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

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Environmental Assessment on Effects of Issuing Marine Mammal Scientific Research Permit No. 16388

April 2013

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

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Location: North Atlantic Ocean, North Pacific Ocean, and Arctic Ocean

Abstract: The National Marine Fisheries Service (NMFS) proposes to issue Scientific Research Permit No. 16388, 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. The purposes of the research are to: 1) characterize diving and foraging behavior in the context of the oceanographic and acoustic environment to support improved management of baleen whales, 2) elucidate day-night cycles of foraging behavior, 3) study the environmental factors that influence diving behavior of all demographic groups, and 4) identify preferred prey species, but also elucidate the oceanographic conditions that help to concentrate prey to develop a predictive model of baleen whale distribution. The applicant requests takes of humpback, fin, blue, bowhead, sei, North Atlantic and North Pacific right, and non-ESA-listed Eastern North Pacific gray whales.

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1.0 PURPOSE OF AND NEED FOR ACTION

Proposed Action: In response to an application from Dr. Mark Baumgartner, Woods Hole Oceanographic Institution, MA, NMFS proposes to issue Scientific Research Permit No. 16388 authorizing takes"[1] by level A and B 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.*), and the Endangered Species Act of 1973 (ESA; 16 U.S.C. 1531 *et seq.*).

Purpose of and Need for Action: The MMPA and ESA prohibit "takes" of marine mammals and of threatened and endangered species, respectively, with only a few specific exceptions. The applicable exceptions in this case are an exemption for *bona fide*[3] scientific research under Section 104 of the MMPA and for scientific purposes related to species recovery under Section 10(a)(1)(A) of the ESA.

The purpose of the permit is to provide the applicant with an exemption from the take prohibitions under the MMPA and ESA for harassment of marine mammals, including those listed as endangered, during conduct of research that is consistent with the MMPA and ESA issuance criteria.

The need for issuance of the permit is related to the purposes and policies of the MMPA and ESA. 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. Facilitating research about species' basic biology and ecology or that identifies, evaluates, or resolves specific conservation problems informs NMFS management of protected species.

Other EA/EIS That Influence Scope of this Environmental Assessment

NMFS Permits Division has prepared Environmental Assessments (EAs) with Findings of No Significant Impact (FONSI) for issuance of permits to conduct research on humpback whales (*Megaptera novaeangliae*), fin whales (*Balaenoptera physalus*), North Atlantic right whale (*Eubalaena glacialis*), North Pacific right whales (*E. japonica*), sei whales (*Balaenoptera borealis*), blue whales (*B. musculus*), bowhead whales (*Balaena mysticetus*), and gray whales (*Eschrichtius robustus*):

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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." 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."

[2] "Harass" is defined under the MMPA 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."

- *Environmental Assessment On the Issuance of a Scientific Research Permit to the National Marine Fisheries Service Northeast Fisheries Science Center [Responsible Party: Dr. Nancy Thompson] to Conduct Research on Marine Mammals in the North Atlantic Ocean (2007a)*
- *Environmental Assessment On The Issuance Of Two Scientific Research Permits For Vessel Surveys And Suction Cup Tagging Studies Of Baleen Whales (2007b).*
- *Environmental Assessment for the Issuance of Scientific Research Permits for Research on Humpback Whales and Other Cetaceans [File Nos. 14682, 10018-01, 13846, 14451, 14585, 14599, 14122, 14296, and 14353] (2010).*
- *Environmental Assessment for Issuance of a Scientific Research Permit for Cetacean Studies in the Pacific, Arctic and Atlantic Oceans [File No. 14245] (2011).*

These EAs were prepared to take a closer look at potential environmental impacts of permitted research on marine mammals listed as threatened or endangered, not because the Permits Division determined that significant adverse environmental impacts were expected or that a categorical exclusion was not applicable. As each EA demonstrates, and each FONSI has documented, research on marine mammals generally does not have a potential for significant adverse impacts on marine mammal populations or any other component of the environment. These EAs are hereby incorporated by reference.

Scope of Environmental Assessment: This EA focuses primarily on effects on humpback whales, fin whales, North Atlantic right whale, North Pacific right whales, sei whales, blue whales, and bowhead whales listed as endangered under the ESA.

The National Oceanic and Atmospheric Administration (NOAA) has, in NOAA Administrative Order 216-6 (NAO 216-6; 1999), listed issuance of permits for research on marine mammals and threatened and endangered species as categories of actions that "do not individually or cumulatively have a significant effect on the human environment..." and which therefore do not require preparation of an EA or environmental impact statement (EIS). A possible exception to the use of these categorical exclusions is when the action may adversely affect species listed as threatened or endangered under the ESA (NAO 216-6 Section 5.05c). NMFS has prepared this EA, with a more detailed analysis of the potential for adverse impacts on threatened or endangered species resulting from takes of a specified number of the target marine mammals to assist in making the decision about permit issuance under the MMPA and ESA.

There is no evidence from prior analyses[4] of the effects of permit issuance, or from monitoring reports submitted by permit holders[5], that issuance of research permits for take of marine mammals listed under the ESA results in adverse effects on stocks or species. Nevertheless, NMFS has prepared this EA, with a more detailed analysis of the potential for adverse impacts

[4] Since 2005, NMFS has prepared over 100 EAs for issuance of permits under the MMPA and ESA. In every case, the EA supported a finding of no significant impact regardless of the nature of the permitted take or the status of the species that were the subject of the permit or batched permits. These EAs were accompanied by Biological Opinions prepared pursuant to interagency consultation under section 7 of the ESA and further document that such permits are not likely to adversely affect listed species.

[5] All NMFS permits for research on marine mammals require submission of annual reports, which include information on responses of animals to the permitted takes.

on threatened or endangered species resulting from takes of a specified number of individual whales, to assist in making the decision about permit issuance under the MMPA and ESA.

A *Federal Register* notice (77 FR 31585) was published to allow other agencies and the public the opportunity to review and comment on this EA and the application. Comments were received only on the application and they did not result in changes to the alternatives considered or provide information on effects discussed in the EA.

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

Alternative 1 - No Action: Under the No Action alternative, no permit would be issued and the applicant would not receive an exemption from the MMPA and ESA prohibitions against take.

Alternative 2 - Proposed Permit: Under the Proposed Permit alternative, a permit would be issued to exempt the applicant from MMPA and ESA take prohibitions during conduct of research that is consistent with the purposes and policies of the MMPA and ESA and applicable permit issuance criteria.

The objectives of the applicant's research are to: 1) characterize diving and foraging behavior in the context of the oceanographic and acoustic environment to support improved management of baleen whales, 2) elucidate day-night cycles of foraging behavior, 3) study the environmental factors that influence diving behavior of all demographic groups, and 4) identify preferred prey species, but also elucidate the oceanographic conditions that help to concentrate prey to develop a predictive model of baleen whale distribution.

The following is a summary of the applicant's request to take marine mammals.

Methods: The research protocols briefly summarized here are described in the application on file for this action which is hereby incorporated by reference. The experimental protocol consists of close vessel approach for photo-identification, behavioral observations, and suction cup and dermal satellite tagging.

Level B harassment would occur during vessel surveys, passive acoustics, behavioral observations, and photo-identification activities. All these activities would only result in Level B harassment if a large whale is within 100 yards of the vessel. Non-target animals could potentially be harassed by vessel approaches during tagging operations. Environmental sampling would be conducted in proximity to the tagged whale with a vertical profiler that contains a conductivity-temperature-depth instrument, fluorometer, optical plankton counter, and video plankton recorder.

Level A harassment would occur during suction cup and dermal satellite tagging. For each type of deployment, a tagger would attach an archival tag to a whale from the bow of a small boat (e.g., a zodiac). Level B harassment from vessel-based activities, as described above, would occur concurrently.

The boat would drive to within a few meters of the whale and the tag would be applied at least 1.5 m posterior to the blowholes; the tag would never be attached near or anterior to the blowholes or to the flippers or the flukes. After either suction-cup or dermal attachment tag deployment, the tagged whale would be tracked by the small boat from a distance of greater than 100 m with the aid of an acoustic transmitter (housed within the tag) using a hand-held directional hydrophone.

Suction-cup tag design

In some studies, the suction-cup tag would consist of a time-depth recorder (Wildlife Computers), pitch and roll sensor (Star Oddi), a 36 kHz acoustic transmitter (Vemco), a VHF radio transmitter (Telonics), and syntactic foam floatation to allow recovery of the tag at the sea surface after detachment. The portion of the tag in contact with the whale (i.e., the suction cup) would be roughly 9.7 cm in diameter. The tag would be 10-12 cm high and weigh approximately 500 g in air. Suction-cup tags would be attached using a hand-held, 9 m long pole. Detachment of these tags would occur via a corrosive foil release that causes the suction cup to be flooded with seawater after a specified time (1-3 hours).

Dermal attachment tag design

The dermal attachment consists of a 316 stainless steel solid core needle that is 6.5 or 7.5 cm (2.5 or 3 inches) long and 0.635 cm (0.25 inches) in diameter and is designed to implant in the epidermis and blubber (7.5 cm needles used for species with a thicker epidermis, e.g., bowhead and right whales, and 6.5 cm needles are used for species with thinner epidermis, e.g., humpback and fin whales). The implanted needle acts as an anchor for a recoverable archival tag that is attached to it via a severable tether. The tether passes through a corrosive foil release that is designed to allow detachment of the tag from the anchor after a specified time (a few to 72 hours). Depending on the species, the needle would either have rings raised 0.16 cm from the shank, or would have 316 stainless steel pins attached to the shank to prevent early detachment (Figure 1). The raised-ring design appears to provide sufficient anchoring power for humpback whales; however, the design featuring stainless steel pins is required for reliable attachment to bowhead whales (Baumgartner et al. submitted); the observed differences between species are likely related to the structure and relative amount of connective tissue present in the blubber layer. The needle also has a large hemispherical delrin "stop" to limit the depth of penetration (Figure 1).

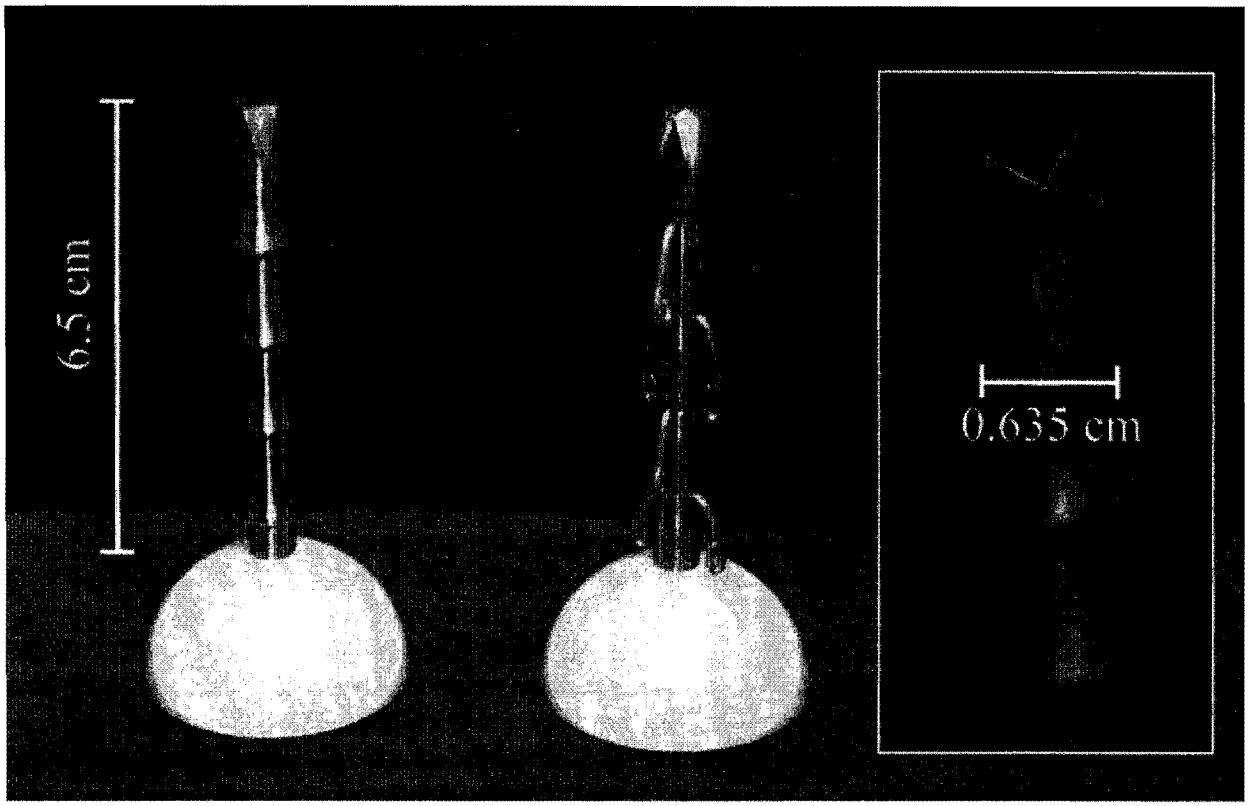

Figure 1. Needles (anchors) used for dermal attachment tag. Needle at left features 4 tapered cupped rings rising 0.16 cm above the needle shaft, while the needle at right features 4 curved 316 stainless steel pins. Each needle is attached to a white hemispherical delrin "stop". Inset shows cross design of needle tip with 4 cutting blades and side vents

Two types of tags would be used with the dermal attachment. The first would consist of a 36 kHz acoustic transmitter (Vemco), a time-depth recorder (Lotek), a VHF radio transmitter (Telonics), and PVC foam floatation housed in a 42.5 cm long and 3.7 cm diameter polyethylene pipe (Figure 2). The pipe freely floods to allow accurate depth sensing by the time-depth recorder and effective acoustic transmission from the acoustic transmitter. The total tag weight is approximately 250 g in air. The tag is designed to be a contiguous projectile when launched, 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 tether. After a specified period of time, the zinc foil release would corrode sufficiently to allow detachment of the tag from the needle. The needle would remain implanted in the whale while the tag floats to the surface and is recovered. It is anticipated that the needle would remain implanted for several days before being shed by the whale.

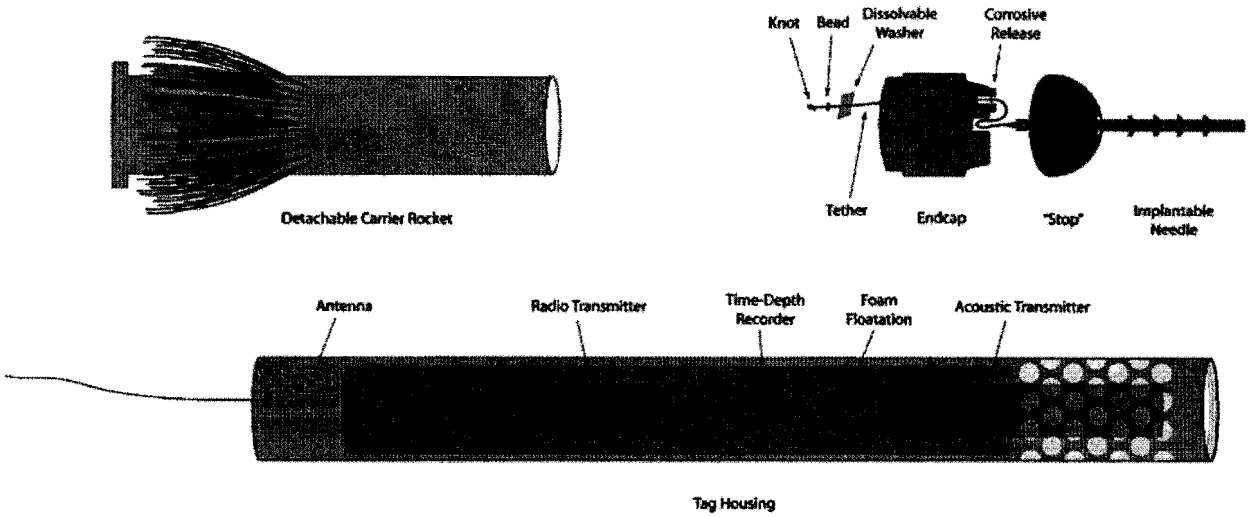

Figure 2. Dermal attachment tag components, including tag housing, foam floatation, TDR, radio transmitter, acoustic transmitter, detachable carrier rocket with flu-flu fletching design, and endcap with needle, stop, and corrosive release mechanism. To assemble for launch, the carrier rocket is fitted into the end of the tag housing at the left, and the endcap is screwed into the tag housing at the right.

The second tag to be used via dermal attachment is a Wildlife Computers MK10-PATF (152×51×32 mm, 130 g in air; Figure 3). This tag allows archival storage of depth, temperature, light level, wet/dry state, and Fastloc GPS data, and it also has the capability to transmit Fastloc GPS data via an integrated ARGOS transmitter. To facilitate tracking and recovery, the ship would receive frequent (every 5 minutes) ARGOS transmissions from the tag via a wideband radio receiver and an antenna mounted high on the ship's mast (this should provide a line-of-sight reception range of roughly 10 km). The Fastloc GPS data would be combined with GPS satellite ephemeris data acquired by a conventional ship-mounted GPS receiver (Garmin) to compute accurate locations of the tagged whale. This tag would be used for deployments of 24+ hours, as the Fastloc GPS would allow safe nighttime tracking from a large oceanographic vessel.

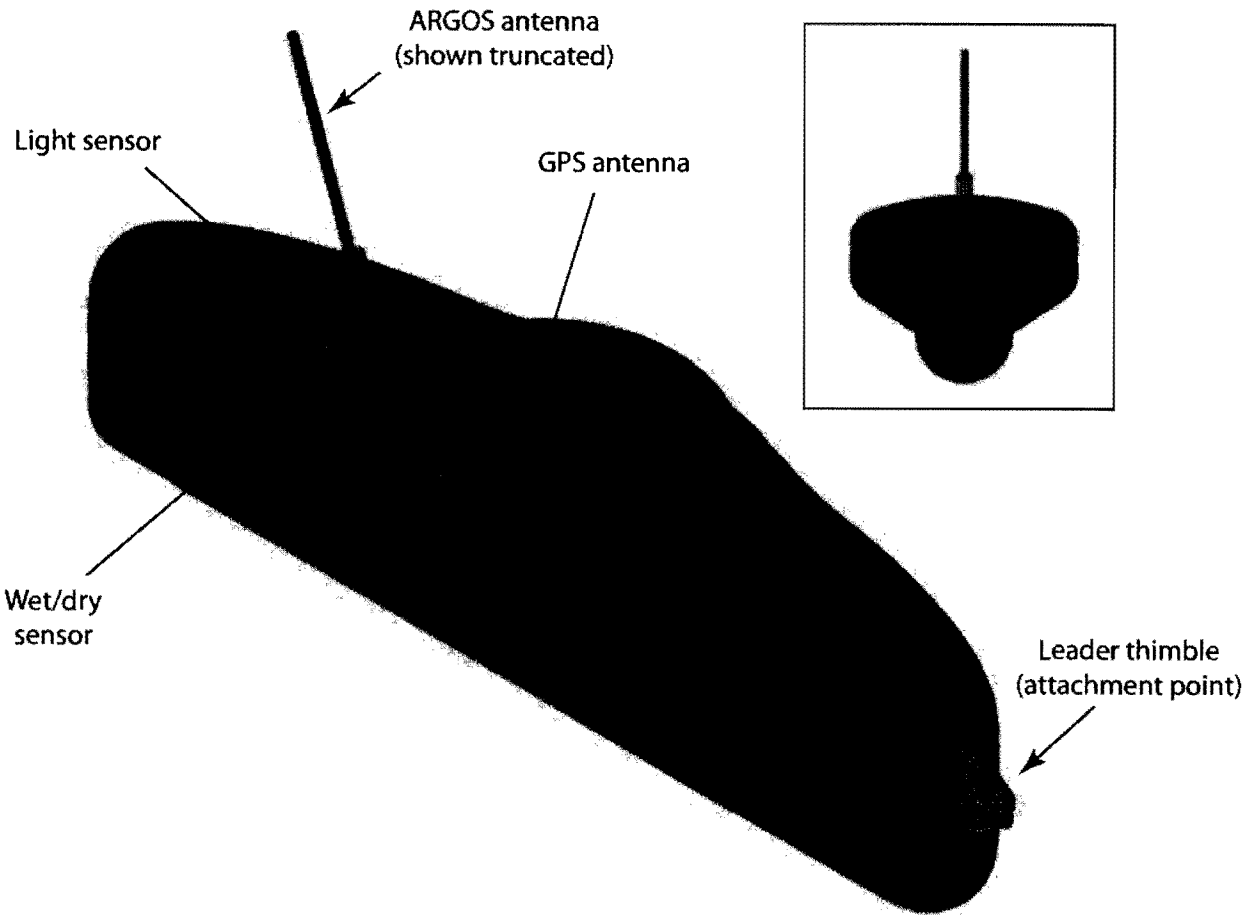

Figure 3. Wildlife Computers MK10-PATF tag (pressure and temperature sensors and communications port on bottom out of view). The dermal anchor would be attached to the leader thimble via a short length of Spectra fishing line, and the corrosive release at the thimble would allow the tag to part with this line. Inset shows head-on view to show the tag's hydrodynamic shape.

Both types of dermal attachment tags would be launched from the Air Rocket Transmitter System (ARTS; Heidi-Jørgensen et al. 2001), 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 anticipated to be 10-25 m (i.e., the distance between the tagging vessel and whale).

Mitigation measures during tagging approaches include:

- Every effort would be made to minimize disturbance to the whale during attempts to attach the tag.
- Prior to approaching a whale, the behavior of the candidate whale would be monitored.
- Animals that are in any way agitated (e.g., breaching, tail lobbing) or engaged in social activity with other whales would not be approached.
- Close approaches to whales would be conducted in a controlled manner at safe speeds so as not to alarm the whale and so that the approach can be aborted at any time.

- Evasive behavior is expected during some approaches, but tagging attempts on animals that continually evade would be abandoned.
- Tagging attempts on animals that exhibit moderate to strong reactions to close approaches (e.g., forceful roll, tail slash, tail lob, breach) would also be abandoned.
- Only suction-cup tagging would be used to study the diving and foraging behavior of females accompanied by calves or calves over 6 months of age.
- The use of the dermal attachment would be limited to sub-adults (> 1 year) and adults that are unaccompanied by a calf.
- The age of animals would be judged in the field by size such that small animals likely to be young of the year would not be considered for the dermal attachment.
- Likewise, small animals accompanied by an adult would not be considered candidates for dermal attachment.
- Any calf with evidence of fetal folds would not be tagged.
- During tagging attempts, if any close boat approach results in separation of a mother and her calf by more than 50 m for longer than a few minutes, tagging attempts on the pair would be abandoned. In the applicant's experience tagging right and humpback whales, he has never observed separation of a mother and calf as a result of close boat approach and suction-cup tagging.

The efficiency of suction-cup tagging and the decision to switch to the dermal attachment would be evaluated in the context of the study design and sample size requirements. In cases where the success rate of suction-cup tagging is too low to meet the sample size requirements of the study, the dermal attachment would be used. For example, if the study design calls for 10 tag attachments during 5 days of effort at sea, yet suction-cup tagging yields only one successful tagging every 3-4 days, suction-cup tagging would be deemed inefficient and the dermal attachment would be used.

Suction-cup tagging remains the preferred method of tracking the diving and foraging behavior of baleen whales. Dermal attachment would be used only under conditions that make efficient deployment of suction-cup attached tags impossible. These conditions include:

- Whales regularly evade approach within 10 m for pole deployment of suction-cup tags,
- The skin condition of target animals make attachment via suction cup unlikely,
- Rough seas preclude the use of a long pole for attachment, but still allow for effective deployment with a projectile tag, and
- The study design calls for attachment durations (24-72 hours) that exceed the typical capabilities of suction cups (6-12 hours).

Mitigation measures used during dermal attachment tagging include:

- Needles would be washed in warm soapy water, rinsed with tap water, inserted into an autoclave bag, and sterilized with a tabletop steam sterilizer (autoclave).
- An indicator would be used to insure the effectiveness of each sterilization procedure.
- After sterilization, the needle would remain in its autoclave bag until immediately prior to loading in the ARTS launcher.

- The needle is not touched during the loading process (it is handled by the delrin stop), and it is subsequently protected from incidental contact and sea spray while inside the barrel of the launcher.
- If launched and recovered (i.e., a missed shot or premature shedding), anchors would never be re-used without washing and steam sterilization.
- Replacing a needle would be easily achieved in the field by unscrewing the end cap with the used anchor and replacing it with an end cap attached to a sterile anchor.

Duration: The researchers intend to conduct surveys from March-November. The sampling period of each individual tagging project would be 2-6 weeks. The permit would be valid for five years from date of issuance.

Target species or stocks: The applicant's research is directed at humpback, fin, sei, blue, bowhead, North Atlantic and North Pacific right, and non-ESA listed Eastern North Pacific gray whales. The proposed annual take for each species is summarized in Appendix 1. The requested actions involve Level A and B harassment. The permit would exempt takes of all these marine mammals that potentially could be disturbed.

3.0 AFFECTED ENVIRONMENT

Location

Research would occur in the northwest Atlantic from Maine to Florida; Canadian waters of the Gulf of Maine, Labrador Sea, Davis Strait, Baffin Bay, and Hudson Bay; waters off the U.S. North Pacific (California to Washington); and the Arctic Ocean including Bering, Chukchi and Beaufort Seas.

Status of ESA Species

Further details on the species and the status by stock can be found in the Atlantic and Gulf of Mexico U.S. Stock Assessment Report (Waring et. al. 2011), U.S. Pacific Marine Mammal Stock Assessment Report (Carretta et al. 2011), and Alaska Marine Mammal Stock Assessment Report (Allen and Angliss 2011).

Humpback whales: Humpback whales are listed as depleted under the MMPA and endangered under the ESA, throughout their range. There is one recognized management stock of humpback whales in the Atlantic (Gulf of Maine stock) and three management stocks of humpback whales are recognized within the North Pacific (the eastern North Pacific stock, the central North Pacific stock, and the western North Pacific stock). Population estimates for the entire North Pacific are estimated 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).

Gulf of Maine stock: Winter breeding areas are known to occur in the West Indies. Most breeding sites are found in the waters of the Dominican Republic but can extend throughout the Antillean arc, from Puerto Rico to the coast of Venezuela. The best available estimate for the Gulf of Maine (formerly Western North Atlantic) stock is 847 animals. This population is estimated to be growing at about six percent annually (Barlow and Clapham 1997).

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 2,043 whales and appears to be increasing in abundance (Carretta et al., 2010).

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 the most recent N_{min} was calculated to be 5,833 (Allen and Angliss, 2010). The stock appears to be increasing, with a PBR of 61.2 animals.

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 938 individuals and the PBR is calculated to be 2.6. Current data indicate the population size is trending upwards but no confidence limits are available.

Sei whales: Sei whales are listed as depleted under the MMPA and endangered under the ESA, throughout their range. The best estimate of abundance for the Nova Scotia stock sei whales is 386. Current and maximum net productivity rates are unknown for this stock. However, it is estimated that this stock may not grow at rates much greater than 4% given the constraints of their reproductive life history (Barlow et al. 1995). Sei whale abundance is greatest in U.S. waters mostly in the northern portions of the U.S. Atlantic Exclusive Economic Zone (EEZ)—the Gulf of Maine and Georges Bank during spring and summer.

Within the Pacific U.S. EEZ, sei whales are divided into two discrete stocks: the Eastern North Pacific stock and the Hawaii stock.

Eastern North Pacific stock: The best abundance estimate for whales off the coasts of California, Oregon and Washington is 126 animals with an annual Potential Biological Removal (PBR) level of 0.17 (Caretta et al., 2010). No population trend is available for this stock.

Hawaii stock: The best abundance estimate for whales off Hawaii is 77 animals with an annual PBR level of 0.1 (Caretta et al., 2010). No population trend is available for this stock. There have been no reported fishery related mortality or serious injuries of sei whales in the Hawaiian Islands EEZ and is not considered to be a significant concern.

Fin whales: Fin whales are listed as depleted under the MMPA and endangered under the ESA, throughout their range. The best available estimate for the Western North Atlantic stock is 3,985. There are insufficient data to determine status and population trends for this stock. A recent NMFS 5-year Status Review of fin whales points out that there is a lack of ocean-wide status and trend information of fin whales (NMFS 2011).

Three stocks of fin whales are recognized in Pacific U.S. waters:

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 3,044 whales with a PBR of 16 whales (Carretta et al., 2010).

Northeast Pacific (Alaska) stock: Whales in this stock are found from Canadian waters north to the Chukchi 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 suggest 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).

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 is not available to determine a population trend for this stock.

Blue whales: Blue whales are listed as depleted under the MMPA and endangered under the ESA, throughout their range. There are insufficient data to determine the status and trends of the blue whale population in the western North Atlantic stock (Waring et al. 2011). The Recovery Plan for the blue whale (NMFS 1998) summarizes what is known about blue whale abundance in the western North Atlantic and concludes that the population probably numbers in the low hundreds. More than 440 individuals were photo-identified in the Gulf of St. Lawrence between 1979-2009 (R. Sears, pers. comm., as quoted by Waring et al. 2011).

Within U.S. waters in the North Pacific, blue whales are divided into two stocks: Western and Eastern. Insufficient data are available to evaluate the current abundance or population trends of blue whale stocks in the western North Pacific. The best estimate of blue whale abundance in the eastern North Pacific is 2,842 animals with an annual PBR of six whales per year in U.S. waters. Along the California coast blue whale abundance has been increasing during the past two decades (Barlow, 1994; Calambokidis and Barlow, 2004; Calambokidis et al., 1990).

North Atlantic right whales: North Atlantic right whales are listed as depleted under the MMPA and endangered under the ESA, throughout their range. The western North Atlantic population size was estimated to be at least 361 individuals in 2005 based on a census of individual whales identified using photo-identification techniques. Research using the North Atlantic Right Whale Catalogue has indicated that, annually, between 14% and 51% of right whales are involved in entanglements (Knowlton et al. 2005). Ship strikes are also a major cause of mortality and injury to right whales (Kraus 1990; Knowlton and Kraus 2001). In records from 2003 through 2007, mortality and serious injury to right whales due to ship strikes were 2.8 whales per year (U.S. waters, 2.2; Canadian waters, 0.6). Given the small population size and

low reproductive rate, human-related mortalities may be the principal factors inhibiting growth and recovery of the population. In order to reduce the threat of ship collisions with North Atlantic right whales, NMFS issued a final rule to implement speed restrictions in 2008.

North Pacific right whales: In April 2008, the North Pacific right whale was listed as a separate, endangered species. There are no reliable estimates of current abundance or trends for right whales in the North Pacific including 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. 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 (Wade et al., 2006, 2011).

Bowhead whales: Bowhead whales are listed as depleted under the MMPA and endangered under the ESA, throughout their range. The Western Arctic bowhead whale stock has been increasing in recent years; the estimate of 10,545 is between 19% and 105% of the pre-exploitation abundance (estimates ranging roughly from 10,000 to 55,000), and this stock may now be approaching its carrying capacity (Brandon and Wade 2004, 2006).

The estimated abundance of the Spitsbergen stock was 24,000 prior to commercial exploitation, but currently numbers less than one hundred. The Baffin Bay-Davis Strait stock was estimated at about 11,750 prior to commercial exploitation and the Hudson Bay-Fox Basin stock at about 450. The current abundance of the Baffin Bay-Davis Straight and Hudson Bay-Fox Basin stocks combined is estimated as about 450.

Status of Other Marine Mammals

Eastern North Pacific gray whales would also be targeted but none in the action area are listed as threatened or endangered under the ESA or considered strategic or depleted under the MMPA.

Non-Target Marine Animals

In addition to the marine mammal stocks and species that are the subject of the permit, an assortment of sea birds, sea turtles, fish and invertebrates may be found in the action area. The permit would only authorize takes of marine mammals (Appendix 1). Non-target animals would not be approached and therefore not subject to harassment. They would not be affected by the action and are not considered further.

Biodiversity and Ecosystem Function

The proposed action is directed at marine mammals and does not interfere with benthic productivity, predator-prey interactions or other biodiversity or ecosystem functions. Marine mammals would not be removed from the ecosystem or displaced from habitat, nor would the permitted research affect their diet or foraging patterns. Further, the proposed action does not involve activities known to or likely to result in the introduction or spread of nonindigenous species, such as ballast water exchange or movement of vessels among water bodies. Thus, effects on biodiversity and ecosystem function will not be considered further.

Ocean and Coastal Habitats
The ESA provides for designation of "critical habitat" for listed species and includes physical or biological features essential to the conservation of the species. Critical habitats may require special management considerations or protection. Critical habitat designations affect only federal agency actions or federally funded or permitted activities. Essential fish habitat (EFH) designated for various species of fish as well as critical habitat for leatherback sea turtles, Steller sea lions, North Pacific and North Atlantic right whales, southern resident killer whales, northern sea otters, marbled murrelets, and proposed critical habitat for Cook Inlet beluga whales overlap with the proposed action area. However, the proposed action is directed at marine mammals and does not affect habitat. It does not involve alteration of substrate, movement of water or air masses, or other interactions with physical features of ocean and coastal habitat. Thus effects on the ocean and coastal habitat will not be considered further.

Unique Areas
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) to ensure that the research would not adversely impact marine mammals, birds or other animals within the sanctuaries. In addition, permit actions including the proposed action are sent to the NMSP for review if research is to occur in Sanctuary waters. Additionally, Permit Holders also have the responsibility to obtain any other permits, or comply with any other Federal, State, local laws or regulations.

The action area contains:

- Studds-Stellwagen Bank National Marine Sanctuary
- Gray's Reef National Marine Sanctuary
- Monitor National Marine Sanctuary
- Florida Keys National Marine Sanctuary
- Olympic Coast National Marine Sanctuary
- Cordell Bank National Marine Sanctuary
- Gulf of the Farallones National Marine Sanctuary
- Channel Islands National Marine Sanctuary
- Monterey Bay National Marine Sanctuary
- San Juan Islands National Wildlife Refuge
- Protection Island National Wildlife Refuge
- Alaska Maritime Wildlife Refuge

The proposed action is directed at marine mammals and involves routine vessel transit through the water. Thus, effects on such unique areas will not be considered further. There are no other historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas within the action area, which is limited to coastal and open waters.

Historic Places, Scientific, Cultural, and Historical Resources
There are no districts, sites, highways or structures listed in or eligible for listing in the National Register of Historic Places in the action area. The proposed action is an undertaking that does not have the potential to cause effects on historic properties. The proposed action represents

non-consumptive use of marine mammals and does not preclude their availability for other scientific, cultural, or historic uses, including subsistence harvest by Alaskan Natives. Thus, effects on such resources will not be considered further.

Social and Economic Resources
The proposed action does not affect distribution of environmental burdens, access to natural or depletable resources or other social or economic concerns. It does not affect traffic and transportation patterns, risk of exposure to hazardous materials or wastes, risk of contracting disease, risk of damages from natural disasters, food safety, or other aspects of public health and safety. Research would be conducted by or under the close supervision of experienced personnel, as required by the permit. The equipment and vessels used are local and any equipment that comes in contact with animals would be thoroughly decontaminated between uses. Research vessels do not carry ballast water and any scientific samples are shared only between scientific laboratories. Therefore, no negative impacts on human health or safety are anticipated during research. Thus, effects on such resources will not be considered further.

4.0 ENVIRONMENTAL CONSEQUENCES

Effects of the No Action Alternative
There are no direct or indirect effects on the environment of not issuing the permit. The takes of marine mammals, including those listed as threatened or endangered, resulting from the applicant's research would not be exempted. It is unlikely the applicant would conduct the research in the absence of a permit, because to do so would risk sanctions and enforcement actions.

If the research is not conducted, the opportunity would be lost to collect information that would contribute to a better understanding of marine mammal populations. This information is necessary for NMFS to conduct mandated stock assessments and status reviews and implement management activities. The proposed research would directly address research needs for bowhead whales as well as those identified in NMFS recovery plans for humpback, blue, fin, North Atlantic right, and sei whales, as well as the 2011 5-year Status Review of fin whales, and would provide important information that would help conserve, manage, and recover this species as required by the ESA and the MMPA. 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 is to recover.

Effects of the Proposed Permit Alternative
Effects would occur at the time when the applicant's research results in takes of marine mammals, including those listed as threatened or endangered.

The activities requested in the permit application would allow research conducted under Permit No. 1058-1733, to continue for five additional years. The overall effects of issuing the permit would be similar to the effects of issuing Permit No. 1058-1733, which has been amended one time since issuance. An EA of the initial permit resulted in a FONSI (June 25, 2007). Research

activities may result in short-term behavioral responses by individuals, but would not be expected to result in stock- or species-level effects.

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.

Subsequently, 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 of the listed species in the wild.

Level B harassment, as defined by the MMPA, would occur during vessel surveys, behavioral observations, photo-identification, passive acoustic recording, and tracking activities. These activities were analyzed in past EAs for large whale research conducted by other researchers working in the same waters, and it was determined that they could lead to short-term disturbance of marine mammals, but that there would be no significant impact from issuance of the permits and amendments (NMFS 2007, 2010, and 2011). These research activities are all considered Level B harassment and are not new types of activities; therefore, NMFS feels that the effects of close approach to marine mammals would be minimal and short-term. The close approach activities requested in the proposed action would not be expected to have any additional effects that were not analyzed in previous EA's.

Level B harassment, as described above, would occur concurrently with Level A harassment activities.

Level A harassment, as defined by the MMPA, would occur during tagging activities, when physical contact is made that has the potential to injure animals. Actual injury would be minimized by conditions of the permit limiting how attachment of tags may occur, such as avoiding sensitive areas of the body and sterilizing darts in a multi-step process to minimize the risk of infection.

The suction cup and dermal attachment tag types to be used for this action were fully analyzed in the EA for Southwest Fisheries Science Centers permits (File No. 774-1714 and 14097, NMFS 2004 and 2010c) and Dr. Baumgartner's current permit (File No. 1058-1733, NMFS 2007b).

The use of suction cup attached tags was analyzed in the EA's for Permit No. 774-1714 (NMFS 2004), Permit No. 1058-1733 (NMFS 2007b) Permit No. 14097 (NMFS 2010c). NMFS determined 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.
- The round cap midway along the anchor would ensure that the tag or anchor does not migrate deeper (i.e. muscle layer) into the whale after deployment.
- None of the attachment types would be likely to injure individuals or elicit more than a minimal, short-lived response from whales.

Impacts of currently authorized satellite tag types were 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, 2010c). In 2000, 71% of the 42 whales that were closely approached (within 10 m) showed no observable reaction (22 of 28 successfully tagged individuals and eight of 14 unsuccessfully tagged individuals). Of the remaining whales, reactions included lifting the head or flukes, arching the back, rolling to one side, rolling to one side and beating the flukes (on one occasion), or performing a head lunge (on one occasion) (Baumgartner and Mate 2003).

During field trials with the dermal attachment tag described here, Baumgartner et al. (submitted) reported a mild reaction (tail flick) to close boat approach and tagging in one humpback whale, but no reaction was reported in the other four humpback whale tagging events. Whales tagged with the dermal attachment tags swam at comparable speeds to those tagged with suction cup tags, and their diving behavior was likewise similar to suction-cup tagged whales. Of eight bowhead whales tagged with the dermal attachment tag, only one had a mild reaction (tail flick); in all other cases, there was no overt reaction to close boat approach or tagging (Baumgartner et al. submitted). Three of the eight whales had unusually long dives upon tagging (4-10 minutes), indicating that some whales clearly had an immediate response, albeit relatively mild, to the tagging process. Respiration rates were monitored for both the tagged bowhead whales and four undisturbed whales; for the five whales tagged for roughly 1.5 hours or more, respiration rates were significantly higher in the first hour than in the second hour, but respiration rates during the second hour were comparable to those of undisturbed whales. These results suggest the response

of bowhead whales to close approach and tagging lasts approximately one hour, but afterward, the whales behave (at least physiologically) like undisturbed whales.

The longer-term distress caused by dermal and sub-dermal attachment has been difficult to evaluate because of the paucity of follow-up studies on tagged animals. Much of the effort to characterize the long-term consequences of invasive tagging methods have concentrated on implantable tags (note that implantable tags are typically 1.8-2.6 cm in diameter, anchor in the muscle below the hypodermis, and are designed for long-term attachment; the proposed tag uses a 0.635-cm diameter needle, anchors in the epidermis and blubber, and is designed for short-term attachment). Several studies have sought to characterize the appearance of tagging wound sites both while the tag is implanted and after the tag is shed (Watkins et al. 1981, Kraus et al. 2000, Best and Mate 2007, Mate et al. 2007), but inferences about the health of the animal are difficult to make from superficial observations of these wounds. Mate et al. (2007) report resightings of over 40 of the 427 whales they tagged with implantable satellite transmitters from 1990 to 2005, and observed that while varying levels of swelling and scarring had been observed at the tag site, none of the animals were in poor health; they expressed the belief that "such swellings are not debilitating." In contrast, Weller (2008) reported that during a large whale tagging workshop convened by the Marine Mammal Commission and the National Marine Fisheries Service in 2005, "local and regional swelling [at the tag site] raised concern" among some workshop participants.

Baumgartner et al. (submitted) reported results from a detailed photographic follow-up study of humpback whales tagged with the dermal attachment tag described here. In the short term (i.e., in the few hours following tagging), the tag site looked very good with the delrin stop resting snugly against the skin with no sign of swelling, depression, bruising, protruding tissue, or damage to nearby skin. For two of the humpback whales, shedding of the anchor was documented within 2 and 5 days. Photographs within a day of anchor shedding indicated the wound site was very small (no larger than the needle itself), and was healing very well. Photographs taken over the ensuing weeks and months indicated complete healing.

For the humpback whales tagged with the dermal attachment described here, all were re-sighted in the same habitat both within the same year of tagging as well as in subsequent years (Baumgartner et al. submitted). Over the three months following tagging, all of the whales were re-sighted within 30 km of the location at which they were originally tagged. Confirmed re-sightings of three of the four whales persisted within 30 km of the tagging location for nearly five months after tagging. All were re-sighted in the same area the following year. Moreover, two of the tagged whales were reproductively mature females, and both produced calves in years following the tagging. One of these females calved during the winter following tagging, and was therefore pregnant when tagged.

The size of the dermal attachment needle (0.635 cm diameter, Figure 1) is comparable to a typical biopsy plug used to extract skin and blubber from large whales. Several studies have investigated the short-term effect of biopsying (Brown et al. 1991, 1994, Weinrich et al. 1992, Clapham and Matilla 1993, Gauthier and Sears 1999) and concluded that reactions are generally low to moderate. Weinrich et al. (1992) found that over the time scale of one week, re-sighting rates of biopsied and un-biopsied humpback whales were similar, and that re-sighting rates of

biopsied whales over the course of a year in the area where they were biopsied was significantly higher than un-biopsied animals; these results suggest that whales do not substantially change their distribution because of biopsying. In addition to the diameter of the dermal attachment needle, its tip has also been designed to prevent long-term distress to the animal. For example, the needle has 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 are also required to prevent epidermal cells and surface contaminants from being dragged into the dermis and potentially causing infection.

After detachment of the archival tag, only the needle remains attached to the whale. The needle is expected to produce a foreign body response such that rejection of the needle would occur. This process of rejection has been well documented in implanted satellite tags (Mate et al. 2007). Although detachment of the tag would remove a major source of drag on the needle that would have otherwise helped removal, the "stop" on the needle would provide some drag to help facilitate rejection. Shedding of the needle is anticipated to occur within a few days of implantation (see above for actual shedding times measured on humpback whales).

There is no evidence that responses of individual whales would exceed short-term stress and discomfort. 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.

In accordance with Section 7 of the ESA, a Biological Opinion was prepared which determined that the proposed action is not likely to jeopardize the continued existence of the targeted species and is not likely to destroy or adversely modify designated critical habitat.

Cumulative Impacts

Cumulative impacts 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 non-federal) or person undertakes such actions. The combined effects of the total amount of research permits relative to the status of the population were considered. Issuance of each permit was found not likely to have a significant adverse impact on its own or in combination with other permits. As a permit requirement, researchers must notify the relevant NMFS Regional Office in advance of their research plan and each Region is responsible for coordination of researchers in the area.

Cumulative impacts can result from individually minor but collectively significant actions that take place over a period of time. There may already be substantial adverse impacts on marine mammals from the existing levels of human activities. However, the relative incremental effect of the proposed action would not be significant.

NMFS believes that the proposed action as discussed above is similar to that of actions previously analyzed in the four NMFS EA's discussed in the *Other EA/EIS That Influence Scope of this Environmental Assessment* section which have been incorporated by reference. These prior analyses determined that the research directed at large whales and other species would not have a significant cumulative effect on either the human or marine environment. This included examining other past, present and future activities affecting whales, such as whaling, ship strikes, entanglement, anthropogenic noise, whale watching, and habitat degradation. The proposed action would be directed at fin, blue, sei, bowhead, North Atlantic and North Pacific right, gray, and humpback whales and would similarly not be likely to have a significant cumulative effect on the target and non-target species. Furthermore, it is not expected that the proposed action will have a significant cumulative impact on ththe Based on these determinations, it is highly unlikely that activities carried out by the researcher under the proposed permit would have significant cumulative impacts.

5.0 MITIGATION MEASURES

In addition to the mitigation measures identified by the applicant and described in this EA, the permit, if issued, would contain conditions requiring the applicant to retreat from animals if behaviors indicate the approach may be interfering with reproduction, pair bonding, feeding, or may be life threatening.

In summary, the permit conditions limit the level of take to level A and level B harassment and require notification, coordination, monitoring, and reporting.

6.0 LIST OF PREPARERS AND AGENCIES CONSULTED

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

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APPENDIX 1: TABLES SPECIFYING THE KINDS OF PROTECTED SPECIES, LOCATIONS, AND MANNER OF TAKING

TABLE 1. Proposed Annual Takes of Cetacean Species during Vessel Surveys from Maine to Florida, including waters in and adjacent to the Gulf of Maine.

Whale, blue	Western North Atlantic Stock (NMFS Endangered)	All	Male and Female	800	Harass	Incidental harassment	Level B take of non-target animals during tagging operations
Whale, blue	Western North Atlantic Stock (NMFS Endangered)	Adult/ Juvenile	Male and Female	60	Harass/ Sampling	Acoustic, passive recording; Instrument, suction-cup (e.g., VHF, TDR); Observations, behavioral; Photo-id; Tracking	Suction-cup tag adults and juveniles
Whale, blue	Western North Atlantic Stock (NMFS Endangered)	Calf	Male and Female	10	Harass/ Sampling	Acoustic, passive recording; Instrument, suction-cup (e.g., VHF, TDR); Observations, behavioral; Photo-id; Tracking	Suction-cup tag calves >6 months of age
Whale, blue	Western North Atlantic Stock (NMFS Endangered)	Adult	Female	20	Harass/ Sampling	Acoustic, passive recording; Instrument, suction-cup (e.g., VHF, TDR); Observations, behavioral; Photo-id; Tracking	Suction-cup tag females with calves

[1] Maximum No. Animals per year is 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.

Whale, blue	Western North Atlantic Stock (NMFS Endangered)	Adult/ Juvenile	Male and Female	45	Harass/ Sampling	Acoustic, passive recording; Instrument, implantable (e.g., satellite tag); Observations, behavioral; Photo-id; Tracking	Dermal attachment tag adults and juveniles >1 year of age
Whale, fin	Western North Atlantic Stock (NMFS Endangered)	Adult/ Juvenile	Male and Female	60	Harass/ Sampling	Acoustic, passive recording; Instrument, suction-cup (e.g., VHF, TDR); Observations, behavioral; Photo-id; Tracking	Suction-cup tag adults and juveniles
Whale, fin	Western North Atlantic Stock (NMFS Endangered)	Calf	Male and Female	10	Harass/ Sampling	Acoustic, passive recording; Instrument, suction-cup (e.g., VHF, TDR); Observations, behavioral; Photo-id; Tracking	Suction-cup tag calves >6 months of age
Whale, fin	Western North Atlantic Stock (NMFS Endangered)	Adult	Female	20	Harass/ Sampling	Acoustic, passive recording; Instrument, suction-cup (e.g., VHF, TDR); Observations, behavioral; Photo-id; Tracking	Suction-cup tag females with calves
Whale, fin	Western North Atlantic Stock (NMFS Endangered)	Adult/ Juvenile	Male and Female	45	Harass/ Sampling	Acoustic, passive recording; Instrument, implantable (e.g., satellite tag); Observations, behavioral; Photo-id; Tracking	Dermal attachment tag adults and juveniles >1 year of age
Whale, fin	Western North Atlantic Stock (NMFS Endangered)	All	Male and Female	800	Harass	Incidental harassment	Level B take of non-target animals during tagging operations

Whale, humpback	Western North Atlantic Stock (NMFS Endangered)	All	Male and Female	800	Harass	Incidental harassment	Level B take of non-target animals during tagging operations
Whale, humpback	Western North Atlantic Stock (NMFS Endangered)	Adult/ Juvenile	Male and Female	60	Harass/ Sampling	Acoustic, passive recording; Instrument, suction-cup (e.g., VHF, TDR); Observations, behavioral; Photo-id; Tracking	Suction-cup tag adults and juveniles
Whale, humpback	Western North Atlantic Stock (NMFS Endangered)	Calf	Male and Female	10	Harass/ Sampling	Acoustic, passive recording; Instrument, suction-cup (e.g., VHF, TDR); Observations, behavioral; Photo-id; Tracking	Suction-cup tag calves >6 months of age
Whale, humpback	Western North Atlantic Stock (NMFS Endangered)	Adult	Female	20	Harass/ Sampling	Acoustic, passive recording; Instrument, suction-cup (e.g., VHF, TDR); Observations, behavioral; Photo-id; Tracking	Suction-cup tag females with calves
Whale, humpback	Western North Atlantic Stock (NMFS Endangered)	Adult/ Juvenile	Male and Female	45	Harass/ Sampling	Acoustic, passive recording; Instrument, implantable (e.g., satellite tag); Observations, behavioral; Photo-id; Tracking	Dermal attachment tag adults and juveniles >1 year of age
Whale, right, North Atlantic	Western Atlantic Stock (NMFS Endangered)	Adult/ Juvenile	Male and Female	60	Harass/ Sampling	Acoustic, passive recording; Instrument, suction-cup (e.g., VHF, TDR); Observations, behavioral; Photo-id; Tracking	Suction-cup tag adults and juveniles

Whale, right, North Atlantic	Western Atlantic Stock (NMFS Endangered)	Calf	Male and Female	10	Harass/ Sampling	Acoustic, passive recording; Instrument, suction-cup (e.g., VHF, TDR); Observations, behavioral; Photo-id; Tracking	Suction-cup tag calves >6 months of age
Whale, right, North Atlantic	Western Atlantic Stock (NMFS Endangered)	Adult	Female	20	Harass/ Sampling	Acoustic, passive recording; Instrument, suction-cup (e.g., VHF, TDR); Observations, behavioral; Photo-id; Tracking	Suction-cup females with calves
Whale, right, North Atlantic	Western Atlantic Stock (NMFS Endangered)	Adult/ Juvenile	Male and Female	45	Harass/ Sampling	Acoustic, passive recording; Instrument, implantable (e.g., satellite tag); Observations, behavioral; Photo-id; Tracking	Dermal attachment tag adults and juveniles >1 year of age
Whale, right, North Atlantic	Western Atlantic Stock (NMFS Endangered)	All	Male and Female	800	Harass	Incidental harassment	Level B take of non-target animals during tagging operations
Whale, sei	Nova Scotia Stock (NMFS Endangered)	All	Male and Female	800	Harass	Incidental harassment	Level B take of non-target animals during tagging operations
Whale, sei	Nova Scotia Stock (NMFS Endangered)	Adult/ Juvenile	Male and Female	60	Harass/ Sampling	Acoustic, passive recording; Instrument, suction-cup (e.g., VHF, TDR); Observations, behavioral; Photo-id; Tracking	Suction-cup tag adults and juveniles
Whale, sei	Nova Scotia Stock (NMFS Endangered)	Calf	Male and Female	10	Harass/ Sampling	Acoustic, passive recording; Instrument, suction-cup (e.g., VHF, TDR); Observations, behavioral; Photo-id; Tracking	Suction-cup tag calves >6 months of age

Whale, sei	Nova Scotia Stock (NMFS Endangered)	Adult	Female	20	Harass/ Sampling	Acoustic, passive recording; Instrument, suction-cup (e.g., VHF, TDR); Observations, behavioral; Photo-id; Tracking	Suction-cup tag females with calves
Whale, sei	Nova Scotia Stock (NMFS Endangered)	Adult/ Juvenile	Male and Female	45	Harass/ Sampling	Acoustic, passive recording; Instrument, implantable (e.g., satellite tag); Observations, behavioral; Photo-id; Tracking	Dermal attachment tag adults and juveniles >1 year of age

TABLE 2. Proposed Annual Takes of Cetacean Species during Vessel Surveys in Canada, primarily in the Labrador Sea, Davis Strait, Baffin Bay, and Hudson Bay.

Whale, bowhead	Range-wide	Adult/ Juvenile	Male and Female	60	Harass/ Sampling	Acoustic, passive recording; Instrument, suction-cup (e.g., VHF, TDR); Observations, behavioral; Photo-id; Tracking	Suction-cup tag adults and juveniles
Whale, bowhead	Range-wide	Calf	Male and Female	10	Harass/ Sampling	Acoustic, passive recording; Instrument, suction-cup (e.g., VHF, TDR); Observations, behavioral; Photo-id; Tracking	Suction-cup tag calves >6 months of age
Whale, bowhead	Range-wide	Adult	Female	20	Harass/ Sampling	Acoustic, passive recording; Instrument, suction-cup (e.g., VHF, TDR); Observations, behavioral; Photo-id; Tracking	Suction-cup tag females with calves

[2] Maximum No. Animals per year is 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.

Whale, bowhead	Range-wide	Adult/ Juvenile	Male and Female	45	Harass/ Sampling	Acoustic, passive recording; Instrument, implantable (e.g., satellite tag); Observations, behavioral; Photo-id; Tracking	Dermal attachment tag adults and juveniles >1 year of age
Whale, bowhead	Range-wide	All	Male and Female	800	Harass	Incidental harassment	Level B take of non-target animals during tagging operations

TABLE 3. Proposed Annual Takes of Cetacean Species during Vessel Surveys in the Pacific Ocean from Alaska to California.

Whale, blue	Eastern North Pacific Stock (NMFS Endangered)	Adult/ Juvenile	Male and Female	60	Harass/ Sampling	Acoustic, passive recording; Instrument, suction-cup (e.g., VHF, TDR); Observations, behavioral; Photo-id; Tracking	Suction-cup tag adults and juveniles
Whale, blue	Eastern North Pacific Stock (NMFS Endangered)	Calf	Male and Female	10	Harass/ Sampling	Acoustic, passive recording; Instrument, suction-cup (e.g., VHF, TDR); Observations, behavioral; Photo-id; Tracking	Suction-cup tag calves >6 months of age
Whale, blue	Eastern North Pacific Stock (NMFS Endangered)	Adult	Female	20	Harass/ Sampling	Acoustic, passive recording; Instrument, suction-cup (e.g., VHF, TDR); Observations, behavioral; Photo-id; Tracking	Suction-cup tag females with calves

[3] Maximum No. Animals per year is 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.

Whale, blue	Eastern North Pacific Stock (NMFS Endangered)	Adult/ Juvenile	Male and Female	45	Harass/ Sampling	Acoustic, passive recording; Instrument, implantable (e.g., satellite tag); Observations, behavioral; Photo-id; Tracking	Dermal attachment tag adults and juveniles >1 year of age
Whale, blue	Eastern North Pacific Stock (NMFS Endangered)	All	Male and Female	800	Harass	Incidental harassment	Level B take of non-target animals during tagging operations
Whale, fin	Range-wide (NMFS Endangered)	All	Male and Female	800	Harass	Incidental harassment	Level B take of non-target animals during tagging operations
Whale, fin	Range-wide (NMFS Endangered)	Adult/ Juvenile	Male and Female	45	Harass/ Sampling	Acoustic, passive recording; Instrument, implantable (e.g., satellite tag); Observations, behavioral; Photo-id; Tracking	Dermal attachment tag adults and juveniles >1 year of age
Whale, fin	Range-wide (NMFS Endangered)	Calf	Male and Female	10	Harass/ Sampling	Acoustic, passive recording; Instrument, suction-cup (e.g., VHF, TDR); Observations, behavioral; Photo-id; Tracking	Suction-cup tag calves >6 months of age
Whale, fin	Range-wide (NMFS Endangered)	Adult	Female	20	Harass/ Sampling	Acoustic, passive recording; Instrument, suction-cup (e.g., VHF, TDR); Observations, behavioral; Photo-id; Tracking	Suction-cup tag females with calves
Whale, fin	Range-wide (NMFS Endangered)	Adult/ Juvenile	Male and Female	60	Harass/ Sampling	Acoustic, passive recording; Instrument, suction-cup (e.g., VHF, TDR); Observations, behavioral; Photo-id; Tracking	Suction-cup tag adults and juveniles

Whale, gray	Eastern North Pacific	All	Male and Female	800	Harass	Incidental harassment	Level B take of non-target animals during tagging operations
Whale, gray	Eastern North Pacific	Adult/ Juvenile	Male and Female	60	Harass/ Sampling	Acoustic, passive recording; Instrument, suction-cup (e.g., VHF, TDR); Observations, behavioral; Photo-id; Tracking	Suction-cup tag adults and juveniles
Whale, gray	Eastern North Pacific	Calf	Male and Female	10	Harass/ Sampling	Acoustic, passive recording; Instrument, suction-cup (e.g., VHF, TDR); Observations, behavioral; Photo-id; Tracking	Suction-cup tag calves >6 months of age
Whale, gray	Eastern North Pacific	Adult	Female	20	Harass/ Sampling	Acoustic, passive recording; Instrument, suction-cup (e.g., VHF, TDR); Observations, behavioral; Photo-id; Tracking	Suction-cup tag females with calves
Whale, gray	Eastern North Pacific	Adult/ Juvenile	Male and Female	45	Harass/ Sampling	Acoustic, passive recording; Instrument, implantable (e.g., satellite tag); Observations, behavioral; Photo-id; Tracking	Dermal attachment tag adults and juveniles >1 year of age
Whale, humpback	Eastern North Pacific Stock (NMFS Endangered)	Adult/ Juvenile	Male and Female	60	Harass/ Sampling	Acoustic, passive recording; Instrument, suction-cup (e.g., VHF, TDR); Observations, behavioral; Photo-id; Tracking	Suction-cup tag adults and juveniles
Whale, humpback	Range-wide (NMFS Endangered)	Adult/ Juvenile	Male and Female	45	Harass/ Sampling	Acoustic, passive recording; Instrument, implantable (e.g., satellite tag); Observations, behavioral; Photo-id; Tracking	Dermal attachment tag adults and juveniles >1 year of age

Whale, humpback	Range-wide (NMFS Endangered)	All	Male and Female	800	Harass	Incidental harassment	Level B take of non-target animals during tagging operations
Whale, humpback	Range-wide (NMFS Endangered)	Calf	Male and Female	10	Harass/ Sampling	Acoustic, passive recording; Instrument, suction-cup (e.g., VHF, TDR); Observations, behavioral; Photo-id; Tracking	Suction-cup tag calves >6 months of age
Whale, humpback	Range-wide (NMFS Endangered)	Adult	Female	20	Harass/ Sampling	Acoustic, passive recording; Instrument, suction-cup (e.g., VHF, TDR); Observations, behavioral; Photo-id; Tracking	Suction-cup tag females with calves
Whale, right, North Pacific	Eastern North Pacific Stock (NMFS Endangered)	Adult/ Juvenile	Male and Female	60	Harass/ Sampling	Acoustic, passive recording; Instrument, suction-cup (e.g., VHF, TDR); Observations, behavioral; Photo-id; Tracking	Suction-cup tag adults and juveniles
Whale, right, North Pacific	Eastern North Pacific Stock (NMFS Endangered)	Calf	Male and Female	10	Harass/ Sampling	Acoustic, passive recording; Instrument, suction-cup (e.g., VHF, TDR); Observations, behavioral; Photo-id; Tracking	Suction-cup tag calves >6 months of age
Whale, right, North Pacific	Eastern North Pacific Stock (NMFS Endangered)	Adult	Female	20	Harass/ Sampling	Acoustic, passive recording; Instrument, suction-cup (e.g., VHF, TDR); Observations, behavioral; Photo-id; Tracking	Suction-cup females with calves
Whale, right, North Pacific	Eastern North Pacific Stock (NMFS Endangered)	Adult/ Juvenile	Male and Female	45	Harass/ Sampling	Acoustic, passive recording; Instrument, implantable (e.g., satellite tag); Observations, behavioral; Photo-id; Tracking	Dermal attachment tag adults and juveniles >1 year of age

Whale, right, North Pacific	Eastern North Pacific Stock (NMFS Endangered)	All	Male and Female	800	Harass	Incidental harassment	Level B take of non-target animals during tagging operations
Whale, sei	Range-wide (NMFS Endangered)	All	Male and Female	800	Harass	Incidental harassment	Level B take of non-target animals during tagging operations
Whale, sei	Range-wide (NMFS Endangered)	Adult/ Juvenile	Male and Female	60	Harass/ Sampling	Acoustic, passive recording; Instrument, suction-cup (e.g., VHF, TDR); Observations, behavioral; Photo-id; Tracking	Suction-cup tag adults and juveniles
Whale, sei	Range-wide (NMFS Endangered)	Adult/ Juvenile	Male and Female	45	Harass/ Sampling	Acoustic, passive recording; Instrument, implantable (e.g., satellite tag); Observations, behavioral; Photo-id; Tracking	Dermal attachment tag adults and juveniles >1 year of age
Whale, sei	Range-wide (NMFS Endangered)	Calf	Male and Female	10	Harass/ Sampling	Acoustic, passive recording; Instrument, suction-cup (e.g., VHF, TDR); Observations, behavioral; Photo-id; Tracking	Suction-cup tag calves >6 months of age
Whale, sei	Range-wide (NMFS Endangered)	Adult	Female	20	Harass/ Sampling	Acoustic, passive recording; Instrument, suction-cup (e.g., VHF, TDR); Observations, behavioral; Photo-id; Tracking	Suction-cup tag females with calves

TABLE 4. Proposed Annual Takes of Cetacean Species during Vessel Surveys in the Arctic Ocean primarily in the Bering, Chukchi and Beaufort Seas.

Whale, bowhead	Western Arctic Stock (NMFS Endangered)	Adult/ Juvenile	Male and Female	60	Harass/ Sampling	Acoustic, passive recording; Instrument, suction-cup (e.g., VHF, TDR); Observations, behavioral; Photo-id; Tracking	Suction-cup tag adults and juveniles
Whale, bowhead	Western Arctic Stock (NMFS Endangered)	Calf	Male and Female	10	Harass/ Sampling	Acoustic, passive recording; Instrument, suction-cup (e.g., VHF, TDR); Observations, behavioral; Photo-id; Tracking	Suction-cup tag calves >6 months of age
Whale, bowhead	Western Arctic Stock (NMFS Endangered)	Adult	Female	20	Harass/ Sampling	Acoustic, passive recording; Instrument, suction-cup (e.g., VHF, TDR); Observations, behavioral; Photo-id; Tracking	Suction-cup tag females with calves
Whale, bowhead	Western Arctic Stock (NMFS Endangered)	Adult/ Juvenile	Male and Female	45	Harass/ Sampling	Acoustic, passive recording; Instrument, implantable (e.g., satellite tag); Observations, behavioral; Photo-id; Tracking	Dermal attachment tag adults and juveniles >1 year of age
Whale, bowhead	Western Arctic Stock (NMFS Endangered)	All	Male and Female	800	Harass	Incidental harassment	Level B take of non-target animals during tagging operations
Whale, gray	Eastern North Pacific	All	Male and Female	800	Harass	Incidental harassment	Level B take of non-target animals during tagging operations

[4] Maximum No. Animals per year is 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.

Whale, gray	Eastern North Pacific	Adult/ Juvenile	Male and Female	60	Harass/ Sampling	Acoustic, passive recording; Instrument, suction-cup (e.g., VHF, TDR); Observations, behavioral; Photo-id; Tracking	Suction-cup tag adults and juveniles
Whale, gray	Eastern North Pacific	Calf	Male and Female	10	Harass/ Sampling	Acoustic, passive recording; Instrument, suction-cup (e.g., VHF, TDR); Observations, behavioral; Photo-id; Tracking	Suction-cup tag calves >6 months of age
Whale, gray	Eastern North Pacific	Adult	Female	20	Harass/ Sampling	Acoustic, passive recording; Instrument, suction-cup (e.g., VHF, TDR); Observations, behavioral; Photo-id; Tracking	Suction-cup tag females with calves
Whale, gray	Eastern North Pacific	Adult/ Juvenile	Male and Female	45	Harass/ Sampling	Acoustic, passive recording; Instrument, implantable (e.g., satellite tag); Observations, behavioral; Photo-id; Tracking	Dermal attachment tag adults and juveniles >1 year of age