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. 15274

November 2011

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**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**: Hawaiian waters (primarily Maui County and Kona Coast) and Southeast Alaska and Kachemak Bay

**Abstract**: The National Marine Fisheries Service (NMFS) proposes to issue Scientific Research Permit No. 15274, 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 continue studies of long-term social affiliations among humpback whales and to investigate competitive group behavioral dynamics. The applicant requests takes of humpback whales, the Hawaiian Insular Stock of false killer whales, and other cetaceans in the action area.

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## 1.0 PURPOSE OF AND NEED FOR ACTION

**Proposed Action**: In response to an application from Dan Salden, Ph.D., Hawaii Whale Research Foundation, Maryville, Illinois, NMFS proposes to issue Scientific Research Permit No. 15274 authorizing takes"[1] by level 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 would include: 1) continue and expand a study of humpback whales, 2) examine the role and function of competitive groups as they relate to the mating system of humpback whales, 3) study the life histories of known individual humpback whales, and 4) opportunistically study the stock structure, life history parameters (reproductive rates, mortality, etc.) and abundance of other cetaceans.

### 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 and proposed for listing species, as well as for issuance of permits to conduct tagging studies on

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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."

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 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.

Dr. Salden has been authorized to conduct similar research in the past under Permit Nos. 882, 587-1472, and the most recent, 587-1767, which expired September 30, 2011. The issuance of each of these permits and subsequent amendments was analyzed in one or more NEPA documents.

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

- *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).

  The SEA 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 in the current action was part of this analysis, File No. 587-1767.

- *Environmental Assessment on the Issuance of Two Scientific Research Permits for the Harassment of Cetaceans in Hawaiian Waters* (NMFS 2008).

  The EA was prepared for issuance of two scientific research permits and describes the effects of collecting information on the status, numbers, distribution, and life histories of cetacean species in Hawaiian waters using methods ranging from close approaches during vessel surveys for photo-identification and behavioral observation to biopsy sampling and acoustic playbacks. A FONSI was signed on June 13, 2008.

- *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 (*Megaptera novaeangliae*), 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 whales which are listed as endangered under the ESA. The other marine mammals that are also the subject of the permit application are not listed under the ESA. The only exception being the Hawaiian Insular stock of false killer whales (*Pseudorca crassidens*) which NMFS is proposing to list as endangered under the ESA and for this analysis will be treated as if it is listed 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 and Hawaiian Insular Stock of false killer 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.

**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.

[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.

The objectives of the applicant's research are to: 1) observe the nature of long-term association patterns among North Pacific humpback whales to delineate the directed communication behaviors that establish, define, and regulate those relationships, and 2) study the behavioral interactions among whales participating in competitive groups with the objective of clarifying the role of the competitive group in the humpback whale mating system. 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 that are listed and not listed 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 experimental protocol consists of photo-identification, passive acoustics, collection of sloughed skin and/or feces, and underwater photography and videography.

*Close vessel approach[6] 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 primarily from a 28-foot parasail boat with inboard Volvo diesel (Maui), a 26 ft Sport-Cat with twin 115 hp Honda outboard motors, and a 24 ft hard hull, whaler-type boat with twin 45 hp Honda outboard motors (Big Island of HI). Surveys in Alaska would be conducted opportunistically when a vessel platform becomes available. Boat approaches would be 75-150 ft from an individual, although a whale might approach the boat closer than this distance. The average time spent with the animals would be around one hour. However, if they were to encounter large, high intensity competitive groups, the interactions would last approximately 2-3 hours. For large whales, boat approaches would be within a whale's length from an individual (ca. 30-50 ft for an adult-sized whale), although a whale might approach the boat closer than this distance.

Focal animal or group follows would be conducted, during which the behavior of the animal(s) would be recorded, pod composition determined, and behavioral roles identified when possible. Photographs of the ventral surface of the tail flukes, dorsal fin shape, and distinctive scars and body markings of each member of a group would be taken. When feasible, behaviors would be photographed and videotaped. Observations and photography of the animal(s) would be of variable duration depending on circumstances, behaviors, social dynamics, and weather and water conditions. Canon digital EOS-SLR cameras equipped with motor drives and assorted lenses (from 24mm to 400mm, including zoom lenses) would be used to photograph or record marine mammals. When photographing whale behavior in the field, film and behavior references would be dictated on a digital voice recorder to complement the written Field Log.

The following information would be recorded for each encounter: date, time, location (using GPS references), sea and wind conditions, number of whales observed, affiliations and

[6] An "approach" is defined as a continuous sequence of maneuvers (episode) [involving a vessel or researcher's body in the water], including drifting, directed toward a cetacean or group of cetaceans closer than 100 yards for large whales, or 50 yards for smaller cetaceans.

disaffiliations, behavior activity identification, image numbers for still documentation, and videotape time references.

*Snorkelers and/or Scuba for underwater photography and videography*
If the whales or small cetaceans under observation become stationary, mill, or are swimming slowly, a swimmer equipped with mask, snorkel, fins, and an underwater still or video camera would enter the water within approximately 75-150 ft of the targeted group. The swimmer would approach the animals quietly at the surface until they are a whale's length away (ca. 30-50 ft for an adult whale). Depending on the animal's behavior, a second swimmer equipped with an underwater camera would be deployed to obtain video of key underwater displays, physical appearance, fluke photographs (if not obtainable from the surface), or affiliations. A third swimmer equipped with an underwater still camera would also act as a safety diver.

The amount of time the swimmers are in the water would depend on the number of animals in a group and that group's behavior. For example, more time is generally spent with large competitive groups than small competitive groups. Also, a group that is stationary may provide more opportunities for obtaining data than a group that is traveling. Usually, deployment of swimmers for in-water data collection lasts about one hour. However, on occasion, a group that dives for long periods and that is stationary between dives, may provide an opportunity of an hour or longer for obtaining data.

Some divers would be equipped with SCUBA gear. The research vessel would approach foraging whales to deploy divers, who would then approach by swimming to within one whale body length. It is estimated that most encounters with whales would be relatively brief, typically several minutes before whales swim away; however encounters could last up to 60 minutes (includes drop off and pick up of divers).

*Passive acoustic recording*
Acoustic recordings of large whale and small cetacean songs and social sounds would be recorded by digital video cameras or by hydrophone on high fidelity tape, which would generally be deployed in the water at a depth of 20-30 ft. 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 approached for acoustic recording unintentionally more than once in a day and in a season.

*Collection of marine mammal sloughed skin and feces* Sloughed skin and feces would be collected from large whales and small cetaceans following certain surface activities (e.g., breaching, tail slapping). Sloughed skin would be collected from the site of the surface activity only after the animals have moved greater than 100 yards from the location.

Duration: The researchers intend to conduct the surveys annually from late December through mid-May. They would operate five days per week (8 hour days) each field season in Hawaii. Surveys in SE Alaska and Kachemak Bay area, would occur during the months of July through December for 1-2 weeks at a time when platforms become available. The permit would thus be valid for five years from date of issuance.

Target species or stocks: The applicant's research is directed at humpback whales. However, as the research involves approaching groups of animals that may affect marine species other than humpback 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 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 cetacean species during vessel surveys around Hawaii and Alaska. All life stages as well as both male and females could be harassed.

| Species | MMPA Stock/ ESA Listing Unit/ | Maximum No. Animals per year[7] | Procedures |
|---|---|---|---|
| Whale, humpback | Range-wide (NMFS Endangered) | 3000 | Acoustic, passive recording; Collect, sloughed skin; Incidental harassment; Observations, behavioral; Photo-id; Underwater photo/videography |
| Whale, false killer | Hawaiian Stock | 850 | Acoustic, passive recording; Collect, sloughed skin; Incidental harassment; Observations, behavioral; Photo-id; Underwater photo/videography |
| Whale, false killer | Hawaiian Insular Stock (NMFS proposed listing) | 150 | Acoustic, passive recording; Collect, sloughed skin; Incidental harassment; Observations, behavioral; Photo-id; Underwater photo/videography |
| Whale, pilot, short-finned | Hawaiian Stock | 500 | Acoustic, passive recording; Collect, sloughed skin; Incidental harassment; Observations, behavioral; Photo-id; Underwater photo/videography |
| Whale, killer | Range-wide (excluding Southern Resident) | 500 | Acoustic, passive recording; Collect, sloughed skin; Incidental harassment; Observations, behavioral; Photo-id; Underwater photo/videography |
| Dolphin, bottlenose | Hawaiian Stock | 200 | Acoustic, passive recording; Collect, sloughed skin; Incidental harassment; Observations, behavioral; Photo-id; Underwater photo/videography |
| Dolphin, spinner | Hawaiian Stock | 2000 | Acoustic, passive recording; Collect, sloughed skin; Incidental harassment; Observations, behavioral; Photo-id; Underwater photo/videography |
| Dolphin, pantropical spotted | Hawaiian | 2000 | Acoustic, passive recording; Collect, sloughed skin; Incidental harassment; Observations, behavioral; Photo-id; Underwater photo/videography |

[7] 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.

## 3.0 AFFECTED ENVIRONMENT

### Location

The research involves vessel based observations directed at humpback whales and requires approaches to marine mammals. Most of the activities would be conducted in the winter season (December through mid-May) in the waters surrounding Hawaii, primarily Kona Coast and Maui County near-Lanai waters, Kalohi Channel, and Pailolo Channel. The Alaskan surveys in Southeast Alaska and Kachemak Bay area would occur when platforms become available.

### Status of 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 of mortality 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).

*Eastern North Pacific stock:* The eastern North Pacific stock is referred to as the winter/spring population in coastal Central America and Mexico which migrates to the coast of California to southern British Columbia in summer/fall (Steiger et al. 1991; Calambokidis et al. 1993). The best available abundance estimate for this stock is 1,391 whales and appears to be increasing in abundance (Carretta et al. 2008). The estimated annual mortality and injury due to entanglement (2.6 whales/yr), other anthropogenic sources (zero), plus ship strikes (zero) in California exceeds the Potential Biological Removal (PBR) allocation of 2.5 whales annually for U.S. waters.

*Central North Pacific stock:* The central North Pacific humpback whale stock is referred to as the winter/spring population of the Hawaiian Islands which migrates to northern British Columbia/Southeast Alaska and Prince William Sound west to Kodiak (Baker et al. 1990; Perry et al. 1990; Calambokidis et al. 1997). Population estimates vary for this stock, but it likely contains approximately 4,000 whales (Calambokidis et al. 1997). The stock appears to be increasing, but it is not possible to assess the rate of increase or set a PBR level for this stock. It is impacted by fishery interactions (3.2 whales seriously injured or killed annually) and ship strikes (1.8 animals/year).

*Western North Pacific stock:* The western North Pacific Stock is referred to as the winter/spring population of Japan and probably migrates to waters west of the Kodiak Archipelago (the Bering Sea and Aleutian Islands) in summer/fall (Berzin and Rovnin 1966; Nishiwaki 1966; Darling 1991). This population is estimated to include 394 individuals and the PBR is undetermined. No population trend is available for this stock. Fisheries interactions result in an annual mortality rate of 0.2 whales.

**Status of ESA-listed species**

Hawaiian Insular stock of false killer whales: NMFS has proposed (75 FR 70169; 11/17/2010) that the Hawaiian Insular stock of false killer whales is a distinct population segment and should be listed as endangered under the ESA. Thus, for this analysis it will be treated as if it is listed under the ESA.

The species is a slender, large delphinid, with maximum reported sizes of 610 cm for males (Leatherwood and Reeves, 1983) and 506 cm for females (Perrin and Reilly, 1984). Large individuals may weigh up to 1,400 kg. Little is known about the breeding behavior of false killer whales in the wild, but some information is available from false killer whales held in oceanaria (Brown et al., 1966). Gestation has been estimated to last 11 to 16 months, (Kasuya, 1986; Odell and McClune, 1999). Females with calves lactate for 18 to 24 months (Perrin and Reilly, 1984). Estimated age at sexual maturity is about 8 to 11 years for females, while males may mature 8 to 10 years later (Kasuya, 1986). The maximum reported age has been estimated as 63 years for females and 58 years for males (Kasuya, 1986). Both sexes grow 40 to 50 percent in body length during their first year of life. Growth ceases between 20 and 30 years of age (Ferreira, 2008?).

False killer whales are top predators, eating primarily fish and squid, but also occasionally taking marine mammals (see references in Oleson et al., 2010). False killer whales feed both during the day and night (Evans and Awbrey, 1986; Baird et al., 2008). They can dive between 20 to 150m looking for prey.

Within waters of the central Pacific, four Pacific Islands Region management stocks of false killer whales are currently recognized for management under the MMPA: the Hawaii Insular stock, the Hawaii pelagic stock, the Palmyra Atoll stock, and the American Samoa stock (Carretta et al., 2010).

Hawaiian Insular false killer whales share a portion of their range with the genetically distinct pelagic population (Forney et al., 2010). Therefore, the draft 2010 Stock Assessment Report (SAR) for false killer whales recognizes an overlap zone between insular and pelagic false killer whales between 40 km and 140 km from the main Hawaiian Islands based on sighting, telemetry, and genetic data (based on justification in Forney et al., 2010; Carretta et al., 2010 as well as the original boundary recommendation of Chivers et al. (2008). Individuals utilize habitat overlaying a broad range of water depths, varying from shallow (<50m) to very deep (>4,000m) (Baird et al., 2010).

The draft 2010 SAR for Hawaiian Insular false killer whales (Carretta et al., 2010) gives the best estimate of current population size as 123 individuals (coefficient of variation, or CV = 0.72), citing Baird et al. (2005). The large groups sizes observed in 1989, together with the declining encounter rates from 1993 through 2003 suggest that Hawaiian Insular false killer whales have declined substantially in recent decades.

Hawaiian Insular false killer whales are behaviorally unique because they are the only population of the species known to have movements restricted to the vicinity of an oceanic island group. This behavioral separation is supported by their linkage through a tight social network, without

any linkages to animals outside of the Hawaiian Islands. They persist in an ecological setting unusual or unique from other false killer whale populations because they are found primarily in island-associated waters that are relatively shallow and productive compared to surrounding oligotrophic waters. False killer whales are highly social mammals with long interbirth intervals and reproductive senescence suggesting transfer of knowledge is important to successfully persist in this unique Hawaiian habitat. The insular population contributes to cultural diversity in the species, and this may provide the capacity for different amounts of cultural capabilities such as the ability of false killer whales to adapt to environmental change

NMFS has determined that Hawaiian Insular false killer whales are discrete from other false killer whales based on genetic discontinuity and behavioral factors (the uniqueness of their behavior related to habitat use patterns). NMFS has also determined that Hawaiian insular false killer whales are significant to the taxon, based on their unique ecological setting, marked genetic characteristic differences, and cultural factors.

**Status of Other Marine Mammals**

The permit application summarizes the status of the other marine mammals in the project area that may be affected by the action and for which takes are requested. With the exception of humpback whales and Hawaiian Insular false killer 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 most recent SARs 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 |
|---|---|---|
| False killer whale | Hawaiian Pelagic Stock | 484 |
| Short-finned Pilot Whale | Hawaiian Stock | 8,846 |
| Bottlenose dolphin | Hawaiian Pelagic Stock* | 3,178 |
| Bottlenose dolphin | Kaua'I and Ni'ihau Stock* | 147 |
| Bottlenose dolphin | O'ahu Stock* | 594 |
| Bottlenose dolphin | 4 Islands Region Stock* | 153 |
| Bottlenose dolphin | Hawaii Island* | 102 |
| Spinner dolphin | Hawaiian Pelagic Stock* | 2,805 |
| Spinner dolphin | Hawaii (island) Stock* | Unknown |

| | | |
|---|---|---|
| Spinner dolphin | O'ahu / 4 Islands Stock* | Unknown |
| Spinner dolphin | Kaua'I / Ni'ihau Stock* | Unknown |
| Spinner dolphin | Kure / Midway Stock* | Unknown |
| Spinner dolphin | Pearl and Hermes Reef Stock* | Unknown |
| Killer whale | Hawaii Stock | 349 |
| Killer whale | Eastern North Pacific Offshore | 240 |
| Pantropical spotted dolphin | Hawaiian Stock | 8,978 |

*The draft SAR 2010 has separated these species of marine mammals from the original Hawaiian Stock into new stock structures.

Several other marine mammal species may be found in waters along the Hawaii EEZ, but they are either primarily deep water species not likely to be found within the near shore action area, are only present seasonally and not expected at the time of the project, or have only been sighted on rare occasions and considered unlikely to be encountered. The endangered Hawaiian monk seal is present in the action area but the permit would not authorize the close approach to these animals and researchers would have to follow the viewing guidelines. No take allowance was requested for these other species and they are not considered further.

**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. 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 will not be removed from the ecosystem or displaced from habitat, nor will 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.

Cook Inlet Beluga Whale Critical Habitat
Critical habitat for Cook Inlet Beluga whales was designated on April 11, 2011 (76 FR 20180). Kachemak Bay, off the fishing town of Homer, and most of the inlet's southwestern coastline has been designated as critical habitat for Cook Inlet belugas since they are heavily used by the whales for congregating and summer feeding.

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**
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 those in the proposed action are sent to the NMSP for review if research is to occur in sanctuary waters.

Hawaiian Islands Humpback Whale National Marine Sanctuary (HIHWNMS)
The sanctuary was designated on November 4, 1992, and is actually a series of five marine protected areas distributed across the Main Hawaiian Islands. The total area of the sanctuary is approximately 1,400 square miles. Encompassing about half of the total sanctuary area, the largest contiguous portion of the sanctuary is delineated around Maui, Lana`i and Moloka`i. The four smaller portions are located off the north shore of Kaua`i, off Hawai`i's Kona coast, and off the north and southeast coasts of O`ahu. Approximately 2,000-5,000 humpback whales migrate from their Alaskan feeding grounds to the Hawaiian Islands to mate and give birth in its protected, warm waters. The sanctuary also holds cultural significance to Native Islanders and is active in conducting many projects, such as restoration of the Native Hawaiian Fishpond, named Ko`ie`ie Loko I`a.

**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, 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. 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.

**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, collection of sloughed skin or feces, underwater photography and videography. These activities were analyzed in past EAs for large whale research conducted by the applicant, 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 2005). These research activities are all considered Level B harassment and are not new activities; therefore, NMFS feels that the effects of close approach to marine mammals would be minimal and short-term.

*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. 587-1767 that most whales showed no reaction to their research vessel. For example, in their 2009 permit report they observed signs that whales were disturbed in only 23 out of 320 groups encountered. Reactions from these encounters included avoidance of their boat, breaches, rolling at surface, and pectoral slaps.

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.
- Consulting with other researchers in Hawaii and Alaska to: avoid harassing the same animals, explore collaborations, contribute to the cumulative research in the area, and share photo-identification images.

*Snorkelers and/or Scuba for underwater photography and videography*
No more than 3 people would be in the water at any time during underwater observations. The underwater observations would be terminated any time that there are adverse or evasive changes in the whales behavior that appear to be the result of the presence of divers. Based on the applicant's experience and protocols, NMFS does not expect that the presence of divers/snorkelers will have an effect to the target and non-target species.

*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 marine mammal sloughed skin and feces*
Sloughed skin would be collected from the site of the surface activity only after the animals have moved greater than 100 yards from the location. 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 applicants 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.

In accordance with Section 7 of the ESA, a Biological Opinion was prepared and after reviewing the current status of listed resources, the environmental baseline for the Action area, the anticipated effects of the propose activities, and the cumulative effects, it is NMFS' Opinion that

the activities authorized by the proposed issuance of scientific research permit, 15274, as proposed, is not likely to jeopardize the continued existence of humpback whales and Hawaiian insular false killer 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 at the same time 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:

- Ensure that the applicant takes steps to minimize disturbance of the subject animals by exercising caution when approaching animals, particularly mother/calf pairs, and stopping an approach if there is evidence that the activity may be interfering with mother/calf behavior, feeding, or other vital functions.

- Require monitoring, documentation, and reporting of any and all strong whale reactions to approach and presence of the research watercraft and researchers.

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

  **NMFS Response**: These recommendations are standard conditions and reporting requirements of a permit and will be included.

**Cumulative Impacts**
Effects of Scientific Research Permits and Authorizations: In general, takes of marine mammals by 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 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 twenty-five (three will expire in 2011, Appendix A) other permits, including the applicant's current permit File No. 587-1767, for takes of humpback whales in Hawaii, Alaska and other regions along the Pacific as well as takes of all stocks of Hawaiian False Killer whales in Hawaii. Not all permitted researchers work strictly with humpback whales or in the same waters as the applicant. Some work mostly in waters of 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, especially considering many of the takes are authorized by current permits. In addition, all permits issued by NMFS for research on protected species, including the proposed permit, contain conditions requiring the Permit Holders to coordinate their activities with the NMFS regional offices and other Permit Holders conducting research on the same species in the same areas, and, to the extent possible, share data to avoid unnecessary duplication of research and disturbance of animals.

NMFS acknowledges that repeated disturbance of some individual large whales could occur. However, NMFS expects that the temporary harassment of individuals would dissipate within minutes, and therefore animals would recover before being targeted for research by another Permit Holder. Further, NMFS has taken steps to limit repeated harassment and avoid unnecessary duplication of effort through permit conditions requiring coordination among Permit Holders. Coordination between humpback researchers in Hawaii is facilitated by the requirement to fly a clearly visible triangular pennant from the research vessels, to obtain a research permit from the state of Hawaii, and to participate in yearly meetings sponsored by the NMFS Pacific Islands Regional Office and the Hawaii Department of Land and Natural Resources Office. 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.

<u>Incidental Harassment Authorizations</u>: In addition to scientific research permits, NMFS issues Letters of Authorization (LOAs) and IHAs under the MMPA for the incidental take of marine mammals. NMFS has issued one LOA for the take of marine mammals near the action area.

<u>Effects of Ship strikes</u>: 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, coastal development and ship strike. Humpback and

killer whales in the action area and elsewhere are 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.

Collisions with commercial ships are an increasing threat to many large whale species, particularly as shipping lanes cross important large whale breeding and feeding habitats or migratory routes. Many types and sizes of vessels have been involved in ship strikes, including container/cargo ships/freighters, tankers, steamships, U.S. Coast Guard (USCG) vessels, U.S. Navy vessels, cruise ships, ferries, recreational vessels, fishing vessels, and whale watching vessels (Jensen and Silber 2003).

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

Collisions occur off almost every U.S. coastal state, but strikes are most common along the east coast, followed by the west coast and Alaska/Hawaii (Jensen and Silber 2003). Two humpback whale deaths were attributed to ship strikes during the period 2004-2008 (NMFS, unpublished stranding data). An additional animal that was struck in Washington waters in 2008 was reported to have broken the stabilizer on the vessel that struck it, but the condition of the whale is unknown. The average number of documented humpback whale deaths by ship strikes for 2004-2008 is 0.4 per year, but it is apparent that animals struck by ships are unlikely to be reported.

<u>Effects of Commercial Whaling:</u> 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).

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

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).

Effects of Whale Watching Operations: Commercial and private vessels engaged in marine mammal watching or other recreational activities have the potential to impact cetaceans in the proposed action area. A study of whale watch activities worldwide found that the business of viewing whales and dolphins in their natural habitat has grown rapidly over the past decade into a billion dollar (U.S. dollars) industry involving over 80 countries and territories and over 9 million participants (Hoyt 2001). In 1988, a workshop sponsored by the Center for Marine Conservation (CMC) and NMFS was held to review and evaluate whale watching programs and management needs (CMC and NMFS 1988). Several recommendations were made to address concerns about the harassment of marine mammals during wildlife viewing activities including the development of regulations to restrict operating thrill craft near cetaceans, swimming and diving with the animals, and feeding cetaceans in the wild.

Although marine mammal watching is considered by many to be a non-consumptive use of marine mammals with economic, recreational, educational, and scientific benefits, it is not without potential negative impacts. One concern is that animals may become more vulnerable to vessel strikes once they habituate to vessel traffic (Swingle et al. 1993; Wiley et al. 1995). Another concern is that preferred habitats may be abandoned if disturbance levels are too high. In the Notice of Availability of Revised Whale Watch Guidelines for Vessel Operations in the Northeastern United States (64 FR 29270; June 1, 1999), NMFS noted that whale watch vessel operators seek out areas where whales concentrate, which has led to numbers of vessels congregating around groups of whales, increasing the potential for harassment, injury, or even the death of these animals. In 2001, NMFS instated 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.

Summary: 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. The proposed takes of specified numbers of marine mammals

by level B harassment are not likely to contribute to collectively substantial adverse impacts on marine mammal stocks or species, including those listed as threatened or endangered. The effects of the takes would be transitory and recoverable, associated with only minor and short-term changes in the behavior of a limited number of individual marine mammals.

## 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 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 to level B harassment and require notification, coordination, monitoring, and reporting.

## 6.0 LIST OF PREPARERS AND AGENCIES CONSULTED

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

The National Marine Sanctuary Program was consulted for activities that would be conducted in the Hawaiian Islands Humpback Whale National Marine Sanctuary.

## 7.0 LITERATURE CITED

Baird, R.W., A.M. Gorgone, D.L. Webster, D.J. McSweeney, J.W. Durban, A.D. Ligon, D.R. Salden, and M.H. Deakos. 2005. False killer whales around the main Hawaiian Islands: An assessment of inter-island movements and population size using individual photo-identification. Contract Report JJ133F04SE0120 prepared for the Pacific Islands Fisheries Science Center, National Marine Fisheries Service, 2570 Dole Street, Honolulu, Hawaii, 96822. 24pp.

Baird, R. W., A. M. Gorgone, D. J. McSweeney, D. L. Webster, D. R. Salden, M. H. Deakos, A. D. Ligon, G. S. Schorr, J. Barlow and S. D. Mahaffy. 2008. False killer whales (*Pseudorca crassidens*) around the main Hawaiian Islands: long-term site fidelity, inter-island movements, and 5445association patterns. Marine Mammal Science 24: 591-612.

Baker, C.S., L.M. Herman, B.G. Bays, and G.B. Bauer. 1983. The impact of vessel traffic on the behavior of humpback whales in southeast Alaska: 1982 season. Report submitted to the National Marine Mammal Laboratory, Seattle, WA, 78 pp.

Baker, C.S. and L.M. Herman. 1987. Alternative population estimates of humpback whales (*Megaptera novaeangliae*) in Hawaiian waters. Can. J. Zool. 65(11):2818-2821.

Balcomb, K., and G. Nichols. 1978. Western North Atlantic humpback whales. Rep. Int. Whal. Comm. 28:159-164.

Bauer, G.B. and L.M. Herman. 1986. Effects of vessel traffic on the behavior of humpback whales in Hawaii. Report Submitted to NMFS Southwest Region, Western Pacific Program Office, Honolulu, HI. 151 pp.

Berzin, A. A., and A. A. Rovnin. 1966. The distribution and migrations of whales in the northeastern part of the Pacific, Chukchi and Bering Seas. Izvestiya Tikhookeanskogo Nauchno-Issledovatel'skogo Institut Rybnogo Khozyaistva I Okeanografii 58:179-207. (Translated by Bureau of Commercial Fisheries, U. S. Fish and Wildlife Service, Seattle, 1968, pp. 103-136. In K. I. Panin (ed.), Soviet Research on Marine Mammals of the Far East.)

Brown, D. H., D. K. Caldwell and M. C. Caldwell. 1966. Observations on the behavior of wild and captive false killer whales, with notes on associated behavior of other genera of captive dolphins. Los Angeles County Musuem Contributions in Science 95: 30.

Brueggeman, J.J., Green, G.A., Grotefendt, R.A., Chapman, D.G., 1987. Aerial surveys of endangered cetaceans and other marine mammals in the northwestern Gulf of Alaska and southeastern Bering Sea. Envirosphere Co., Bellevue, Washington. Report to the Minerals Management Service, Alaska OCS Office OCSEAP Unit 673 for Contract No. 85-ABC-00093. 72 pp.

Carretta, J.V. K.A. Forney, M.S. Lowry, J. Barlow, J. Baker, D. Johnston, B. Hanson, M.M. Muto, D. Lynch, and L. Carswell. 2008. U.S. Pacific Marine Mammal Stock Assessments: 2008. NOAA-TM-NMFS-SWFSC-434.

Carretta, J.V., K.A. Forney, E. Oleson, K. Martien, M.M. Muto, M.S. Lowry, J. Barlow, J. Baker, B. Hanson, D. Lynch, L. Carswell, R.L. Brownell Jr., J. Robbins, D.K. Mattila, K. Ralls, and M.C. Hill. Draft U.S. Pacific Marine Mammal Stock Assessments: 2010.

Calambokidis, J., E.A. Falcone, T.J. Quinn, A.M. Burdin, P.J. Clapham, J.K.B. Ford, C.M. Gabriele, R. LeDuc, D. Mattila, L. Rojas-Bracho, J.M. Straley, B.L. Taylor, J. Urbán R., D. Weller, B.H. Witteveen, M. Yamaguchi, A. Bendlin, D. Camacho, K. Flynn, A. Havron, J. Huggins, and N. Baker, C.S., S.R. Palumbi, R.H. Lambertsen, M.T. Weinrich, J. Calambokidis, and S.J. O'Brien. 1990. Influence of seasonal migration on geographic distribution of mitochondrial DNA haplotypes in humpback whales. Nature 344:238-240.

Calambokidis, J., G.H. Steiger, and J.R. Evenson. 1993. Photo-id and abundance estimates of humpback and blue whales off California in 1991-92. Final Contract Report 50ABNF100137 to Southwest Fisheries Science Center, P.O. Box 271, LaJolla, CA. 92038. 67pp.

Calambokidis, J., G.H. Steiger, J.M. Straley, T. Quinn, L.M. Herman, S. Cerchio, D.R. Salden, M. Yamaguchi, F. Sato, J.R. Urban, J. Jacobson, O. Von Zeigesar, K.C. Balcomb, C.M. Gabriele, M.E. Dahlheim, N. Higashi, S. Uchida, J.K.B. Ford, Y. Miyamura, P. Ladron de Guevara, S.A. Mizroch, L. Schlender, and K. Rasmussen. 1997. Abundance and population structure of humpback whales in the North Pacific basin. Final Contract Report 50ABNF500113 to Southwest Fisheries Science Center, P.O. Box 271, La Jolla, CA 92038. 72pp.

Chittleborough, R.G. 1965. Dynamics of two populations of humpback whale, *Megaptera novaeangliae* (Borowski). Aust. J. Mar. Freshwater Res. 16:33-128.

Chivers, S.J., K.A. Forney, and D. Johnston. 2008. Rationale for the 2008 Revision To Hawaiian Stock Boundaries For False Killer Whales, *Pseudorca crassidens*. Administrative Report LJ-08-04

Clapham, P.J. and C.A. Mayo 1987. Reproduction and recruitment of individually identified humpback whales, Megaptera novaeangliae, observed in Massachusetts Bay, 1979-1985. Can. J. Zool. 65: 2853-2863.

CMC and NMFS. 1988. Proceedings of the Workshop to Review and Evaluate Whale Watching Programs and Management Needs. Sponsored by the Center for Marine Conservation and National Marine Fisheries Service. November 14-16, 1988, Monterey, California. 53 pp.

Darling, J.D. 1991. Humpback whales in Japanese waters. Ogasawara and Okinawa. Fluke identification catalog 1987-1990. Final Contract Report, World Wide Fund for Nature, Japan. 22pp.

Evans, W. E. and F. T. Awbrey. 1986. Natural history aspects of marine mammal echolocation: feeding strategies and habitat. Animal Sonar Systems. P. E. Nachtigall. New York, Plenum Press: 521-534.

Ferreira, I. M. (2008). Growth and reproduction in false killer whales (*Pseudorca crassidens* Owens, 1846). Faculty of Natural and Agricultural Science, University of Pretoria, South Africa. M.Sc. Thesis: 152.

Forney, K. A., R. W. Baird and E. M. Oleson. 2010. Rationale for the 2010 revision of stock boundaries for the Hawaii insular and pelagic stocks of false killer whales, Pseudorca crassidens. PSRG-2009-11. 5.

Hall, J.D. 1979. A survey of cetaceans of Prince William Sound and adjacent vicinity—their numbers and seasonal movements. Pp. 631-726. in Environmental Assessment of the Alaska Continental Shelf; final Reports of the Principal Investigators. Biological Studies, Vol. 6. Boulder, NOAA-OCCSEAP.

Hall, J.D. 1982. Prince William Sound, Alaska: Humpback whale population and vessel traffic study. Final Report, Contract No. 81-ABG-00265. NMFS, Juneau Management Office, Juneau, Alaska. 14 pp.

Herman, L.M. Forestell, P.H., and R.C. Antinoja. 1980. The 1976/1977 migration of humpback whales into Hawaiian waters: composite description. Marine Mammal Commission Report No. MMC 77-19. Washington, D.C.

Hoyt, E. 2001. Whale watching 2001: worldwide tourism numbers, expenditures, and expanding socioeconomic benefits. International Fund for Animal Welfare, Yarmouth Port, MA, USA, pp. i–vi; 1–158.

Leatherwood, S., Bowles, AE., and Reeves, R.R. 1983. Aerial surveys of marine mammals in the southern Bering Sea. U.S. Department of Commerce, NOM OCS Environmental Assessment Program. Final Report. 42(1986): 147-490.

Jensen, A.S., and G.K. Silber. 2003. Large whale ship strike database. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-F/OPR 25, 37 p.

Johnson, J. H., and A. A. Wolman. 1984. The humpback whale, *Megaptera novaeangliae*. Mar. Fish. Rev. 46(4):30-37.

Kasuya, T. 1986. False killer whales. Japanese Fisheries Agency. 178-187.

Kenney, R.D., and S.D. Kraus. 1993. Right whale mortality-A correction and update. Mar. Mam. Sci 9(4): 445-446.

Laist, D. W., A. R. Knowlton, J. G. Mead, A. S. Collet and M. Podesta. 2001. Collisions between ships and whales. Mar. Mam. Sci 17: 35-75.

Maloney. 2008. SPLASH: Structure of Populations, Levels of Abundance and Status of Humpback Whales in the North Pacific. Final report for Contract AB133F-03-RP-00078. 57pp.

Morris, B.F., Alton, M.S. and Braham, H.W. 1983. Living marine resources of the Gulf of Alaska, a resource assessment for the Gulf of Alaska/Cook Inlet proposed oil and gas Lease Sale 88. U.S. Dept. Commerce, NOAA Tech. Memo. NMFS FIAKR-5.232 pp.

Nishiwaki, M. 1966. Distribution and migration of the larger cetaceans in the North Pacific as shown by Japanese whaling results. Pp. 172-191 In K. S. Norris (ed.), Whales, Dolphins and Porpoises, University of California Press, Berkeley, CA.

NMFS. 1991. Recovery Plan for the Humpback Whale (*Megaptera novaeangliae*). Prepared by the Humpback Whale Recovery Team for the National Marine Fisheries, Silver Spring, Maryland. 105 pp.

Odell, D. K. and K. M. McClune. 1999. False killer whale *Pseudorca crassidens* (Owen, 1846). Handbook of Marine Mammals. S. H. Ridgway and R. Harrison. Orlando, FL, Academic Press. 6: 213-243.

Pace, R.M, and G.K. Silber. 2005 Abstract. Simple analyses of ship and large whale collisions: Does speed kill? Sixteenth Biennial Conference on the Biology of Marine Mammals, San Diego, December 2005.

Perrin, W.F. and S.B. Reilly. 1984. Reproductive Parameters of Dolphins and Small Whales of the Family Deiphinidae. Rep. Int. Whal. Comm. Special Issue 6:97-133

Perry, A., C.S. Baker, and L.M. Herman. 1990. Population characteristics of individually identified humpback whales in the central and eastern North Pacific: a summary and critique. Rep. Int. Whal. Comm. Special Issue 12:307-317.

Rice, D.W . 1978. The humpback whale in the North Pacific: Distribution, exploitation, and numbers. In K. S. Norris and R. R. Reeves (editors), Report on a workshop on problems related to humpback whales (*Megaptera novaeangliae*) in Hawaii, p. 29-44. Sea Life, Inc., Waimanalo, Hawaii. [Submitted to U.S. Mar. Mammal Comm., Washington, D.e., as Rep. MMC-77/03, available U.S. Dep. Commer., Natl. Tech.

Steiger, G.H., J. Calambokidis, R. Sears, K.C. Balcomb, and J.C. Cubbage. 1991. Movement of humpback whales between California and Costa Rica. Mar. Mam. Sci 7:306-310.

Swingle, W.M., S.G. Barco, T.D. Pitchford, W.A. McLellan, and D.A. Pabst. 1993. Appearance of juvenile humpback whales feeding in the nearshore waters of Virginia. Mar. Mam. Sci 9(3):309-315.

Tomilin, A.G. 1967. Mammals of the USSR and adjacent countries. Vol. 9, Cetacea. Israel Program Sci. Transl. No. 124, Natl. Tech. Inf. Serv. TT 65-50086. Springfield, VA 717pp. (Translation of Russian text published in 1957).

Von Ziegesar, O. 1984. A survey of the humpback whales in southeastern Prince William Sound, Alaska: 1980, 1981, and 1983. Report to the state of Alaska, Alaska Council on Science and Technology, 34 pp.

Von Ziegesar, O., and C.O. Matkin. 1986. Humpback whales in Prince William Sound in 1985: a contract report. Contract No. 41 USC 252, NMFS, National Marine Mammal Laboratory, Seattle, WA.

Watkins W.A. 1986. Whale reactions to human activities in Cape Cod waters. Mar. Mam. Sci., 2:251-262.

Whitehead, H. 1982. Populations of humpback whales in the northwest Atlantic. Rep. Int. Whale Comm. 32:345-353.

Whitehead, H. 1987. Updated status of the humpback whale, *Megaptera novaeangliae*, in Canada. Canadian Field-Naturalist 101(2):284-294.

Wiley, D.N., R.A. Asmutis, T.D. Pitchford, and D.P. Gannon. 1995. Stranding and mortality of humpback whales, *Megaptera novaeangliae*, in the mid-Atlantic and southeast United States, 1985-1992. Fishery Bulletin, U.S. 93:196- 205.

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

| Permit No. | Permit Holder | Expiration date | Ocean Basin or Area | Harassment |
|---|---|---|---|---|
| 532-1822 | Kenneth Balcomb III | 4/14/2012* | CA to AK | Level B |
| 540-1811-03 | Calambokidis | 4/14/2012* | North Pacific Ocean, including CA, OR, WA | Level A & B |
| *587-1767-01^* | *Salden* | *9/30/2011** | *HI, AK* | *Level B only* |
| 727-1915^ | Scripps Institute of Oceanography | 2/1/2013 | HI, CA to WA | Level A & B |
| 731-1774-06 | Baird | 8/31/2011* | HI, CA to AK, high seas | Level A & B |
| 781-1824-01 | NMFS, NWFSC | 4/14/2012* | AK to CA | Level A & B |
| 945-1776 | Glacier Bay National Park and Preserve | 11/30/2011* | AK | Level B only |
| 1058-1733-01 | Baumgartner | 5/31/2012 | Pacific and Atlantic Oceans and high seas | Level A & B |
| 1120-1898 | Eye of the Whale | 7/31/2012 | AK | Level B only |
| 1127-1921^ | Hawaii Marine Mammal Consortium | 6/30/2013 | HI | Level A & B |
| 10018-01^ | Cartwright | 6/30/2013 | HI | Level B |
| 13427^ | Pacific Whale Foundation | 06/15/2013 | HI | 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 |
| 14245^ | NMFS NMML | 05/01/2016 | AK, WA, OR,CA, HI and Atlantic Ocean | Level A & B |
| 14296 | Witteveen | 7/31/2015 | AK | Level A & B |
| 14353^ | Zoidis | 7/31/2015 | HI | Level A & B |
| 14451^ | Mobley | 7/31/2015 | Pacific and Atlantic Ocean | Level B |
| 14534 | NOAA Science and Technology | 7/31/2015 | Eastern Pacific Ocean, CA | Level A & B |
| 14585^ | Pack | 7/31/2015 | Western North Pacific Ocean, CA to AK, HI | Level A & B |

| Permit No. | Permit Holder | Expiration date | Ocean Basin or Area | Harassment |
|---|---|---|---|---|
| 14599 | Sharpe | 7/31/2015 | AK | Level A & B |
| 14610 | Alaska Department of Fish and Game | 5/31/2015 | AK | Level A & B |
| 14682^ | Au | 11/15/2015 | HI | Level A & B |
| 15806^ | U.S Navy | 09/30/2011 | HI | LOA** |

^have Hawaiian False Killer Whale takes but permits do not distinguish between Hawaiian Stock and Hawaiian Insular Stock
* indicates that there is an extension on the permit
**MMPA Small Take Letter of Authorization
*Italicized row indicates the permit that would be replaced by the permit issued in this action*