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

Environmental Assessment
on
Effects of Issuing Marine Mammal Scientific Research Permit No. 15844

February 2012

Lead Agency: USDOC 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
National Marine Fisheries Service
1315 East West Highway
Silver Spring, MD 20910
(301) 427-8400

Location: Inside and coastal waters of southeastern Alaska (primarily Glacier Bay and Icy Strait)

Abstract: The National Marine Fisheries Service (NMFS) proposes to issue Scientific Research Permit No. 15844, 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. The purposes of the research are to continue studies of long-term humpback whale populations to document trends in the abundance, spatial and temporal distribution, reproductive parameters, feeding behaviors, and the ecology, behavior, and population status of all demographic groups of these animals. The applicant requests takes of humpback whales, killer whales, and minke whales in the action area by conducting passive acoustics, videography, photo-identification surveys, biopsy sampling, and collecting sloughed skin and/or feces.

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1.0 PURPOSE OF AND NEED FOR ACTION

Proposed Action: In response to an application from Glacier Bay National Park and Preserve (GBNPP) (Responsible Party: Susan Boudreau; Principal Investigator: Christine Gabriele), Gustavus, Alaska 99826, NMFS proposes to issue Scientific Research Permit No. 15844 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. The purposes of the proposed research activities are to: 1) study the ecology, behavior and population status of all demographic groups of humpback (*Megaptera novaeangliae*), killer (*Orcinus orca*) and minke (*Balaenoptera acutorostrata*) whales, 2) continue one of the longest and most complete time-series data sets on humpback whale populations, and 3) document long-term trends in the abundance, spatial and temporal distribution, reproductive parameters and feeding behaviors of humpback, killer, and minke whales, which would enhance information-based resource management of these species in the waters of southeastern Alaska, primarily in and around GBNPP.

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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."

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 the listed species, as well as for issuance of permits to conduct biopsy studies on numerous species of marine mammals. Those EAs were prepared to take a closer look at potential environmental impacts of permitted research on marine mammals listed as threatened or endangered, and not because the Permits Division determined that significant adverse environmental impacts were expected or that the 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.

GBNPP has been authorized to conduct similar research in the past under Permit No. 945-1499, and the current permit, No. 945-1776, which expired November 30, 2011. The applicant's proposed activities on large whales have been analyzed in one or more NEPA documents.

The NEPA documents that contain analyses relevant to the proposed action include:

- *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).

  This was a batched EA which analyzed the issuance of 11 research permits. This EA described and analyzed the effects of research activities ranging from close approaches during aerial and vessel surveys for photo-identification to biopsy sampling and acoustic playbacks on a variety of marine mammal and sea turtle species in the action area, with a focus on humpback whales in the North Pacific. A Finding of No Significant Impact (FONSI) was signed June 30, 2004.

- *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 2005).

  This supplemental EA was prepared for issuance of nine scientific research permits and describes the effects of collecting information on the basic biology, ecology, and stock structure of ESA-listed large whale species, and several other non-listed cetacean and pinniped species using a subset of the original research methodologies, target species, and action area. A FONSI was signed September 16, 2005.

The applicant's current permit was part of this analysis (File No. 945-1776).

- *Environmental Assessment for the Issuance of Scientific Research Permits for Research on Humpback Whales and Other Cetaceans* (NMFS 2010)

  The EA was prepared for issuance of eight scientific research permits and describes the effects of collecting information on the biology, foraging ecology, behavior, and communication of a variety of marine mammal species in the Pacific Ocean, with a focus on humpback whales using aerial and vessel surveys for behavioral observations, photo-identification, underwater photography and videography, collection of sloughed skin and feces, sampling whale blows, passive acoustic recordings, export and re-import of parts, tags attached by suction cup or by implanting darts, barbs, or a portion of the tag into the skin and blubber, biopsy sample collection, and acoustic playbacks. A Finding of No Significant Impact (FONSI) was signed July 14, 2010.

Scope of Environmental Assessment: This EA focuses primarily on effects on humpback 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).

The target species of the applicant's research are humpback, killer, and minke whales. Of the target species only humpback whales are listed as endangered under the 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 on threatened or endangered species resulting from takes of a specified number of individual humpback whales to assist in making the decision about permit issuance under the MMPA and ESA.

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.

[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. 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.

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 permit would contain terms and conditions standard to such permits as issued by NMFS.

The following is a summary of the applicant's request to take marine mammals, including those listed as threatened or endangered under the ESA.

Methods: The research protocols are described in detail in the application on file for this action and are briefly summarized here. The research would consist of approaching target animals for photo-identification (photo-ID), passive acoustics, biopsy sampling, and collection of sloughed skin and/or feces.

Close vessel approach for photo-identification and behavioral observations
Vessel surveys using random routes or line-transect sampling methods would be used to collect data for estimating abundance of cetaceans. Sightings would be conducted from 4 – 8 m outboard or inboard driven vessels. Boat approaches would be between 10 – 40 m from an individual, although a whale might approach the boat closer than this distance. The average time spent with the animals would be around twenty minutes. However, the interactions could last up to one hour depending on group size.

Focal animal or group follows would be conducted, during which the behavior of the animal(s), sketches of the markings on the whales' tail flukes and dorsal fins, descriptions of any prey patches observed on the echo-sounder, and notes on feeding behavior would be recorded. Photographs would be taken of the ventral surface of the tail flukes, dorsal fin shape, and distinctive scars and body markings of each member of a group.

During close vessel approaches for all activities (level B harassment), disturbance to animals would be minimized by:

- Approaching at minimal speeds from behind or beside the group.
- Remaining parallel to the animals.
- Matching speed with the group.
- Minimizing changes in speed.
- Terminating activities if active avoidance is occurring.
- Not conducting activities if other vessels are in the immediate vicinity of whales.
- Minimize approaching the same whales by not surveying the same areas on consecutive days.
- Consulting with other researchers in Alaska to: avoid harassing the same animals, explore collaborations, contribute to the cumulative research in the area, and share photo-identification images.

Passive acoustic recording
Whale songs and social sounds would be recorded using a digital recorder and a hydrophone, which would generally be deployed in the water at a depth of 6 – 18 m. Generally, recordings would be of individuals already approached for behavioral observation, and the vessel would not

approach closer than a whale's body length when passively recording humpback vocalizations. Some individuals could be unintentionally approached for acoustic recording more than once in a day and in a season.

Collection of sloughed skin and feces
Sloughed skin and feces would be collected following certain surface activities (e.g., breaching, tail slapping). Pieces of sloughed skin can aggregate in the wake behind a moving animal, the slick "footprint" after a whale submerges, or in the rough water following surface active behaviors such as breaching or social behaviors that often involve physical contact between whales. Feces can be directly collected in the water column from the vessel.

Biopsy
Biopsy samples would be collected for genetic analysis to determine stock structure, pregnancy testing, and health assessments, and for stable isotope or fatty acid analysis for age determination and dietary analysis. Skin and attached blubber tissue samples would be collected from humpback and killer whales using a 5 mm diameter ultra light dart. The dart would extract a small tubular tissue sample and bounce off. The dart would float to the sea surface and be retrieved after sampling. In no instance would the dart extend through the blubber to the muscle layer. Crossbows or a .22 pneumatic rifle would be used for sample collection.

Vessels would approach to within 15 – 30 m of the target animal. Darts would be aimed at the upper back just below the dorsal fin. Biopsy samples would be collected from adults and juveniles of both sexes; species and take numbers are specified in the take table. Samples would be frozen or stored in dry salt, DMSO or ethanol. Tissues samples would be sent to the Southwest Fisheries Science Center (SWFSC) genetic laboratory for archiving or exported to Dr. Lance Barrett-Lennard for analysis.

In addition to the mitigation measures described above for close approach, mitigation measures used during biopsy sampling include:

- Using soap, a chlorine bleach solution soak and an ethanol rinse for cleaning dart tips to ensure that no infectious agents are transmitted to the whale in the course of biopsying.
- Using dart tips with lengths that are appropriate to the size of the whale (2.5 cm for killer whales and 4 cm for humpback whales) so that the dart does not penetrate to an unsafe depth.

<u>Duration:</u> The researchers intend to conduct the surveys annually, generally April through November. In May through September, day-long surveys would occur 4 – 5 times weekly. The permit would be valid for five years from date of issuance.

<u>Target species or stocks:</u> The applicant's research is directed at humpback whales, killer whales, and minke whales (Table 1). The permit would authorize takes of all marine mammals potentially disturbed by the proposed activities. This is consistent with the MMPA definition of level A harassment in which actions with a potential to injure a marine mammal or marine mammal stock in the wild and level B harassment in which actions with a potential to disturb a marine mammal in the wild by causing disruption of behavioral patterns including migration, breathing, nursing, breeding, feeding, or sheltering are considered a take. The inclusion of

"potential to" in this definition means that the take occurs regardless of whether there is a disruption in the behavioral patterns of marine mammals exposed to the action.

Table 1. Proposed takes of male and female cetaceans during vessel surveys around southeastern Alaska especially GBNPP.

Species	MMPA Stock/ ESA Listing Unit/	Lifestage	Maximum No. Animals per year	Procedures	Details
Whale, humpback	Central North Pacific Stock (NMFS Endangered)	Adult/ Juvenile	50	Import/export/receive, parts; Acoustic, passive recording; Acoustic, sonar for prey mapping; Collect, sloughed skin; Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photograph/Video; Sample, skin and blubber biopsy	30 successful biopsy samples with up to 3 attempts each; export only
Whale, humpback	Central North Pacific Stock (NMFS Endangered)	All	6300	Acoustic, passive recording; Acoustic, sonar for prey mapping; Collect, sloughed skin; Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photograph/Video; Sample, fecal	
Whale, killer	Eastern North Pacific Alaska Resident Stock	All	200	Acoustic, passive recording; Acoustic, sonar for prey mapping; Collect, sloughed skin; Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photograph/Video; Sample, fecal	
Whale, killer	Eastern North Pacific Alaska Resident Stock	Adult/ Juvenile	50	Import/export/receive, parts; Acoustic, passive recording; Acoustic, sonar for prey mapping; Collect, sloughed skin; Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photograph/Video; Sample, skin and blubber biopsy	30 successful biopsy samples; up to 3 attempts each; export only
Whale, killer	Eastern North Pacific Offshore Stock	All	100	Acoustic, passive recording; Acoustic, sonar for prey mapping; Collect, sloughed skin; Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photograph/Video; Sample, fecal	
Whale, killer	Eastern North Pacific Offshore Stock	Adult/ Juvenile	50	Import/export/receive, parts; Acoustic, passive recording; Acoustic, sonar for prey mapping; Collect, sloughed skin; Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photograph/Video; Sample, skin and blubber biopsy	30 successful biopsy samples; up to 3 attempts each; export only
Whale, killer	West Coast Transient Stock	Adult/ Juvenile	50	Import/export/receive, parts; Acoustic, passive recording; Acoustic, sonar for prey mapping; Collect, sloughed skin; Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photograph/Video; Sample, skin and blubber biopsy	30 successful biopsy samples; up to 3 attempts each; export only
Whale, killer	West Coast Transient Stock	All	200	Acoustic, passive recording; Acoustic, sonar for prey mapping; Collect, sloughed skin; Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photograph/Video; Sample, fecal	
Whale, minke	Alaska stock	All	20	Acoustic, passive recording; Acoustic, sonar for prey mapping; Collect, sloughed skin; Count/survey; Observation, monitoring; Observations, behavioral; Photo-id; Photograph/Video; Sample, fecal	

3.0 AFFECTED ENVIRONMENT

Location

The research activities would be conducted in southeastern Alaska especially in Glacier Bay National Park & Preserve. The core study area is Glacier Bay/Icy Strait, but includes all nearshore waters of the mainland and Alexander Archipelago (56 – 60° N).

Status of ESA-listed Target Species

Humpback whales: Humpback whales, throughout their range, are listed as depleted under the MMPA and endangered under the ESA. NMFS is conducting a status review of humpback whales under the ESA to ensure that the listing classification of the species is accurate. The status review will be based on the best available scientific and commercial data.

The humpback whale is a mid-sized baleen whale that occurs 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 include parasites, disease, predation (killer whales, false killer whales, and sharks), biotoxins, and ice entrapment.

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 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).

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; 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).

The central North Pacific humpback whale stock is the stock found within GBNPP and 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 was calculated to be 5,833 (Allen and Angliss, 2010). The stock appears to be increasing, with a PBR of 61.2 animals. It is impacted by fishery interactions (3.8 whales seriously injured or killed annually) and ship strikes (1.6 animals/year).

Status of Other Target Marine Mammals

With the exception of humpback whales, none of the other affected marine mammals belong to stocks listed as depleted under the MMPA. These other marine mammals are from robust populations that are either stable or increasing in size. The minimum population estimates from the 2010 Stock Assessment Report (SAR) are provided for reference. More information about each stock may be found in the respective SARs, which are available online at http://www.nmfs.noaa.gov/pr/sars/species.htm.

Species	Stock	Minimum Population Estimate
Killer whale	Eastern North Pacific Alaska Resident Stock	2,084
Killer whale	Eastern North Pacific Offshore	240
Killer whale	West Coast Transient Stock	354
Minke whale	Alaska stock	unknown

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 specified marine mammals (Table 1). The takes of marine mammals by harassment would not affect any non-target marine animals and they 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 non-indigenous 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 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 habitat will not be considered further.

Unique Areas
Under the proposed action, vessel surveys would occur in Glacier Bay National Park and Preserve. GBNPP was designated a National Monument on February 26, 1925 and then designated as a reserve on December 2, 1980. It was also designated as a World Biosphere Reserve and World Heritage site in 1986 and 1992, respectively. The 3.3 million acre park derives its name and much of its biological and cultural significance from its glacier-crowned, maritime wilderness and a saltwater bay, which harbors spectacular tidewater glaciers and a unique assemblage of marine and terrestrial life. To the south and east, the landscape fragments into the timbered islands and winding fjords of the Alexander Archipelago and the Tongass National Forest. To the west, the Park's outer coast opens to the Gulf of Alaska. Marine waters make up nearly one fifth of the park. Each summer humpback whales regularly feed in park waters, concentrating in the lower part of the bay. Special regulations affecting vessel speed limits and travel routes in certain areas go into effect when large concentrations of whales are in the park. Humpback whales spend the summer in Glacier Bay and swim to Hawaii for the winter. GBNPP would be in compliance with all relevant rules and regulations of the park.

<u>Critical Habitat</u>
Critical habitat has been designated within GBNPP for Steller sea lions. The critical habitat includes a terrestrial zone, an aquatic zone, and an air zone that extend 3,000 feet (0.9 km) landward, seaward, and above, respectively, each major rookery and major haulout in Southeast Alaska.

The proposed action is directed at humpback whales and does not affect critical habitat. The researchers would only operate a vessel at the water surface and none of the proposed research

activities would affect the constituent elements of the Steller sea lion's habitat like the prey species or the quality of the water. The proposed action does not involve alteration of substrate, movement of water or air masses, or other interactions with physical features of ocean and coastal habitat. In addition, the researchers do not work near major haul-outs or rookeries listed in 50 CFR 226.202 that are surrounded by the 3000 ft aquatic zone critical habitat designation. Thus, effects on habitat will not be considered further.

Essential Fish Habitat

Essential fish habitat (EFH) has been designated within GBNPP for Pacific salmon, which includes hard and soft bottom substrates.

The proposed action is directed at marine mammals and involves routine vessel transit through the water; the proposed activities would not alter or affect unique areas, including any components of Critical Habitat or EFH. Thus, effects on such unique areas will not be considered further.

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 represents non-consumptive use of marine mammals and does not preclude their availability for other scientific, cultural, or historic uses. 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. 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 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 identified in the NMFS recovery plan for humpback whales, and would provide important information that would help conserve, manage, and recover 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 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.

Level B harassment, as defined by the MMPA, would occur during vessel surveys, behavioral observations, photo-identification activities and collection of sloughed skin, prey remains and/or feces. These activities were analyzed in past EAs for large whale research and it has been repeatedly 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 (NMFS 2005 and 2010).

Close vessel approach for photo-identification and behavioral observations
For the proposed Level B harassment activities, the presence of vessels can lead to disturbance of cetacean although animals' reactions, are generally short-term and of a low impact. Baker et al. (1983) described two responses of whales to vessels, including: (1) "horizontal avoidance" of vessels 2,000 to 4,000 meters away characterized by faster swimming and fewer long dives; and (2) "vertical avoidance" of vessels from 0 to 2,000 meters away during which whales swam more slowly, but spent more time submerged. Watkins et al. (1981) found that both fin and humpback whales appeared to react to vessel approach by increasing swim speed, exhibiting a startled reaction, and moving away from the vessel with strong fluke motions. Studies of humpback whales on their summering grounds, as summarized by Baker et al. (1983) and Baker and Herman (1987), and on their wintering grounds, as summarized by Bauer and Herman (1986), found similar patterns of disturbance in response to vessel activity. However, the applicant noted in prior annual reports for permit No. 945-1776 that most whales showed no reaction to their research vessel. For example, in their 2010 permit report they observed signs that whales were disturbed in only 23 out of 639 encounters. Reactions from these encounters included the whales becoming surface active and exhaling loudly.

Passive acoustic recording
The proposed acoustic recording of marine mammals involves the use of a passive acoustic array towed or suspended from the back of the vessel. Sounds would be then recorded and taped via an apparatus on the vessel. As a passive system, the array would not emit any sounds or signals into the water column. The actual presence of the array in the marine environment is not expected to have any impact on marine mammals or critical habitat. On occasion, researchers have noted some instances of animals investigating a hydrophone but NMFS is not aware of any documentation of the presence of a hydrophone, array, or similar recording device, resulting in a significant impact to a protected species. Based on the applicant's protocol and monitoring, NMFS does not expect that the array poses a risk of entanglement with target or non-target species.

Collection of sloughed skin and feces
Sloughed skin and/or feces would be collected from the site of the surface activity after the whales are known to have left the immediate area or during the approach for photo-ID. The whales would not be approached solely for the purposes of collecting sloughed skin, and/or

feces. NMFS does not expect that the collection of sloughed skin, and/or feces poses a risk of injury to target and non-target species.

Summary of Effects of Level B Harassment
Behavioral responses would be expected to vary from no response to diving, tail slapping, or changing direction. With experienced vessel drivers, 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 applicant under current and past permits 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.

Level A harassment, as defined by the MMPA, would occur during biopsy sampling, when physical contact is made that has the potential to injure animals. Actual injury would be minimized by measures identified by the applicant and described in Chapter 2 and conditions of the permits limiting how activities may occur, such as avoiding sensitive areas of the body during sampling.

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

Effects of biopsy sample collection
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.

The effects of biopsy sampling of humpback whales requested in the proposed action were analyzed in previous EAs prepared (NMFS 2004, 2005, 2010). All of these analyses found that there would be no significant impact from issuance of the permits and amendments.

In addition to the effects of the close approach of a vessel to whales associated with collecting biopsy samples, the analyses determined:

- 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). Barrett-Lennard et al. (1996) reported that 74% of killer whales biopsied during their research showed slight reactions to the darts. Those individuals that did react responded either by shaking or quivering of the dorsal fin and/or accelerating. 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). Some whales were evasive prior to the biopsy attempt, suggesting that these individuals may have had negative experiences with boats in the past (Barrett-Lennard et al. 1996).

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. In a study conducted by Cantor et al. (2010) in the South Atlantic, behavioral reactions were registered for 484 shots out of the 542 shots taken, 53.8% of the successful hits and 52.8% of unsuccessful shots had no response. Meanwhile for the whales that did exhibit a reaction, the most common reaction was the fluke moving; 47.5% for the successful hits and 64.3% for the unsuccessful shots (Cantor et al. 2010). 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 general, biopsy samples can successfully be taken from about 90 percent of whales that are approached (Gauthier and Sears, 1999). There is no evidence that responses of individual whales to biopsy sampling would exceed short-term stress and discomfort and no long-term effects would be anticipated. This activity would not be expected to have any additional effects that were not analyzed in the previous EAs. 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 and after reviewing the current status of endangered humpback whales in the status of listed resources, the environmental baseline for the action area, the effects of the proposed research programs, and the cumulative effects, it is the NMFS' opinion that issuing Permit 15844 (S. Boudreau, GBNPP) is not likely to jeopardize the continued existence of humpback whales.

Controversy

Federal agencies are required to consider "the degree to which effects on the quality of the human environment are likely to be highly controversial" when evaluating potential impacts of a proposed action [40 CFR §1508.27]. The application for the proposed permit was made available for public review and comment. No substantive public comments were received.

The application was sent to the Marine Mammal Commission for review during the 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.

The Marine Mammal Commission (MMC) recommended that NMFS:

- Requires the applicant to provide documentation that an Institutional Animal Care and Use Committee has reviewed and approved the research activities before initiation of those activities.

  NMFS Response: Review and approval by an Institutional Animal Care and Use Committee is not a condition of permit issuance under the MMPA. It is a requirement of the Animal Welfare Act. Enforcing compliance with this provision of the Animal Welfare Act is under the jurisdiction of the U.S. Department of Agriculture.

- Ensures that activities to be conducted under this permit and those of other permit holders who might be conducting research on the same species in the same areas are coordinated and, as possible, data and samples shared to avoid duplicative research and unnecessary disturbance of animals.

  NMFS 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.

Cumulative Impacts

The stocks and populations of marine mammals that are the subject of the permit are exposed to a variety of human activities including entanglement in fishing gear, anthropogenic noise from vessel traffic, scientific research, coastal development, and ship strike.

Effects of Scientific Research Permits and Authorizations: In general, takes of marine mammals by level A harassment through biopsy sampling and level B harassment during permitted research have not been shown to result in long-term or permanent adverse effects on individuals regardless of the number of times the harassment occurs. The frequency and duration of the disturbance under the proposed permit would allow adequate time for animals to recover from adverse effects such that additive or cumulative effects of the action on its own are not expected.

No measurable effects on population demographics are anticipated because any sub-lethal (disturbance) effects are expected to be short-term, with the animals recovering within hours to days, and the proposed action is not expected to result in mortality of any animals. There exists the possibility that adverse effects on a species could accrue from the cumulative effects of a large number of permitted takes by level A and level B harassment relative to the size of the

population. However, there is no evidence that current or past levels of permitted takes have resulted in such species level effects.

There are seventeen other permits (Appendix A), including the applicant's current permit File No. 945-1776, for takes of humpback whales in Alaska and other regions along the Pacific. Not all permitted researchers work strictly with humpback whales or in the same waters as the applicant. Some work mostly in waters off California, Washington, Oregon, Alaska or other parts along the Pacific. 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 the applicant is not expected to result in a significant adverse impact on the target species.

NMFS acknowledges that repeated disturbance of some individual whales could occur. However, NMFS expects that the effects of 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 standard permit conditions requiring coordination with NMFS Regional offices and 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.

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. Currently, no LOA's or IHA's have been issued near the action area.

Effects of Ship strikes and Commercial Whale Watching Operations: Humpback and killer whales in the action area and elsewhere is the subject of an ever-growing commercial whale-watch industry.

Many marine mammal populations may be experiencing increased exposure to vessels and associated sounds. Commercial shipping, whale watching, ferry operations, and recreational boating traffic have expanded in many regions in recent decades, including the northeastern Pacific. Commercial fishing boats are also a prominent part of the vessel traffic in many areas. Vessels have the potential to affect marine mammals through the physical presence and activity of the vessel, the increased underwater sound levels generated by boat engines or a combination of these factors. Vessel strikes are rare, but do occur and can result in injury.

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, at an average rate of 3.7% per year, over the past decade into a two billion dollar (U.S. dollars) industry involving over 119 countries and territories and over 13 million participants (O'Connor et al. 2009). 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). In 2001, NMFS established a final rule prohibiting approach, by any means, within 100 yards (90 m) of any humpback whale (50 CFR 224.103) in the states of Alaska and Hawaii.

In order to reduce the potential for marine traffic to adversely affect endangered humpback whales, vessel numbers and operating requirements have been in place for Glacier Bay since 1979. A vessel permit system has regulated the number of entries into the bay for cruise ships, tour boats, charter boats, and private boats since 1985. The whale distribution data collected under the humpback whale monitoring program (proposed permit activities) has assisted and will continue assisting in determining when and where to implement vessel speed and course restrictions annually in Glacier Bay, with the intent of reducing whale disturbance from vessels in the narrow glacial fjord system. In 2007, regulations 36 CFR 13 sections 1150-1188 were enacted to outline GBNPP's permitting system. Any changes to the vessel quotas are subject to the findings of GBNPP's ongoing monitoring program, which would be authorized under this permit.

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 19th 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 20th century (Rice 1978).

<u>Effects of Entanglement with Fishing Gear:</u> Because the occurrence of some 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.

In general, marine mammals may interact with a variety of fishing gear to become entangled, injured, or die. A total of 18 humpback whales were observed entangled in fishing gear during 2004-2008 in California, and Oregon, and Washington. Of the 18 humpbacks entangled in

fishing gear, 11 were reported entangled at sea in trap/pot fishery gear off California and Oregon, 7 were reported entangled in unknown gillnet or other gear, including lines and buoys of unknown origin (NMFS, Southwest Regional Stranding Program, unpublished data). The overall U. S. commercial fishery-related minimum mortality and serious injury rate for the central North Pacific stock is 3.8 humpback whales per year, based on observer data from Alaska (0.2), observer data from Hawaii (0.2), stranding records from Alaska (3.4), and stranding records from Hawaii (0) (Allen and Angliss 2011).

Effect of Climate 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 whales. Inter-annual, 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.

Summary: There may already be significant 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. The activities would not be expected to have any additional effects that have not been previously analyzed. 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. The 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.

5.0 MITIGATION MEASURES

In addition to the mitigation measures identified by the applicant and described in Chapter 2 of this EA, the permit, if issued, would contain conditions requiring the applicants to retreat from animals if behaviors indicate the approach may be interfering with reproduction, pair bonding, feeding, or other vital functions.

In summary, the permit conditions limit the level of take as described in the take table and require notification, coordination, monitoring, and reporting. Although injury and mortality are not expected, if they occur due to the authorized actions, the permit contains measures requiring researchers to cease activities until protocols have been reviewed and revised with NMFS.

Review of monitoring reports of previous permits for the same or similar research protocols indicate that these types of mitigation measures are effective at minimizing stress, pain, injury, and mortality associated with takes.

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 A: Active Scientific Research Permits and Letters of Confirmation Authorizing Research on humpback whales in the Action Area

Permit No.	Permit Holder	Expiration date	Ocean Basin or Area	Harassment
532-1822	Balcomb	4/14/2012*	CA to AK	Level B
781-1824-01	NMFS, NWFSC	4/14/2012*	AK to CA	Level A & B
1100-1849	Shane Moore	3/31/2012	AK	Level B
1120-1898	Eye of the Whale	7/31/2012	AK	Level B
10018	Cartwright	6/30/2012	HI, AK	Level B
13846	Darling	7/31/2015	HI, WA, AK	Level A & B
14097	NMFS, SWFSC	6/30/2015	Pacific Ocean / international and U.S. territorial waters of the Pacific and Southern Oceans	Level A & B
14122	Straley	7/31/2015	AK	Level A & B
14227	Day	2/17/2014	AK	Level B
14245	NMFS, NMML	5/1/2016	HI, CA to AK, international waters	Level A & B
14296	Witteveen	7/31/2015	AK	Level A & B
14451	Mobley	7/31/2015	Pacific and Atlantic Ocean	Level B
14585	Pack	7/31/2015	Western North Pacific Ocean, CA to AK, HI	Level A & B
14599	Sharpe	7/31/2015	AK	Level A & B
14610	Alaska Department of Fish and Game	5/31/2015	AK	Level A & B
15330	Baird	8/01/2016	HI, CA to AK, high seas	Level A & B
MMPA Rulemaking	U.S. Navy	5/04/2016	AK	MMPA Rulemaking

* indicates that there is a one-year extension on the permit