may mean up to 16 passes (on average 4-8 passes) over or near a whale group on any given day, and 4-8 surveys of the group within each field season.

Aerial surveys typically follow predetermined tracklines. When a whale is sighted, the aircraft circles back behind the animal at an altitude of 300 to 800 feet and flies directly overhead where the whale is photographed through a belly window in the plane. After a whale of interest is sighted, the trackline would either be completed before going off effort, or would be marked to

resume after photographic passes. After breaking trackline effort, passes would be made directly over an individual or group in order to obtain a precise location. Several additional passes would be flown if needed to obtain appropriate photographs for identification and measurements.

Incidental harassment of pinnipeds

During aerial surveys, researchers may incidentally fly over several pinniped species, including Steller sea lions, *Eumetopias jubatus* (see Appendix A). Conditions of the permit would mitigate harassment of such non-target species, by requiring researchers to avoid pinniped haul outs and leaving the vicinity of the animals when practicable. However, harassment of pinnipeds may be unavoidable in some cases while researchers are collecting data on target cetaceans in the area. The permit would authorize take for the incidental disturbance of pinniped species during surveys for these cases.

**Vessel surveys**

Line transect vessel surveys would be conducted from various NOAA ships or vessels chartered especially for these studies. Survey areas would include the North Pacific Ocean, as well as the Gulf of Alaska, Bering Sea, Chukchi Sea, Beaufort Sea, Arctic Ocean, Gulf of California, international waters, and the North Atlantic. Surveys would be conducted mostly during the late spring and summer, when weather is optimal or to maximize comparisons to previous surveys, but takes would be authorized to occur in any season as needed to meet research objectives.

Data would be collected using line-transect methodology to estimate population abundance by species/stock. Although procedures may vary slightly depending on the specific objective of the survey, the following protocol is typically used on NMML research vessel surveys. The vessel would traverse predetermined track lines within the study area at a constant speed (usually 10 knots). Marine mammal observers stationed on the flying bridge deck of the vessel would search the area from directly ahead to abeam of the ship using pedestal-mounted 25X binoculars. At times, depending on the species sighted and the data collection priorities, the vessel may turn off the track line and approach marine mammals to confirm species identification and to estimate group size. Photographs of bow-riding animals would also be taken on an opportunistic basis from the bow of the main research vessel.

In addition to line transect surveys, NMML would conduct research that involves directed approaches to cetaceans in small and large craft for photo-identification (usually in conjunction with biopsy studies, see description below). All individual whales would be photographed for identification, if possible. Many of these approaches would also be used to collect tissue samples for genetic and contaminant analyses. Cetaceans would be approached and then photographed and biopsied from small boats launched from shore or from larger vessels. The approaches would be gradual and would be designed to minimize or avoid any startle response.

Large vessel approaches to cetaceans would be conducted at the minimum speed needed to close the distance between ship and the animals, typically 10 knots or less, and often cease when the ship is within 500 yards of the group. Approaches would be made from behind or from the side of animals. Approach methods are designed to cause as little disturbance as possible, because it is in the best interest of the science not to disrupt the school or cause it to break into smaller groups.

Other activities that might occur concurrently with large vessel surveys include:

- aerial photogrammetry,
- photo-identification from small vessels,
- biological sampling from small vessels,
- tagging from small vessels, and
- skin/blubber biopsy samples and photographs collected from the main vessel.

Tagging would be done by remote deployment methods. Biopsy samples would be obtained from tagged animals when possible.

Small vessels would be used in conjunction with large vessels or for dedicated local surveys. Approaches would be conducted from behind animals in a manner that minimizes boat noise, does not involve sudden changes in speed or course, and does not greatly exceed the animal's travel speed. Time spent in the vicinity of target animals, as well as the number of attempts made to collect photographs or biopsy samples or to deploy tags, would be limited in order to minimize any harassment or disturbance from the presence of the small boat or the activities. Small vessel surveys conducted by NMML would occur year-round or seasonally, depending on data collection needs.

**Photo-identification and Observations**

Photo-id would be primarily conducted from small boats (e.g., rigid-hull inflatables or small boat with an outboard engine) either on an opportunistic basis during large vessel surveys, or during coastal small boat surveys. An individual animal may be photographed multiple times within a given survey period to document residency, and would be targeted at least once each year if seen to provide an additional dataset for capture-recapture abundance estimates. Because NMML conducts surveys in many different locations in a given year, it is possible that an individual could be re-encountered and photographed multiple times in a given year.

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) and document behavioral observations. Distance for optimal approach varies with the species being photographed. Generally, large whales would be approached within 15-20 m. Smaller animals, such as delphinids, would be approached within 5-10 m. If the opportunity arises, females accompanied by calves would be approached for photo-identification, but as a condition of the permit efforts would cease immediately if there is any evidence that the activity may be interfering with pair bonding, nursing, reproduction, feeding or other vital functions.

**Collection of Feces, Sloughed Skin, and Remains for Predation Studies**

Feces and sloughed skin would be collected opportunistically with dipnets during field work. This sampling would only have the potential to result in take by Level B harassment if a large cetacean is within 100 yards or a small cetacean is within 50 yards of the vessel during collection. Cetacean remains would be collected opportunistically during vessel surveys for studies of predatory whales such as killer whales preying on other cetaceans. NMML would do take care to avoid disrupting any predation or feeding behaviors witnessed.

### Underwater Photography and Observations

Observations would be conducted from large vessels, from small boats or by underwater observations, either using snorkel gear for directed underwater observations or by using underwater cameras lowered over the side of a vessel.

In conjunction with vessel surveys and photo-identification, as described above, Level A harassment would occur during biopsy sampling, tagging, captures and procedures conducted upon capture.

### Biopsy Sampling

Biopsy sampling would be conducted in conjunction with photo-identification surveys and tagging projects and during dedicated biopsy projects. Biopsies may be collected from both sexes, all ages except neonates, and any reproductive status. Samples may be collected from individuals as many as four times throughout the course of the year for studies that involve distribution, prey choices, reproductive status, health and condition. Mothers as well as calves would be sampled if there is no adverse reaction to the approach of the small vessel. For North Pacific right whales (*Eubalaena japonica*), NMML would sample calves only in feeding areas. In such areas, any right whale calf would have migrated from a winter calving ground and would be well past the neonatal stage.

It is difficult to determine the age of a cetacean calf visually. However, NMML would base the age of a calf of a migratory species such as large whales by three observable age classes:

- Neonate, determined by a certain set of cues such as fetal folds, dorsal fin shape and behavioral cues such as very short dive times (see additional description below)
- Young calves, pre-migration
- Older calves, post migration.

Once a whale is past the calf stage (one year or older), it is impossible to determine the age of a whale strictly by observation. While in the field, if the applicant sees a small (non-calf) whale closely associated with a known female, researchers may note that it could be her yearling based on skin coloration and/or certain behaviors, but this cannot be confirmed without some other corroborating data such as photo-ID or genetics data (e.g., Valsecchi et al. 2002).

Sampling non-neonate calves would allow for:

- development of a genetic catalog of known age whales as the calves are re-sampled as juveniles and adults;
- determination of sex, diet, nutritional status, and levels of pollutants in the blubber;
- determination of paternity and reproductive success of individual males and in the long term provide an independent measure of reproductive success for an individual female; and
- refined determination of stock separation or mixing.

In addition, biopsy samples of mothers and calves would allow NMML to estimate contaminant load and contaminant transfer from mother to offspring.

When possible, detailed records of dorsal fins or fluke photographs would be maintained to reduce the likelihood of biopsying the same individual whale more than once within a given survey, and aid in re-sampling individuals across surveys during different times of year or in different regions. NMML's goal is to sample each individual up to four times per year, except for North Pacific right whale calves, which would be sampled no more than one time per year. Four takes per animal are to account for missed attempts which count as "takes" and to assess seasonal shifts in prey preference.

Skin and blubber samples would be collected using a projectile dart. Projectile biopsies would be collected using a crossbow, adjustable-pressure modified air-gun, black powder gun, or pole. During any single encounter, no more than three biopsy sample attempts per individual would be made. Animals would rarely be targeted for biopsy more than twice during an encounter.

One of a suite of generally accepted biopsy methods would be used. For bowriding small cetaceans, an airgun (Barrett-Lennard et al. 1996, Krützen et al. 2002) or a pole-spear may be used, similar to that used by NMFS Southeast Fisheries Science Center. For large and medium-sized cetaceans biopsied from large vessels, a Larsen gun (Larsen 1998), crossbow, or airgun may be used. For cetaceans biopsied from small vessels, a crossbow or airgun would be used. The Larsen gun is a modified .38 caliber rifle which fires .38 caliber blanks; the expanding gases propel a biopsy dart with an attached float. It is equipped with a gas port to allow adjustment of dart velocity. The dart is the same type as is used with the crossbow, only shorter -- 8" long with a 1" diameter float.

Typically, the area just below and behind the dorsal fin would be targeted, staying well away from the face of the animal. The dart hits the animal and bounces off, floating in the location of where the animal was shot. The biopsy sample in the dart can then be retrieved while the animal moves away from the area. For small cetaceans, the biopsy dart would be approximately 25 mm in length and for large cetaceans, the biopsy dart would be 40-60 mm in length.

Samples may be frozen or stored in 70% ethanol or 5 M NaCl with 20% DMSO (Hoelzel and Amos 1988) or equivalent. Biopsy dart tips would be thoroughly cleaned between sampling events and sterilized by immersion in 70% ethanol or equivalent sterilizing technique.

**Tagging**

Whales and dolphins would be tagged using a suite of attachment methods to investigate movements and habitat use to obtain scientific information that will be used to support management and conservation actions.

A variety of transmitters and attachments would be used depending on the objectives of the study and the species of interest. Tag deployments have 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. The instrument packages designed for deployment on cetaceans may be a:

- partially or fully implanted cylinder or rectangular shape with the attachment mechanism built on to the tag,
- tag package mounted on the end of an implanted attachment dart or tethered to an implanted dart or toggle, or
- tag package mounted on or tethered to suction cups, or tags attached by cables to implanted pins, anchors or toggles.

Dimensions and weights of tags described below are examples and as tag technology improves, over the course of the permit, smaller and/or lighter tags may be used. Tagging equipment is constantly being improved in terms of size and weight, and NMML continues to update its tagging equipment as newer models become available. Careful consideration of the primary research objective would be given before finalizing the tag package and deployment system to ensure that the smallest, lightest package is deployed to reduce drag, increase retention time and have the least impact on the cetacean.

Beluga whales (all stocks) would be authorized for suction-cup tag attachments only during vessel surveys. For North Atlantic humpback whales, only juveniles and adults would be tagged. For all other cetacean species, any animal older than a neonate could be suction-cup tagged. However, invasive tag attachments would only be authorized for juvenile and adult animals.

Tag Units

A variety of tag designs would be employed, depending on the primary research question being addressed. A description of each type of unit follows.

*Radio tags* These tags allow real-time tracking of individual whales and provide information on dive patterns, which is used to estimate correction factors for aerial and vessel survey based abundance estimates. The radio tag would consist of a radio transmitter and an antenna. The transmitter would operate at 144-9 MHz with a 10-50 millisecond pulse and 50-200 pulses/minute. The tags would be at most 10 cm x 3 cm x 3 cm with a 10-50 cm transmitting antenna. The tag with antenna would weigh at most 100 g. A typical tag attachment would occur with suction cups or implanted darts.

The *time-depth-recorder (TDR) tag* package is a recoverable unit that provides more detailed data on dive behavior, recording water temperature, depth, and time at one-second intervals. To allow retrieval of the package for data recovery, floatation material, a release device and a recovery or "homing" beacon are incorporated into the package. The TDR provides a profile of the diving activity (e.g., position in the water column, dive depth, ascent/descent rates) of the animal. Time and depth are recorded by a time interval specified by the user. The TDR to be used may be an MK-9 or MK-10, built by Wildlife Computers, or the equivalent. The current model measures 9.5 cm x 2.5 cm x 1.3 cm and weighs 42 g, not including the flotation part of the tag. This consists of a 3.5 V battery, VHF radio transmitter, and sensors for velocity, light levels, temperature, and depth. With half a megabyte of memory, the TDR is not duty cycled and senses depth every second. A flotation unit is attached to the TDR along with a suction cup. A typical tag attachment would occur with suction cups or implantable darts.

The TDR, recovery beacon, and release device would be encased within or attached to a non-compressible foam or plastic floatation system. A typical housing would consist of a mixture of glass microspheres and polyethylene resin such that the whole tag package is durable, lightweight and buoyant.

The acoustic-TDR tag package is a recoverable unit that includes an acoustic recording device with the TDR described above (same size and weight). The acoustic recorder includes a hydrophone and a recording system and samples and records the acoustic environment in the vicinity of the animal including sounds that the animal produces. The acoustic recorder is similar in size to the TDR and is packaged together with it. Similarly, the digital 3-D motion tag (DTAG) may also be used. This tag records sound and 3-D animal movement, providing a high level of detail on diving and foraging behaviors. A flotation unit would be attached to tags as described above.

*Satellite tags* would be used to collect data on longer-term movements of animals as well as dive time and depth data. They could include location-only satellite transmitters (e.g., the SPOT5 electronics of Wildlife Computers) or data-collection transmitters (e.g., the SPLASH/Mk10A tags from Wildlife Computers) which obtain light level, temperature and dividing information in addition to location. Current technology uses the ARGOS system to retrieve transmissions from the tags and determine location. In the future, GPS tags may be used that actually calculate the location onboard the tag, and transmit precise locations. The tags would contain a small computer, batteries, sensors and a transmitter with antenna all incased in a hard epoxy resin block or sealed in a metal tube and may be further housed in a non-compressible foam structure. Data are collected and summarized by the computer and then transmitted to the satellite when the whale surfaces and the tag is exposed. The largest current implantable satellite tag measures 14 cm x 9 cm x 3 cm and weighs 450 g (models SDR-T15, ST-16, Telonics, Arizona and SPOT tags, Wildlife Computers). Smaller satellite "dart" tags would be held externally on the body of the whale by implanted barbed darts. These tags would be much smaller than the implantable tags (e.g., 63 mm x 30 mm x 19 mm, weight 40 gram, Andrews et al. 2008). If a comparable tag that is smaller and lighter is available by the start of any tagging activities, it could be used instead. The tag may be attached or tethered to the end of a dart, where only the dart is implanted. Alternatively, satellite tags may be packaged in an epoxy cylinder, where the entire cylinder or only part of the cylinder is imbedded in the whale's flank.

*"Critter-Cam"* is a recoverable unit that includes an underwater video camera and may include an acoustic recording device and a TDR described above. The critter-cam is designed to videotape the area in front of the animal and is typically placed to the side and behind the blowhole. The current models measure 30 cm x 8 cm x 8 cm and weigh less than 1,000 g, including the flotation part of the tag. A flotation unit would be attached to the combined as described under the TDR section. Tag attachment would occur with suction cups be timed to last less than eight hours, or a dart anchor and release mechanism.

*Other tag options:* As research needs evolve, the instrument packages deployed may 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 of the unit would be no 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 sought.

Attachment Mechanism

Animals would be tagged remotely when they approach the vessel or other platform on their own (passive approach) or during directed approaches made by an appropriate research vessel (active approach). Animals may have more than one tag attached but no more than two would be attached by techniques that pierce the skin (e.g., a recoverable tag that stays on for 30 days and a satellite tag intended to last a year may be attached to the same animal) to collect different data. In general, NMML would try to combine instruments into one or two tag packages. However, it may be necessary to have three separate tags on a whale in some rare cases such as to monitor and evaluate the effectiveness of tag designs.

At least five types of remotely deployed tag and transmitter packages would be used:

- Suction cup tags (not invasive),
- Dermally-attached short-term (aka DASH) tag (partially implantable),
- Implantable satellite tag (fully implantable),
- Dorsal fin (aka DART) tags (partially implantable), and
- Data-collecting tags (partially implantable).

Tags would be attached by:

- flaps, vanes or flanges that fold flat against the tag or a dart shaft as it is inserted through the skin into the blubber that then spread out and braces against the inner surface of the skin to prevent subsequent removal;
- toggles , a cylinder or bar which is inserted endwise through the skin then turns parallel to the skin spanning the insertion hole and becomes lodged against the underside of the skin to prevent removal; or
- suction cups attached to the surface of the skin.

*Suction cup tags*

These tags are non-invasive and would be used for short-term studies of cetacean movements and profiles (Figure 1). Suction cup tags consist of the actual cup itself and an attach point for the instrument package. The cup is typically formed from rubber or silicon rubber. Suction cups may be as small as 3 cm in diameter or as large as 30 cm in diameter depending on the size if the instrument package. Two or more smaller suction cups may also be used in place of a single large suction cup. Suction would be generated passively when the cup hits the whale or actively using a vacuum system or Venturi device or by a system of one way valves as the whale dives and returns to the surface. Typically suction cups eventually break suction and fall off. In larger suction cups or suction cup systems that are designed to stay on longer than a few days, a release valve and mechanism would be incorporated to break the suction. The instrument package may be attached directly to the suction cup or may be attached to the cup by a hinge point, ball joint, universal joint, or flexible or elastic cables or straps, or may sit on a platform attached to one or

more suction cups. The suction cup may be lubricated with silicon grease or other non-reactive substance to improve the seal between cup and skin.

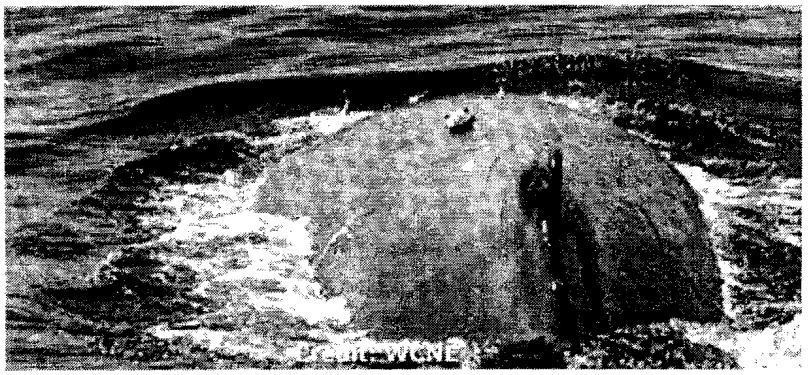

Figure 1. Example of a suction cup tag. Exact configuration may vary.

*Dermally-attached short-term (aka DASH) tag*

In cases where whales are difficult to approach at close range for attachment of a suction cup tag because of evasive behavior or rough sea conditions, or if the whales' skin conditions preclude reliable attachment of a suction cup (i.e., extremely rough skin), or if the study requires attachment durations longer than typical suction cup attachments can reliably provide (several hours), a small dermal anchor would be used to attach a recoverable archival tag to the whales. The tag would usually consist of the same components as suction cup tags (see Figure 2).

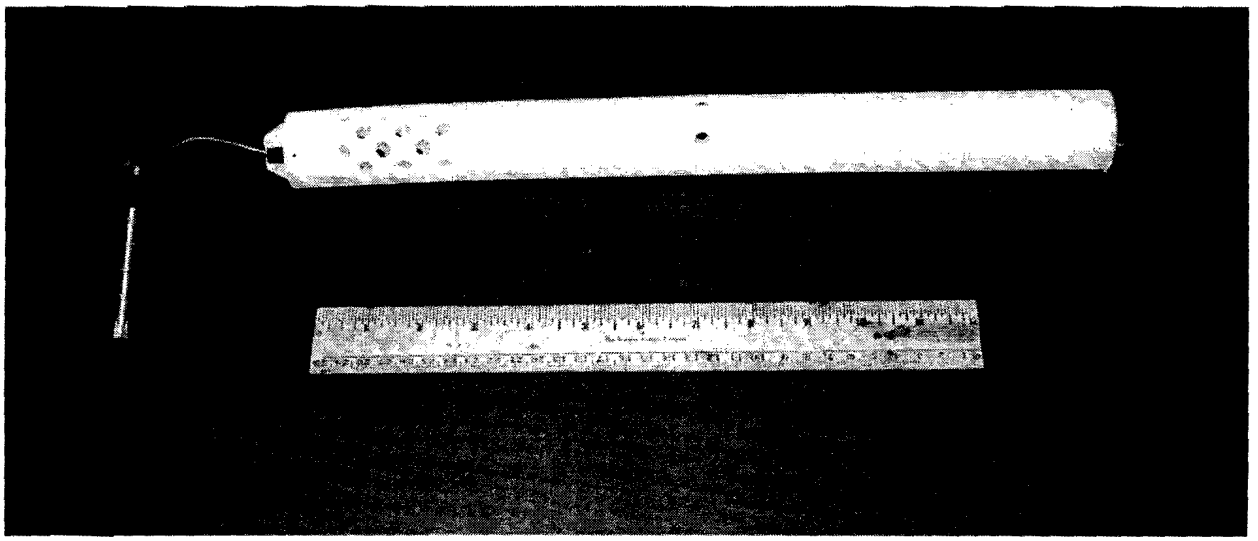

Figure 2. Example of a DASH tag. Exact configuration may vary.

The dermal attachment consists of a solid-core needle less than 10 cm long and 6.4 mm in diameter. The needle has raised rings 1-2 mm from the shank or pins attached to the shank to prevent early detachment. Like the needle itself, the pins are made of surgical-grade stainless steel. The needle has a robust "stop" attached to it to limit the depth of penetration; the needle is designed to only anchor in the epidermis and blubber. The needle is attached to the tag housing using a severable tether that allows a controlled separation of the recoverable tag from the implanted needle. The mechanism of separation is a corrosive weak link at the point where the

tether inserts into the tag housing. Current tags consist of an acoustic transmitter (Vemco), a TDR (Lotek), a radio transmitter (Telonics), and polymer foam floatation housed in a 35 mm diameter polyethylene pipe. The pipe is flooded to allow accurate depth sensing by the TDR and effective acoustic transmission from the acoustic transmitter. The total tag weight is generally less than 350 g. The tag is designed to be a contiguous projectile when fired at the whale, but after attachment, the tag housing would disconnect from the needle such that it is free to float parallel to the whale's skin while still attached to the needle by the severable wire. After a specified period of time, the corrosive link would corrode sufficiently to allow detachment of the tag from the tether. The tag would float to the surface and be recovered. The needle would remain implanted for a few days to weeks before being rejected by the whale.

The proposed dermal attachment is similar in design to the tag described by Goodyear (1993), but with a few important differences. Goodyear (1993) used a 7 mm diameter, 6.5 cm long, stainless steel pointed anchor with four 2 cm long stiff tines to prevent the anchor from backing out of the skin. The proposed anchor would be of similar length and diameter, but NMML would avoid the use of steel tines. It is unclear if steel tines actually prolong attachment, or if the tines facilitate detachment of the anchor by cutting, thus weakening, the surrounding skin that is acting to hold the anchor in place. A ringed needle design may provide sufficient holding power by keeping neighboring skin intact. It is also assumed that less disruption to the surrounding skin will create a smaller wound and would speed healing once the needle is rejected. The needle point would be carefully designed with tapered cutting edges that create a clean opening that is slightly smaller than the diameter of the needle; this narrow hole should allow a tight fit between the needle and the surrounding tissue. The cutting edges also would be required to prevent epidermal cells and surface contaminants from being dragged into the dermis and potentially causing infection. The initial design would be based on a miniaturized version of the projectile point used by Bill Watkins (WHOI) for radio tag deployments (Watkins 1979).

The tag and dermal attachment would be fired from the Air Rocket Transmitter System (ARTS; see p. 26 for details), which uses compressed air as a propellant. The pressure in the ARTS can be varied to allow control over the implantation force. The deployment range for this system is 10-25 m (i.e., the distance between the tagging vessel and whale). Unlike satellite tags that need to be deployed at short ranges to insure implantation high on the back, the archival tag can be attached anywhere on the back. Deployment would be from 1 m posterior of the blowholes to 1-2 m anterior of the peduncle above the water line. Tags would never be attached on the head, flippers, or flukes.

*Implantable satellite tag*

Implantable tags partially or fully penetrate the body of the animal and are designed to anchor in the fascia between muscle and blubber (Figure 3). Therefore, the total length of these tags (the transmitter plus attachment system) varies according to the target species. Dimensions of implantable transmitters vary. The minimum size and weight of the body of the tag in existing models would b 78 mm (diameter) x 20 mm (width) x 10 mm (depth) and 77 grams, respectively. This small implantable tag would be flat. Larger tag types can measure 116-167 mm in length and 20-25 mm in width (or diameter in the case of cylindrical housings) and weigh as many as 130-200 grams (e.g., Wildlife Computers Mold 177).

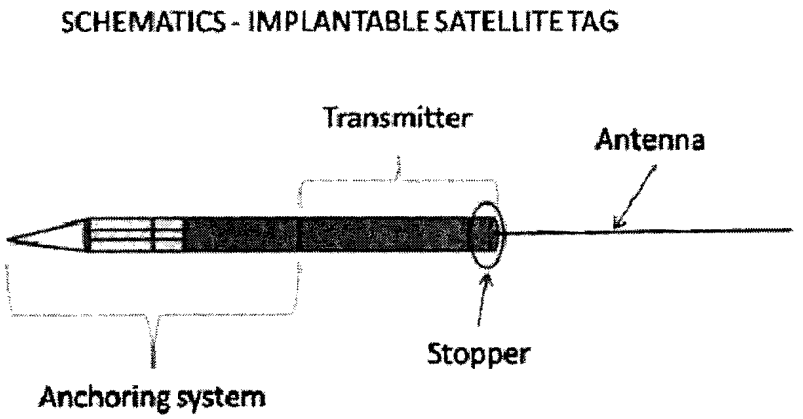

Figure 3: Example of an implantable satellite tag.

Transmitters would have a steel wire rope antenna attached to the body, which can measure up to 200 mm. For cylindrical tags, stoppers can have a diameter of up to 38 mm. The housing of implantable transmitters can be equipped with stoppers in the form of stop plates or studs. Stoppers are used to prevent (1) full penetration of the tag upon deployment or (2) post-deployment migration of the tag inside the whale. The battery and electronic components of implantable transmitters are held inside a stainless steel tube or box, which cover almost the whole extension of the transmitter. Only the posterior end where the salt water switch is located, would remain exposed. This portion of the tag would not penetrate the body of the whale. The stainless steel housing can potentially be coated with or inserted in a sleeve made with ultra high molecular weight surgical material to minimize tissue rejection of implantable components of the transmitter.

Implantable transmitters are usually equipped with a single attachment dart. The dart is composed by a cylindrical or rectangular rod with needle or arrow-shaped (bladed) tips and multiple sets of retention barbs or toggles. The rod would be 20-180 mm in length, including the tip, depending on the type of transmitter used. The diameter would vary according to the placement, size and shape of the tips and retention barbs/toggles, but usually ranges from 8 to 20 mm. The number of barb/toggle sets would range from one (shorter attachment systems) to three (longer systems) and the length of the barbs from 35 to 70 mm. Stainless steel or titanium barbs and toggles would deploy immediately after the tag is attached to the body of the whale by opening outwards and anchoring in the adjacent tissue. The total length of implantable tags (the transmitter plus attachment system) would be a maximum of 300 mm. Maximum depth of penetration varies by species and is always less than the full size of the tag due to the presence of stoppers on the body of the transmitter. For medium sized cetaceans (e.g., killer whales) maximum depth of penetration is about 100 mm, while for larger whales (e.g., humpback, right or bowhead whales, *Balaena mysticetus*) maximum depth of penetration could reach up to 290 mm. Maximum weight ranges from 300-350 grams depending on exact design. Tags could remain attached for hundreds of days.

Attachment systems used for implantable tags can also be adapted for deployment of the larger types of external tags. In such cases, the attachment rod would be longer (up to 290 mm), but the shape of the tip, number and dimensions of the retention barbs and toggles would remain

unchanged.

*"Dorsal fin" (aka Dart) tags*

Recent advances in component miniaturization and battery construction have allowed production of external satellite tags that are extremely small and are held in place by small barbed-darts that attach to subcutaneous tissue (Andrews et al. 2005) (Figure 4).

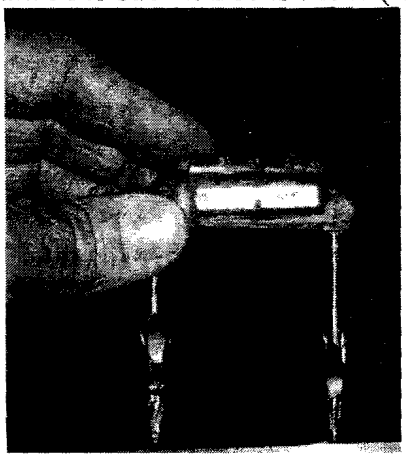

Figure 4. Example of a Dart tag.

NMML would deploy these tags on killer whales, other medium-sized cetaceans and large whales. Small implant dart-tags would be implanted into the dorsal fin, or dorsal surface of the animal, in order to minimize water resistance in an attempt to increase tag longevity. The design would be based on the small flat-implant tags developed for use on Pacific walrus (Jay et al. 2006) and would be smaller and lighter than fully implantable tags. "Dorsal fin", or "dart", tags are usually PTT (Platform Transmitter Terminal)-only transmitters. Housing for the electronic components measures 63 mm x 30 mm x 19 mm, weighs 40 grams and is made in neutral epoxy material. Tags would be attached with one or two stainless steel or titanium barbed darts. Darts would measure 65 to 100 mm in length and retention barbs would be 20 mm long. Total tag weight would not exceed 70 grams depending on the type of attachment system used. Exact dimensions would evolve to maximize retention time and reduce size and drag.

Dart-tags would be attached using an adjustable-pressure modified air-gun or crossbow. The tag antenna would be inserted into the hollow shaft of a projectile bolt; and on contact with whale this dart would fall away from the whale and be retrieved by a tether line, leaving only the transmitter attached to the whale.

*Data-collecting tags*

Data-collecting tags (e.g., Wildlife Computer models SPLASH or Mk10 or equivalent) can provide diving information in addition to location data. Unlike the implantable versions (see section above), the partially implantable data-collecting transmitter remains outside of the body of the whale. Data collecting tags are used to describe habitat use and diving behavior of cetaceans.

Data-collecting transmitter standard dimensions and weight are approximately 78 mm x 50 mm x 25 mm and 180 grams, respectively. Housing is made in neutral epoxy material similar to that used for "DART" tags and may or may not include external stainless steel housings. For use

with baleen whales, the anchoring systems of these tags would be similar in shape to those used in implantable tags. However, maximum anchor length is slightly greater (maximum of 290 mm) to compensate for the fact that, unlike the implantable versions, the data-collecting transmitter remains outside of the body of the whale.

New data-collecting fully implantable tags are in development. The dimensions and deployment methods for these tags would be consistent with those described above for the location-only, fully implantable tags. The maximum depth of penetration of data-collecting tags would vary by species and would be similar to those for implantable tags (e.g., up to a maximum of 290 mm for large baleen whales). Total weight of the tag, including the transmitter and the attachment system would be 300-400 grams.

**Remote Tag Deployment**

*Approach*
A vessel or other floating or fixed platform would be placed, anchored or allowed to drift in the anticipated path of the target species. Where opportunity allows, an existing natural or manmade platform or shore feature may be used. Ideally the platform would be established prior to the arrival of the target species, however, if the target species or other cetaceans are present, the location for the platform would be approached at moderate speed and the platform would be established by anchoring or drifting with engines off at no less than 100 meters or 10 body lengths from the target species. Platforms would not be placed in locations where they would inhibit the free movement of or cause avoidance by cetaceans or prevent the departure of a cetacean from an enclosed area such as a small bay or harbor. Tags would be deployed with a crossbow, gun, or pole.

The tag is deployed either as a projectile using a bow, crossbow, gun, spear gun, slingshot or throwing device, or using a pole or jab stick. For satellite transmitters and tags with radio transmitters, the preferred location for tag placement is on the whale's dorsal fin or the whale's anterior dorsal surface, near or slightly below the mid-line and in the middle third from snout to fluke. Positioning the satellite tag high on the whale's back is important to ensure the tag is above water when the whale surfaces and has a good sky exposure for transmissions to the satellites. Radio transmitters cannot transmit through salt water so tags with these transmitters placed high on the back of a whale would give a longer signal for tracking. Other tags such as acoustic tags or "critter cam" tags would be placed on other parts of the whale but placed in such a way that the impairment of the whale is minimized. In particular, the areas of the blowhole, eyes, mouth, genitals, flippers and flukes would be avoided.

*Tag Release*
A release device may be incorporated in the tag package to ensure release from the whales and/or enable recovery of the device. The most common usage is with TDR tags where the tag must be recovered to download the data that has been collected. The tag release device may be active, such as a radio-activated or acoustic-activated release, or passive such as a corrodible link, nut or in the case of a suction cup attachment a corrodible or dissolving cap, plug or valve cover to break suction, or just waiting for the cup to lose suction. A typical 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 or uses electricity to rapidly corrode the link. A VHF radio signal would activate the device. Acoustic-activated releases are similar but are activated by an acoustic signal. Corrodible magnesium links or other dissolving release mechanisms also may be included. The passive devices can be calibrated for attachment periods from a few hours to over a week. Once the tag is released from its attachment, a recovery beacon on the tag would be activated to indicate the location of the tag. The recovery beacon may include one or more of a radio transmitter, acoustic device, and visual light. Once the tag package is recovered, the data would be retrieved.

Current dart designs do not include a release to allow the dart to fall off of the whale. A release may be included between the dart and the instrument package, so that the package falls off and the dart remains. The dart tip with or without the instrument package would remain in the whale to be eventually discharged from the body. NMML intends to develop an attachment system that would remain attached through an annual cycle and would necessarily include a release mechanism to insure that the tag did not remain permanently attached.

Tagging pole: The tagging pole is generally an 8 m long carbon fiber pole (modified windsurf masts) used to deploy tags at distances ranging from 3-6 m from the whale. The tag is connected to a plastic tube located at the end of the pole. The whale would be approached and the tag pushed in the body of the whale by the tagger. The pole also has a biopsy tip, which would collect tissue samples when the tag is deployed. Satellite transmitters are usually placed in the mid-posterior portion of the whale's body (e.g., usually near or just behind the dorsal fin).

Air Rocket Transmitter System (ARTS): The ARTS is a modified marine safety line thrower powered by compressed air and developed for remote deployment of satellite tags (Heide-Jørgensen et al. 2001). With this method, the tag slides into a PVC delivery rocket, which would be fired with the ARTS at pressures typically ranging from 8-15 bars. The rocket would detach from the tag upon impact and can be retrieved and re-used. This technique provides deployment ranges much greater than the tagging pole; typically 10 m but deployments for up to 30 m have occurred. The ARTS is equipped with a red-dot laser aim to improve precision. Time spent with whales before tagging, usually ranging from 5 to 30 minutes, is less than if the tagging pole was used. The use of the ARTS also allows deployment of satellite tags in other areas of the body (e.g., the mid to anterior dorsum), which are more difficult to reach with a tagging pole.

Crossbow: Tags would be projected on the end of a crossbow bolt and fired from a crossbow. The tag antenna would be inserted into the hollow shaft of a bolt. On contact with a whale, this dart would fall away and be retrieved by a tether line, leaving only the transmitter attached to the whale. In general, crossbow tag deployment distances are generally 5-10 m.

Larsen gun: Tags may also be attached to (projected on) a crossbow bolt and fired using the adjustable pressure, black-powder Larsen gun. The bolt would be fired from the barrel of the gun, with the tag held outside the forward end of the barrel. The crossbow bolt would be tethered, just as when using a crossbow. In general, Larsen gun tag deployments distances are greater than for other tag deployment methods, usually greater than 10 m and up to 25-30 m.

**Captures and Associated Activities**

Non-listed stocks of Dall's porpoise (*Phocoenoides dalli*), harbor porpoise (*Phocoena phocoena*) and beluga whales may be captured for attachment of satellite and/or VHF telemetry tags, for health assessments, behavioral studies, and telemetry studies. Only adult and juvenile animals would be targeted for capture. All captured animals would be released after examination and work up. Captured females which are thought to be pregnant would be monitored for signs of stress. Obviously pregnant females would not be tagged. Based on guidance from NMFS' veterinarians, the permit would also include conditions limiting the suite of activities that could be performed on pregnant females based on the animal's trimester to minimize harm and harassment. Additional width and depth of support media, such as slings, and holding areas would be used as necessary to accommodate the increased abdominal girth and minimize pressure on the abdomen. Females with calves would be avoided and released immediately if accidentally captured. In the case of belugas, skin scrapings would be collected during release to allow genetic identification.

Approach for Capture

Methods of active approach towards the target species would vary according to the behavioral responses of the species to vessel approach, location and the circumstances and requirements of the research project. An active approach may include any or all of the following steps:

- determining location of target animals or group;
- pursuit and tracking;
- close approach;
- tag deployment; and
- behavioral observation or biological sampling.

Standard aerial, vessel, visual or acoustic survey techniques, or opportunistic encounters would be used to locate target animals. Once the target animals are located, the pursuit would begin with one of two possible goals; either to drive the animal toward a passive tagging platform where the tag attachment would follow the passive approach or prepare the animal for tracking by the tagging vessel.

Capture Method

- Gillnets (harbor porpoise)

  Harbor porpoises would be captured using a drift gill net not more than 200 m long and 5 m deep. The gillnet would be set as a drift net with the float line at the surface and the lead line along the bottom of the 30 foot deep net. The net would be deployed in waters exceeding 30 feet in depth so as not to become entangled on the bottom. Neither the float line nor lead line would be anchored. Should the net drift into shallower water, it would be towed to or raised and redeployed in deeper water. Net soak times usually would not exceed 90 minutes but could be up to four hours in areas used by harbor porpoise.

  A minimum of four boats (2 small inflatable boats mid-net, a net/deployment recovery boat at one end, and crew and small inflatable transport boat at the opposite end) would monitor the

net and wait for a harbor porpoise to become entangled. Researchers would closely watch for animals in the vicinity of the net noting their travel trajectory as this provides a good warning of a potential capture. The float line and visible portion of the net would be continuously monitored visually for disturbance including movements, bunching or sinking of the cork line. If a suspicious irregularity in the cork line is noted, that area would be raised for inspection. Standard practice for these captures includes a vessel on each end of the net and one stationed near the center. Two persons are on board each boat and constantly monitor the net and approximately 200-300 m surrounding the net.

When an entanglement occurs the two inflatable boats would approach the animal and support it from either side. The transport boat would assist the two inflatable boats supporting the animal. The net boat would retrieve the net to avoid capturing additional animals. If more than one harbor porpoise is captured at once, only one would be retained for tagging and the others would be released as quickly as possible. The one to be retained would be the one with the lower stress level and better condition. If the captured porpoises appear to be a mother and calf, then both would be released.

After capture, harbor porpoises would be moved onto a floating mat or partially inflated inflatable boat and monitored for signs of stress. For porpoise captures, the time from capture to release would be limited to 60 minutes.

- Breakaway hoopnet (Dall's porpoise)

  Dall's porpoises would be captured while bowriding in the same manner as previously authorized under Permit No. 782-1349 using a breakaway hoop net similar in design to those previously used on other small cetaceans (Ridgway 1966; Asper 1975; Walker 1975). A small vessel (approximately 8 m) would be maneuvered at a slow speed (less than 10 knots) into the general area (within approximately 50 m) of a group of animals. If any of the animals begin rooster-tailing, although not necessarily toward the boat, this indicates a potential interest in bowriding. The vessel would move away from groups if all the animals swim slowly away from the boat or no approach is made by any group members after three passes in their vicinity. For groups that bowride, the duration that a group of animals remains continuously with the boat may vary considerably, but in many cases the animals will return to bowride if the boat's previous course is retraced. If animals do not return to bowride after three passes the vessel would move away from that group.

  After Dall's porpoise have been hoop-netted, they would be approached via the retrieval line attached to the net. They would be maneuvered into a sling, which is supported on each side by two small boats, similar to the porpoise chute system successfully used on Eastern Tropical Pacific (ETP) dolphins (Perrin et al. 1979; NMML, unpublished data). The sling would be partially raised out of the water while procedures are performed. For porpoise captures, the time from capture to release would be limited to 60 minutes.

- Beluga whale captures

  For beluga whale captures, it may be necessary to pursue the whale for a period of time to tire it out so that it can be easily tracked and approached for tagging. A typical pursuit occurs as follows: a target whale would be singled out from the group and two to six small

boats (including 4 to 16 people) would move toward the whale until it dives or swims rapidly away. During a dive, the boats would spread out to search for the next surfacing location. When the whale is re-sighted, the pursuit would continue. The boats would follow at a safe distance so that they would keep the whale moving in a relatively straight path and not overrun it should it stop or double back. The pursuit would be continued until the animal slows and swims in a predictable pattern so that it is possible to track either alongside or directly behind (within 5-10 m) the whale. Once the boats are tracking the whale and the attachment team has determined that the animal is a candidate for tagging, one of the capture methods described below would commence or the tagging boat would move into position and deploy a tag remotely without capture as described earlier. Remote deployment tags would only be deployed when the whale is positioned relative to the boat and when the whale remains at the surface long enough to place the tag in a good position.

Capture methods would include:

- chasing and capturing individual whales by placing a hoop net over the head and flippers;
- physically blocking one or more whales and forcing them to strand in shallow water;
- herding a whale into a net that is deployed across its path so that it becomes entangled;
- using a set net that is deployed so that whales swim into it and become entangled;
- encircling the whale with a net; and
- working with stranded or beached whales.

In some cases beluga may be captured and tagged in conjunction with a planned native harvest. To minimize impacts to the stocks, if a whale is inadvertently killed during a tagging project, native hunters in the field team would butcher and distribute the whale so the carcass does not go to waste.

If appropriate and deemed safer for the animal, a beluga may be transferred to a sling between two boats for tagging. Whenever a net is set in the water 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. A vet would be present during all beluga captures.

Beluga whales may be captured using a 100 – 300 m long net, 5 m deep with 50 – 70 cm mesh deployed from a 5 – 7 m boat. One or two other boats would herd the target whale into shallow water 1.5 m deep or less, and the net boat would set the net between the beluga and deeper water or in a circle around the beluga. After the net is set, the other boats would prevent the beluga from escaping around the ends of the net.

Once a whale is entangled, it would be approached by a soft sided boat, either an inflatable or rigid hull inflatable at low speed. The engine would be shut off and raised out of the water when the boat is within 3 m of the whale. The net would be gathered and used to pull the boat alongside the whale and the head and fluke are located. A tail rope would be

placed around the base of the peduncle. A tail rope, made of 2 m of 12-mm diameter rope threaded through a 1-m length of soft tubing and with knotless loops 15–20 cm in diameter at both ends, would be placed around the caudal peduncle. The rope end is placed through the loop on the end with tubing and drawn to cinch the tube-covered end around the tail. The tubing protects the tail from abrasion. Once the whale is secured to the boat by one or two tail ropes, a hoop net is placed around the whale's head and flippers.

The hoop net would be a 1.2-m diameter hoop of rebar or metal tubing wrapped in foam pipe insulation and duct tape (similar to Orr et al. 2001). The hoop would not be buoyant enough to float so that if the whale swims away with it, the hoop would fall off when the animal dives. Netting with a stretched mesh size of 40 mm would be attached to the hoop, cut to a length of 140 cm and sewn closed. With tail rope(s) and a hoop net in place, the capture team would remove the net. Once the net is removed the boat crew (separate from the group handling the whale) would quickly remove the set net from the water and stack it in a boat to insure that no other whales are captured in the net.

Each captured whale would be taken to shallow water by another boat towing the boat with the whale attached, or by members of the capture team wearing dry suits pulling the boat and whale into shallow water; slung between two boats using either a full length sling or two or more belly bands spaced along the length of the whale.

Slings and belly bands would have cutouts to go over the flippers. One of the belly bands would be set so that it supports the whale at the flipper girth to ensure that the blow hole remains above water. The whale would be placed on shore near the water line so that it is mostly supported by its own buoyancy or slung so that it is only partially supported. The beluga would be moved periodically to adjust for the tide so that the animal can be easily released when sampling and tagging is complete and to relieve any pressure points that cause discomfort.

Each animal would be carefully monitored by an experienced marine mammal veterinarian to assure an accurate assessment of condition. The heart rate, respiratory rate and quality, body temperature and behavior of each animal would be assessed continually while under restraint. Only one whale would be processed at a time. Total handling time would be kept to a minimum, preferably less than an hour. Sampling would be prioritized so that the highest priority samples would be scheduled early in the processing, and animals would be released prior to obtaining the full suite of samples if needed. Captured belugas would be released as quickly as possible, but no more than 120 minutes after capture. Every effort would be made to ensure the fitness of the tagged whales before release.

*Capturing and processing stranded or beached beluga whales*

If NMML encounters stranded or beached beluga whales, the NMFS Marine Mammal Stranding Network would be notified and NMML would coordinate with the Stranding Network personnel. All stranded beluga that can be approached would be sampled unless doing so would compromise the safety of the researcher or the animal. Condition of animals would vary and may include healthy animals, sick animals, very young animals, pregnant or nursing females. All age and sex classes of beluga whales are vulnerable to

tidal stranding. The belugas are usually stranded by receding tides and are typically refloated 4-12 hours later as the tide comes in. Belugas are well adapted to surviving stranding through a tidal cycle. Euthanasia would not be considered.

If beluga whales appear to be under stress, shade may be provided and water caches around flukes and flippers may be dug and filled if water is available. Beluga may become overheated and suffer sun damage to their skin while they are out of the water due to low tides. In this situation, they are at risk of being attacked by bears and sea gulls. Approach by humans may add to the stress level of the animal but at the same time may deter to some extent injury from other species.

In the event that all procedures cannot be done before the animal needs to be returned to the water, NMML would prioritize procedures as follows: photographs, morphometrics, skin sample, blood, swabs then other samples. If a large group strands, the whole group would be surveyed, numbered, photographed measured and skin biopsies would be collected. If time permitted, the field crew would then focus on a few animals for further sampling.

Associated Capture Activities: Measurements, Sampling and Tagging

During captures morphometric measurements, biological sampling, and tagging would occur. Samples would be handled according to standard laboratory protocols. Animals would be tagged for telemetry and behavior studies. Activities would be authorized for each species/stock as listed in Appendix A, Table 2. Activities, such as behavioral observations and collecting remains, listed in Table 2 that are not described below would be conducted in the same manner as described for Vessel Surveys.

- Measurements, Animal Information, Capture Data: The general location, the capture latitude/longitude, capture time, number of animals in the area, and weather would be recorded. Sex, color, and estimated age of each beluga would also be recorded. A series of standard morphometrics (length, fluke width, axillary girth, anterior dorsal ridge girth, posterior dorsal ridge girth, and maximum girth) would be obtained while the animal is restrained on the beach or in the water.

- Physical Examination: An experienced marine mammal veterinarian or crew member (for porpoise captures) would perform a complete physical examination on each animal. This would consist of a thorough external examination of the integument, eyes, blowhole, anogenital/mammary region, and postnuchal adipose tissue. Breath rate, excursion, and odor would be determined. Cardiopulmonary and abdominal auscultation would be performed. An oropharyngeal examination would evaluate dental health, tongue, gingival and oropharyngeal lymphoid tissue, and capillary refill time. Colonic temperature would be measured using a thermal probe. Vital parameters (temperature, heart rate, and respiration) would be recorded during initial assessment and at periodic intervals.

- Photographs: Photographs would be taken to document external appearance, scaring pattern, any lesion of note, and satellite tag attachment. Photographs would include each

flank, the dorsal and ventral surfaces of the flukes, the head, and the tag unit after attachment.

- Microbiologic and Cytologic Samples: Swab samples would be taken from the blowhole, gastric fluid (if obtained), and anus of each beluga for assessment of the bacterial and fungal populations and for cytologic evaluation. Sampling would follow previously established methods (Buck and Spotte 1986a, 1986b; Buck et al. 1988; Dunn et al. 2001). Sterile cotton-tipped swabs are inserted into the blowhole during a breath, gently moved along the wall of the blowhole, and removed during the next breath. The swab would be wrapped in aluminum foil, then placed in a labeled zip-lock plastic bag and stored with ice. A plain, sterile Petri dish (or similar collection device) would be held over the blow hole during an exhalation for collection of respiratory mucous and cells. Anal swabs would be collected by inserting a sterile swab into the anus. Swab samples would be placed in transport media in preparation for culturing and organism identification. Gastric and blow hole swabs would also be thinly smeared on clean histologic grade microscope slides and air-dried for cytologic evaluation.

- Venipuncture: A blood sample would be drawn typically from the dorsal surface of the flukes with the animal laying in ventral recumbency using 1"-2", 16 to 20 gauge needles with a syringe (10-20 ml) or with a vacutainer following thorough standard sanitary techniques--disinfection with an iodine solution and/or alcohol (Bossart et al. 2001). The fluke would be immobilized, a workable vein located, the area carefully swabbed with alcohol or equivalent, and the needle inserted. No more than two sites would be attempted with a total of four needle sticks. The fluke would not be immobilized for more than 10 minutes without a break of five minutes. Two primary types of samples will be collected: a sample containing EDTA for a complete blood count and a sample with serum separators for blood chemistry. Other types of samples may be taken as research indicates. No more than 500 ml of blood would be collected from a beluga whale and no more than 150 ml from a porpoise.

  The majority of the sampled blood volume would be taken as soon as possible following restraint. A smaller final blood sample would be obtained immediately prior to release to help assess the neuroendocrine stress response induced by the procedure(s). Blood would be stored in a cooler until further processing in town.

  Diagnostic ultrasound: Real time diagnostic ultrasound examinations would be conducted with the animal on the beach or upright in the water by a veterinarian experienced with cetacean ultrasound. The heart, liver, kidney, and reproductive organs would be examined. Additional sites (blubber or organs) of interest may be examined as time permits. The ultrasound instrument would be enclosed in a waterproof housing with a sound transmitting membrane over the transducer head when used on locations on the whale that are submerged.

  Adult females would be examined for pregnancy; pregnant females would be examined using the same safe handling protocols as for other age and sex classes. Ultrasound may be used to image a fetus or internal organs following standard veterinary practices. A

portable imaging ultrasound, such as a SonoSite Vet180plus (SonoSite Inc., Bothell, WA) with a 60-mm head-width transducer would be used to measure blubber thickness at up to 19 body locations to develop a whole body blubber volume model. Frequencies range from 2–18 MHz, which are several orders of magnitude above cetacean hearing range. Blubber distribution in cetaceans is species-specific, and in the beluga whale is highly variable (Doidge 1990). The dorsal region has the least within-species variability (Angell 2006). Ultrasound for blubber thickness would be taken from multiple standardized sites, including dorsal and lateral sites at the neck, axilla, posterior extent of the rib cage, mid-abdomen, and pelvis. For beluga whales, an ultrasound measurement of blubber depth would be obtained immediately prior to each blubber core collected at the site of the core.

- Skin/blubber biopsy

*Trochar technique* (for beluga whales only): Full thickness blubber and skin biopsies including muscle plugs would be obtained using a T-handle coring device (corer or trochar) which would either be 8-mm internal diameter stainless steel cylinder or a 7-mm square internal diameter stainless steel "U" channel with a closing fourth side which slides down to trap the liquid portion of the blubber sample. The site would be prepared with an antiseptic iodine or alcohol scrub. The corer would be inserted through the skin and pushed gently through the blubber until the muscle sheath is contacted. The maximum depth then would be marked on the corer and as it is withdrawn, the end would be capped and placed in an airtight bag.

*Needle and syringe technique* (for beluga whales only): The needle and syringe biopsy would use a large bore needle with a central solid core, similar to that used for spinal taps. The solid core increases the rigidity of the needle and ensures that only the target layer of the blubber is sampled. The site would be prepared with an antiseptic iodine or alcohol scrub before insertion of the needle. Once the needle is inserted to the desired depth, the core of the needle would be removed and a 2- ml sample of the liquid portion of the blubber would be drawn. The samples would be stored in the syringe and placed in a cooler for further processing. The syringe only would be used to sample blubber when a full depth trochar sample is not required.

Both methods described above may be done to the same animal. During captures two full depth biopsies would be taken for blubber calorimetry: one near the anterior terminus of the dorsal ridge and one may be collected near the dorsal ridge in the transition from the abdomen to the caudal peduncle. The two sites are necessary because the forward site varies little from season to season and acts as the control site while the aft sample is in a variable section and would reflect the recent nutritional status of the animal. Syringe samples may be collected from beluga whales independently or near the core sites for comparison. There is no information comparing the full core sample to a sample from a syringe to develop the syringe technique so researchers plan to draw paired samples (a full depth and an adjacent syringe sample) to develop comparisons.

In addition, samples remaining from the three skin/blubber cores obtained during creation of holes for the satellite tag attachment pins would also be retained and preserved. The cores from the tag attachment are a byproduct of the tagging process. They are oblique and do not sample all of the blubber layers uniformly.

Blubber would be analyzed for caloric content, fatty acid analysis, fat soluble contaminants, and hormones including reproductive and metabolic.

*Superficial lesion biopsy technique*: On visual inspection of the captured animal, researchers may wish to sample skin lesions as needed for diagnosis and assessment. Smaller, superficial biopsies (<15 mm depth) would be taken from cutaneous lesions considered potentially significant by the field veterinary staff. The tool is a sterile, single use tool with a corer of less than 8 mm internal diameter and a depth of typically 4 to 10 mm several of these would be carried with the veterinary supplies and the choice of the diameter and depth would be determined at the discretion of the project leader. For beluga whales, up to eight lesions per animal may be photographed and biopsied using a short (<15mm) biopsy tool. For porpoises, only one biopsy sample would be taken per animal and may be taken from healthy skin rather than a lesion.

*Processing*: Biopsies would be stored whole or divided into epidermis and blubber portions. Blubber may be further divided, placed in Teflon, aluminum foil, or plastic containers, and stored at an appropriately low temperature (in a standard freezer, on dry ice, in a liquid nitrogen dry shipper). The skin may be further divided and portions placed in 20% dimethyl sulfoxide (DMSO) for genetic analysis and frozen for contaminant biomarker assays. The remaining skin portions may be placed in 10% buffered formalin for histologic evaluation.

- Muscle biopsy (for beluga whales only): Samples would be collected either as the end plug in a full depth blubber biopsy or using a long biopsy needle. When a needle is to be used the muscle would be examined using ultrasound to determine the appropriate depth and location for the sample. A needle of the appropriate length would be chosen and inserted to the predetermined depth and the sample collected. Samples would be collected from the dorsal large longitudinal muscle. No drugs would be used. The wound would not be packed.

- Urine Sampling: Urine samples would be collected by catheterization, by holding a container in the urine stream as the animal urinates or by using a syringe to collect it off of clean plastic placed under the urogenital slit (McBain 2001). Urine would be initially stored in a sterile container and placed in a cooler until further processing, at which point it would be aliquoted and frozen for later analysis which may include cytology, urinalysis, and screening for algal toxins.

- Fecal Sampling: Samples would be collected opportunistically as the animal voluntarily defecates, or by anal catheterization. In either case, feces would be collected in a sterile container. With the whale in lateral recumbency, catheterization is conducted after other anal swabs have been obtained first; an experienced veterinarian and an assistant would

perform the procedure (catheter and other equipment is sterile). The assistant would gently retract the folds of the anal slit to expose the anal orifice, and the veterinarian carefully would insert sterile tubing, lubricated with sterile lubricating gel and collect a fecal specimen by gentle aspiration with a syringe (McBain 2001). Feces would be initially stored in a cooler until further processing back in town. The fecal sample would be divided and stored in cryovials with formalin, under refrigeration, and frozen for later analysis in a laboratory which may include microbiology, parasitological examination, protozoal identification, and viral identification.

- Gastric Sampling: A gastric fluid sample would be collected by inserting a well-lubricated soft, flexible, plastic foal stomach tube from the oral cavity into the first stomach chamber. Fluid then would be collected by gentle aspiration and stored in a cooler until further processing back in town. Air-dried, unstained cytological slides would be prepared and the remaining sample would be frozen. Analyses may include bacterial and fungal cultures, toxicological screening, and algal toxin identification.

- Tooth Extraction (for beluga whales only)
  Tooth extraction only would be authorized for non-listed stocks of beluga whales, not porpoises. Tooth extraction would follow standard veterinary practice for cetaceans. A suitable tooth between the 5th and 10th would be selected and marked. The jaw surrounding the tooth would be numbed using Novocain or equivalent. After the area is numbed the tooth would be loosened with a wedge and pulled using an extractor sized appropriately for the species. The extraction site would be packed with sterile gauze.

- Auditory brainstem response (ABR) test involves playing sounds of specific frequency and intensity to the animal and measuring the changes in brain waves that result. A sound source would be attached near the apex of the jaw by a small suction cup. A sound receiver and 2 or 3 brain wave receivers would be attached on or behind the melon by small suction cups. Sounds of specific frequency and intensity would be played to the animal in a randomized sequence and the received sound and brain response recorded. A computer continually monitors the data and adjusts the sound selections to until the animals hearing capabilities are fully characterized. The full characterization takes 30 to 45 minutes and would be done while other capture activities are under way.

- Breath Sampling & Metabolic Measurements
  Expelled respiratory gases can be collected using a funnel connected to a vacuum flask held above the blow hole during expiration or a flow through chamber that provides a constant stream of ambient air and samples exhaled gasses. Breath samples can be analyzed for $CO_2$ levels, ketones and other substances that may be reflective of stress levels, health and nutritional status. If this technology can be validated with concurrent blood samples from wild caught belugas it may be possible to rely on breath sample analysis for nutritional status assessment of free swimming belugas.

  The metabolic chamber is a device to measure $CO_2$ in exhalation. A chamber with a volume of about 10 cubic feet would be placed over the blowhole of the beluga and air is blown through the chamber at a constant rate. As the beluga exhales the exhalent is

mixed with the air in the chamber and blown out. A sensor takes small samples of the air and measures the $CO_2$ to as the air is blown past. The $CO_2$ data can then be analyzed to determine the amount of energy that the whale was consuming during the cycle between breaths. Alternatively, researchers would use the funnel, a smaller version of this device that has a limited mixing volume.

- Milk Sample
  All adult females would be checked for lactation, and milk samples collected (McBain 2001). Milk would be expressed with gentle pressure exerted on the mammary gland by suction produced by a 60 cc syringe attached by plastic tubing to the inverted barrel of another 60 cc syringe placed over the nipple. Samples of up to 30 ml would be obtained. Samples would initially be placed in a cooler. The sample would be divided into multiple aliquots and frozen for later analysis which may include assessing levels of lipophilic contaminants and determination of composition.

- Tagging
  Up to three tag units would be placed on an animal (any species) using no more than two attachments to the body. For instance, researchers could attach a satellite tag and VHF tag on either side of the dorsal fin using one set of pins through the fin (Figure 5) and also attach a suction-cup tag forward of the fin to collect short-term fine scale movement patterns. For Dall's and harbor porpoise, attachments for long-term duration of the instrument packs would be made to the dorsal fin with biocompatible pins (titanium, stainless steel, nylon, high density polyethylene or Delrin or other equivalent plastic). After package positioning, a local anesthetic may be applied to the pin sites and 18 gauge needles would be inserted to serve as alignment guides for the pin holes. Attachment pin holes would be made with a tool similar to laboratory cork borer, which has been cold sterilized. Depending on the tag design, up to four sterilized pins approximately 6 mm in diameter would be used.

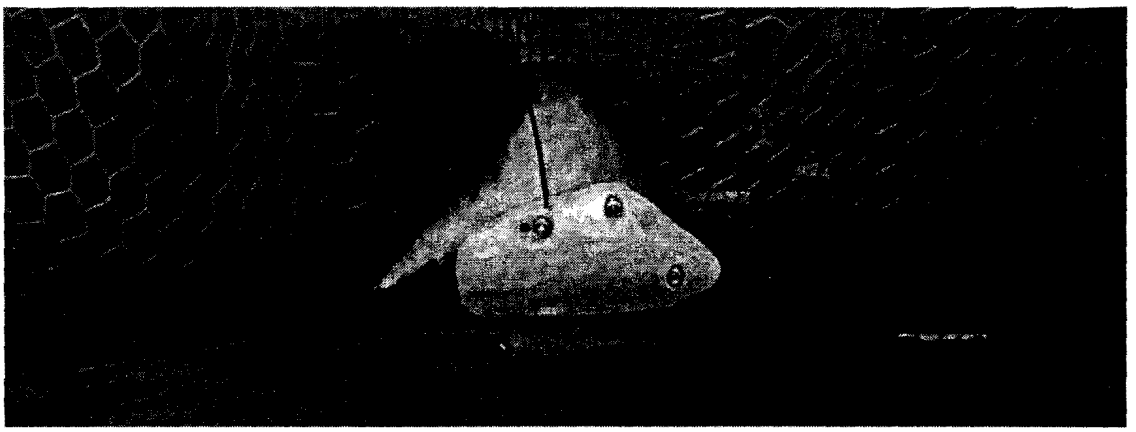

Figure 5. Example of fin tags on a harbor porpoise. One tag unit would be attached on each side of the fin using one set of pins.

Dorsal-fin mounted instrument packages would most likely be mounted on the sides of the fin, but depending on the design may be mounted on the front or back of the dorsal fin. These would be shaped to the contour of the base of the dorsal fin surface.

Researchers intend to position two of the pins near the leading edge of the fin and place the third and fourth pins near the center of the tag. The two anterior pin sites would likely be about 1.5-2 cm posterior to the leading edge of the fin and the posterior pin sites would be in the central part of the fin, but would be adjusted to avoid primary blood trunks.

Corrodible nuts would be used to ensure that the package frees itself from the animal after the batteries are exhausted. However, in some studies tissue degeneration generally allows the pins to migrate out of the skin before the end of battery service life. NMML continues to investigate nuts made of materials that would corrode to a point where the saddle would become free from the pins shortly after the batteries are exhausted.

A suction-cup tag would be applied by hand between the blow hole and the dorsal fin on the dorsal surface of the animal. Suction-cup attached tags are expected to remain attached for approximately 24 hours based on previous results (Hanson and Baird 1998, Hanson 2001).

Package weight would be minimized in tag design, as well as hydrodynamic drag (Wilson et al. 1986, Hanson 2001). Total cross-sectional area and shape are important components affecting hydrodynamic drag (Vogel 1994). Consequently, NMML's design goals include minimizing tag area and maximizing streamline shape. The tags would have a cross-sectional area of less than about 10 $cm^2$, or about 2.5% of the maximum cross-sectional area of the smallest immature male harbor porpoise taken in the Washington coast fisheries (442 $cm^2$, based on maximum girth: Gearin, NMML unpublished data). Tags for attachment to beluga are designed to lay flat against the skin or straddle the dorsal ridge. Tags are continually being modified to reduce hydrodynamic drag and increase longevity of the tag itself and its attachment to the whale. Tags would be attached as quickly as possible.

The current studies would use methodology developed over the past decade. There are no remote methods in current usage for long term attachment (several months to a year or more) of satellite transmitters.

For beluga whales, one of three methods of attachment would be used for each tag:

- spider-type cable attachments consisting of 4 or 6 paired cables that are attached to plastic pins inserted through the skin and blubber (Figure 6);
- one to three spears with toggles or flanges that are inserted through the skin and anchored in the blubber with the tag partially inserted through the skin or external; or
- a suction cup.

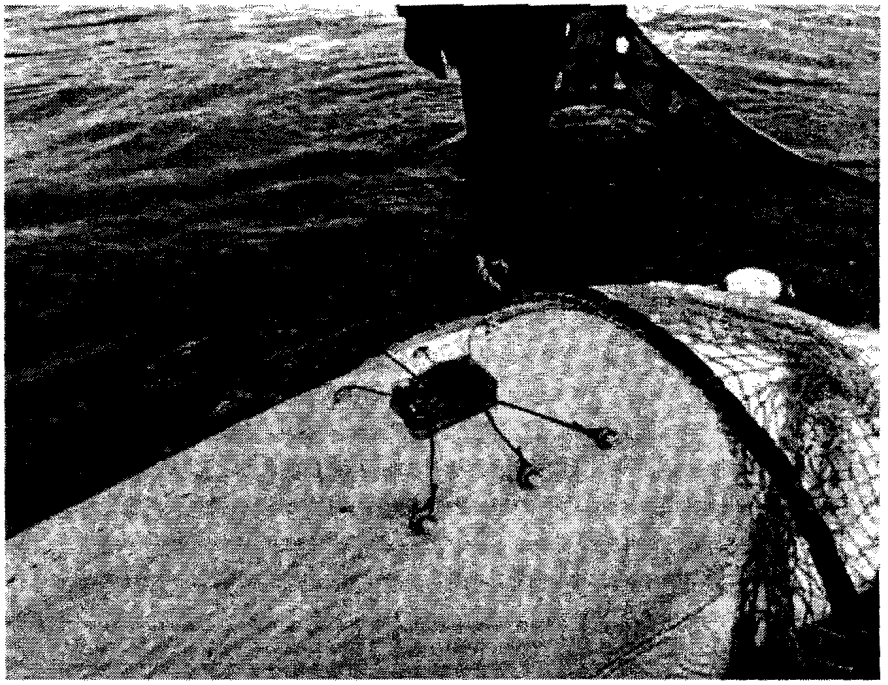
Figure 6. Example of a data collecting spider tag on a beluga whale.

Spider type: 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 (0.4 in) in diameter (OD). Biopsy samples of skin and blubber (described above) would be extracted from the corer to supplement other blubber and skin biopsies and stored in DMSO, 10% formalin, and an RNA extraction solution or similar solution, or frozen. Rods of nylon or other non-reactive material, not greater than 1 cm in diameter and 50 cm in length then would be pushed through the holes, and attached to the wire cables, fabric flange, 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 not 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 is then cut off. Other components such as VHF transmitters, acoustic recorders, behavior recorders, GPS, time-depth recorders or other data recording devices may be included in the instrument package. In the current spider attachment, the transmitters would be attached to belugas with nylon pins, approximately 0.33 m (13 in) long and 10 mm diameter or less. Holes for the pins are made using a trochar of slightly smaller diameter than the pins. Two or three pins would be inserted through the skin and blubber anterior to the dorsal ridge through holes cut using the trochars. Loops in the cables attaching the spider-type tag would be inserted through holes in the pins or looped around specialized lock nuts. Nylon washers or specialized lock nuts would be used to protect the skin from abrasion by the cables. Current designs depend on the pins migrating out through the blubber and skin until the tag is lost.

All equipment would be sterilized by heat or in cold sterile solution, alcohol or equivalent and kept in air and watertight containers prior to use. Each trochar only would be used for one hole before it is cleaned, sharpened and re-sterilized. Where more than one

instrument is to be attached, the total number of pins would be limited to four. Other instruments could be attached by cable to the attached tag or separately using suction cups following the design constraints under remote deployment.

Blubber anchored tag: The spear attachment would consist of 1 to 3 small spears with the tag mounted externally or a single spear incorporating the tag and mounting the tag partially inserted through the skin. Spears would be designed so that they don't insert beyond 10 cm deep.

Suction-cup tag: A suction-cup tag would be applied by hand between the blow hole and the dorsal fin on the dorsal surface of the animal. Suction cup attachments would consist of 1 to 3 suction cups with a total area not exceeding 200 $cm^2$ (i.e., 1 cup 16 cm diameter, 2 cups each 11 cm diameter or 3 cups each 9 cm diameter). Skin sloughing eventually results in a loss of suction by the cup, releasing it and allowing the buoyant tag to float to the surface.

- Release
  During release an animal processed on the beach would be gently moved into deeper water and allowed to swim off on its own. A slung animal would be released from the tail rope and head net then the sling would be dropped on one side and the boats pushed apart allowing the whale to swim off on its own. The beluga would be monitored visually for a brief period of time to ensure it is behaving normally. Subsequent to release, satellite tag returns would be monitored several times a week. If abnormal movement patterns are noted, attempts would be made to re-sight the animal. In the case of mortality, a full necropsy would be performed.

**Incidental Harassment of Pinnipeds**

For gillnetting porpoises, based on past experience NMML would take steps to ensure that non-target species do not become entangled, such as by avoiding setting nets in the vicinity of concentrations of harbor seals, *Phoca vitulina*. Harbor seals are the most likely non-target species that could be encountered during gillnetting. The permit would authorize takes for the incidental capture of harbor seals (see Appendix A) in the event that researchers are not able to avoid entanglements. If any harbor seals become entangled, NMML would ensure that seals are released alive and unharmed.

**Mortalities**

Capture activities pose an unavoidable risk of death to target animals for several reasons. Therefore a limited number of unintentional deaths would be authorized for beluga whales and porpoise as listed in Appendix A for each species or stock. Unlike other proposed takes, lethal takes would be authorized over the life of the permit rather than on an annual basis to minimize the number of animals that could die as a result of capture research. In addition, the permit would include conditions that limit the total number of beluga whales from all stocks combined that may die in any one permit year.

**Mitigation Measures**
See the draft permit for specific conditions NMFS would require to minimize or mitigate potential harassment of animals.

In addition to those precautions outlined in the above description of activities, NMML would minimize harassment during research in the following ways:

- During aerial surveys, NMML would spend as little time as possible circling the animal to collect images. If disturbance is seen, efforts would be made to complete the work as quickly as possible before moving away from the animals.
- If there is evidence of avoidance, a maximum of three vessel approaches will be attempted before the encounter is terminated.
- For tagging, no more than three tag deployment attempts per individual would be made during a single encounter.
- No more than 3 tags would be placed on an animal at a time, but no more than two would be attached by techniques that pierce the skin.
- Researchers would avoid sampling or tagging anywhere anterior to the pectoral flippers to avoid sensitive areas such as the blowholes and eyes.
- No more than 3 implantable tags per individual per year would be placed on large cetaceans and no more than 1 implantable tag per individual per year for smaller animals.
- Crew members would have extensive experience handling small boats around cetaceans.
- Vessel approaches would be gradual, at slow speeds, and designed to minimize or avoid any startle response.
- Crew would be experienced and trained in performing capture procedures.

# CHAPTER 3 AFFECTED ENVIRONMENT

This chapter presents baseline information necessary for consideration of the alternatives, and describes the resources that would 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 alternatives on the environment are discussed in Chapter 4.

Proposed research activities would occur in U.S. territorial waters and the high seas of the Pacific, Arctic and Atlantic Oceans.

## 3.1 SOCIAL AND ECONOMIC ENVIRONMENT

Economic and social factors are listed in the definition of effects in the NEPA regulations. However, the definition of human environment states that "economic and social effects are not

intended by themselves to require preparation of an EIS." An EA must include a discussion of a Proposed Action's economic and social effects when these effects are related to effects on the natural or physical environment. The social and economic effects of the Proposed Action mainly involve the effects on the people involved in the research, as well as any industries that support the research, such as charter vessels, and suppliers of equipment needed to accomplish the research. There are no significant social or economic impacts of the Proposed Action related to significant natural or physical environmental effects, and effects are not discussed further in this EA.

## 3.2 PHYSICAL ENVIRONMENT

### 3.2.1 National Marine Sanctuaries

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 NOAA's National Marine Sanctuaries Program (NMSP). This ensures that the research would not adversely impact marine mammals, birds or other animals within the sanctuaries. In addition, NMML's permit application was sent to the NMSP for review for research that would occur in sanctuary waters.

Under the Proposed Action, vessel and aerial surveys may occur within or over the following National Marine Sanctuaries:

- **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.

- **Cordell Bank National Marine Sanctuary** encompasses 526 square miles (397 $nm^2$) off the northern California coast and 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 species such as krill. With the huge amount of krill, this area is an important summer feeding ground for humpback whales, blue whales (*Balaenoptera musculus*), pacific salmon and bottom fishes. There are 25 species of marine mammals and more than 47 species of seabirds found in this sanctuary.

- **Gulf of 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.

- **Monterey Bay National Marine Sanctuary** was designated in 1992 and is the largest marine sanctuary in the NMSP. 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 four species of sea turtles.

- **Channel Islands National Marine Sanctuary** encompasses 1,658 square miles (1,253 nm2), 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 (*B. borealis*) whales.

- **Hawaiian Islands Humpback Whale National Marine Sanctuary**, designated on November 4, 1992, is actually a series of five marine protected areas distributed across the Main Hawaiian Islands. The total area of the sanctuary is approximately 1,400 square miles. Encompassing about half of the total sanctuary area, the largest contiguous portion of the sanctuary is delineated around Maui, Lana`i and Moloka`i. The four smaller portions are located off the north shore of Kaua`i, off Hawai`i's Kona coast, and off the north and southeast coasts of O`ahu. These areas provide habitats for various species of marine life, including marine mammals, coral reefs and associated fauna, sharks, and invertebrates. Most notably, the Sanctuary is home to a population of humpback whales during the winter months each year. Approximately 2,000-5,000 humpback whales migrate from their Alaskan feeding grounds to the Hawaiian Islands to mate and give birth in its protected, warm waters. The Sanctuary also holds cultural significance to Native Islanders and is active in conducting many projects, such as restoration of the Native Hawaiian Fishpond, named Ko`ie`ie Loko I`a.

- **Papahānaumokuākea Marine National Monument** (formerly Northwestern Hawaiian Islands), established on June 15, 2006, is the largest marine protected area in the world. The Monument is made up of many small islands and atolls of the Hawaiian chain that are located northwest of the main Hawaiian Islands (e.g., French Frigate Shoals, Midway, and Kure). The Monument covers 105,564 square nautical miles of both marine and terrestrial habitat (with approximately 3,910 square nautical miles being coral reef habitat). The Monument is home to over 7,000 marine species, including the threatened green sea turtle and endangered Hawaiian monk seal. There are also 1,700 endemic species found within the Monument that cannot be found anywhere else in the world (e.g., Nihoa, Laysan Finch).

- **Gray's Reef National Marine Sanctuary**, located 17.5 nm (32 km) off the coast of Georgia, protects 17 square miles of open ocean that is home to a wide variety of marine life, as well as the "Bone yard," which has provided scientists with relics and fossils possibly dating back 20,000 years. Its sea floor is considered a "live bottom," where rocky ledges and limestone outcroppings are densely covered by sessile marine invertebrates, interspersed with sandy areas. In addition to being a known foraging and resting ground of loggerhead sea turtles and a right whale calving ground, Gray's Reef is important habitat for over 150 species of fish. Gray's Reef is a common recreational resource for fishing, boating, and diving; however, commercial industries are prohibited.

- **Monitor National Marine Sanctuary** protects the wreck of the famed Civil War ironclad *USS Monitor*. In 1974 the wreck was listed on the National Register of Historic Places. Since its designation as our nation's first marine sanctuary in 1975, the *Monitor* has been the subject of intense investigation. Located 16 miles off the North Carolina coast in 73 m of water, biologists are studying how the *Monitor* acts as a living artificial reef for marine life.

- **Florida Keys National Marine Sanctuary** is known worldwide for its extensive offshore coral reefs and is the United States' only living barrier coral reef. This sub-tropical region also sustains many other interdependent habitats including mangrove islands, seagrass meadows, hard-bottom regions, patch reefs, and bank reefs. These habitats act as nurseries and feeding grounds for a variety of marine life as well as rookeries for sea birds. This complex marine ecosystem is also the foundation for commercial and recreational industries that are vital to south Florida's economy, and includes 400 underwater historical sites. The waters immediately surrounding most of the 1,700 islands that make up the Florida Keys have been designated as a national marine sanctuary since 1990. The sanctuary extends 220 miles in a northeast to southwest arc between the southern tip of Key Biscayne, south of Miami, to beyond, but not including, the Dry Tortugas Islands.

- **Flower Garden Banks National Marine Sanctuary** is located over 100 miles off the coasts of Texas and Louisiana and harbors the northernmost coral reefs in the United States. The Sanctuary, covering 42 square nautical miles, is comprised of three banks: East Flower Garden, West Flower Garden and Stetson and serves as a regional reservoir of shallow water Caribbean reef fishes and invertebrates. The coral reefs rise to within 66 ft of the water surface. This unique coral reef community has been developing for the last 10,000 to 15,000 years on top of salt domes that originated from layers of salt deposits in a once shallow sea 160 to 170 million years ago. The Banks harbor 21 species of coral, over 80 algal species, 250 macroinvertebrates, and 200 fish as well as three species of sea turtles, though the loggerhead is the only resident sea turtle.

- **Gerry E. Studds Stellwagen Bank National Marine Sanctuary**, at the mouth of Massachusetts Bay between Cape Cod and Cape Ann, covers 842 square miles and extends to 80 m deep. It is of special importance because of its historical, economical, biological, and ecological significance. This sanctuary is also important to the local economy, particularly regarding its use by the shipping, fishing, and wildlife watching industries. The area serves as a refuge, feeding ground, and migratory path along the eastern coast of North America for endangered North Atlantic right whales. In addition, Stellwagen Bank is important habitat for a variety of marine species including endangered sea turtles, endangered humpback whales and finback whales, as well as harbor porpoises, Atlantic white-sided dolphins *(Lagenorhynchus acutus)*, harbor seals, and gray seals, numerous fish species, forty species of sea birds, and a variety of invertebrates.

- **Fagatele Bay National Marine Sanctuary** comprises a fringing coral reef ecosystem in the Indo-Pacific formed within an eroded volcanic crater on the island of Tutuila, American Samoa. Founded in 1986, this smallest (0.25 square miles) and most remote of all the National Marine Sanctuaries is the only true tropical reef in the program. Fagatele Bay

provides a home to a variety of wildlife, including sea turtles, whales, sharks and the giant clam.

- **Rose Atoll Marine National Monument** is located approximately 130 nautical miles east-southeast of Pago Pago Harbor, American Samoa. It is one of the smallest atolls in the world, consisting of two low sandy islets, Rose and Sand. Each is located on a coralline algal reef rim enclosing a lagoon. The lagoon is 1.2 miles wide and up to about 65 feet deep, and includes 1,575 acres. Rose and Sand Islands cover areas of about 14 and 7 acres respectively. On January 6, 2009, Rose Atoll Marine National Monument was established, which includes Rose Atoll National Wildlife Refuge within its boundaries.

### *3.2.2 Essential Fish Habitat*

EFH has been designated for many of the fish species within the action area. Details of the designations and descriptions of the habitats are available in the Atlantic and Pacific 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. The applicant would use nets for beluga captures that contact the bottom and at most could be dragged over a 4,000 $m^2$ area based on net dimensions. No other proposed activities are directed at or likely to have any impact on designated EFH.

### *3.2.3 Designated Critical Habitat*

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.

**Steller sea lion (SSL)**

NMFS designated critical habitat areas for SSLs in 1993 (50 CFR 226.202). Critical habitat includes marine waters, terrestrial rookeries (breeding sites), and haulouts (resting sites). The critical habitat for SSLs includes three separate zones: terrestrial, air, and aquatic. For both the western and eastern DPSs, the terrestrial zone extends 3,000 feet (ft) (0.9 km) landward from the baseline or base point of each major rookery and haulout in Alaska and the air zone extends 3,000 ft (0.9 km) above the terrestrial zone, measured vertically from sea level. In areas used by the western DPS, the aquatic zone extends 20 nautical miles (nm) (37 km) seaward in state and federally managed waters from the baseline and basepoint of each major rookery and haulout that is west of 144° W longitude. In areas used by the eastern DPS, the aquatic zone extends 3,000 ft (0.9 km) seaward from the baseline or basepoint of each major rookery and haulout in Alaska that is east of 144° W longitude. In California and Oregon, critical habitat is the same as what is designated for the eastern DPS in Alaska, except that there is no terrestrial zone that extends landward.

**North Pacific right whale**

NMFS revised its listing of critical habitat for the northern right whale by adding two areas in the eastern North Pacific Ocean on July 6, 2006 (50 CFR 226.203). The two areas determined to be

primary or "high use" areas of the eastern North Pacific right whale population include the Southeastern Bering Sea and the Gulf of Alaska.

The life requisites of right whales for such factors as temperatures, depths, and substrate are unknown or may be highly variable. The following sections describe the physical environment of the critical habitat regions, as well as the designated coordinates for these areas.

Southeastern Bering Sea (SEBS)

The Bering Sea is a semi-enclosed, high-latitude sea. Of its total area of 2.3 million square km, 44 percent is continental shelf, 13 percent is continental slope, and 43 percent is deep water basin. The eastern shelf of the Bering Sea is more than 500 km (310 miles) wide. The designated critical habitat area of the SEBS is influenced by large eddies, submarine canyons, and frontal zones that enhance nutrient exchange and act to concentrate prey. The Bering Sea slope is a very productive zone, sometimes referred to as the "Greenbelt," where annual primary production can exceed that of the adjacent shelf and basin by 60 percent and 270 percent, respectively (Springer et al. 1996).

The SEBS right whale critical habitat area is an area delineated by a series of straight lines, connecting the following coordinates in the order listed: 58°00'N/168°00'W; 58°00'N/163°00'W; 56°30'N/161°45'W; 55°00'N/166°00'W; 56°00'N/168°00'W; and returning to 58°00'N/168°00'W. The area described by these boundaries lies completely within the waters of the U.S. EEZ and outside the waters of the State of Alaska.

Gulf of Alaska (GOA)

The central GOA is dominated by the Alaskan gyre, a cyclonic feature demarcated to the south by the eastward flowing North Pacific Current and to the north by the Alaska Stream and Alaska Coastal Current (ACC), which flow westward near the shelf break. The bottom topography of this region is rugged and includes seamounts, ridges, and submarine canyons, along with the abyssal plain. Strong semi-diurnal tides and current flow generate numerous eddies and meanders (Okkonen et al. 2001) that influence the distribution of zooplankton. Temperatures follow a clear seasonal pattern, with the coldest values occurring in March and the warmest in August (Reed and Schumacher 1986).

Compared to the Bering Sea, the GOA has weaker currents and tidal action near the seafloor; therefore, a variety of seabed types are found, such as gravely-sand, silty-mud, and muddy to sandy gravel, as well as areas of hardrock (Hampton et al. 1986). The dominant shelf sediment of the nearly 100-km-wide area (62 miles) of the GOA between Cape Cleare (148°W) and Cape Fairweather (138°W) is clay silt originating primarily from either the Copper River or the Bering and Malaspina glaciers (Feder and Jewett 1987). The GOA critical habitat area is an area delineated by a series of straight lines connecting the following coordinates in the order listed: 57°03'N/153°00'W; 57°18'N/151°30'W; 57°00'N/151°30'W; 56°45'N/153°00'W; and returning to 57°03'N/153°00'W. The area described by these boundaries lies completely within the waters of the United States and its EEZ.

**North Atlantic right whale habitat**

Great South Channel (GSC)

The GSC is a large funnel-shaped bathymetric feature at the southern extreme of the Gulf of Maine between Georges Bank and Cape Cod, Massachusetts. The channel is bordered on the west by Cape Cod and Nantucket Shoals, and on the east by Georges Bank. The average depth is 175m with a maximum depth to about 200m to the north. The V-shaped 100-m isobath effectively delineates the steep drop-off from Nantucket Shoals and Georges back to the deeper basins. On the southwestern fringe of the GSC lies the GSC Sliver Restricted Area, a region established as a Marine Managed Area in 1977. Both the GSC and the Sliver Region are subjected to fisheries management and lie within the Mandatory Ship Reporting System boundaries.

The GSC is one of the most used cetacean habitats off the northeastern United States (Kenney & Winn 1986). The late winter/early spring mixing of warmer shelf waters with the cold Gulf of Maine water funneled through the channel causes a dramatic increase in faunal productivity in the area (Sherman et al. 1987). This increase in zooplankton fauna, the main food source for baleen whales, attracts an abundance of mysticetes to the GSC region. Three "high-use" shipping corridors and numerous fisheries operate within the GSC, making ship-strikes and fishing gear entanglements major threats to baleen whale survival in this region.

Cape Cod Bay (CCB)

CCB is a large embayment on the U.S. Atlantic Ocean off the state of Massachusetts that is bounded on three sides by Cape Cod and the coastline from Plymouth, MA, south. To the north, CCB opens to Massachusetts Bay and the Gulf of Maine. CCB has an average depth of about 25 m (82 ft) and a maximum depth of about 65 m (213 ft). The deepest area of CCB is in the northern section, bordering Massachusetts Bay.

The general water flow is counter-clockwise, running from the Gulf of Maine south into the western half of CCB, over to eastern CCB, and back into the Gulf of Maine through the channel between the north end of Cape Cod (Race Point) and the southeast end of Stellwagen Bank, a submarine bank that lies just north of Cape Cod. Flow within the bay is driven by density gradients caused by freshwater river run-off from the Gulf of Maine (Franks and Anderson 1992; Geyer et al. 1992) and by a predominantly westerly wind.

Thermal stratification occurs in the bay during the summer months. Surface water temperatures typically range from 0 to 19°C throughout the year. Salinity is fairly stable at around 31-32 ppt. Much of the bottom is comprised of unconsolidated sediments, with finer sediments occurring in the deeper waters (Davis 1984). In shallow areas, or where there is sufficient current, sediments tend to be coarser.

The late winter/early spring zooplankton fauna of CCB consists primarily of copepods. Samples taken in the daytime indicated greater densities of copepods at greater depths. The copepod *C. finmarchicus* is found throughout inshore CCB waters at densities of 100 individuals per cubic meter from April through June (Mayo and Marx 1990). Mayo and Marx (1990) found that the density of surface zooplankton samples collected in the path of feeding right whales during mid-winter was significantly higher than for the samples taken where whales were absent (median =

3,904 organisms/$m^3$). The threshold value below which feeding by northern right whales is not likely to occur in CCB is approximately 1,000 organisms/$m^3$ (Mayo and Marx 1990). CCB, like the GSC, is a primary feeding ground for the right whales, most likely because of the high densities of zooplankton species found there.

Southeastern United States (SEUS)
The South Atlantic Bight (also referred to as the SEUS) extends roughly from Cape Hatteras, North Carolina, to West Palm Beach, Florida. These waters average about 30 m in depth with a maximum depth of about 60 m. The deepest waters occur along the coast of Florida, just south of Cape Canaveral. Right whales migrate through the northern portion of the South Atlantic Bight on their way to and from the calving grounds off the Georgia and northern Florida coast.

The South Atlantic Bight contains three large cape areas: Raleigh Bay, Onslow Bay, and Long Bay. The dominant bathymetric features are the continental shelf, the continental slope, and the Blake Plateau. The continental shelf slopes gently from the coast to approximately the 50 m (164 ft) isobath; where it drops off to the 200 m (656 ft) isobath. The continental slope is steeply angled and extends approximately from the 200 m (656 ft) to the 700 m (2,297 ft) isobath. The slope is widest off Jacksonville, FL (30°N). The Gulf Stream flows along the Florida-Hatteras Slope over the Blake Plateau's western flank (DoN August 2002).

The substrate composition of the SEUS ranges from mixed fine sand and gravel near the coast to an increasingly higher percentage of calcium carbonate material at greater depths. There are also traces of gravelly sand, sand and clay, and fine-grained sand and silt found in deeper waters. Continental slope sediments in the SEUS area are primarily composed of silt and clay. The inner part of the Blake Plateau contains a minimal amount of sediments due to the sweeping action of the Gulf Stream. The Plateau is also covered by a thick layer of phosphoritic sediments and a thin layer of carbonate sands (DoN August 2002).

Seasonal water temperatures and salinity for this area are higher than in northern waters. The SEUS is considered a transition zone, where waters change from hosting subtropical marine communities to temperate marine communities. Large, cyclic changes in abundance and dominance of plankton species occur seasonally and annually. Annual variation may be so great that short-term monitoring studies may not be sensitive enough to assess the temporal variability of the plankton community. The recorded preferred food of the northern right whale, *C. finmarchicus*, does not occur in these waters, and the area is not considered a foraging area for northern right whales. The SEUS is believed to be the primary calving and nursery ground for the species.

**Southern Resident killer whale** critical habitat includes three specific marine areas of Puget Sound, Washington (71 FR 69054), and includes all waters relative to a contiguous shoreline delimited by the line at a depth of 20 feet (6.1 m) relative to extreme high water in each of the following areas: (1) *Summer Core Area:* All U.S. marine waters in Whatcom and San Juan counties; and all marine waters in Skagit County west and north of the Deception Pass Bridge (Highway 20); (2) *Puget Sound Area:* All marine waters in Island County east and south of the Deception Pass Bridge (Highway 20), and east of a line connecting the Point Wilson Lighthouse and a point on Whidbey Island; all marine waters in Skagit County east of the Deception Pass

Bridge (Highway 20); all marine waters of Jefferson County east of a line connecting the Point Wilson Lighthouse and a point on Whidbey Island, and north of the Hood Canal Bridge (Highway 104); all marine waters in eastern Kitsap County east of the Hood Canal Bridge (Highway 104); all marine waters (excluding Hood Canal) in Mason County; and all marine waters in King, Pierce, Snohomish, and Thurston counties; (3) *Strait of Juan de Fuca Area:* All U.S. marine waters in Clallam County east of a line connecting Cape Flattery, Washington, Tatoosh Island, Washington, and Bonilla Point, British Columbia; all marine waters in Jefferson and Island counties west of the Deception Pass Bridge (Highway 20), and west of a line connecting the Point Wilson Lighthouse and a point on Whidbey Island.

**Hawaiian monk seal** critical habitat was designated on May 26, 1988 (53 FR 18990). This designated area consists of all beach areas, sand spits, and islets, including all beach crest vegetation to its deepest extent inland, lagoon waters, inner reef waters, and ocean waters out to a depth of 20 fathoms around the following: Kure Atoll, Midway Islands (except Sand Island and its harbor), Pearl and Hermes Reef, Lisianski Island, Laysan Island, Maro Reef, Gardner Pinnacles, French Frigate Shoals, Necker Island, and Nihoa Island.

In July of 2008, NMFS received a petition by three conservation groups to establish revised critical habitat for the Hawaiian monk seal to include haulout areas and waters out to a depth of 200 meters around the Main Hawaiian Islands, and to extend Northwestern Hawaiian Island critical habitat out to a depth of 500 meters. NMFS published a *Federal Register* notice on October 3, 2008 announcing a 90–day finding for a petition to revise Hawaiian monk seal critical habitat under the ESA.

On June 12, 2009, NMFS announced that it intends to revise the Hawaiian monk seal's critical habitat (74 FR 27988). This notice provides initial thoughts on the habitat features that are essential to the conservation of this species. Currently NOAA is reviewing a draft proposed rule to revise the critical habitat.

**Proposed Cook Inlet critical habitat**

A proposed rule to designate critical habitat for the Cook Inlet beluga whales under the ESA was published in 2009; however, no final rule has been issued. The proposed critical habitat includes two geographic areas of marine habitat in Cook Inlet, Alaska comprising 7,809 square kilometers (74 FR 230) and are bounded by Mean Higher High Water (MHHW) mark. Also included in the proposed designation are the lower reaches of the Susitna River, Little Susitna River, Chickaloon River and Kenai River. Other tidally influenced tributaries of Cook Inlet are not included in the proposal.

The applicant would not conduct research in any other designated Critical Habitat. Critical habitat would not be adversely affected as researchers would only be transiting over (aerial) or through these areas by vessel. Vessel-based work would occur at or near the surface of the water. Capture nets would not be set within critical habitat. Bottom substrate within critical habitat would not be impacted and physical sampling of resources beyond the target species would not occur. Therefore impacts to critical habitat are not considered further in this EA.

## 3.3 BIOLOGICAL ENVIRONMENT

### *3.3.1 Targeted Species*

The Proposed Action involves takes of marine mammals, including ESA-listed or MMPA-depleted species. NMFS is responsible for the conservation and recovery of most endangered and threatened marine mammals, and the NMML is responsible for conducting scientific research to conserve and recover the species found in the action area. Cetaceans under NMFS jurisdiction in U.S. territorial and international waters would be targeted for study in the Proposed Action, and are considered part of the affected biological environment. Specific species that will be taken during the Proposed Action are listed in Appendix A. A brief description of the species targeted for research under the Proposed Action is below, summarized from NMFS Stock Assessment Reports; additional information on the status of these species can be found in the Stock Assessment Reports and in the NMFS Recovery Plans for these species. All marine mammals stocks/species listed under the ESA are also considered depleted under the MMPA.

#### *3.3.1.1 ESA Listed Species Directly Targeted for Research*

**Bowhead whale**: Bowhead whales are 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). They reach sexual maturity at about the age of 20 years, at a length of about 35-40 ft (13-14 m). Females generally have one calf every 3 to 4 years after a gestation period around 13 to 14 months. Calves are usually about 13 ft (4 m) long at birth and weigh about 2,000 lbs (900 kg). Adults grow to about 45-60 ft long (14-18 m) and weigh 150,000- 200,000 lbs (75-100 tons). The average and maximum lifespan are unknown; however, some evidence suggests that they can live over 100 years.

Bowhead whales are classified as endangered under the ESA and thus also as a strategic stock under the MMPA. For management purposes, five stocks are recognized by the IWC. Small stocks occur in the Okhotsk Sea 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. 1993). Until recently, available evidence indicated that only a few hundred bowheads were in the Hudson Bay and Davis Strait stocks, but it now appears these should be considered one stock based on genetics (Postma et al. 2006), aerial surveys (Cosens et al. 2006), and tagging data (Dueck et al. 2006; Heide-Jørgensen et al. 2006), and the abundance may be over a thousand (Heide-Jørgensen et al. 2007).

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), is the only stock recognized in U.S. waters for management purposes under the MMPA.

The most recent abundance estimate for this stock, based on surveys conducted in 2001, is 10,545. Using this abundance estimate, the minimum population estimate for the Western Arctic

stock is 9,472 (Allen and Angliss 2010). The count of 121 calves during the 2001 census was the highest yet recorded, and provides corroborating evidence for a healthy and increasing population.

Rare cases of rope or net entanglement have been reported from bowhead whales taken in the subsistence hunt (Philo et al. 1993), and some bowhead whales have historically had interactions with crab pot gear. There are several documented cases of bowheads with ropes or rope scars. Alaska Region stranding reports document three bowhead whale entanglements between 2001 and 2005. In 2003 a bowhead whale was found dead in Bristol Bay entangled in line around the peduncle and both flippers; the origin of the line is unknown. In 2004 a bowhead whale near Point Barrow was observed with fishing net and line around the head. The estimated average annual rate of known entanglement in U.S. commercial fishing gear is currently not available.

Direct takes of bowhead whales by Eskimos have occurred for at least 2,000 years (Stoker and Krupnik 1993). The annual average subsistence take of this stock (by Natives of Alaska, Russia, and Canada) during the 5-year period from 2002 to 2006 is 42.4 bowhead whales. The estimated annual mortality rate incidental to U.S. commercial fisheries is not known to exceed 10% of the Potential Biological Removal level (PBR), and therefore can be considered to be insignificant. The annual level of human-caused mortality and serious injury is not known to exceed the PBR nor the IWC annual maximum.

**Sei whale**: Sei whales are widely distributed in all oceans, although this species is not found as far into polar waters as 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. Commercial whaling reduced sei whale numbers in the North Pacific from 42,000 whales to approximately 7,000 to 12,000 animals by 1974 (Tillman 1977). For management purposes, sei whales within the Pacific U.S. EEZ are divided into two discrete, non-contiguous areas: 1) waters around Hawaii, and 2) California, Oregon and Washington waters.

*Eastern North Pacific stock:* The IWC recognizes only one stock of sei whales in the North Pacific, 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°) are considered a separate stock for management purposes under the MMPA. The best abundance estimate for whales off the coasts of California, Oregon and Washington is 46 animals with an annual PBR level of 0.05 (Caretta et al. 2008). No population trend is available for this stock. The offshore drift gillnet fishery may threaten this stock but no mortalities or serious injuries have been reported. Vessel collisions result in 0.2 whales killed each year.

*Hawaii stock:* Little information is known about animals in Hawaii waters. The best abundance estimate for whales off Hawaii is 37 animals with an annual PBR level of 0.1 (Caretta et al. 2008). No population trend is available for this stock. It is likely threatened by fishery interactions although none have been reported.

**Blue whale**: The blue whale is a cosmopolitan species of baleen whale. Maximum reported body length is about 27 m. As is true of other baleen whale species, female blue whales are

somewhat larger than males. Blue whales have a long body and comparatively slender shape; a broad, flat rostrum; a proportionately smaller dorsal fin than other baleen whales; and a mottled gray color pattern that appears light blue when seen through the water.

The primary and preferred diet of blue whales is krill. Although other prey species, including fish and copepods, have been mentioned in the scientific literature, they likely do not contribute significantly to the diet of blue whales.

Scientists have yet to discern many details regarding the life history of the blue whale. The best available science suggests that the gestation period is approximately 10 to 12 months and that blue whale calves are nursed for about 6 to 7 months (NMFS 1998). Most reproductive activity, including mating and birthing, takes place during the winter. Weaning probably occurs on, or en route to, summer feeding areas. The average calving interval is probably 2 to 3 years. The age at sexual maturity is thought to be 5 to 15 years (Mizroch et al. 1984; Yochem and Leatherwood 1985).

Blue whales inhabit sub-polar to sub-tropical latitudes. Poleward movements in spring allow the whales to take advantage of high zooplankton production in summer. Movement toward the subtropics in the fall allows blue whales to use less energy while fasting, avoid ice entrapment in some areas, and engage in reproductive activities in warmer waters of lower latitudes. Although the species is often found in coastal waters, generally blue whales are thought to occur more offshore than humpback whales, for example.

Blue whales are found in oceans worldwide and are separated into populations by ocean basin in the North Atlantic, North Pacific, and Southern Hemisphere. They follow a seasonal migration pattern between summering and wintering areas, but some evidence suggests that individuals remain in certain areas year-round. Although the extent of knowledge concerning distribution and movement varies by area, and migratory routes are not well known, in general, distribution is driven largely by food requirements.

*North Pacific stocks:* The blue whale's range encompasses much of the North Pacific Ocean, from Kamchatka to southern Japan in the west, and from the Gulf of Alaska and California south, to at least Costa Rica in the east. The species is found primarily south of the Aleutian Islands and the Bering Sea. Whaling and sighting data suggest the existence of at least five subpopulations of blue whales, with an unknown degree of mixing among them.

For management purposes under the MMPA, blue whales inhabiting U.S. waters in the North Pacific are divided into two stocks: Western and Eastern. Based on acoustic and whaling data, it is believed that the Eastern stock winters in waters off Mexico to Costa Rica, and feeds during summer off the U.S. West Coast and to a lesser extent in the Gulf of Alaska and in central North Pacific waters. The Western stock appears to feed in summer southwest of Kamchatka, south of the Aleutians, and in the Gulf of Alaska (Watkins et al. 2000; Stafford 2003); in winter they migrate to lower latitudes in the western Pacific and less frequently in the central Pacific, including Hawaii (Stafford et al. 2001). Insufficient data is available to evaluate the current abundance or population trends of blue whale stocks in the western North Pacific.

Blue whales accompanied by young calves have been observed often in the Gulf of California from December through March, indicating that at least some calves may be born in or near the Gulf (Sears 1990). Therefore, this area is probably an important calving and nursing area for the species.

The best estimate of blue whale abundance in the eastern North Pacific is 1,368 animals with an annual PBR of one whale per year. Along the California coast blue whale abundance has been increasing during the past 2 decades (Calambokidis et al. 1990, Barlow 1994, Calambokidis 1995). Because this apparent increase is too large to be accounted for by population growth alone, it is assumed that a shift in distribution has occurred. Although the population in the North Pacific is expected to have grown since protection began in 1966, the possibility of continued unauthorized takes, incidental ship strikes and mortality, and serious injury in fishing gear makes this trend uncertain.

Blue whales were significantly depleted by commercial whaling activities worldwide. The reported take of North Pacific blue whales by commercial whalers totaled 9,500 between 1910 and 1965 (Ohsumi and Wada 1972). Approximately 3,000 of these were taken from the west coast of North America from Baja California, Mexico to British Columbia, Canada (Rice 1974, Tonnessen and Johnsen 1982, Rice 1992, Clapham et al. 1997). The primary threats currently facing blue whales are vessel strikes and fisheries interactions but also include anthropogenic noise, natural mortality, vessel disturbance, habitat degradation, and competition for prey resources.

*Changes in distribution*
Evidence suggests the distribution and migratory patterns of blue whales may have changed in at least four areas: northern Norway, southern Japan, eastern Aleutian Islands, and northern California.

In northern Norway (i.e., Finnmark, Bear Island, and Svalbard) the paucity of sightings during recent surveys along the coast where blue whales were common in the late 1800s and early 1900s, may suggest that the historic distribution has changed (Christensen et al. 1992). However, it could also indicate depletion of the population by whaling.

In the western North Pacific, the lack of blue whales off southern Japan today may also suggest that the distribution of these animals has changed or that the animals of this region have been extirpated. South of the eastern Aleutian Islands, relatively large concentrations of blue whales were documented in the 1970s but the species appears rare there today, suggesting that illegal and unreported whaling depleted the population (Stewart et al. 1987, Forney and Brownell 1997).

Off northern California (e.g., Farallon Islands, Moss Landing, and Trinidad), the recent appearance of numerous blue whales is noteworthy in light of their rarity in these regions prior to the late 1970s. Calambokidis (1995) concluded that such changes in distribution reflect a shift in feeding from the more offshore euphausiid to the primarily neritic euphausiid. More recently, some Californian animals have been observed returning to waters of southern Alaska and British Columbia to feed (Calambokidis et al. 2009).

**Fin whale** *(B. physalus)*: Fin whales are the second-largest species of whale, with animals in the Northern hemisphere having a maximum length of about 22 m. Fin whales show mild sexual dimorphism, with females measuring longer than males by 5 to 10 percent. Adults can weigh 40 to 80 tons. Fin whales have a sleek, streamlined body with a V-shaped head. They have a tall, falcate dorsal fin, located about two-thirds of the way back on the body, that rises at a shallow angle from the animal's back. The species has a distinctive coloration pattern: the back and sides of the body are black or dark brownish-gray, and the ventral surface is white.

Fin whales can be found in social groups of 2 to 7 whales and in the North Atlantic are often seen feeding in large groups that include humpback whales, minke whales (*B. acutorostrata*), and Atlantic white-sided dolphins (Jefferson et al. 2008). Fin whales are large, fast swimmers and the killer whale is their only non-human predator.

During the summer, fin whales feed on krill, small schooling fish (e.g., herring, capelin, and sand lance), and squid by lunging into schools of prey with their mouth open, using their throat pleats to gulp large amounts of food and water, filtering out food particles using baleen plates on each side of the mouth. Fin whales fast in the winter while they migrate to warmer waters.

Little is known about the social and mating systems of fin whales. Similar to other baleen whales, long-term bonds between individuals are rare. Males become sexually mature at 6 to 10 years old; females at 7 to 12 years old. Physical maturity is attained at approximately 25 years for both sexes. After 11 to 12 months of gestation, females give birth to a single calf in tropical and subtropical areas during midwinter. Newborn calves are approximately 6 m long and weigh 2 tons. Fin whales can live 80 to 90 years.

Fin whales are found in deep, offshore waters of all major oceans, primarily in temperate to polar latitudes, and less commonly in the tropics. They occur year-round in a wide range of latitudes and longitudes, but the density of individuals in any one area changes seasonally.

Fin whales occur in all major oceans worldwide and seasonally migrate between temperate and polar waters (Perry et al. 1999). In the North Pacific, the International Whaling Commission (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 U.S. waters: the California/Oregon/Washington stock, the Northeast Pacific (Alaska) stock, the Hawaii stock, and the western North Atlantic stock.

*California/Oregon/Washington stock:* This stock is found along the U.S. west coast from California to Washington in waters out to 300 nmi. Because fin whale abundance appears lower in winter/spring in California (Dohl et al. 1983; Forney et al. 1995) and in Oregon (Green et al. 1992), it is likely that the distribution of this stock extends seasonally outside these coastal waters. The best available estimate of the stock's population size is 2,636 whales with a PBR of 14 whales (Carretta et al. 2008). Some data indicate that fin whales have increased in abundance in California coastal waters (Barlow 1994, 1997), but these trends are not significant. Ship strikes average 1.6 serious injuries or mortality each year. Fishery interactions may be approaching zero mortality and serious injury rate.

*Northeast Pacific (Alaska) stock:* Whales in this stock are found from Canadian waters north to the Bering Sea. Reliable estimates of current and historical abundance of fin whales in the entire northeast Pacific are currently not available. Based on surveys which covered only a small portion of the range of this stock, a rough minimum estimate of the size of the population west of the Kenai Peninsula is 5,700 with a PBR level of 11.4 whales (Angliss and Allen 2009). Data suggests that this stock may be increasing at an annual rate of 4.8 percent, however, this is based on uncertain population size and incomplete surveys of its range (Angliss and Allen 2009). Fishery interactions may threaten this stock but fishery-related mortality levels can be determined to have met a zero mortality and serious injury rate.

*Hawaii stock:* The best available abundance estimate for this stock is 174 whales based on a 2002 survey of the entire Hawaiian Islands EEZ (Barlow 2003) with a PBR of 0.2 whales per year (Carretta et al. 2010). Data are not available to determine a population trend for this stock. Available information is insufficient to determine whether the total fishery mortality and serious injury for fin whales is insignificant and approaching zero mortality and serious injury rate.

Commercial whaling for this species ended in the North Pacific Ocean in 1976, in the Southern Ocean in 1976-77, and in the North Atlantic Ocean in 1987. Fin whales are still hunted in Greenland and subject to catch limits under the IWC's aboriginal subsistence whaling scheme.

Other current threats not listed by stock include reduced prey abundance due to overfishing, habitat degradation, disturbance from low-frequency noise and the possibility that illegal whaling or resumed legal whaling will cause removals at biologically unsustainable rates. Of all species of large whales, fin whales are most often reported as hit by vessels (Jensen and Silber 2003). Schooling fish constitute a large proportion of the fin whale's diet in many areas of the North Atlantic, so trends in fish populations, whether driven by fishery operations, human-caused environmental deterioration, or natural processes, may strongly affect the size and distribution of fin whale populations.

**North Pacific right whale**: Adults are generally between 45 and 55 feet (13.7-16.7 m) long and can weigh up to 70 tons (140,000 lbs; 63,502 kg). Females are larger than males, and give birth to their first calf at an average age of 9-10 years. Calves are 13-15 feet (3.9-4.6 m) long at birth. Gestation lasts approximately 1 year. Calves are usually weaned toward the end of their first year. It is believed that right whales live at least 50 years, but there are few data on the longevity of right whales.

In April 2008, the North Pacific right whale was listed as a separate, endangered species. The same two areas that were designated as critical habitat for the northern right whale are now designated as critical habitat for the North Pacific right whale.

North Pacific right whales inhabit the Pacific Ocean, particularly between 20° and 60° latitude. Before commercial whalers heavily exploited right whales in the North Pacific, concentrations were found in the Gulf of Alaska, eastern Aleutian Islands, south central Bering Sea, Sea of Okhotsk, and Sea of Japan. Recently, there have been few sightings of right whales in the central North Pacific and Bering Sea. Sightings have been reported as far south as central Baja

California in the eastern North Pacific, as far south as Hawaii in the central North Pacific, and as far north as the sub-Arctic waters of the Bering Sea and sea of Okhotsk in the summer. Since 1996, right whales have been consistently observed in Bristol Bay, southeastern Bering Sea, during the summer months.

Migratory patterns of the North Pacific right whale are unknown, although it is thought the whales spend the summer on high-latitude feeding grounds and migrate to more temperate waters during the winter.

There are no reliable estimates of current abundance or trends for right whales in the North Pacific. However, the pre-exploitation size of this stock exceeded 11,000 animals.
In general, there are no data on trends in abundance for either the eastern or western population. For the western North Pacific, sighting survey estimates for the summer feeding ground indicate an abundance of around 900 in the Sea of Okhotsk. It is clear that this population is significantly larger than that in the eastern North Pacific. Over the past forty years, most sightings in the eastern North Pacific have been of single whales. However, during the last few years, small groups of right whales have been sighted. This is encouraging but there has been only one confirmed sighting of calves in the 20th century.

In the North Pacific, ship strikes and entanglements may pose a threat to right whales. However, because of their rare occurrence and scattered distribution, it is impossible to assess the threat of ship strikes or entanglement to North Pacific right whales at this time. Thus, the estimated annual rate of human-caused mortality and serious injury appears minimal. The reasons for the apparent lack of recovery for right whales in this region are unknown.

**Humpback whale**: The humpback whale is a mid-sized baleen whale. They 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. Humpback whales exhibit a wide range of foraging behaviors, and feed on many prey types including small schooling fishes, krill, and other large zooplankton.

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 percent (Chittleborough 1965, Herman et al. 1980, Whitehead 1982, Bauer 1986, 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 (*Pseudorca crassidens*), and sharks), biotoxins, and ice entrapment.

Data suggests that up to 11,570 whales may reside within the entire North Atlantic (Palsbøll et al. 1997) and may be increasing 3.1 percent annually (Stevick et al. 2003). The four recognized stocks (based on geographically distinct winter ranges) of humpback whales in the United States are: the Gulf of Maine stock, the eastern North Pacific stock, the central North Pacific stock, and the western North Pacific stock.

*Gulf of Maine stock:* This stock of humpback whales includes relatively discrete sub-populations which feed during summer in the waters of the Gulf of Maine, the Gulf of St. Lawrence, Newfoundland/Labrador, and western Greenland (Katona and Beard 1990). Other North Atlantic feeding grounds occur off Iceland and northern Norway (Christensen et al. 1992). In the winter, whales from all six feeding areas (including the Gulf of Maine) mate and calve primarily in the West Indies, where spatial and genetic mixing among sub-populations occurs (Clapham et al. 1993; Katona and Beard 1990; Stevick et al. 1998). Humpback whales also use the Mid-Atlantic as a migratory pathway and apparently as a feeding area, at least for juveniles. Since 1989, observations of juvenile humpbacks in that area have been increasing during the winter months, peaking January through March, particularly in the vicinity of the Chesapeake and Delaware Bays (Swingle et al. 1993). Biologists theorize that non-reproductive animals may be establishing a winter feeding range in the Mid-Atlantic because they are not participating in reproductive behavior in the Caribbean.

The best population estimate for the stock is 847 whales with a PBR of 1.1 whales annually (Waring et al. 2009). Although the most recent abundance estimates indicate continued population growth, the size of the Gulf of Maine humpback whale stock may be below the optimum sustainable population in the U.S. Atlantic EEZ. Barlow and Clapham (1997) estimated a rate of population increase of at 6.5 percent for this stock.

The total level of human-caused mortality and serious injury is unknown, but may be slowing recovery of the population. The main sources of human-caused serious injury and mortality are entanglement in fishing gear and vessel collisions. On average 3 animals are seriously injured or killed as a result of fishery interactions and another 1.4 whales due to vessel collisions annually. The total level of U.S. fishery-caused mortality and serious injury is unknown, but reported levels are more than 10% of the calculated PBR and, therefore, cannot be considered to be insignificant or approaching zero mortality and serious injury rate.

*North Pacific stocks:* 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). Humpback whales also summer throughout the central and western portions of the Gulf of Alaska, including Prince William Sound, around Kodiak Island, 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).

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 increased from 1,200 in 1966 to 6,000-8,000 in 1992. More recently, photo-identification results from SPLASH, an international collaborative research program on the abundances, population structure, and potential human impacts on humpback whales in the North Pacific involving more than 50 research groups and 300 researchers, estimated the abundance of humpback whales in the North Pacific to be just under 20,000 animals (Calambokidis et al. 2008). The population is estimated to be growing six to seven percent annually (Carretta et al. 2008). The SPLASH study collected data from all known wintering and feeding areas for humpback whales in the North Pacific, and the data suggest the likely existence of missing wintering areas that have not been previously described. Humpback whales that feed off the Aleutians and in the Bering Sea were not well represented on any of the sampled wintering areas and must be going to one or more unsampled winter locations (Calambokidis et al. 2008).

*Eastern North Pacific stock:* 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 best available abundance estimate for this stock is 1,391 whales and appears to be increasing in abundance (Carretta et al. 2008). The estimated annual mortality and injury due to entanglement (2.6 whales/yr), other anthropogenic sources (zero), plus ship strikes (zero) in California exceeds the PBR allocation of 2.5 whales annually for U.S. waters.

*Central North Pacific stock:* 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). Population estimates vary for this stock, but likely contains approximately 4,000 whales (Calambokidis et al. 1997). The stock appears to be increasing, but it is not possible to assess the rate of increase or set a PBR level for this stock. It is impacted by fishery interactions (3.2 whales seriously injured or killed annually) and ship strikes (1.8 animals/year).

*Western North Pacific stock:* 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 394 individuals and the PBR is undetermined. No population trend is available for this stock. Fisheries interactions result in an annual mortality rate of 0.2 whales.

**Sperm whale** *(Physeter macrocephalus)*: Sperm whales are the largest of the odontocetes and the most sexually dimorphic cetaceans, with males considerably larger than females. Adult females may grow to lengths of 11 m and weigh 15 tons. Adult males, however, reach about 16 m and may weigh as much as 45 tons. The sperm whale is distinguished by its extremely large head, which takes up to 25 to 35 percent of its total body length. Sperm whales are mostly dark gray, but oftentimes the interior of the mouth is bright white, and some whales have white patches on the belly.

Because sperm whales spend most of their time in deep waters, their diet consists of many larger organisms that also occupy deep waters of the ocean. Their principle prey is large squid, but they will also eat large demersal and mesopelagic sharks, skates, and fishes. The average dive lasts about 35 minutes and is usually down to 400 m, however dives may last over an hour and reach depths over 1,000 m.

Female sperm whales reach sexual maturity around 9 years of age when they are roughly 9 m long. At this point, growth slows and they produce a calf approximately once every 5 years. After a 14 to 16 month gestation period, a single calf about 4 m long is born. Although calves will eat solid food before one year of age, they continue to suckle for several years. Females are physically mature around 30 years and 10.6 m long, at which time they stop growing. Males reach physical maturity around 50 years and when they are 16 m long. Males often do not actively participate in breeding until their late 20s.

Most females will form lasting bonds with other females of their family, and on average 12 females and their young will form a family unit. While females generally stay with the same unit all their lives in and around tropical waters, young males between 4 and 21 years old form "bachelor schools", comprised of other males that are about the same age and size. As males get older and larger, they begin to migrate to higher latitudes and slowly bachelor schools become smaller, until the largest males end up alone. Older, larger males are generally found near the edge of pack ice in both hemispheres. On occasion, however, these males will return to the warm water breeding area.

Sperm whales tend to inhabit areas with a water depth of 600 m or more, and are uncommon in waters less than 300 m deep. Female sperm whales are generally found in deep waters (at least 1,000 m) of low latitudes (less than 40°, except in the North Pacific where they are found as high as 50°). These conditions generally correspond to sea surface temperatures greater than 15°C, and while female sperm whales are sometimes seen near oceanic islands, they are typically far from land.

Sperm whales inhabit all oceans of the world. They can be seen close to the edge of pack ice in both hemispheres and are also common along the equator, especially in the Pacific. Their distribution is dependent on their food source and suitable conditions for breeding, and varies with the sex and age composition of the group. Their migrations are not as predictable or well understood as migrations of most baleen whales. In some mid-latitudes, there seems to be a general trend to migrate north and south depending on the seasons, moving poleward in summer. However, in tropical and temperate areas, there appears to be no obvious seasonal migration.

Currently, no good estimate is available for the total number of sperm whales worldwide. For management purposes, sperm whales inhabiting U.S. waters have been divided into five stocks:

*California-Oregon-Washington stock:* Sperm whales are found year-round in California waters, but they reach peak abundance from April through mid-June and from the end of August through mid-November. They have been seen in every season except winter in Washington and Oregon. The most precise and recent estimate of sperm whale abundance for this stock is 2,853 animals from the ship surveys conducted in 2001 (Barlow and Forney 2007) and 2005 (Forney 2007). Survey data from the last few decades indicate that sperm whale abundance has been rather variable off California and does not show obvious trends. The offshore driftnet gillnet fishery is the main threat to this stock. The PBR level for this stock is set at 9.3 whales per year.

*North Pacific (Alaska) stock:* The shallow continental shelf apparently bars the movement of sperm whales into the northeastern Bering Sea and Arctic Ocean. Males are thought to move north in the summer to feed in the Gulf of Alaska, Bering Sea, and waters around the Aleutian Islands. Current and historic estimates for the abundance of sperm whales in the North Pacific are considered unreliable. The number of sperm whales of the North Pacific occurring within Alaska waters is unknown. Consequently, the PBR for this stock is unknown. Potential entanglement in fishing gear is a growing concern for this stock as whales have been observed depredating in several commercial Alaskan fisheries.

*Hawaiian stock:* Summer/fall surveys in the eastern tropical Pacific show that although sperm whales are widely distributed in the tropics, their relative abundance tapers off markedly westward towards the middle of the tropical Pacific and tapers off northward towards the tip of Baja California. The best estimate for sperm whales occurring in U.S. waters of Hawaii is 7,082 (Barlow 2003); however, no population trend is available. The PBR for this stock is 11 animals per year. Commercial longline fisheries are a threat to this stock though no serious injuries or mortalities of sperm whales were reported from 1998 to 2002.

The greatest natural predators to sperm whales are killer whales, which have been documented killing at least one sperm whale in California. Typically, however, it is believed that most killer whale attacks are unsuccessful. Pilot whales have been observed harassing sperm whales, but it is unclear if they pose any real threat (Perry et al. 1999). Large sharks may also be a threat, especially for young sperm whales.

The greatest threat for sperm whales has been man, especially with the advent of whaling. By 1987, whalers took at least 345,000 sperm whales in the North Pacific and North Atlantic Oceans combined, with approximately 99 percent coming from North Pacific stocks (Perry et al. 1999). Hunting of sperm whales by commercial whalers declined in the 1970s and 1980s, and virtually ceased with the implementation of a moratorium against whaling by the IWC in 1988. Sperm whales are still being targeted in a few areas: there is a small catch by primitive methods in Lamalera, Indonesia, and Japan takes sperm whales for scientific purposes. There is also some evidence to suggest that sperm whales are being hunted illegally in some parts of the world (Allen and Angliss 2010).

In addition to whaling, sperm whales may be impacted by other shipping traffic, noise disturbance, and fishing operations. Sperm whales have the potential to be harmed by ship strikes and entanglements in fishing gear, although these are not as great of a threat to sperm whales as they are to more coastal cetaceans. Disturbance by anthropogenic noise may prove to be an important habitat issue in some areas of this population's range, notably in areas of oil and gas activities or where shipping activity is high. Another potential human-caused source of mortality is from accumulation of stable pollutants (e.g., polycholorobiphenyls, chlorinated pesticides, polycyclic aromatic hydrocarbons, and heavy metals). Stable pollutants might affect the health or behavior of sperm whales. The potential impact of coastal pollution may be an issue for this species in portions of its habitat, though little is known on this to date. In efforts to recover this species, the NMFS' recovery plan for sperm whales noted that the potential effects of pollutants is unknown (2010). At present, because of their general offshore distribution, sperm whales are less likely to be impacted by humans, and those impacts that do occur are less likely to be recorded.

**Killer whales, Eastern North Pacific Southern Resident stock**: This species shows considerable size dimorphism. Adult males develop larger pectoral flippers, dorsal fins, tail flukes, and girths than females. Male adult killer whales reach up to 32 feet (9.8 m) in length and weigh nearly 22,000 pounds (10,000 kg); females reach 28 feet (8.5 m) in length and weigh up to 16,500 pounds (7,500 kg). Sexual maturity of female killer whales is achieved when the whales reach lengths of approximately 15-18 feet (4.6 m-5.4 m), depending on geographic region. The gestation period for killer whales varies from 15-18 months, and birth may take place in any month. Calves are nursed for at least 1 year, and may be weaned between 1 and 2 years of age. The birth rate for killer whales is not well understood, but is estimated as every 5 years for an average period of 25 years. Life expectancy for wild female killer whales is approximately 50 years, with maximum longevity estimated at 80-90 years. Male killer whales typically live for about 30 years, with maximum longevity estimated at 50-60 years.

Resident killer whales in the North Pacific consist of Southern, Northern, Southern Alaska, and Western Alaska North Pacific Residents. The Southern Resident killer whale (SRKW) stock contains three pods (or stable family-related groups)--J, K, and L pods. Their range during the spring, summer, and fall includes the inland waterways of Puget Sound, Strait of Juan de Fuca, and Southern Georgia Strait. Their occurrence in the coastal waters off Oregon, Washington, Vancouver Island, and more recently off the coast of central California in the south and off the Queen Charlotte Islands to the north has been documented. Little is known about the winter movements and range of the SRKW stock. SRKW have not been observed associating with other resident whales, and mitochondrial and nuclear genetic data suggest that SRKW rarely interbreed with other killer whale populations.

The population is currently estimated at about 88 whales, with a PBR of 0.17 animals per year. The estimated population shows a decline from its estimated historical level of about 200 during the mid- to late 1800s. Beginning in about 1967, the live-capture fishery for oceanarium display removed an estimated 47 whales and caused an immediate decline in SRKW numbers. The population fell an estimated 30% to about 67 whales by 1971. By 2003, the population increased to 83 whales.

**Beluga whale, Cook Inlet stock**: Cook Inlet belugas are listed as endangered under the ESA and depleted under the MMPA. This DPS remains in the Inlet year-round, concentrating at rivers and bays in the upper Inlet during summer and fall, and dispersing offshore into the mid Inlet during winter (Hobbs et al. 2005). Their movement patterns exploit seasonal changes in prey distribution (NMFS 2008). They feed on a variety of seasonally-abundant prey, such as eulachon and Saffron and Pacific cod in spring, several species of salmon during summer, and bottom-dwellers such as Pacific staghorn sculpin and flatfishes [e.g., starry flounder and yellowfin sole in the fall (described in detail in Hobbs et al. 2006, NMFS 2008).

Aerial surveys conducted in 1978-79 indicate that belugas were previously distributed over a relatively large area of Cook Inlet, but the highest concentration of belugas has since shifted northeast towards the Little Susitna River, Knick Arm, and Turnagain Arm (Hobbs and Shelden 2008). Satellite tagging and aerial abundance surveys indicate that Knick Arm, Turnagain Arm, Chickaloon Bay, and the Susitna River delta are high-use areas of the upper Inlet for belugas. While there are no reliable historic abundance estimates, systematic, annual aerial surveys have been conducted by NMFS since 1993, and have documented a decline in abundance from an estimated 653 animals in 1994 to an estimated 375 animals in 2008 (Hobbs and Shelden 2008). It is possible that as the population declined the remaining animals retracted to preferred habitat, or that the remaining population is limited to optimal habitat where feeding opportunities are maximized by prey concentration in shallow river channels (Hobbs and Shelden 2008).

Cook Inlet belugas were subject to commercial whaling and sport hunting prior to the MMPA, and Alaska Natives have legally hunted them prior to and since the passage of the MMPA. Although it is difficult to obtain accurate estimates of harvest numbers by Alaska Natives, it is believed that at least 30 belugas were taken annually during the mid- to late-1990s (detailed in Mahoney and Shelden 2000). The Cook Inlet beluga population also declined during this period, from an estimated 653 in 1994 to an estimated 367 in 1999 (Hobbs et al. 2000). In 1999, concerns about this decline and continued exploitation led to the Native community voluntarily suspending the subsistence hunt. A limited number of belugas have since been taken annually. Long-term limits on the maximum number of Cook Inlet belugas that may be taken by Alaska Natives for subsistence and handicraft purposes were established in 2008 and effective on November 14, 2008 (Final Rule, 73 FR 60976, October 15, 2008). In accordance with the *Subsistence Harvest Management Plan*, there will be no harvest from 2008-2012 because the most recent 5-year population average was less than 350 belugas (the 2003-2007 average was 336 belugas). A harvest will only be allowed from 2013-2017 if the 5-year population average from 2008-2012 is greater than 350 belugas. Harvest numbers are determined using a combination of that average and the best estimate of the population growth rate using data from the previous 10 years, as detailed in the final rule.

For more information, a detailed description of the biology and life history of Cook Inlet belugas can be found in section 3.2.1 of the Cook Inlet Beluga Whale Subsistence Harvest Final Supplemental EIS.

### *3.3.1.2 MMPA-Depleted Marine Mammal Species 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. Depleted stocks targeted for research in the Proposed Action include:

**Spinner dolphin, Eastern Tropical Pacific stock** (*Stenella longirostris orientalis*): Spinner dolphins are distributed in tropical and subtropical waters worldwide (Perrin and Gilpatrick 1994) and are most abundant in warm, tropical waters (Wade and Gerrodette 1993). Spinners are an offshore, deep water species. The three subspecies of spinner dolphins in the Pacific Ocean are the white belly, the eastern, and the Central American (Perrin 1990; DeMaster and Sisson 1992).

Spinner dolphins are relatively small, reaching lengths of 6 to 7 feet (2 m) and weighing approximately 130 to 170 pounds (59-77 kg) at adulthood. Spinner dolphins often occur in groups of several hundred to several thousand animals. They often school with other dolphin species, such as spotted dolphins, bottlenose dolphins (*Tursiops truncatus*), or humpback whales in Hawaii.

Mating and calving occurs year-round, with gestation similar to that of most dolphins, around eleven months. Multiple males may mate with one female in short, consecutive intervals. Lactation often takes place for two years, but can also last for only one year. Calving intervals average three years. Maturity occurs at around seven years of age and maximum longevity is 20 years.

In most places, spinner dolphins are found in the deep ocean where they likely track prey. The Hawaii population has a more coastal distribution. There, the animals rest in bays and protected areas during the day and then fuse into larger groups to feed in deeper water on fish and squid at night.

At the time of the MMPA depleted listing, the eastern spinner dolphin was estimated to be at 44 percent of its pre-exploitation population size. Currently, the eastern stock is estimated to have a population size of 613,000 (Gerrodette et al. 2005). The long-term trend is flat for this stock.

Due to the as yet unexplained association between large yellowfin tuna and some dolphin stocks in the Eastern Tropical Pacific, the presence of the eastern stock of spinner dolphins has been used by the tuna purse-seine fishery to find tuna. Dolphins can become trapped in the nets and drown. Stress from becoming encircled in purse seines has also been documented as a very serious threat to dolphins. Currently, fishing methods for tuna imported into the United States under the Dolphin-Safe program do not allow fishing practices, such as setting on dolphins.

*3.3.1.3 Other Species Directly Targeted for Research*

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. (See Appendix A for more information on takes requested.)

NMFS publishes annual SARs for the marine mammals under its jurisdiction. While research has been conducted on narwhals by the marine mammal community, NMFS has not previously permitted takes of narwhals under a scientific research permit due to the species' remote range in the Arctic. However, due to recent occasional sightings in U.S. waters, NMFS is currently preparing the first ever SAR for narwhals. The Proposed Action would authorize takes of narwhals to NMML to help fulfill data needs for this new SAR. The 2009 Stock Assessment Reports (SARS; Pacific: Carretta et al. 2009; Alaska: Allen and Angliss 2010) describe the distribution, abundance, productivity, and annual human-caused mortality for the targeted marine mammal species and are available in PDF format at www.nmfs.noaa.gov. This includes the following species:

| | **Stock Assessment Report** | | |
|---|---|---|---|
| **Species/Stock** | U.S. West Coast | Hawaii and Western Pacific | Alaska |
| Baird's beaked whale, *Berardius bairdii* | x | | x |
| Beluga whale (non-listed stocks) | | | x |
| Bottlenose dolphin | x | x | |
| Cuvier's beaked whale, *Ziphius cavirostris* | x | x | x |
| Dall's porpoise | x | | x |
| Dwarf sperm whale, *Kogia sima* | x | x | |
| False killer whale* | | x | |
| Gray whale, *Eschrichtius robustus* | | | x |
| Harbor porpoise | x | | x |
| Killer whale (non-listed stocks) | x | x | x |
| Long-beaked common dolphin, *Delphinus capensis* | x | | |
| Melon-headed whale, *Peponocephala electra* | | x | |
| Mesoplodont beaked whales, *Mesoplodon spp.* | x | | |
| Minke whale | x | x | |
| Narwhal | | | ** |
| Northern right whale dolphin, *Lissodelphis borealis* | x | | |
| Pacific white-sided dolphin, *Lagenorhynchus obliquidens* | x | | x |
| Pantropical spotted dolphin, *Stenella* | | x | |

| | | | |
|---|---|---|---|
| *attenuata* | | | |
| Pygmy sperm whale, *Kogia breviceps* | x | x | |
| Risso's dolphin, *Grampus griseus* | x | x | |
| Rough-toothed dolphin, *Steno bredanensis* | | x | |
| Short-beaked common dolphin, *Delphinus delphis* | x | | |
| Short-finned pilot whale, *Globicephala macrorhynchus* | x | x | |
| Spinner dolphin (non-ETP stocks), *Stenella longirostris* | | x | |
| Striped dolphin, *Stenella coeruleoalba* | x | x | |
| Stejneger's beaked whale, *M. stejnegeri* | | | x |

*The Hawaiian-insular stock has been proposed for ESA listing as threatened as of November 17, 2010.
**In development.

### *3.3.2 Non-target species*

In addition to the target species, a wide variety of non-target species could be found within the action area, including invertebrates, fish, and other marine mammals. Merely being present within the action area does not necessarily mean a marine organism will be affected by the proposed action. Research is not directed at these species and any impacts would be considered incidental to the Proposed Action. The Proposed Action would include takes for the incidental harassment of pinniped species that would be unavoidable due to the nature of the research (see Appendix A) including Northern fur seals (*Callorhinus ursinus*), endangered and threatened Steller sea lions, and ringed (*P. hispida*) and bearded (*Erignathus barbatus*) seals, which have distinct population segments that have been proposed for listing as threatened under the ESA. The permit would also authorize the incidental capture of harbor seals during gillnet captures. Animals would be immediately released alive and none would be seriously injured or killed as a result of capture. No other species are expected to be affected by the Proposed Action.

**Northern fur seals** – Northern Fur Seals range throughout the North Pacific Ocean from southern California north to the Bering Sea and west to the Okhotsk Sea and Honshu Island, Japan. Two separate stocks are recognized in U.S. waters: the Eastern Pacific stock and the San Miguel Island stock. In addition to the MMPA, this species is protected by the FSA. The following information is summarized from the conservation plan (NMFS 2007b) and NMFS webpage (http://www.nmfs.noaa.gov/pr/species/mammals/pinnipeds/northernfurseal.htm) developed for the species.

Northern fur seal habitat includes a variety of marine waters and haulouts (resting sites), and a small number of terrestrial rookeries (breeding sites). Rookeries can be found at St. Paul and St. George islands (i.e., collectively the Pribilof Islands), Bogoslof Island in the southern Bering

Sea, San Miguel Island in southern California. Rookeries outside of U.S. waters exist on the Commander Islands in the western Bering Sea, Robben Island in the Sea of Okhotsk, and the Kuril Islands north of Japan. Southeast Farallon Island and San Nicolas Island, California, are known haulout sites; however, they may temporarily haul out on land at other sites in Alaska, British Columbia, and on islets along the coast of the continental United States.

Adult males inhabit the rookeries from May through August, and some may stay until November after giving up their territories. Adult females occupy the rookeries from June through November. The following 7 to 8 months will then be spent at sea migrating south. Females and pups originating from the Pribilof Islands tend to migrate to the North Pacific Ocean offshore of Oregon and California. Pups may stay at sea for 22 months before returning to the rookery of their birth. Males commonly migrate only as far as the Gulf of Alaska.

The Pribilof Island population was designated as "depleted" under the MMPA in 1988 because it had declined by more than 50% since the 1950s. Current trends show that northern fur seal populations on the Pribilof Islands have continued to decline. The Eastern Pacific stock is currently estimated at 666,000 animals from a historical high of 2.1 million in the late 1940s to early 1950s. On the Pribilof Islands of St. Paul and St. George, the estimated pup production has declined 5.2% per year since 1998. Conversely, fur seal abundance on Bogoslof Island increased through the 1990s (58% per year from 1988 to 1997) and continues to increase.

The first fur seals to populate San Miguel Island likely migrated from the Pribilof Islands. The population grew steadily in the 1950s and early 1960s (46%), but experienced declines from major El Niño events. The population began to recover in 1999 (approximately 1,084 pups and 4,336 adults were documented), but a reduced number of females after 1998 may mean fewer numbers of pups for several more years. A small population has developed on South Farallon Island (off the California coast), presumably immigrants from San Miguel Island.

The Commander Islands, Kuril Islands, and Robben Islands in Asia experienced a severe decline of northern fur seals in the early 1900s from commercial sealing. The number of seals declined on all three islands between the late 1960s and the late 1980s. The Robben Island population now appears to be recovering.

Historical declines were caused by unregulated commercial harvests; however, after "pelagic" harvests were stopped in 1911, the fur seal population recovered, and by the 1950s was thought to be at pre-harvest levels. The most recent decline began soon after an experimental female harvest was implemented in 1956 to increase the productivity of the herd. Although the consequences of this program were recognized within a few years and the female harvest ended in 1968, the northern fur seal population on the Pribilof Islands continued to decline. Regulated commercial harvests ended on St. George Island in 1976 and on St. Paul Island in 1984. NMFS currently allows a subsistence harvest by Alaskan natives based on need. This is not thought to be a cause of continued population decline. The number of fur seals taken for subsistence purposes currently ranges from 1,645-2,000 seals on St. Paul Island and 300-500 on St. George Island.

Northern fur seals face a variety of threats including: predation, changes in the availability of prey, bycatch in fishing gear, habitat change, entanglement in marine debris, disturbance from vessels and humans, climate change, and environmental pollutants. The factors affecting northern fur seal survival are poorly understood, particularly while the animals range outside the Bering Sea. Studies of Steller sea lions, which have experienced similar population declines, suggest that factors limiting recovery include changes in quantity and quality of prey and possible increased predation by killer whales. Reduced survival rates of northern fur seal adult females and juveniles may also limit recovery.

**Steller sea lions** – Steller sea lions prefer the colder temperate to sub-arctic waters of the North Pacific Ocean. Haul outs and rookeries usually consist of beaches (gravel, rocky or sand), ledges, rocky reefs. In the Bering Sea and Okhotsk Sea, sea lions may also haul out on sea ice, but this is considered atypical behavior. Critical habitat has been defined for Steller sea lions as a 20 nautical mile buffer around all major haul-outs and rookeries, as well as associated terrestrial, air and aquatic zones, and three large offshore foraging areas.

Steller sea lions are distributed mainly around the coasts to the outer continental shelf along the North Pacific Ocean rim from northern Hokkaiddo, Japan through the Kuril Islands and Okhotsk Sea, Aleutian Islands and central Bering Sea, southern coast of Alaska and south to California. For management purposes, Steller sea lions inhabiting U.S. waters have been divided into two Distinct Population Segments (DPSs) at 144° West longitude (Cape Suckling, Alaska). The differentiation is based primarily on genetic and physical differences, but also on differing population trends in the two regions. The Western DPS includes Steller sea lions that reside in the central and western Gulf of Alaska, Aleutian Islands, as well as those that inhabit the coastal waters and breed in Asia (e.g., Japan and Russia). The Eastern DPS includes sea lions living in southeast Alaska, British Columbia, California, and Oregon.

Approximately 39,000-45,000 Steller sea lions are in the Western DPS and 44,500-48,000 in the Eastern DPS. The Western DPS declined by 75% between 1976 and 1990, and decreased another 40% between 1991 and 2000 (the average annual decline during this period was 5.4%). Since the 1970s, the most significant drop in numbers occurred in the eastern Aleutian Islands and the western Gulf of Alaska. The extent of this decline led NMFS to list the Steller sea lion as threatened range-wide under the ESA in April 1990. However, NMFS recently received two petitions to delist the Eastern DPS and is soliciting comments on these requests. In the 1990s, the decline continued in the Western portions of the range leading NMFS to divide the species into two distinct population segments (DPS), Western and Eastern, and list the Western DPS as endangered in 1997. Population surveys suggest that the Eastern U.S. DPS is stable or increasing in the northern part of its range (Southeast Alaskan and British Columbia), while the remainder of the Eastern DPS and all the Western DPS is declining.

The Eastern DPS consists of animals born in southeast Alaska, British Columbia, Washington, Oregon, and California. Similar to the western DPS, population surveys prior to the 1970s were of limited geographical scope, used various techniques, and occurred during different times of year. Survey techniques since the 1980s have been the same as those used in the western DPS, including the use of trend sites. The population in southeast Alaska increased by almost 4 percent per year between 1985-1989 (Loughlin et al. 1992). From 1990 to 2000, counts of non-

pup SSLs at trend sites showed an overall increase of 29 percent, or an average increase of almost 2 percent per year (Sease et al. 2001). Trends in British Columbia, Washington, and Oregon have shown similar increases. While numbers in central and southern California have been decreasing, the eastern stock as a whole is stable or increasing slowly (Allen and Angliss Outlaw 2010).

Steller sea lions in southeast Alaska are not an isolated population, as demonstrated by the movement of branded and tagged animals from southeast Alaska to British Columbia and Washington (Raum-Suryan et al. 2002). In addition, recent mitochondrial deoxyribonucleic acid (DNA) studies with large samples of pups from newly established rookeries in the eastern DPS have shown that some females born in the Western DPS are pupping in the Eastern DPS (NMFS unpublished data).

Overall, the Eastern DPS has increased over 3 percent per year since the 1970s, more than doubling in southeast Alaska, British Columbia, and Oregon. The Eastern DPS contained only about 10 percent of the total number of Steller sea lions in the United States in the 1970s. However, large declines in the Western DPS coupled with notable increases in the east resulted in a shift such that over half of the Steller sea lions in the United States now belong to the Eastern DPS (NMFS 2006c).

Anthropogenic threats to Steller sea lions include boat strikes, contaminants/pollutants, habitat degradation, illegal hunting/shooting, offshore oil and gas exploration, direct and indirect interactions with fisheries, and subsistence harvests by natives in Alaska and Canada (150-300 taken a year). In the 1800s, they were targeted by hunters for their meat (food), fur hides (clothing), oil, and various other products. In the early 1900s, fishermen killed and placed bounties on this species, which they blamed for stealing fish from them. Some Steller sea lions were killed to limit their predation on fish in aquaculture facilities (fish farms), but intentional killing of Steller sea lions has not been permitted since they were protected under the MMPA and listed under the ESA.

Steller sea lions' direct and indirect interactions with fisheries are currently receiving significant attention and may possibly be an important factor in their decline. Direct fishing impacts are largely due to fishing gear (drift and set gillnets, longlines, trawls, etc.) that has the potential to entangle, hook, injure, or kill sea lions. These pinnipeds have been seen entangled in fishing equipment with what are considered "serious injuries". Steller sea lions are also indirectly threatened by fisheries because they have to compete for food resources and critical habitat may be modified by fishing activities.

**Ringed and Bearded Seals**

NMFS has been evaluating the status of ice-associated seals (ribbon, *Histriophoca fasciata*, ringed, spotted, *P. largha*, and bearded) with respect to whether listing them as threatened or endangered under the ESA is warranted. In March 2008 (73 FR 16617) NMFS announced initiation of status reviews of ribbon, bearded, ringed, and spotted seals to determine if is ESA listing is warranted.

Ringed seals and bearded seals are now considered "candidate species" meaning they are species for which NMFS has been petitioned to list as endangered or threatened under the ESA and for which an ESA status review has been initiated. A final determination is pending completion of the status review.

- Early estimates of the Alaska stock of bearded seal population range from 250,000 to 300,000 animals. Current abundance and population trends of the U.S. stock are unknown. Loss of sea ice is the primary threat to this stock.
- The estimated population size for the Alaska stock of ringed seals is 249,000 animals. The population trend for this stock is unknown. Because much of their habitat is dependent upon pack ice, changes in ice availability are considered the most serious threat to this population.

No other stocks of pinnipeds that might be incidentally harassed are listed as depleted, threatened or endangered.

# CHAPTER 4 ENVIRONMENTAL CONSEQUENCES

This chapter 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).

## 4.1 EFFECTS OF ALTERNATIVE 1: No Action

The majority of the proposed activities are authorized under Permit No. 782-1719, originally issued in 2004, and as such are considered as part of the baseline. Currently authorized take numbers are comparable to or slightly lower than (within the same order of magnitude) those requested in the Proposed Action (Appendix A).

Under Alternative 1, the requested permit would not be issued. Activities currently authorized under Permit No. 782-1719-09 would cease when a decision is made to issue or deny the Proposed Action. This alternative would eliminate any potential risk to the environment from the proposed research activities. However, the research would not be conducted and the opportunity would be lost to collect information that would contribute to better understanding marine mammal populations. This information is necessary for NMFS to conduct mandated stock assessments and status reviews and implement management activities.

More specifically, the No Action alternative would prohibit the researchers from collecting valuable information on cetaceans in the action area. The work described in the Proposed Action directly addresses research needs identified in NMFS recovery plans for several of the target ESA species, and would provide important information that would help conserve, manage, and recover species as required by the ESA, MMPA, and implementing regulations. The information would also contribute substantially to conservation efforts by providing critical information about marine mammal ecology. Without relevant, up-to-date information on species biology,

ecology, and behavior, management decisions may be too conservative or not sufficiently conservative to ensure a stock or species to recover.

Even if the requested permit is not issued, marine mammals living within the action area would still be exposed to vessel traffic and anthropogenic effects, including existing permitted scientific research and future requests for permits (see Ch. 4.7 for more details). Takes authorized by existing permits occur by a variety of research and enhancement activities involving harassment, as defined under the MMPA, and take as defined under the ESA.

## 4.2 EFFECTS OF ALTERNATIVE 2: Issue permit with standard conditions

The activities requested in the permit application would allow research conducted since 2004 under Permit No. 782-1719, and under various prior scientific research permits, to continue for five additional years. The number of animals proposed to be taken annually would be comparable to, and in some cases lower than, currently authorized take levels. The proposed action would differ from NMML's current permit by authorizing takes for:

- Level B research on narwhals,
- Humpback whale research in the Atlantic Ocean,
- Some sampling methods for health assessments during captures, and
- Captures, associated procedures and mortality of Dall's and harbor porpoises.

However, both porpoise species were authorized for capture by drift net under Permit No. 782-1645. The majority of the proposed associated capture procedures have been previously authorized by No. 782-1719. Beyond the noted activities that differ from the current permit, the proposed take levels would not be substantially different from the level of effort authorized under Permit No. 782-1719. Therefore, the overall effect of issuing the permit would be similar to the effects of issuing Permit No. 782-1719 and subsequent amendments.

**Effects to the Physical Environment**

The Proposed Action would mainly impact the biological environment. However, due to the use of capture nets, minor impacts to bottom habitat could occur as noted in Ch. 3. Only beluga entanglement nets are likely to contact habitat. Nets used for porpoise captures would not touch bottom and therefore are not expected to result in impacts to the physical environment. Entanglement nets based on dimensions could sweep of 4,000 $m^2$ during a capture while circling the animal. The leadline on the net would be very light and would lightly contact but not drag the bottom or bring up substantial debris. NMML noted that in the past, only a few blades of vegetation were observed in the net from very few of their sets. NMML attempts to set nets in soft bottom habitat (mud, sand, or gravel) that is free of debris or substantial vegetation since it can foul the net and/or create an opening at the base that the target beluga can use to escape the net. NMFS contacted the NMFS Office of Habitat Conservation (OHC) to determine if EFH impacts may occur. The OHC responded March 21, 2011 that no adverse effects to EFH would be expected from the proposed activities. In addition NMML would try to visually check for vegetation prior to setting the net when possible (based on water clarity) and would review appropriate EFH maps prior to field trips and attempt to avoid setting nets in areas with

vegetation. Based on this information, NMFS does not expect that EFH or other portions of the physical environment would be significantly impacted by the Proposed Action.

**Effects to the Biological Environment**

The issue most relevant to this analysis is the potential for negative impacts on the target and non-target species. It is important to recognize that an adverse effect on a single individual or a small group of animals does not translate into an adverse effect on the population or species unless it results in reduced reproduction or survival of the individual(s) that causes an appreciable reduction in the likelihood of survival or recovery for the species. In order for the Proposed Action to have an adverse effect on a species, the exposure of individual animals to the research activities would first have to result in:

- direct mortality,
- serious injury that would lead to mortality, or
- disruption of essential behaviors such as feeding, mating, or nursing, to a degree that the individual's likelihood of successful reproduction or survival was substantially reduced.

That mortality or reduction in the individual's likelihood of successful reproduction or survival would then have to result in a net reduction in the number of individuals of the species. In other words, the loss of the individual or its future offspring would not be offset by the addition, through birth or emigration, of other individuals into the population. That net loss to the species would have to be reasonably expected, directly or indirectly, to appreciably reduce the likelihood of both the survival and recovery (for ESA species) of the species in the wild.

For narwhals, only activities resulting in Level B harassment would be authorized by the permit (see Appendix A for proposed aerial and vessel takes). No Level A activities, including biopsy sampling, tagging, captures or mortalities, would be authorized.

Effects to Target Species

***Effects of Aerial Surveys***

***Level B harassment***, as defined by the MMPA, would occur during aerial surveys, photo-identification activities, observations, and aerial photogrammetry surveys. The effects of these activities were analyzed in the original EA for Permit No. 782-1719 (NMFS 2004). The 2004 EA noted that surveys may harass marine mammals; however, they are not likely to result in serious injury or mortality of any species. Given the mitigation measures that were included in the permit, animals may temporarily change their behavior as the aircraft approaches, but this harassment would be minimal and short-lived. Therefore, NMFS determined that disturbances from these surveys would not have a significant impact on marine mammals. Given that similar mitigation measures would be included for the permit to minimize harassment during surveys, issuance of Permit No. 14245 would not be expected to have any additional effects that were not previously analyzed. No more than short-term behavioral responses would be expected to result from the proposed aerial surveys.

Studies on the reactions of cetaceans to aircraft show little negative response (Richardson et al. 1995). In general, reactions range from sudden dives and turns and are typically found to

decrease if the animals are engaged in feeding or social behavior. Whales with calves or in confined waters may show more of a response. Generally there has been little or no evidence of marine mammals responding to aircraft overflights when altitudes are at or above 1,000 ft, based on three decades of flying experience in the Arctic (NMFS unpublished data). Richardson and Malme (1993) provide a review of noise from aircraft flown at 1,000 ft altitude; a twin-engine turboprop fixed-wing aircraft will have 80-315 db at the water surface beneath the aircraft, which is near or above ambient sound levels (73-75 db) in the Arctic. This indicates that an aircraft flying directly overhead is likely heard by a bowhead, but it does not suggest that the whale will be alarmed by the sound. Even though aerial surveys have operated most years near Barrow since 1978 (Braham et al. 1979) and fairly intensely between 1984 and 1994 (Rugh et al. 2009) as well as in 2003 and 2004 (Koski et al., in review), often doing passes from 300 to 500 ft for photography, the whale migration continues to return to this same area each year. Reactions observed from Southern right whales off Argentina to overflights of small aircraft have included accelerated swimming and diving; however, this was noted in <2% of the observed animals and occurred at lower altitudes (213–492 ft) (Payne et al. 1983). Southern right whales off Australia showed little response to overhead aircraft except when it circled at 492 ft. Reactions included longer dive times and shorter surfacing (Ling and Needham 1990). In addition, observations from Southern right whales and North Atlantic right whales showed that individual animals appeared to react more than larger groups (Fairfield 1990).

Beluga whales have also shown variable reactions to aircraft depending on aircraft type and altitude and beluga activity or habitat type (Richardson et al. 1991). Some beluga whales did not respond to aircraft flying as low as 358 ft while others looked upward, dove abruptly or turned sharply to aircraft flying at 1,500 ft. Patenaude et al. (2002) found few belugas (3.2%) reacting to overflights of fixed wing aircraft at altitudes 200 – 1,500 ft in the Beaufort Sea. Based on long-term studies that have been conducted on beluga whales in Cook Inlet since 1993, NMFS expect that there will be no effects of this research on beluga whales. No change in beluga swim directions or other noticeable reactions have been observed during the Cook Inlet aerial surveys flown from 600 to 800 ft. (e.g., Rugh et al. 2000).

***Effects of Vessel-Based Research***

***Level B harassment***, as defined by the MMPA, would occur during large and small vessel surveys, photo-identification activities, observations, collection of remains, feces, and sloughed skins. These activities were analyzed in the original EA for Permit No. 782-1719 (NMFS 2004) which determined that close vessel approaches could lead to disturbance of marine mammals, but reactions are generally short-term and of a low impact and not likely to disrupt the migration, breathing, nursing, feeding, breeding, or sheltering behavior of marine mammals (NMFS 2004). Issuance of Permit No. 14245 would not be expected to have any additional effects, summarized below, that were not previously analyzed. No more than short-term behavioral responses would be expected to result from research activities.

As described in the 2004 EA, behavioral responses would be expected to vary from no response to diving, tail slapping, or changing direction. With experienced vessel drivers and pilots, any potential effect of vessel approach should be short-lived and minimal. These short-term behavioral responses would not likely lead to mortality, serious injury, or disruption of essential

behaviors such as feeding, mating, or nursing, to a degree that the individual's likelihood of successful reproduction or survival would be substantially reduced. Annual reports submitted by the NMML under Permit No. 782-1719 indicate that conduct of activities resulting in Level B harassment have not lead to mortality, serious injury, or disruption of essential behaviors such as feeding, mating, or nursing.

The permit, if issued, would contain conditions requiring NMML to retreat from animals if behaviors indicate the approach may be interfering with reproduction, pair bonding, feeding, or other vital functions. No mortalities or long-term adverse effects would be expected as a result of these research activities. The short-term behavioral responses that might result from research activities would not likely lead to mortality, serious injury, or disruption of essential behaviors such as feeding, mating, or nursing, to a degree that the individual's likelihood of successful reproduction or survival would be substantially reduced.

***Level A harassment***, as defined by the MMPA, would occur during biopsy sampling, tagging, captures, and subsequent capture procedures, when physical contact is made that has the potential to injure animals. Actual injury would be minimized by conditions of the permit limiting how sampling and attachment of tags may occur, such as avoiding sensitive areas of the body. NMML would also minimize potential disturbance and stress by:

- Limiting time spent in the vicinity of target animals and the number of attempts made to collect biopsy samples or to deploy tags in order to minimize incidental harassment or disturbance from the presence of the small boat or the activities.
- Not approaching animals exhibiting behaviors that indicate a negative reaction to the vessel, such as aerial behaviors or tail slaps. If at any time during these there is a negative reaction (rapidly diving, tail slapping, or rapidly swimming away), all efforts to approach the animals will cease.
- Not biopsy sampling neonate animals.
- Limiting the time animals are held during captures.
- Limiting the suite of capture procedures that may be performed on pregnant females.
- Monitoring nets and conducting net checks during captures.
- Having qualified, trained staff or veterinarians perform capture procedures.

Level B harassment from large and small vessel surveys and photo-identification, as described above, would occur in conjunction with Level A harassment activities.

*Remote Biopsy Sampling*

Biopsy sampling has been used extensively worldwide and is a common and widely accepted method for obtaining tissue samples, especially because the unequivocal value of molecular genetic tools and analyses has been recognized. The potential for serious injury and/or long-term effects on individuals from remote biopsy sampling is considered minimal. The biopsy darts would not contain any hazardous materials, and the penetration depth of the dart relative to the blubber depth, and the mitigation measures employed to prevent deeper penetration, make it highly unlikely that serious injury would occur to target individuals.

As with any instance where the dermis is penetrated, there is the possibility of infection associated with biopsy sampling. However, no evidence of infection has been seen at the point of penetration or elsewhere among the many whales re-sighted in days following the taking of a biopsy sample. There have been no documented cases of infection or injury to large whales resulting from biopsies, including well-monitored populations with repeatedly observed identified individuals.

Wounds heal quickly in cetaceans (Weller et al. 1997, Krützen et al. 2002, Parsons et al. 2003). In addition to naturally occurring coloration patterns, the marks used to identify individuals include healed wounds from predation attempts (see Heithaus 2001a for a review of predator interactions), inter- and intra-species interactions, barnacles, remora, entanglement, and vessel interactions. In Shark Bay, Australia, approximately 74% of non-calf bottlenose dolphins had shark bite scars (Heithaus 2001b). A recent permit application for capture of bottlenose dolphins in the Indian River Lagoon, Florida, indicated that wounds from the collection of a full-thickness skin and blubber wedge biopsy approximately 5 cm length x 3 cm width typically heal in 14-30 days. No known morbidity or mortality has been associated with these procedures as described (G. Bossart, File No. 14352). Given the size of the proposed samples that would be collected relative to the size of the target cetaceans, these small biopsy wounds would be expected to heal in a similar time frame. A study of wound healing in pilot whales indicates that biopsy wounds can heal in as little as several days to a couple months after sampling (Gimenez et al. 2011). In addition, the authors state that the condition of the healed wound site indicates that long-term health problems are not likely from biopsy sampling.

Reeb and Best (2006) collected deeper biopsy samples from Southern right whales of all age classes using a hand-held pole system. The longest (deepest) samples the authors collected were from two early season calves (11.7 and 12.4 cm), a late season calf (13.2 cm), an early season adult (18.6 cm), and a late season adult (21.2 cm). Behavioral reactions to this system of biopsy collection were no greater than those observed during use of the more superficial Paxarms biopsy system (Best et al. 2005). The greatest component of the behavioral reaction to pole sampling was to the close approach of the vessel (Reeb and Best 2006). The biopsy site was hardly visible following biopsy, with one exception. In that instance, a thin spray of blood was seen from the biopsy site of a neonate, who reacted by lifting its head and fluke, slapping the water surface with its fluke, and swimming away. The bleeding ceased within minutes and the neonate's behavior appeared normal (Reeb and Best 2006).

Biopsy sampling of cetaceans using remote darting procedures is well documented and has been successfully practiced for many years, and has been a standard technique since the late 1980s for species as diverse as harbor porpoise and blue whales. For example, it was used extensively on humpback whales in the North Atlantic (over 3,000 samples (Palsbøll et al. 1997)). There has been no evident effect of biopsy sampling on any stock up to ten years after the completion of the studies, including those with mothers and calves. Humpback whales have been biopsied perhaps more often than any other large cetacean, and the most heavily sampled stocks in both the North Atlantic and the North Pacific are at stable or possibly increasing population levels (Mizroch et al. 2004); NMFS SARs (www.nmfs.noaa.gov/pr/sars/species.htm). Further, in the years that NMML has been collecting biopsy samples, no known instance of an injury to a

marine mammal has occurred from biopsy sampling. Bearzi et al. (2000) reported the death of a common dolphin following penetration of a biopsy dart and subsequent handling. The authors concluded that the biopsy dart did not produce a lethal wound, but that the biopsy darting and subsequent handling, perhaps in combination with potential pre-existing health conditions of the animal, produced physical and/or physiological consequences that were fatal to the animal. There is no evidence that the biopsy procedure or associated boat approaches, if conducted responsibly and by experienced individuals, has any significant impact on cetacean populations. Studies to date indicate no long-term consequences on survival, return rates, or fecundity.

*Effects of Biopsy Sampling Large Whales*

The effects of biopsy sampling on the large whale species requested in the Proposed Action were analyzed in the original EA for Permit No. 782-1719 (NMFS 2004) and subsequent SEAs (NMFS 2005a,b; 2006b; and 2007) for the permit identified in Ch. 1.2. In addition to the effects of the close approach of a vessel to whales associated with collecting biopsy samples (described above), that analysis determined:

- No evidence of infection has been seen at the point of penetration of a biopsy dart or elsewhere among whales re-sighted following biopsy sampling.

- The responses of whales are generally minimal to non-existent when approaches are slow and careful, and 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.

- Biopsy sampling would not be expected to have long-term, adverse effects on the target species; therefore disturbances from the activities were considered not likely to have a significant cumulative effect on any research animals.

Biopsy sampling has been conducted successfully with little or no behavioral reactions (e.g., Weinrich et al. 1991, 1992; Clapham and Mattila 1993; Brown et al. 1994; Gauthier and Sears 1999; Cerchio 2003); NMFS' Northeast Fisheries Science Center (NEFSC) has reported that most right whales darted during past research (80.6 percent; Brown et al. 1991) have shown no reaction. Those individuals that did react either responded by "flinching" or through a tail flick or dive. Whales that have been inadvertently biopsied more than once have been documented displaying either no response or short-term behavioral responses (Gauthier and Sears 1999), although Southern right whale cows in cow-calf pairs may react more strongly to inadvertent repeat sampling (Best et al. 2005). A few strong reactions have been documented in humpback whales following biopsy procedures (Weinrich et al. 1991, 1992), but all involved unusual instances, such as a biopsy dart retrieval line being snagged on a fluke. Observations of whales in the days and years following darting indicated no long-term effects of the procedure. When reactions to biopsy sampling are observed, most individuals resume their normal behavior within a few minutes (Gauthier and Sears 1999).

In some cases, the Proposed Action contains comparable or slightly higher take numbers for biopsy sampling of large whale species than are currently authorized for Permit No. 782-1719; however, there is no evidence that responses of individual whales would exceed short-term stress and discomfort and no long-term effects would be anticipated. The activities would not be

expected to have any additional effects that were not previously analyzed. The short-term behavioral responses that might result from research activities would not likely lead to mortality, serious injury, or disruption of essential behaviors such as feeding, mating, or nursing, to a degree that the individual's likelihood of successful reproduction or survival would be substantially reduced. In addition, conditions and mitigation measures would be placed in the permit to further limit the potential for negative effects from these activities.

*Effects of Biopsy Sampling Large Whale Calves and Mother/Calf Pairs*
Studies indicate that mothers/calf pairs are no more sensitive to biopsy procedures than other groups, although mothers tended to be more evasive of approaching boats (Weinrich et al. 1991, 1992). The potential for disturbance of mother/calf pairs lies not in the sampling, but rather in the associated vessel approach (Clapham and Mattila 1993). Similar to other age classes, changes in behavior associated with sampling have been observed to be momentary; the biopsied individual will almost always continue the original behavior, or resume the behavior within a few minutes.

The main consideration for potential impacts from biopsy sampling calves and mother/calf pairs is the potential for the close presence of the vessel to disrupt the important mother/calf pair bond or otherwise interfere with mother or calf fitness or survival. There have been a number of studies that have collected biopsy samples from large whales, including calves, with the following results:

- Clapham and Mattila (1993) conducted a detailed, directed study of the effects of biopsy sampling on humpback whales, including individual calves less than 6 months old, and concluded "biopsies can be obtained from mothers and their calves with little effect on the animals." They analyzed behaviors before and after biopsy sampling, and the immediate reactions of 565 biopsied humpback whales (in addition to 427 misses). They found that most whales did not react (or did so minimally), and those behaviors, before and after, most often did not change. Additionally, mothers were the *least* likely to react to a biopsy hit, and calves reacted the same as non-calf whales that were not anticipating contact (*e.g.*, noncompetitive and not mothers). Minimal reaction has been observed in studies of biopsy-sampled calves (Clapham and Mattila 1993, Cerchio 2003). Calves reacted more to biopsy hits than mothers, principal escorts, challengers and secondary escorts, but not significantly different than all the other classes of whales (Clapham and Mattila 1993). In no instance was a calf ever observed to separate from a mother, and many hundreds of mothers and calves have been observed and biopsied. The reactions were always short-term and the mothers and calves resumed normal behavior after the sampling ended (Clapham and Mattila 1993).

- Gauthier and Sears (1999) studied reactions of three baleen whales species, including humpback, fin and blue whales, revealing differences between the species. The majority of fin and blue whales exhibited no behavioral response to biopsy sampling, including two fin whale calves biopsied. No strong reactions were observed for these species (Gauthier and Sears 1999). The majority of humpback responses were moderate, consisting of hard tail flicks. Of the humpback whale calves biopsied, 4 out of 7 had a

moderate to low reaction while the rest had no reaction (Gauthier and Sears 1999). They also noted that reactions of whales typically lasted at the most only a few minutes.

- Minimal reactions of biopsied adult females, including mothers, have been observed in many studies (Weinrich et al. 1992; Clapham and Mattila 1993; Brown et al. 1994). Mothers reacted significantly less to the biopsy strike than all other classes combined (Clapham and Mattila 1993). Reactions were always short-lived.

- A study of the long-term effects of biopsy sampling southern right whales (*E. australis*) found that the majority of cows that accompanied calves elicited a non-forceful fluke movement or lesser reaction (Best et al. 2005). Calves of cow/calf pairs on average showed a lesser response akin to a startle when biopsied (Best et al. 2005). Their data also suggested that cows may become more sensitive to repeated biopsy sampling within short time frames (less than 1 year) while this could not be detected in calves due to low sample sizes (Best et al. 2005). The authors also were unable to detect any difference in reproductive success or the proportion of normal calving intervals based on whether an animal was biopsy sampled in the prior 2 years, but they caution this could be due to low sample sizes and statistical power. Despite this, no major effects to the population were detected and the authors cautiously approve of the biopsy sampling of southern right whale cow/calf pairs when done with care.

- The NMFS Northeast Fisheries Science Center (NEFSC) has evaluated long-term impacts of biopsy sampling for humpback whale mothers and calves, and a similar analysis is underway for right whales. The humpback whale data indicates that survival of biopsied (n = 106) and unbiopsied (n = 112) calves is not significantly different. Similarly, the fecundity and return rates of biopsied adult females (n = 52) and unbiopsied mature females (n = 144) were not significantly different. The NEFSC has seen little effect from biopsy activities conducted on right and humpback whales both in the short and long term based on records maintained for biopsy operations. The available data suggest that in all cases, the activity has had little effect on right and humpback whales (Clapham et al. in prep).

- NMML is currently authorized to biopsy sample calves less than six months of age and females accompanying them under Permit No. 782-1719-09. Annual reports indicate that no more than short-term behavioral responses (e.g., tail flick, dive) have been observed during sampling. The mother-calf bond has not been broken during sampling events.

Based on this information, NMFS expects that the effects of biopsy sampling large whale calves and females with calves would be similar to sampling adult large whales. These procedures would be expected to result only in short-term stress and discomfort and no long-term effects would be anticipated. Any behavioral impacts to this age class and pairing would likely be short-term and considered minimal. In addition, conditions and mitigation measures would be placed in the permit to further limit the potential for negative effects from these activities.

*Effects of Biopsy Sampling Small Cetaceans*
As with large whales, the effects expected from biopsy sampling dolphins would include behavioral reactions to close vessel approach (as described above) and responses to biopsy darts. During past research conducted by the NMML, reactions by individuals of various species to biopsy sampling and tagging generally have been low-level and short-lived, ranging from no visible response to a "startled" reaction sometimes followed by an animal swimming away or diving; individual animals were more likely to respond to the approach of the small boat than to the biopsy itself. Bowriding dolphins sampled from the main research vessel often continue to ride the bow after the biopsy sample has been collected. No known injuries or other significant effects have been observed during the two decades NMML has conducted this type of sampling, and no entanglements have resulted from using tethered biopsy darts.

The Proposed Action contains comparable or slightly higher take numbers for biopsy of small cetaceans than are authorized for Permit No. 782-1719; however, there is no evidence that responses of individual dolphins would exceed short-term stress and discomfort and no long-term effects would be anticipated. The activities would not be expected to have any additional effects that were not previously analyzed. The short-term behavioral responses that might result from research activities would not likely lead to mortality, serious injury, or disruption of essential behaviors such as feeding, mating, or nursing, to a degree that the individual's likelihood of successful reproduction or survival would be substantially reduced. In addition, conditions and mitigation measures would be placed in the permit to further limit the potential for negative effects from these activities.

*Summary of Effects of Biopsy Sampling*
The proposed activities would not be expected to result in more than short-lived, minimal harassment of individual animals of any age class or sex. No serious injury or mortality would be expected from these activities. Vessel collision during research is not likely to occur given the nature of the proposed activities, the researchers' experience in maneuvering boats around cetaceans, and the mitigating measures in the permit. Mitigating measures would also reduce the level of harassment to sensitive groups such as females with calves and repeated harassment of animals during all activities.

The proposed activities would not be expected to reduce the reproductive fitness or success of any cetacean. Re-sightings of sampled animals suggest that animals would not significantly alter their range or habitat use and that any wounds at the biopsy site would heal over time, resulting in no long-term adverse effects to individual health. The proposed biopsy activities would not likely lead to serious injury, mortality, or disruption of essential behaviors such as feeding, mating, or nursing, to a degree that the individual's likelihood of successful reproduction or survival would be substantially reduced; therefore no stock- or species-level effects would be expected.

*Tagging*
In addition to the potential for behavioral responses to close approach (described above), potential effects to individuals targeted for tagging include behavioral responses to tag attachment, increased hydrodynamic drag, and the possibility for infection at the attachment site of tags that break the skin.

The proposed tagging activities would continue the use of the suction cup attached tags and implantable tags authorized by Permit No. 782-1719 and analyzed in the 2004 EA and subsequent SEAs for the permit identified in Ch. 1.2. Briefly, NMFS determined in the previous EAs that, in addition to any Level B harassment resulting from the close approach to attach tags:

- Suction-cup attachments would be short-term (generally less than one day), and could be dislodged by the animal by maneuvering rapidly, breaching, or rubbing against a solid surface.
- The suction cup assembly could migrate along the skin of the whale, but because the tag would be attached caudal to the blowhole, movement would be toward the fluke of the animal and therefore would create no danger that the tag would cover the blowhole.
- The proportion of the suction cup assembly to the animal's size and weight would be such that any additional energetic demand created by hydrodynamic drag would likely be insignificant.
- Implantable tags would work their way out of the blubber in days to months after tagging, and the chance of infection would be expected to be extremely low.
- None of the attachment types would be likely to injure individuals or elicit more than a minimal, short-lived response from whales.

The proposed data collecting tags and the dorsal fin "dart" tags are medium-duration satellite tags (after Andrews et al. 2008) that attach using small, penetrating darts for an average of four weeks before backing out of the entrance holes. Applications of the "dart" tag unit on other marine mammals indicate that it may remain attached for 14 weeks (Jay 2006). The tag is expected to back out of the entry site leaving only small wounds that would heal rapidly. Signs of chronic inflammation have been observed at the dart site in two pilot whales, but after tag loss the penetration sites and surrounding tissue appeared to be granulation tissue (Hanson et al. 2008). In terms of size and weight, these tags are approximately equal to or less than the tag units authorized under Permit No. 782-1719. The SWFSC reported (for Permit No. 774-1714) that three "dart" tags were applied to the dorsal fins of fin whales in 2008, and transmitted for 26, 34, and 86 days. Although follow-up photographs had not yet been obtained at the time of reporting, Hanson et al. (2008) have shown this tag type to have minimal long-term impact and generally only slight scarring evident around the tag implant site.

Fully implantable satellite tags, currently authorized by Permit No. 782-1719, attach dorsally no deeper than the blubber-fascia-muscle interface and generally work their way out in days to months after tagging, depending on the tag design. Impacts of currently authorized satellite tag types for NMML's current permit were analyzed in the 2004 EA and subsequent SEAs prepared for the permit and found not to be significant, with the majority of effects (responses) occurring during the tagging event due to vessel approach and tag attachment and causing no more than short-term disturbance of animals (NMFS 2004, 2005b, 2006b, 2007). NMML scientists involved in tagging activities have extensive experience with animals in the wild. No serious injury or mortality would be expected as a result of use of the proposed tags.

Exact dimensions and weights vary with tag generation and specific components, but the ongoing trend is toward smaller, lighter tags. The annual reports from the use of older tag models, which were often larger and heavier than proposed units, indicate that no known mortality or serious injury has arisen from their use by NMML under past permits. In addition, NMML noted that the proposed tags have been safely and successfully deployed on:

- humpback whale (Mizroch et al. 2010; Mate et al. 1998, Zerbini et al. 2006a, Mate et al. 2007, Clapham et al. 2008, Garrigue et al. in press, Hauser, in press #19404, Hauser et al. in press);
- gray whales (Swartz et al. 1987; Durban, NMML unpublished data);
- blue whales (Mate et al. 1999, Croll et al. 2001, Heide-Jørgensen et al. 2001, Acevedo-Gutierrez et al. 2002);
- minke whales (Víkingsson and Heide-Jørgensen 2005);
- right whales (Mate et al. 1997, Wade et al. 2006);
- bowhead whales (Mate et al. 2000, Heide-Jørgensen et al. 2003, Quakenbush et al. in press);
- killer whales (Andrews et al. 2005, Andrews et al. 2008); and
- sperm whales, minke whales, medium-sized odontocetes and beaked whales (www.cascadiaresearch.org/robin/satellite.htm).

The Proposed Action contains comparable or slightly higher take numbers for tagging cetaceans than are authorized by NMML's current permit; however, there is no evidence that responses of individual whales would exceed short-term stress and discomfort and no long-term effects would be anticipated. The activities would not be expected to have any additional effects that were not previously analyzed for NMML's current permit. The short-term behavioral responses that might result from research activities would not likely lead to mortality, serious injury, or disruption of essential behaviors such as feeding, mating, or nursing, to a degree that the individual's likelihood of successful reproduction or survival would be substantially reduced. In addition, conditions and mitigation measures would be placed in the permit to further limit the potential for negative effects from these activities.

Tag configurations might include the use of VHF transmitters to aid researchers in locating tags, but the frequency range (MHz) for these transmitters would be well above the known hearing range for marine mammals, fish and sea turtles, and NMFS considers signals over 200 KHz to have no effects (A. Scholik-Schlomer, pers. comm. to K. Beard, Oct 2009), therefore VHF transmissions are not considered further.

*Capture, Associated Procedures, and Mortality*

The majority of the proposed capture methods and associated procedures have been previously analyzed for NMML's current permit (NMFS 2004). Gillnetting is not authorized under Permit No. 782-1719 but was previously authorized for NMML under Permit No. 782-1645. Some of the procedures were not conducted under Permit No. 782-1719; however, none of the activities are new or novel procedures in marine mammal research. To ensure the safety of the captured animals, health assessment captures rely on a trained suite of personnel who have participated in

captures and are familiar with the non-target species which they actively avoid when sighted. Recognizing that wild animals are capable of inflicting injury and the possibility of disease transmission to persons handling them, the applicant has established appropriate handling and restraint techniques to avoid injury to both animals and humans. Although the potential for zoonotic disease transmission is low, adequate protective measures would be implemented during all capture and sampling activities. All participants would avoid unnecessary exposure to bodily fluids, feces, etc. from the animal.

All protocols are intended to be non lethal. However, because NMFS recognizes that the use of nets in the water inherently poses a risk of mortality during captures, a low number of accidental mortalities would be issued over the life of the permit (rather than annually) for species authorized for capture: Dall's porpoise, harbor porpoise and non-listed stocks of beluga whales. Mortality could occur during the chase, capture, holding, assessment, tagging or release of the cetacean or be caused by an unanticipated event, such as an additional animal accidentally being captured.

For example, in one porpoise capture session under Permit No. 782-1645 in 2002, three porpoise were captured simultaneously. This was an extremely unusual event. The capture team had never captured more than two animals together in the past and has not captured more than two subsequently. One porpoise was released unharmed, one was successfully tagged, but the third one was not released in time and died. As a result of this mortality event, NMML implemented additional deployment, communications, and net check procedures to ensure that each observed potential entanglement is responded to as quickly as possible.

The encirclement method has been attempted by NMML on more than 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 in 2002 in Bristol Bay under Permit No. 782-1438 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. Since then, NMML has revised its capture protocol and net checks to prevent this from happening in the future.

Though no capture activities are currently proposed for Cook Inlet beluga whales, in August 2002, a whale tagged in Cook Inlet apparently died within a few days of capture and tagging. Although no cause of death can be determined, the loss of the whale seems more than just coincidental and suggests that the death was 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 from capture 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. Sterile procedures have also been reviewed with all co-investigators so that established aseptic procedures are followed. In addition, NMML would only process one captured animal at a time. If more than one animal is captured, NMML would retain the animal

with the lower stress level and better condition and release the other. Likewise if a mother and calf are caught together, both animals would be released.

NMML would continue to follow these improved protocols. Further, the permit would be conditioned to cease research if a certain number of mortality is reached during the course of a year across stocks so that capture protocols and procedures can be reviewed and modified, if warranted. While the PBR level for most of the target beluga and porpoise stocks is considered undetermined, the proposed level of lethal take is well below the PBRs for the Bering Sea and Bristol Bay stocks of beluga whales (Allen and Angliss 2010).

Dr. Randy Wells (File No. 15543) has performed encirclement and breakaway hoop netting followed by comparable procedures on bottlenose dolphins over the course of the 40+ years and none of his activities have been demonstrated to adversely affect dolphins.

NMML notes in their application that their proposed method of monitoring and supporting harbor porpoises has been used on bottlenose dolphins in Florida (Michael Scott, Inter-American Tropical Tuna Commission, pers. comm.) and has been successfully used on a harbor porpoise in Washington (NMML, unpublished data, Hanson pers. comm. with NMML).

Potentially adverse effects of the capture tagging operations would be minimized by using a highly competent field team, limiting the handling time, maintaining antiseptic conditions to the highest extent possible, and including mitigating conditions in the permit for these activities based on veterinarian expertise. NMML scientists involved in biopsy and tagging activities have had extensive experience with animals in the wild. Animals 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.

Once captured, multiple sampling procedures would be conducted. These are performed by trained veterinarians and support staff with extensive experience and training handling marine mammals and bottlenose-dolphins in particular. Animals are carefully monitored for capture stress and response procedures are in place to address any negative reaction or distress to the procedures. The sampling is divided between non-penetrating (gastric, blowhole swabs, fecal, urine, milk, ultrasonography, and passive and active acoustic sampling, suction cup tagging) and penetrating (blood sampling, skin and muscle biopsies, lesion biopsies, invasive tagging, and tooth extraction) sampling. Stranded beluga whales would not be sampled if doing so would compromise the safety of the researcher or the animal.

Non-penetrating procedures and blood sampling are standard procedures commonly used on captive marine mammals for health assessment and husbandry. The adverse effects associated with these procedures are considered minor with temporary physical discomfort and/or behavioral harassment and are expected to have insignificant effects on individual animals, with no impacts to stocks. Portable ultrasound equipment such as a SonoSite Vet180plus (SonoSite Inc., Bothell, WA) and ultrasound techniques have been used extensively in reproductive studies of captive cetaceans including belugas (Robeck et al. 1998, Robeck and O'Brien 2004; Brook

2001), and with free-ranging cetaceans not including belugas (Moore et al. 2001, Madsen et al. 2002, Angell 2006), with no reports of ill effects.

The more invasive procedures have been a component of this applicant's beluga captures, and other researchers', such as Randy Wells, capture work for many years, and effects have been well documented. Lesion samples are a more superficial tissue collection and biopsies of these have all been observed to heal with no issues. Dr. Wells has performed 136 tooth extractions since 1984. According to Dr. Wells' application submitted for Permit No. 15543, in 97 cases the animals were re-examined and the tooth alveoli were in excellent condition with no complications. Taking into consideration the results of this long term-study and other permitted health assessment studies, none of these procedures have been demonstrated to adversely impact cetaceans. Furthermore, many of the target animals sustain far more traumatic wounds from intra-species interactions, shark bites, vessel strikes, and/or line entanglements from which they have recovered and survived for decades as well as successfully reproduced (Wells et al. 2008).

Captured females which are thought to be pregnant would be monitored for signs of stress and if possible, would be processed the same as any of the animals captured for the project except that a tag would not be attached to an obviously pregnant female. Additional width and depth of support media such as slings, holding areas would be used as necessary to accommodate the increased abdominal girth and minimize pressure on the abdomen.

Captured animals, except pregnant females, may also be fitted with tags. These would be either suction cup tags (DTAGs) or tags with pins thru the dorsal fin or ridge (VHF radio and satellite linked tags). Suction cup tags are considered benign with no risk of injury, and fall off after a few days to week's time. No adverse effects on individual dolphins are expected nor has any been documented during direct observations during and after tagging. Tags with pins require a hole to be bored through the dorsal fin with a biopsy punch. This can be painful and could result in infection. 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. At least nine Cook Inlet beluga whales previously captured and tagged in this manner have been resighted with these scars from one to seven years after tagging and appeared (from a distance) to have healed completely and suffered no long-term physical impairment (LGL 2007 annual report for Letter of Confirmation No. 481-1795). As documented in the report, the resights also indicate that capture and tagging activities did not result in significant behavioral impacts, such as shifts in habitat use. Further, four of these animals were resighted with calves, some with calves in more than one year, indicating that the tagging did not result in long-term impacts to the individuals' fecundity. 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. 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.

For the proposed tag attachments for Dall's and harbor porpoise, similar tag designs have remained attached to a harbor porpoise for 19 months (Hanson 2007), bottlenose dolphins for 9 months, and Dall's porpoise for over a year (Hanson 2001). The proposed beluga tag attachment has been successfully used by NMML under Permit No. 782-1719 and appears to have little long-term impact on beluga whales (Orr et al. 1998).

Based on results from captures by NMML and other researchers, NMML's improvements to their capture protocols, the mitigation measures outlined above, in Ch.2, and in Ch. 4.5 Mitigation Measures, and the fact that limitations to accidental mortalities would be imposed, NMFS does not believe the proposed capture and associated procedures would have long-term, adverse effects on the target species. A low number of mortalities could occur for non-listed belugas, Dall's porpoise and harbor porpoise over the life of the permit; however the level of lethal take is not expected to result in population or species level effects. Therefore, NMFS believes impacts from these activities are not likely to have a significant cumulative effect on the target species.

Effects on Non-Target Species

*Effects of Aerial Surveys on Pinnipeds: Incidental Harassment*
Non-target pinnipeds listed in Appendix A could be incidentally disturbed during aerial surveys. However, NMML noted that for most aerial surveys, the most common behavior observed when flying over pinnipeds is "no response to the aircraft". NMML also noted that for surveys flown over land less than 10% of animals have been observed to react and for surveys over water, NMML has observed no reaction from Steller sea lions. Most reactions are usually as benign as turning a head or moving a short distance. NMML also noted that they would seldom fly over haul outs at altitudes less than 1,000 ft.

Because pinnipeds would not be targeted for research, the aircraft's presence would be momentary. Also, as a condition of the permit researchers would be required to avoid pinniped haulouts when practicable. NMFS does not expect disturbance to occur for surveys flown at 1,000 ft or higher, but below 1,000 ft disturbance may occur. Aerial surveys generally elicit limited reactions from pinnipeds such as body realignment (i.e., upward turned head, slight body shift). At the lower end of proposed altitudes (e.g., ~300 ft), disturbance of animals could cause animals to leave the area temporarily or submerge below the water's surface. Due to the instantaneous nature of the surveys, they are not expected to result in more than minimal temporary disturbance of individual animals in the area. Animals would not be expected to permanently abandon an area or pups. No serious injury, reduced fecundity or mortality would be expected. Further, cumulative impacts are not likely to occur given that: 1) animals would likely recover within minutes and before they could be disturbed by other human activities, and 2) given the remote area of surveys, the intensity and frequency of human activities is low relative to coastal areas of the contiguous United States.

In addition, NMML provided the following estimates of pinniped responses based on their past aerial surveys, keeping in mind that most reactions are usually as benign as turning a head or moving a short distance.

Bearded seal: Low likelihood of a response. Even when a helicopter doing directed research makes a close pass (i.e., not our surveys), some bearded seals do not leave an ice floe. Expected reaction rate may be <10%.

Harbor seal: Highly variable reactions depending on environment, timing (molt, pupping, etc.), and previous exposure to aircraft. Expected reaction rates may be <1% in some areas (e.g., Cook Inlet, near Anchorage) or ~20% in others (e.g., sand shoals along the Alaska Peninsula).

Ribbon seal: Very rough estimate would be about <20% would react to an aircraft.

Ringed seal: Expected reactions when ringed seals are on ice would be <20% reaction; in the water <10% reaction.

Spotted seal: Expected reactions when spotted seals are on land is nearly 100% with most animals entering the water (very sensitive to motor noise), but in the water, reaction may be <10%.

Northern fur seal: On land, <10% reaction; in the water, no reaction.

California sea lion, *Zalophus californianus*: On land, <10% reaction; in the water, no reaction.

Steller sea lion: On land, <10% reaction; in the water, no reaction.

Overall, no mortalities or long-term adverse effects would be expected as a result of aerial surveys. The short-term behavioral responses that might result from research activities would not likely lead to mortality, serious injury, or disruption of essential behaviors such as feeding, mating, or nursing, to a degree that the individual's likelihood of successful reproduction or survival would be substantially reduced.

*Incidental Capture of Harbor Seals*
Because researchers would avoid setting gillnets in the vicinity of concentrations of harbor seals, NMFS does not expect a high level of impact to harbor seals. However, the applicant acknowledges that it may be possible that a harbor seal is not seen prior to setting the net and a seal is incidentally captured. Because gillnets would be continuously monitored, if a seal became entangled, researchers would quickly move to release the animal immediately. Therefore, NMFS expects that the proposed gillnetting would not result in more than temporary disturbance of harbor seals. Animals would be released alive and unharmed.

## 4.3 SUMMARY OF COMPLIANCE WITH APPLICABLE LAWS, NECESSARY FEDERAL PERMITS, LICENSES, AND ENTITLEMENTS

As summarized below, NMFS has determined that the proposed research is consistent with the purposes, policies, and applicable requirements of the MMPA, ESA, and NMFS regulations. NMFS issuance of the permit would be consistent with the MMPA and ESA.

### *4.3.1 Endangered Species Act*

This section summarizes conclusions resulting from consultation as required under section 7 of the ESA. The consultation process was concluded after close of the comment period on the application to ensure that no relevant issues or information were overlooked during the initial scoping process summarized in Ch. 1. Consultation with NMFS determined that the Proposed Action would not jeopardize any endangered species or destroy or modify any critical habitat under NMFS jurisdiction (NMFS 2011).

### *4.3.2 Marine Mammal Protection Act*

The applicant submitted an application which included responses to all applicable questions in the application instructions. The requested research is consistent with applicable issuance criteria in the MMPA and NMFS implementing regulations. The views and opinions of scientists or other persons or organizations knowledgeable of the marine mammals that are the subject of the application or of other matters germane to the application were considered, and support NMFS's initial determinations regarding the application.

The permit would contain standard terms and conditions stipulated in the MMPA and NMFS's regulations. As required by the MMPA, the permit would specify: (1) the effective date of the permit; (2) the number and kinds (species and stock) of marine mammals that may be taken; (3) the location and manner in which they may be taken; and (4) other terms and conditions deemed appropriate. Other terms and conditions deemed appropriate relate to minimizing potential adverse impacts of specific activities, coordination among Permit Holders to reduce unnecessary duplication and harassment, monitoring of impacts of research, and reporting to ensure permit compliance.

### *4.3.3 National Marine Sanctuaries Act*

NMML has obtained the necessary permits to conduct research activities in National Marine Sanctuaries (NMS). A copy of the application was to sent to applicable NMS where work may occur. One NMS provided comments in support of the request and guidance for the applicant about permits for that Sanctuary. The remaining NMS provided no comments.

### *4.3.4 Convention on International Trade in Endangered Species of Wild Fauna*

Permits have been or will be obtained from the U.S. Fish and Wildlife Service to authorize under CITES the import/export activities included in this application.

## 4.4 COMPARISON OF ALTERNATIVES

The majority of the activities described in the Proposed Action are currently authorized under NMML's current permit which would expire upon issuance of the Proposed Action. The Proposed Action has slightly higher take numbers for some species or activities, and if all requested takes were to be used, may result in a small amount of additional disturbance and mortality over what was previously analyzed for Permit No. 782-1719. Further, the loss of a minimal number of whales or porpoises from their respective stocks is not expected to result in significant impacts to those stocks or species. The Proposed Action does not represent a substantial increase in the harassment of marine mammals in the action area, but would extend the duration of harassment for five years beyond what is currently authorized under Permit No.

782-1719. Additional incidental disturbance of non-target pinniped species may occur if those animals are in the vicinity of research activities. Overall, the potential for adverse impacts on the human environment is not greater under the Proposed Action than under the No Action alternative.

## 4.5 MITIGATION MEASURES

In addition to the measures identified by researchers in their application and otherwise considered "good practice or protocol", all NMFS marine mammal 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 about the effects of particular research techniques and the responses of animals to these activities.

A full list of permit conditions is available in the permit. Conditions would include:

- Limitations on activities authorized for specific age classes and species.
- Requirements for Researchers to suspend permitted activities in the event serious injury or mortality of protected species occurs or authorized take is exceeded.
- Requirements for Researchers to exercise caution when approaching animals and retreating if behaviors indicate the approach may be interfering with reproduction, feeding, or other vital functions.
- During authorized activities on females with calves:
    - Termination of efforts if there is any evidence that the activity may be interfering with pair-bonding or other vital functions.
    - Not positioning the research vessel between the mother and calf.
    - Approaching mothers and calves gradually to minimize or avoid startle response.
    - Discontinuing the approach if the calf is actively nursing.
    - Sampling the calf first to minimize the mother's reaction.
- Requirements for Researchers to take reasonable measures to avoid unintentional repeated tagging or biopsy sampling of any individual (e.g., compare photo-identifications).
- Limitations on the number of attempts that would be made to tag or biopsy sample an individual.
- Requirements that Researchers not attempt to biopsy or tag a cetacean anywhere forward of the pectoral fin.
- Requirements to discontinue attempts to attach tags or collect biopsy samples if an animal exhibits repetitive strong adverse reactions to the activity or the vessel.
- Requirements for researchers to monitor deployed nets and perform net checks to insure no animals are missed in the net.

## 4.6 UNAVOIDABLE ADVERSE EFFECTS

The majority of activities under the Proposed Action would result in no more than short-lived disturbance of individual animals. In addition, a minor number of beluga whales and porpoise could be lethally taken during captures. However, the impacts of all activities are not expected to result in significant impacts to stocks or species.

## 4.7 CUMULATIVE EFFECTS

Cumulative effects are defined as those that result from incremental impacts of a proposed action when added to other past, present, and reasonably foreseeable future actions, regardless of which agency (federal or nonfederal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions that take place over a period of time.

### *4.7.1 Vessel Interactions: 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. Many types and sizes of vessels have been involved in ship strikes, including container/cargo ships/freighters, tankers, steamships, U.S. Coast Guard (USCG) vessels, U.S. Navy vessels, cruise ships, ferries, recreational vessels, fishing vessels, and whale watching vessels (Jensen and Silber 2003).

Vessel speed (if recorded) at the time of a large whale collision has ranged from 2 to 51 knots (Jensen and Silber 2003). A summary paper on ship collisions and whales by Laist et al. (2001) reported that, of 28 recorded collisions causing lethal or severe injuries to whales, 89 percent involved vessels traveling at 14 knots or faster, and the remaining 11 percent involved vessels traveling at 10 to 14 knots; none occurred at speeds below 10 knots, although there is a predicted 45 percent chance of death or serious injury to the whale at 10 knots (Pace and Silber 2005). New regulations (discussed in the following section) requiring vessels to slow down in certain circumstances may reduce the likelihood of future vessel collisions with large whales.

Collisions occur off almost every U.S. coastal state, but strikes are most common along the east coast, followed by the west coast and Alaska/Hawaii (Jensen and Silber 2003). According to the 2009 SARs (Allen and Angliss 2010, Caretta et al. 2009):

- Ship strikes were implicated in the deaths of at least two humpback whales in 1993, one in 1995, and one in 2000. One humpback was reported injured as the result of a ship strike in 2005 and a second in 2007, but the fate of the animals is unknown and details are lacking to determine if they were seriously injured.
- Ship strikes were implicated in the deaths of five blue whales from 2003 to 2007 along the U.S. west coast.
- Ship strikes were implicated in the deaths of seven fin whales and the injury of another in CA/OR/WA from 2002 to 2006 (NMFS, unpublished stranding data),
- Ship strikes were implicated in the deaths or serious injury of five gray whales from 1997 to 2003.

- A ship strike mortality was reported for a sei whale in Washington in 2003 (NMFS Northwest Regional Office, unpublished data).
- Twelve injuries and one mortality of unidentified large whales were reported from 2002-2006.

Based on a recent estimate of the mortality rate and records of ship strikes to large whales, scientists estimate that less than one-quarter (17 percent) of ship strikes are actually detected (Kraus et al. 2005). Incidences of ship strikes on large whales in the proposed action area are difficult to quantify because not all whales that were hit will strand, and even if they do, there's not always a clear indicator as to what the cause was.

#### *4.7.2 Vessel Interactions: Marine Mammal Watching*

Commercial and private vessels engaged in marine mammal watching or other recreational activities have the potential to impact cetaceans in the proposed action area. A study of whale watch activities worldwide 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 (CMC) and NMFS was held 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.

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 have suggested that marine mammals are at risk of being disturbed ("harassed"), displaced, or injured by such close interactions. It is a concern that mammals may avoid preferred habitat altogether if the disturbance in that area is too high. 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; Cope et al. 1999; Mann et al. 2000; Samuels et al. 2000; Boren et al. 2001; Constantine 2001; Nowacek et al. 2001). More recently, a study conducted by Weinrich and Corbelli (2009) suggests that whale watching does not result in long-term impacts to humpback whales. The authors found that whale watching in New England

waters did not negatively affect long-term calving rates of females, calf survival during the first two years of life, or a female's reproductive success in a given year.

### *4.7.3 Conservation Efforts*

Some human activities result in beneficial impacts to the target cetacean species, including guidelines that encourage responsible, safe viewing of protected animals by the public, regulations that reduce the potential for harmful interactions with aircraft and vessels, and conservation efforts to reduce interactions with commercial fisheries. NMFS has launched an education and outreach campaign to provide commercial boat operators and the general public with responsible marine mammal viewing guidelines. Each NMFS region provides guidelines for the public's viewing of marine wildlife. Viewing distances vary slightly by region, but NMFS generally recommends the public remain at least 50 to 100 yards away from protected marine mammals.

In addition to the viewing guidelines, federal regulations (50 CFR 224.103) prohibit vessels from approaching humpback whales within 100 yards in Alaska and Hawaii. There are a few exceptions to these regulations, such as permitted researchers, but whale-watching vessels must maintain the regulatory distance. These regulations on vessel approaches have reduced the potential for temporary, perhaps relatively minor, effects on these whales. However, recent collisions between whale-watching boats and a humpback (2001) and a minke whale (1998) illustrate that death or serious injury is still possible.

NMFS also strives to reduce the injuries and deaths of large whales as a result of incidental entanglement in commercial fisheries. The Atlantic Large Whale Take Reduction Team (ALWTRT) is one of several TRTs established by NMFS to help develop plans to mitigate the risk to marine mammals posed by fishing gear. TRTs were established as advisory teams under the MMPA. The ALWTRT's plan consists of a combination of regulatory and non-regulatory programs, including broad gear modifications, time-area closures, expanded disentanglement efforts, extensive outreach efforts in key areas, gear research, and an expanded right whale surveillance program to supplement the Mandatory Ship Reporting System.

### *4.7.4 Commercial Whaling and Subsistence Hunting*

The target large whale populations were the subject of commercial whaling to varying degrees for hundreds of years. The development of steam-powered boats in the late 19$^{th}$ century, coupled with the use of the forward-mounted gun-fired harpoon, made it possible to more efficiently kill and tow ashore the larger baleen whale species such as blue, fin, and minke whales. Earliest efforts to end commercial whaling included a ban by the League of Nations in the mid-1930s and the formation of the International Convention for the Regulation of Whaling in 1946. Prior to current prohibitions on whaling, such as the IWC's moratorium, most large whale species had been depleted to the extent that it was necessary to list them as endangered under the ESA.

The industry caused significant declines in several of the target species' populations. Over 28,000 humpback whales were taken by commercial whalers during the 20$^{th}$ century (Rice 1978). Before its protection by the IWC in 1966, whalers took approximately 9,500 blue whales throughout the North Pacific over a span of 55 years, beginning in 1910 (Ohsumi and Wada 1972). Commercial whaling severely depleted the Eastern gray whale population between the

mid-1800s and early 1900s. Sei whales were estimated to have been reduced to 20% of their pre-whaling abundance in the North Pacific (Tillman 1977). Pelagic commercial whaling for bowheads principally occurred in the Bering Sea from 1848 to 1919. Within the first 2 decades of the fishery (1850–1870), over 60 percent of the estimated pre-whaling abundance was harvested, although effort remained high into the 20th century (Braham 1984). It is estimated that the commercial whaling industry harvested over 20,000 whales from this stock (Woodby and Botkin 1993). Over 3,000 blue whales were taken by whalers in the Eastern North Pacific during the early 1900s (Carretta et al. 2009). At least 20,000 Bryde's and 436,000 sperm whales were harvested in the North Pacific (Best 1976; Ohsumi 1980; Brownell 1998; Kasuya 1998; Carretta et al. 2009). Scarff (2001) estimated that up to 37,000 North Pacific right whales were killed between 1839 and 1909. From 1900 to 1999, 411 animals were killed by whalers in the eastern North Pacific (Brownell et al. 2001).

Eskimos have been taking bowhead whales for at least 2,000 years (Marquette and Bockstoce 1980; Stoker and Krupnik 1993). Since 1977, subsistence takes have been regulated by a quota system under the authority of the IWC. Alaska Native subsistence hunters take approximately 0.1 to 0.5 percent of the population per year (Philo et al. 1993). Suydam and George (2004) summarize that this group harvested 832 bowheads from 1974 to 2003. Since then, Alaska Natives landed 36 bowheads in 2004 (Suydam et al. 2005) and 68 in 2005 (Suydam et al. 2006). Canadian and Russian Natives are also known to harvest a minor number of whales from this stock. The annual average subsistence take (by Natives of Alaska, Russia, and Canada) between 2001 and 2005 was 46 bowhead whales.

Native tribes have an IWC subsistence quota for Eastern gray whales. The annual subsistence take averaged 122 whales by foreign and national tribes from 1999 to 2003, which does not exceed the PBR for this stock (Angliss and Allen 2010). It is unknown whether North Pacific right whales have been hunted; no take has been reported by subsistence hunters.

#### *4.7.5 Entrapment and Fishing Gear Entanglement*

Because the occurrence of some large whales can overlap with frequented fishing areas, gear entanglements are common and can cause death by drowning or serious injuries such as lacerations, which in turn can lead to severe infections. Injuries and entanglements that are not initially lethal may result in a gradual weakening of entangled individuals, making them more vulnerable to some other direct cause of mortality (Kenney and Kraus 1993). For example, entanglement may reduce a whale's ability to maneuver, making it more susceptible to ship strikes. Entanglement-related stress may decrease an individual's reproductive success or reduce its life span, which may in turn depress population growth.

Annual fishery related mortality and serious injury is described in the 2009 and 2010 Marine Mammal SARs. The estimated minimum annual mortality rate of gray whales incidental to U.S. commercial fisheries (6.7 whales) does not exceed 10 percent of the PBR for the stock and, therefore, is considered to be insignificant and approaching a zero mortality and serious injury rate (Allen and Angliss 2010). In the North Pacific, on average $\geq$ 3.6 humpback and 0.2 sperm whale deaths result from fishery interactions each year (Allen and Angliss 2010, Carretta et al. 2009). For North Pacific right whales, one death was reported from gear entanglement in 1989 (Allen and Angliss 2010). The estimated annual mortality rate incidental to U.S. commercial

fisheries approaches zero whales per year from this stock. Therefore, the annual human-caused mortality level is considered to be insignificant and approaching a zero mortality and serious injury rate. Information on fishing interactions for bowhead whales is scant, although NMFS Alaska Region stranding reports document two Arctic bowhead whale entanglements between 2001 and 2005.

The number of deaths attributed to fishing gear interactions may be grossly underestimated. In many cases, veterinarians and researchers are unable to determine a cause of death from a whale carcass. Another possibility is that some whales become entangled, drown, and fail to resurface, so their carcasses are never recovered and examined.

#### *4.7.6 Habitat Degradation*

Some researchers have correlated contaminant exposure to possible adverse health effects in marine mammals. 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). 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 enough to suggest that the PSP toxins are affecting marine mammals, possibly resulting in lower respiratory function, changes in feeding behaviour, and a lower reproductive fitness (Durbin et al. 2002).

Anthropogenic activities, such as emitting discharge from wastewater facilities, dredging, ocean dumping and disposal, aquaculture, and coastal development are also known to have deleterious impacts on marine mammals and their prey's habitat, ultimately affecting the animals themselves. Point source pollutants from coastal runoff, at sea disposal of dredged material and sewage effluents, oil spills, as well as substantial commercial and recreational vessel traffic and impacts of fishing operations continue to negatively affect marine mammals in the proposed action areas.

#### *4.7.7 Noise*

The impacts of noise pollution and the increasing level of anthropogenic noise are growing concerns that may affect cetacean communication (Carretta et al. 2001). Animals inhabiting the marine environment are continually exposed to many sources of sound. Naturally occurring sounds such as lightning, rain, sub-sea 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 larger and more numerous. Commercial fishing vessels, cruise ships, transport boats, airplanes, helicopters and recreational boats all emit sound into the ocean. The military uses

acoustics to test the construction of new vessels as well as for naval operations, and has recently requested MMPA 101(a)(5)(A) authorization for activities in the Hawaii Range Complex, as well as having been issued Incidental Harassment Authorizations (IHAs) for prior training activities in this vicinity.

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 sounds produced by helicopters and fixed-wing aircraft, boats and ships, as well as dredging, construction, and geological explorations (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 (Hall 1982; Baker et al. 1983; Krieger and Wing 1984; Bauer and Herman 1986), but the long-term effects, if any, are unclear or not detectable.

The marine mammals 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). Impacts may be chronic, resulting in 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, and the parameters that influence an animal's sensitivity to disturbance or the accommodation time in response to prolonged disturbance (Geraci and St. Aubin 1980).

#### *4.7.8 Climate and Ecosystem Change*

The extent to which climate and/or ecosystem changes impact the target cetacean species is largely unknown. However, NMFS recognizes that such impacts may occur based on the biology, diet, and foraging behavior of dolphins and whales. Interannual, decadal, and longer time-scale variability in climate can alter the distribution and biomass of prey available to large whales. The effects of climate-induced shifts in productivity, biomass, and species composition of zooplankton on the foraging success of planktivorous whales have received little attention. Such shifts in community structure and productivity may alter the distribution and occurrence of foraging whales in coastal habitats and affect their reproductive potential as well. Similar shifts in prey resources could likewise impact large whales if climate change alters the density, distribution, or range of prey.

#### *4.7.9 Incidental Harassment Authorizations*

In addition to scientific research permits, NMFS issues Letters of Authorization (LOAs) and IHAs under the MMPA for the incidental take of marine mammals. Due to the broad action area, NMFS has issued 10 IHAs, six rulemakings, and 11 LOAs for the take of one or more target or non-target species in the action area for which takes would be authorized.

#### *4.7.10 Other Scientific Research Permits and Authorizations*

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 the take of marine mammals by harassment from a variety of activities, including aerial and vessel surveys, photo-identification, remote biopsy sampling, and attachment of scientific instruments in the Action Area. One permit (NMFS Marine Mammal Health and Stranding Response Program, File No. 932-1905) authorizes the take of stranded or distressed marine mammals, including disentangling whales.

The number of permits and associated takes by harassment indicate a high level of research effort 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 large whales is likely to occur in some instances, particularly in coastal areas (due to the proximity to shore). 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.

A total of 60 permits, including the applicant's current permit, authorize the harassment of one or more of the target or non-target species in the action area (Appendix B). Permits in Appendix B are organized by ocean basin, but most permits authorize a smaller study area or region within an ocean basin, reducing the chance of repeated harassment of individual whales by researchers. Therefore, most of this research does not overlap in area or timing. Some spatial overlap exists for research on species with known feeding or breeding grounds, such as humpback whales. The majority of the takes authorized by these permits are for Level B harassment that will result in no more than disturbance to the target species. No other permits authorize the take of narwhals. The Proposed Action would be the first permit to authorize research on narwhals due to the recent but rare sightings of the species in U.S. waters.

In addition to these permits, eight Letters of Confirmation (LOC) under the General Authorizations have been issued for at least one of the target species; these LOCs confirm that the research will result in no more than Level B harassment of non-ESA marine mammals. Unlike research permits, LOCs do not authorize activities or associated take numbers for the target species but rather only confirm that the activities will not result in Level A harassment.

Some of the permits are currently operating under a one-year extension (Appendix B); an extension does not authorize additional takes of the target species but allows researchers to use authorized takes remaining from the last year of the permit for an additional 12 months or until the remaining takes have been exhausted, whichever occurs first. Many of the active permits (Appendix B) will expire before Permit No. 14245 can be issued or shortly thereafter (within approximately 6 months). As permits gradually expire over the life of the permit, the level of impact on each species would gradually decrease, assuming that none of the active permits are amended to increase take activities. NMFS expects that some researchers, such as NMFS Science Centers which are mandated to assess the status of U.S. marine mammal stocks, will request new permits, or renewals, to continue their work once the current permit expires. NMFS cannot predict with certainty the level of take of each species that may be requested in the future

but, conservatively, expects the amount of future research to be similar to or slightly greater than current levels as interest in marine conservation, biology, and management of these species grows.

Except for capture research authorized by NMML's existing permit, none of the active research permits authorize activities likely to result in the serious injury or mortality of any animal. Further, no such incidences have been reported by permitted cetacean researchers. Therefore, the number of takes proposed by NMML is not expected to result in a significant adverse impact on the target species, especially considering the majority of the takes are authorized in NMML's current permit. In addition, all permits issued by NMFS for research on protected species, including the proposed permit, contain conditions requiring the Permit Holders to coordinate their activities with the NMFS regional offices and other Permit Holders conducting research on the same species in the same areas, and, to the extent possible, share data to avoid unnecessary duplication of research and disturbance of animals.

In addition to the active permits, NMFS Office of Protected Resources is processing nine permit requests to conduct research on one or more of the target species/stocks in the action area. This is due largely to the broad scope of the action area of the NMML's request. Some of these requests are from current Permit Holders whose permit is set to expire before the end of 2011 or Permit Holders that have recently had a permit expire. An ESA Section 7 consultation will be completed for each of these requests.

NMFS acknowledges that repeated disturbance of some individual large whales could occur. However, NMFS expects that the temporary harassment of individuals would dissipate within minutes, and therefore animals would recover before being targeted for research by another Permit Holder. Further, 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 many of the target whales 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.

#### *4.7.11 Summary of cu mulative effects*

The activities 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 the target species are impacted by a number of human activities, it is important to note that these activities are not occurring simultaneously on the same individuals of a population/stock on a daily basis and most human impacts are not known to cause serious injury or mortality of dolphins and whales. Further, the target species are not exposed to all human activities at all times, particularly given the migratory nature of some species.

The short-term stresses (separately and cumulatively with other environmental stresses) resulting from the proposed research activities would be expected to be minimal to targeted animals. Behavioral reactions suggest that harassment is brief, lasting minutes, before animals resume normal behaviors. NMFS expects any effects of harassment to dissipate before animals could be harassed by other human activities. Significant cumulative impacts are not expected since no serious injury or mortality is expected (resulting in no direct loss of animals from the population) nor is an appreciable reduction in the fecundity of target individuals. Therefore, the proposed research would contribute a negligible increment of harassment over and above the effects of the baseline activities currently occurring in the marine environment of the proposed action area over the life of the permit.

Although the effects of repeated or chronic disturbance from scientific research activities should not be dismissed, the potential long-term benefits and value of information gained on these species also must be considered. The proposed research would provide valuable information on these species' biology and ecology that in turn may be used to improve their management and reduce the effects of human activities on these populations.

## CHAPTER 5 LIST OF PREPARERS AND AGENCIES CONSULTED

This document was prepared by Amy Hapeman with the Permits, Conservation and Education Division of NMFS' Office of Protected Resources in Silver Spring, Maryland.

Agencies Consulted:

Marine Mammal Commission
NOS National Marine Sanctuaries Program
NMFS Office of Habitat Conservation

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| SPECIES | LISTING UNIT/STOCK | NO. TAKES | PROCEDURES |
|---|---|---|---|
| Narwhal | Range-wide | 1,000 | Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video |
| Porpoise, Dall's | Range-wide | 5,000 | Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video |
| Porpoise, harbor | Range-wide | 5,000 | Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video |
| Whale, Baird's beaked | Range-wide | 5,000 | Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video |
| Whale, beluga | Beaufort Sea Stock | 15,000 | Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video |
| Whale, beluga | Bristol Bay Stock | 15,000 | Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video |
| Whale, beluga | Cook Inlet Stock (NMFS Endangered) | 11,700 | Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video |
| Whale, beluga | Eastern Bering Sea Stock | 15,000 | Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video |
| Whale, beluga | Eastern Chukchi Sea Stock | 15,000 | Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video |
| Whale, blue | Eastern North Pacific Stock (NMFS Endangered) | 2,000 | Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video |
| Whale, blue | Range-wide (NMFS Endangered) | 2,000 | Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video |
| Whale, bowhead | Range-wide (NMFS Endangered) | 11,000 | Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video |
| Whale, Cuvier's beaked | Range-wide | 5,000 | Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video |

| SPECIES | LISTING UNIT/STOCK | NO. TAKES | PROCEDURES |
|---|---|---|---|
| Whale, Mesoplodon beaked | California/Oregon/Washington Stocks | 5,000 | Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video |
| Whale, minke | Range-wide | 5,000 | Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video |
| Whale, pilot, short-finned | Range-wide | 5,000 | Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video |
| Whale, pygmy sperm | Range-wide | 5,000 | Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video |
| Whale, right, North Pacific | Range-wide (NMFS Endangered) | 200 | Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video |
| Whale, sei | Range-wide (NMFS Endangered) | 1,000 | Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video |
| Whale, sperm | Range-wide (NMFS Endangered) | 8,000 | Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video |
| Whale, Stejneger's beaked | Range-wide | 5,000 | Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video |
| Seal, bearded | Range-wide, except Beringia DPS | 1,000 | Incidental disturbance |
| Seal, bearded | Beringia DPS | 1,000 | Incidental disturbance |
| Seal, harbor | Bering Sea Stock | 10,000 | Incidental disturbance |
| Seal, harbor | California Stock | 10,000 | Incidental disturbance |
| Seal, harbor | Gulf of Alaska Stock | 10,000 | Incidental disturbance |
| Seal, harbor | Oregon & Washington Coastal Waters Stocks | 10,000 | Incidental disturbance |
| Seal, harbor | Southeast Alaska Stock | 10,000 | Incidental disturbance |

| SPECIES | LISTING UNIT/STOCK | LIFESTAGE | NO. TAKES[6] | PROCEDURES | DETAILS |
|---|---|---|---|---|---|
| ***Vessel Surveys: Harassment and Sampling Activities. Animals may be taken multiple times in a year.*** | | | | | |
| Dolphin, bottlenose | Range-wide | All | 4,400 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Underwater photo/videography | |
| Dolphin, bottlenose | Range-wide | Adult/ Juvenile | 100 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Instrument, dart/barb tag; OR dorsal fin/ridge attachment; OR suction-cup (e.g., VHF, TDR); Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Sample, skin and blubber biopsy; Underwater photo/videography | No more than 1 tag on an animal at a time |
| Dolphin, bottlenose | Range-wide | Non-neonate | 500 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Instrument, suction-cup (e.g., VHF, TDR); Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Sample, skin and blubber biopsy; Underwater photo/videography | |

6Takes = the **maximum** number of animals, not necessarily individuals, that may be targeted for research annually in each row of the table. If any animal is harassed more than once during research, each additional attempt (i.e., take) reduces the number of total takes remaining. E.g., if two *attempts* were required to tag an animal for which 10 annual *takes* are authorized, the researcher has used 2 takes and has 8 takes remaining.

| SPECIES | LISTING UNIT/STOCK | LIFESTAGE | NO. TAKES[6] | PROCEDURES | DETAILS |
|---|---|---|---|---|---|
| Dolphin, common, short-beaked | Range-wide | Adult/ Juvenile | 100 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Instrument, dart/barb tag; OR dorsal fin/ridge attachment; OR suction-cup (e.g., VHF, TDR); Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Sample, skin and blubber biopsy; Underwater photo/videography | No more than 1 tag per animal at a time |
| Dolphin, common, short-beaked | Range-wide | Non-neonate | 500 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Instrument, suction-cup (e.g., VHF, TDR); Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Sample, skin and blubber biopsy; Underwater photo/videography | |
| Dolphin, northern right whale | Range-wide | Non-neonate | 500 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Instrument, suction-cup (e.g., VHF, TDR); Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Sample, skin and blubber biopsy; Underwater photo/videography | |

| SPECIES | LISTING UNIT/STOCK | LIFESTAGE | NO. TAKES[6] | PROCEDURES | DETAILS |
|---|---|---|---|---|---|
| Dolphin, Pacific white-sided | Range-wide | Non-neonate | 500 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Instrument, suction-cup (e.g., VHF, TDR); Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Sample, skin and blubber biopsy; Underwater photo/videography | |
| Dolphin, pantropical spotted | Range-wide | Non-neonate | 500 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Instrument, suction-cup (e.g., VHF, TDR); Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Sample, skin and blubber biopsy; Underwater photo/videography | |
| Dolphin, pantropical spotted | Range-wide | Adult/ Juvenile | 100 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Instrument, dart/barb tag; OR dorsal fin/ridge attachment; OR suction-cup (e.g., VHF, TDR); Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Sample, skin and blubber biopsy; Underwater photo/videography | No more than 1 tag on an animal at a time |
| Dolphin, pantropical spotted | Range-wide | All | 4,400 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Underwater photo/videography | |

| SPECIES | LISTING UNIT/STOCK | LIFESTAGE | NO. TAKES[6] | PROCEDURES | DETAILS |
|---|---|---|---|---|---|
| Dolphin, rough-toothed | Range-wide | Adult/ Juvenile | 100 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Instrument, dart/barb tag; OR dorsal fin/ridge attachment; OR suction-cup (e.g., VHF, TDR); Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Sample, skin and blubber biopsy; Underwater photo/videography | No more than 1 tag on an animal at a time |
| Dolphin, rough-toothed | Range-wide | All | 4,400 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Underwater photo/videography | |
| Dolphin, spinner | Range-wide | All | 4,400 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Underwater photo/videography | |
| Dolphin, spinner | Range-wide | Adult/ Juvenile | 100 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Instrument, dart/barb tag; OR dorsal fin/ridge attachment; OR suction-cup (e.g., VHF, TDR); Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Sample, skin and blubber biopsy; Underwater photo/videography | No more than 1 tag on an animal at a time |

| SPECIES | LISTING UNIT/STOCK | LIFESTAGE | NO. TAKES[6] | PROCEDURES | DETAILS |
|---|---|---|---|---|---|
| Narwhal | Range-wide | All | 1,000 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Underwater photo/videography | |
| Porpoise, Dall's | Range-wide | Non-neonate | 2,000 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Instrument, suction-cup (e.g., VHF, TDR); Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Sample, skin and blubber biopsy; Underwater photo/videography | |
| Porpoise, Dall's | Range-wide | All | 2,950 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Underwater photo/videography | |
| Porpoise, harbor | Range-wide | All | 3,950 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Underwater photo/videography | |

| SPECIES | LISTING UNIT/STOCK | LIFESTAGE | NO. TAKES[6] | PROCEDURES | DETAILS |
|---|---|---|---|---|---|
| Whale, beluga | Beaufort Sea Stock | All | 18,800 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal ; Underwater photo/videography | |
| Whale, beluga | Beaufort Sea Stock | Non-neonate | 1,000 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Instrument, suction-cup (e.g., VHF, TDR); Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Sample, skin and blubber biopsy; Underwater photo/videography | |
| Whale, beluga | Bristol Bay Stock | Non-neonate | 1,000 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Instrument, suction-cup (e.g., VHF, TDR); Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Sample, skin and blubber biopsy; Underwater photo/videography | |
| Whale, beluga | Bristol Bay Stock | All | 900 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Underwater photo/videography | |

| SPECIES | LISTING UNIT/STOCK | LIFESTAGE | NO. TAKES[6] | PROCEDURES | DETAILS |
|---|---|---|---|---|---|
| Whale, beluga | Eastern Chukchi Sea Stock | All | 1,800 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Underwater photo/videography | |
| Whale, beluga | Eastern Chukchi Sea Stock | Non-neonate | 1,000 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Instrument, suction-cup (e.g., VHF, TDR); Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Sample, skin and blubber biopsy; Underwater photo/videography | |
| Whale, blue | Eastern North Pacific Stock (NMFS Endangered) | Adult/ Juvenile | 1,000 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Instrument, suction-cup (e.g., VHF, TDR); Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Sample, skin and blubber biopsy; Underwater photo/videography | |
| Whale, blue | Eastern North Pacific Stock (NMFS Endangered) | Adult/ Juvenile | 100 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Instrument, dart/barb tag; Instrument, dorsal fin/ridge attachment; Instrument, implantable (e.g., satellite tag); Instrument, suction-cup (e.g., VHF, TDR); Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Sample, skin and blubber biopsy; Underwater | No more than 3 tags total on an animal at a time with no more than 2 that pierce the skin. |

| SPECIES | LISTING UNIT/STOCK | LIFESTAGE | NO. TAKES[6] | PROCEDURES | DETAILS |
|---|---|---|---|---|---|
| Whale, blue | Range-wide (NMFS Endangered) | Adult/ Juvenile | 600 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Instrument, suction-cup (e.g., VHF, TDR); Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Sample, skin and blubber biopsy; Underwater photo/videography | |
| Whale, blue | Range-wide (NMFS Endangered) | Adult/ Juvenile | 50 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Instrument, dart/barb tag; Instrument, dorsal fin/ridge attachment; Instrument, implantable (e.g., satellite tag); Instrument, suction-cup (e.g., VHF, TDR); Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Sample, skin and blubber biopsy; Underwater photo/videography | No more than 3 tags total on an animal at a time with no more than 2 that pierce the skin. |
| Whale, bowhead | Range-wide (NMFS Endangered) | Adult/ Juvenile | 1,000 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Instrument, suction-cup (e.g., VHF, TDR); Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Sample, skin and blubber biopsy; Underwater photo/videography | Up to 100 biopsy samples per year may be obtained from the annual harvest by Alaska Native hunters |

| SPECIES | LISTING UNIT/STOCK | LIFESTAGE | NO. TAKES[6] | PROCEDURES | DETAILS |
|---|---|---|---|---|---|
| Whale, Cuvier's beaked | Range-wide | Non-neonate | 500 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Instrument, suction-cup (e.g., VHF, TDR); Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Sample, skin and blubber biopsy; Underwater photo/videography | |
| Whale, Cuvier's beaked | Range-wide | Adult/ Juvenile | 100 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Instrument, dart/barb tag; Instrument, dorsal fin/ridge attachment; Instrument, implantable (e.g., satellite tag); Instrument, suction-cup (e.g., VHF, TDR); Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Sample, skin and blubber biopsy; Underwater photo/videography | No more than 3 tags total on an animal at a time with no more than 2 that pierce the skin. |
| Whale, dwarf sperm | Range-wide | Adult/ Juvenile | 500 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Instrument, dart/barb tag; Instrument, dorsal fin/ridge attachment; Instrument, suction-cup (e.g., VHF, TDR); Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Sample, skin and blubber biopsy; Underwater photo/videography | No more than 3 tags total on an animal at a time with no more than 2 that pierce the skin. |

| SPECIES | LISTING UNIT/STOCK | LIFESTAGE | NO. TAKES[6] | PROCEDURES | DETAILS |
|---|---|---|---|---|---|
| Whale, false killer | Range-wide | Adult/ Juvenile | 10 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; incidental harassment; Instrument, dart/barb tag; Instrument, dorsal fin/ridge attachment; Instrument, suction-cup (e.g., VHF, TDR); Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Sample, skin and blubber biopsy; Underwater photo/videography | All stocks except the Hawaiian insular stock. No more than 3 tags total on an animal at a time with no more than 2 that pierce the skin. |
| Whale, false killer | Hawaiian insular stock | All | 90 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Underwater photo/videography | |
| Whale, false killer | Hawaiian insular stock | Non-neonate | 100 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; incidental harassment; Instrument, suction-cup (e.g., VHF, TDR); Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Sample, skin and blubber biopsy; Underwater photo/videography | |

| SPECIES | LISTING UNIT/STOCK | LIFESTAGE | NO. TAKES[6] | PROCEDURES | DETAILS |
|---|---|---|---|---|---|
| Whale, fin | California/Oregon/Washington Stock (NMFS Endangered) | Calf | 150 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Instrument, suction-cup (e.g., VHF, TDR); Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Sample, skin and blubber biopsy; Underwater photo/videography | Intent is to target non-neonate calves < 6 mos. but may use remaining takes on older calves if available |
| Whale, fin | California/Oregon/Washington Stock (NMFS Endangered) | All | 1,750 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Underwater photo/videography | |
| Whale, fin | Range-wide (NMFS Endangered) | All | 2,500 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Underwater photo/videography | |
| Whale, fin | Range-wide (NMFS Endangered) | Calf | 300 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Instrument, suction-cup (e.g., VHF, TDR); Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Sample, skin and blubber biopsy; Underwater photo/videography | Intent is to target non-neonate calves < 6 mos. but may use remaining takes on older calves if available |

| SPECIES | LISTING UNIT/STOCK | LIFESTAGE | NO. TAKES[6] | PROCEDURES | DETAILS |
|---|---|---|---|---|---|
| Whale, gray | Eastern North Pacific | Non-neonate | 2,000 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Instrument, suction-cup (e.g., VHF, TDR); Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Sample, skin and blubber biopsy; Underwater photo/videography | |
| Whale, gray | Eastern North Pacific | All | 12,800 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Underwater photo/videography | |
| Whale, humpback | Central North Pacific Stock (NMFS Endangered) | All | 2,500 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Underwater photo/videography | |
| Whale, humpback | Central North Pacific Stock (NMFS Endangered) | Calf | 300 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Instrument, suction-cup (e.g., VHF, TDR); Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Sample, skin and blubber biopsy; Underwater photo/videography | Intent is to target non-neonate calves < 6 mos. but may use remaining takes on older calves if available |

| SPECIES | LISTING UNIT/STOCK | LIFESTAGE | NO. TAKES[6] | PROCEDURES | DETAILS |
|---|---|---|---|---|---|
| | | | | photo/videography | if available |
| Whale, humpback | Eastern North Pacific Stock (NMFS Endangered) | Adult/ Juvenile | 1,000 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Instrument, suction-cup (e.g., VHF, TDR); Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Sample, skin and blubber biopsy; Underwater photo/videography | |
| Whale, humpback | Eastern North Pacific Stock (NMFS Endangered) | Adult/ Juvenile | 100 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Instrument, dart/barb tag; Instrument, dorsal fin/ridge attachment; Instrument, implantable (e.g., satellite tag); Instrument, suction-cup (e.g., VHF, TDR); Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Sample, skin and blubber biopsy; Underwater photo/videography | No more than 3 tags total on an animal at a time with no more than 2 that pierce the skin. |
| Whale, humpback | Western North Pacific Stock (NMFS Endangered) | Adult/ Juvenile | 30 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Instrument, dart/barb tag; Instrument, dorsal fin/ridge attachment; Instrument, implantable (e.g., satellite tag); Instrument, suction-cup (e.g., VHF, TDR); Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Sample, skin and blubber biopsy; Underwater photo/videography | No more than 3 tags total on an animal at a time with no more than 2 that pierce the skin. |

| SPECIES | LISTING UNIT/STOCK | LIFESTAGE | NO. TAKES[6] | PROCEDURES | DETAILS |
|---|---|---|---|---|---|
| Whale, killer | Eastern North Pacific Southern Resident Stock (NMFS Endangered) | Adult/ Juvenile | 10 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Instrument, suction-cup (e.g., VHF, TDR); Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Sample, skin and blubber biopsy; Underwater photo/videography | |
| Whale, killer | Range-wide | Adult/ Juvenile | 150 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Instrument, dart/barb tag; Instrument, dorsal fin/ridge attachment; Instrument, implantable (e.g., satellite tag); Instrument, suction-cup (e.g., VHF, TDR); Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Sample, skin and blubber biopsy; Underwater photo/videography | No more than 3 tags total on an animal at a time with no more than 2 that pierce the skin. |
| Whale, killer | Range-wide | Non-neonate | 300 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Instrument, suction-cup (e.g., VHF, TDR); Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Sample, skin and blubber biopsy; Underwater photo/videography | |

| SPECIES | LISTING UNIT/STOCK | LIFESTAGE | NO. TAKES[6] | PROCEDURES | DETAILS |
|---|---|---|---|---|---|
| Whale, Mesoplodon beaked | California/Oregon/Washington Stocks | Adult/ Juvenile | 10 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Instrument, dart/barb tag; Instrument, dorsal fin/ridge attachment; Instrument, implantable (e.g., satellite tag); Instrument, suction-cup (e.g., VHF, TDR); Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Sample, skin and blubber biopsy; Underwater photo/videography | No more than 3 tags total on an animal at a time with no more than 2 that pierce the skin. |
| Whale, Mesoplodon beaked | California/Oregon/Washington Stocks | Non-neonate | 50 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Instrument, suction-cup (e.g., VHF, TDR); Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Sample, skin and blubber biopsy; Underwater photo/videography | |
| Whale, Mesoplodon beaked | California/Oregon/Washington Stocks | All | 4,940 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Underwater photo/videography | |
| Whale, minke | Range-wide | All | 900 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Underwater photo/videography | |

| SPECIES | LISTING UNIT/STOCK | LIFESTAGE | NO. TAKES[6] | PROCEDURES | DETAILS |
|---|---|---|---|---|---|
| Whale, pilot, short-finned | Range-wide | Non-neonate | 500 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Instrument, suction-cup (e.g., VHF, TDR); Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Sample, skin and blubber biopsy; Underwater photo/videography | |
| Whale, pilot, short-finned | Range-wide | All | 4,400 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Underwater photo/videography | |
| Whale, pygmy sperm | Range-wide | All | 3,900 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Underwater photo/videography | |
| Whale, pygmy sperm | Range-wide | Non-neonate | 1,000 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Instrument, suction-cup (e.g., VHF, TDR); Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Sample, skin and blubber biopsy; Underwater photo/videography | |

| SPECIES | LISTING UNIT/STOCK | LIFESTAGE | NO. TAKES[6] | PROCEDURES | DETAILS |
|---|---|---|---|---|---|
| Whale, right, North Pacific | Range-wide (NMFS Endangered) | Calf | 10 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Instrument, suction-cup (e.g., VHF, TDR); Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Sample, skin and blubber biopsy; Underwater photo/videography | |
| Whale, right, North Pacific | Range-wide (NMFS Endangered) | All | 130 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Underwater photo/videography | |
| Whale, sei | Range-wide (NMFS Endangered) | All | 682 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Underwater photo/videography | |
| Whale, sei | Range-wide (NMFS Endangered) | Calf | 8 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Instrument, suction-cup (e.g., VHF, TDR); Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Sample, skin and blubber biopsy; Underwater photo/videography | Intent is to target non-neonate calves < 6 mos. but may use remaining takes on older calves if available |

| SPECIES | LISTING UNIT/STOCK | LIFESTAGE | NO. TAKES[6] | PROCEDURES | DETAILS |
|---|---|---|---|---|---|
| Whale, sperm | Range-wide (NMFS Endangered) | Adult/ Juvenile | 200 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Instrument, dart/barb tag; Instrument, dorsal fin/ridge attachment; Instrument, implantable (e.g., satellite tag); Instrument, suction-cup (e.g., VHF, TDR); Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Sample, skin and blubber biopsy; Underwater photo/videography | No more than 3 tags total on an animal at a time with no more than 2 that pierce the skin. |
| Whale, sperm | Range-wide (NMFS Endangered) | Calf | 300 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Instrument, suction-cup (e.g., VHF, TDR); Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Sample, skin and blubber biopsy; Underwater photo/videography | Intent is to target non-neonate calves < 6 mos. but may use remaining takes on older calves if available |
| Whale, sperm | Range-wide (NMFS Endangered) | All | 2,500 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Underwater photo/videography | |
| Whale, Stejneger's beaked | Range-wide | All | 4,940 | Collect, remains for predation study; Collect, sloughed skin; Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sample, fecal; Underwater photo/videography | |

Table 2: Proposed Annual Takes for Capture Activities in the U.S. EEZ of the North Pacific Ocean.

| SPECIES | LISTING UNIT/STOCK | LIFESTAGE | NO. TAKES | TAKE ACTION | COLLECT METHOD | PROCEDURES | DETAILS |
|---|---|---|---|---|---|---|---|
| Porpoise, Dall's | Range-wide | Adult/ Juvenile | 50 | Capture/Handle/Release | Breakaway hoop net | Auditory brainstem response test; Collect, remains for predation study; Collect, sloughed skin; Count/survey; Instrument, dart/barb tag; Instrument, dorsal fin/ridge attachment; Instrument, suction-cup (e.g., VHF, TDR); Lavage; Measure; Measure, colonic temperature; Metabolic chamber/hood; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sampling: anal swab, blood, blowhole swab, exhaled air, fecal, milk (lactating females), skin and blubber biopsy, and urine; Ultrasound; Underwater photo/videography | Up to 3 tags: 1 by suction cup and 2 units attached through 1 invasive attachment. No more than 4 pins through the dorsal fin. |
| Porpoise, Dall's | Range-wide | Adult/ Juvenile | 4 | Unintentional mortality | Breakaway hoop net | Unintentional mortality | 4 deaths over life of permit, not annually. |
| Porpoise, harbor | Range-wide | Adult/ Juvenile | 50 | Capture/Handle/Release | Gillnet | Auditory brainstem response test; Collect, remains for predation study; Collect, sloughed skin; Count/survey; Instrument, dart/barb tag; Instrument, dorsal fin/ridge attachment; Instrument, suction-cup (e.g., VHF, TDR); Lavage; Measure; Measure, colonic | Up to 3 tags: 1 by suction cup and 2 units attached through 1 invasive attachment. |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | swab, blood; blowhole swab, exhaled air; fecal, milk (lactating females), skin and blubber biopsy, tooth extraction, muscle biopsy, and urine; Ultrasound; Underwater photo/videography | |
| Whale, beluga | Bristol Bay Stock | Adult/ Juvenile | 100 | Capture/Handle/Release | Tangle Net, Hoop net, Encirclement net or stranding | Auditory brainstem response test; Collect, remains for predation study; Collect, sloughed skin; Count/survey; Instrument, dart/barb tag; Instrument, dorsal fin/ridge attachment; Instrument, implantable (e.g., satellite tag); Instrument, suction-cup (e.g., VHF, TDR); Lavage; Measure; Measure, colonic temperature; Metabolic chamber/hood; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video; Sampling: anal swab, blood, blowhole swab, exhaled air, fecal, milk (lactating females), skin and blubber biopsy, tooth extraction, muscle biopsy and urine; Ultrasound; Underwater photo/videography | Up to 3 tags: 1 by suction cup and 2 units attached through 1 invasive attachment. No more than 4 pins through the dorsal ridge. |
| Whale, beluga | Eastern Bering Sea Stock | Adult/ Juvenile | 200 | Capture/Handle/Release | Tangle Net, Hoop net, Encirclement net or stranding | Auditory brainstem response test; Collect, remains for predation study; Collect, sloughed skin; Count/survey; Instrument, dart/barb tag; Instrument, dorsal fin/ridge attachment; Instrument, implantable (e.g., satellite tag); | Up to 3 tags: 1 by suction cup and 2 units attached through 1 invasive |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Whale, beluga | Eastern Bering Sea Stock | Adult/ Juvenile | 4** | Unintentional mortality | Tangle Net, Hoop net, Encirclement net or stranding | Unintentional mortality | See footnote |
| Whale, beluga | Beaufort Sea Stock | Adult/ Juvenile | 4** | Unintentional mortality | Tangle Net, Hoop net, Encirclement net or stranding | Unintentional mortality | See footnote. |
| Whale, beluga | Bristol Bay Stock | Adult/ Juvenile | 4** | Unintentional mortality | Tangle Net, Hoop net, Encirclement net or stranding | Unintentional mortality | See footnote. |
| Whale, beluga | Eastern Chukchi Sea Stock | Adult/ Juvenile | 4** | Unintentional mortality | Tangle Net, Hoop net, Encirclement net or stranding | Unintentional mortality | See footnote |

**No more than 4 beluga deaths are authorized from each stock over the life of permit, not annually. However, if in any one year 4 animals die from all beluga stocks combined, capture research will be halted until receiving approval to resume activities from the Permit s Division.

| | | | | | |
|---|---|---|---|---|---|
| Whale, humpback | All | 1,000 | Survey, aerial | Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photogrammetry; Photograph/Video | |

| Permit No. | Permit Holder | Ocean Basin | Expiration date | Species | Harassment |
|---|---|---|---|---|---|
| 540-1811-03 | Calambokidis | Pacific Ocean | 4/14/2011 | blue, Baird's beaked, Cuvier's beaked, humpback, fin, sei, sperm, killer, minke, gray, pygmy sperm, dwarf sperm, beaked, short-finned pilot, and false killer whales; bottlenose, northern right whale, Pacific white-sided, Risso's, striped, and common dolphins; Dall's and harbor porpoise, California and Steller sea lions, Northern fur and harbor seals | Level A & B |
| 781-1824-01 | NMFS, NWFSC | Pacific Ocean | 4/14/2011 | blue, humpback, fin, sperm, killer, minke, gray, pygmy sperm, beaked, and short-finned pilot whales; common, Pacific white-sided, Risso's, striped, and northern right whale dolphins; Dall's, harbor porpoise | Level A & B |
| 532-1822-02 | Balcomb | Pacific Ocean | 4/14/2011 | Pacific white-sided dolphins, minke, humpback, gray and Killer whales, Dall's and harbor porpoise, Northern fur and harbor seals, Steller and California sea lions | Level B only |
| 965-1821-01 | Bain | Pacific Ocean | 4/14/2011 | killer, humpback, fin, minke, and gray whales; Pacific white-sided dolphins; Dall's and harbor porpoise, Steller and California sea lions, Northern fur and harbor seals | Level B only |
| 1058-1733-01 | Baumgartner | Atlantic, Arctic & Pacific Oceans | 5/31/2012 | North Pacific right, bowhead, humpback, fin, sei, blue, gray whale | Level A & B |
| 1120-1898 | Eye of the Whale | Pacific Ocean | 7/31/2012 | Humpback whale | Level B only |
| 727-1915 | Scripps Institute of Oceanography | Pacific Ocean | 2/1/2013 | Baird's beaked, Cuvier's beaked, blue, sei, fin, humpback, sperm, gray, short-finned pilot, beaked, dwarf sperm, pygmy sperm, false killer, pygmy killer, minke, bryde's, melon-headed whales; Pacific white-sided, bottlenose, northern right whale, rough-toothed, striped, spinner, pantropical spotted, Risso's, and common dolphins; Dall's porpoise | Level A & B |
| 1127-1921 | Hawaii Marine Mammal Consortium | Pacific Ocean | 6/30/2013 | Humpback, sperm, blue, Cuvier's beaked, sei, fin, beaked, dwarf sperm, false killer, killer, minke, pygmy sperm, short-finned pilot, melon-headed whale; bottlenose, Risso's, rough-toothed, spinner, striped, pantropical spotted dolphin | Level A & B |

| Permit No. | Permit Holder | Ocean Basin | Expiration date | Species | Harassment |
|---|---|---|---|---|---|
| 14329 | N. Pacific Universities Marine Mammal Research Consortium | Pacific | 8/31/14 | Steller sea lions, Northern fur seal | Level A & B |
| 14330 | Aleut Community of St. Paul Isl. | Pacific | 8/31/14 | Steller sea lions, Northern fur and harbor seal | Level A & B |
| 14331 | Aleut Community of St. George Isl. | Pacific | 8/31/14 | Steller sea lions, Northern fur and harbor seal | Level A & B |
| 14335 | AK Sea Life Center | Pacific | 8/31/14 | Steller sea lions | Level A & B |
| 14336 | Oregon State University | Pacific | 8/31/14 | Steller sea lions | Level A & B |
| 14337 | N. Pacific Universities Marine Mammal Research Consortium | Pacific | 8/31/14 | California and Steller sea lions, harbor and Northern fur seals, killer whale | Level A & B |
| 14345 | Cetos Research Organization | Pacific | 7/31/15 | Bottlenose, Risso's, rough-toothed, spinner and pantropical spotted dolphins, humpback, melon-headed, minke, Cuvier's beaked, false killer, short-finned pilot, dwarf sperm and pygmy sperm whales | Level A & B |
| 14451 | University of Hawaii at Manoa | Atlantic and Pacific | 7/31/15 | Bottlenose, common, northern right whale, Pacific white-sided, Risso's, rough-toothed, spinner, striped and pantropical spotted dolphins, humpback, gray, sei, sperm, melon-headed, blue, beaked, Baird's beaked, fin, killer, minke, Cuvier's beaked, false killer, short-finned pilot, dwarf sperm and pygmy sperm whales | Level B |
| 14534 | NOAA S&T | Pacific | 7/31/15 | Bottlenose, common, northern right whale, Pacific white-sided, Risso's, rough-toothed, spinner, striped and pantropical spotted dolphins, humpback, gray, sei, sperm, melon-headed, blue, beaked, Baird's beaked, fin, killer, minke, Cuvier's beaked, false killer, short-finned pilot, and pygmy sperm whales, California sea lion, Dall's porpoise, Northern fur and harbor seals | Level B |
| 14599 | Sharpe, AK Whale Foundation | Pacific | 7/31/15 | Humpack and killer whales | Level B |
| 14610 | AK Dept Fish and Game | Pacific | 5/31/15 | Harbor, ringed, spotted and bearded seals, beluga, humpback, bowhead, and gray whales, | Level A & B |
| 14636 | Univ. of CA, Santa Cruz | Pacific | 6/30/13 | California sea lion | Level A & B |

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Silver Spring, MD 20910

# Finding of No Significant Impact
# Issuance of Scientific Research Permit No. 14245 for Cetacean Research

Analysis

National Oceanic and Atmospheric Administration Administrative Order (NAO) 216-6 (May 20, 1999) contains criteria for determining the significance of the impacts of a proposed action. In addition, the Council on Environmental Quality (CEQ) regulations at 40 C.F.R. 1508.27 state that the significance of an action should be analyzed both in terms of "context" and "intensity." Each criterion listed below is relevant to making a finding of no significant impact and has been considered individually, as well as in combination with the others. The significance of this action is analyzed based on the NAO 216-6 criteria and CEQ's context and intensity criteria. These include:

1) Can the proposed action reasonably be expected to cause 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?

Response: Although Essential Fish Habitat (EFH) may be present in the action area, the Proposed Action would only affect marine mammals authorized for research or incidental harassment by the permit. Research would involve routine vessel movements at the water surface, aerial surveys and captures that set nets in the water column. Nets would have minimal impacts to bottom habitat based on measures the applicant would take to minimize setting nets in areas with vegetation or live or hard bottom. The Proposed Action would not be expected to cause damage to other aspects of ocean and coastal habitat such as reefs, seagrass beds, soft-bottom sediment, etc. Therefore, no EFH consultation was required.

2) Can the proposed action be expected to have a substantial impact on biodiversity and/or ecosystem function within the affected area (e.g., benthic productivity, predator-prey relationships, etc.)?

Response: The effects of the action on target species, including Endangered Species Act (ESA) listed species, their habitat, EFH, marine sanctuaries, and other marine mammals were considered. The Proposed Action would result in short-term minimal disturbance to individual marine mammals and a limited number of deaths associated with captures. The loss of these animals is not expected to result in significant impacts to their populations or species and therefore would not have an impact on biodiversity or ecosystem function. The research is not expected to affect an animal's susceptibility to predation, alter dietary preferences or foraging behavior, or change distribution or abundance of predators or prey. Therefore, the Proposed Action is not expected to have a substantial impact on biodiversity or ecosystem function.

3) Can the proposed action reasonably be expected to have a substantial adverse impact on public health or safety?

Response: The research activities would be conducted by trained personnel in a safe manner. Research would be conducted by or under the close supervision of experienced personnel, as required by the permit. These activities would not involve hazardous methods, toxic agents or pathogens, or other materials that would have a substantial adverse impact on public health and safety. Therefore, no negative impacts on human health or safety are anticipated during the proposed activities.

4) Can the proposed action reasonably be expected to adversely affect endangered or threatened species, their critical habitat, marine mammals, or other non-target species?

Response: As determined in the 2011 ESA biological opinion prepared for the request, the Proposed Action would affect listed pinnipeds and cetaceans in the action area during research. However, the biological opinion concluded that the effects of the proposed action would be short-term in nature to individual animals. The Proposed Action would not likely jeopardize the continued existence of any ESA-listed species and would not likely destroy or adversely modify designated critical habitat. Some research under Permit No. 14245 would take place in designated critical habitat for multiple ESA species; however, none of the research activities would affect the identified constituent elements of these habitats. Therefore research is not expected to negatively affect critical habitat. The Proposed Action would also affect several non-listed species. Researchers may harass individual animals during vessel- and aerial-based activities. See question #2 for mortalities that would be authorized by the permit. No non-target species would be intentionally approached during proposed research. Further, the permit would contain mitigation measures to minimize the effects of the research and to avoid unnecessary stress to any protected species by requiring use of specific research protocols.

5) Are significant social or economic impacts interrelated with natural or physical environmental effects?

Response: Effects of the research would be limited to the take of target and non-target marine mammals. Permitting the proposed research could result in a low level of economic benefit to local economies in the action area. However, such impacts would be negligible on a national or regional level and therefore are not considered significant. These impacts are not interrelated with any natural or physical impacts. The Proposed Action would not result in inequitable distributions of environmental burdens or affect access (short- or long-term use) to any natural or depletable resources in the action area.

6) Are the effects on the quality of the human environment likely to be highly controversial?

Response: NMFS does not consider the Proposed Action controversial nor has it been considered controversial in the past. All of the proposed research activities are standard research activities that have been conducted on these species by the scientific

been considered controversial in the past. All of the proposed research activities are standard research activities that have been conducted on these species by the scientific community, and by the applicant, for decades. No other portion of the marine environment beyond the target and non-target species authorized by the permit would be impacted by the Proposed Action.

7) Can the proposed action reasonably be expected to result in substantial impacts to unique areas, such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers, essential fish habitat, or ecologically critical areas?

Response: The proposed research would not be expected to result in substantial impacts to any such area. The majority of these habitats are not part of the action area. See response to question #1 for impacts to EFH.

8) Are the effects on the human environment likely to be highly uncertain or involve unique or unknown risks?

Response: The proposed research is not unique. The proposed activities have been previously authorized as research activities for cetaceans for decades. The potential for harassment and mortality from the activities to the target and non-target marine mammals is known and has been considered. Risks to other portions of the human environment as a result of the research activities are not expected. Therefore, the risks to the human environment are not unique or unknown.

9) Is the proposed action related to other actions with individually insignificant, but cumulatively significant impacts?

Response: The Proposed Action is not related to other actions with individually insignificant, but cumulatively significant impacts. While these species are impacted by other human activities, including other scientific research, these activities are not occurring simultaneously on the same individuals of a population/stock. This is largely due to the broad action area and the fact that much of the applicant's activities would occur offshore or in remote areas. The short-term stresses (separately and cumulatively when added to other stresses marine mammals face in the environment) resulting from the research activities would be expected to be minimal. Behavioral reactions suggest that harassment is brief, lasting minutes, before animals resume normal behaviors. Hence, NMFS expects the effects of research to live animals to dissipate before animals could be harassed by other human activities; nor will it result in an appreciable reduction in the fecundity of target individuals. The loss of a limited number of target animals during captures is not expected to result in population or species level impacts. Therefore, significant cumulative impacts are not expected. Furthermore, the permit would contain conditions to mitigate and minimize any impacts to the animals from research activities, including the coordination of activities with other researchers in the area.

10) Is the proposed action likely to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural or historical resources?

Response: The action would not take place in any district, site, highway, structure, or object listed in or eligible for listing in the National Register of Historic Places, thus none would be impacted. See Response #4 for critical habitat. Research may occur in National Marine Sanctuaries. Although NMFS does not expect impacts to Sanctuary resources, the National Marine Sanctuary Program (NMSP) was provided an opportunity to review the applicant's request. Informative comments were received from one of the Sanctuaries and were forwarded onto the applicant. The Proposed Action would not occur in other areas of significant scientific, cultural or historical resources and thus would not cause their loss or destruction. None of these resources are expected to be directly or indirectly impacted.

11) Can the proposed action reasonably be expected to result in the introduction or spread of a non-indigenous species?

Response: The action would not be removing or introducing any species; therefore, it would not likely result in the introduction or spread of a non-indigenous species.

12) Is the proposed action likely to establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration?

Response: The decision to issue the permit would not be precedent setting and would not affect any future decisions. Issuance of a permit to a specific individual or organization for a given research activity does not in any way guarantee or imply that NMFS will authorize other individuals or organizations to conduct the same research activity. Any future request received would be evaluated upon its own merits relative to the criteria established in the MMPA, ESA, and NMFS' implementing regulations.

13) Can the proposed action reasonably be expected to threaten a violation of Federal, State, or local law or requirements imposed for the protection of the environment?

Response: The action would not result in any violation of Federal, State, or local laws for environmental protection. The permit would contain language stating that the Holder is required to obtain any state and local permits necessary to carry out the action. The applicant has been made aware that other permits such as from the NMSP may be needed to conduct the work.

14) Can the proposed action reasonably be expected to result in cumulative adverse effects that could have a substantial effect on the target species or non-target species?

Response: The action is not expected to result in any cumulative adverse effects to the species that are the subject of the proposed research or non-target species found in

these waters. For targeted species, the Proposed Action would not be expected to have more than short-term effects to individuals and the loss of a limited number of animals during captures. These impacts, however, are expected to be negligible to marine mammal stocks and species. The effects on non-target species were also considered and no substantial effects are expected as researchers would make no efforts to approach or interact with them. Therefore, no cumulative adverse effects that could have a substantial effect on any species, target or non-target, would be expected.

**DETERMINATION**

In view of the information presented in this document and the analysis contained in the EA prepared for Issuance of Permit No. 14245, pursuant to the ESA and MMPA, and the ESA section 7 biological opinion, it is hereby determined that the issuance of Permit No. 14245 will not significantly impact the quality of the human environment as described above and in the EA. In addition, all beneficial and adverse impacts of the proposed action have been addressed to reach the conclusion of no significant impacts. Accordingly, preparation of an Environment Impact Statement for this action is not necessary.

James H. Lecky
Director, Office of Protected Resources

4/22/11
Date