NOAA's National Marine Fisheries Service
Endangered Species Act Section 7 Consultation

Biological and Conference Opinion

Agency: Permits, Conservation, and Education Division of the Office of Protected Resources, NOAA's National Marine Fisheries Service

Activity Considered: Biological and Conference Opinion on the proposal to issue Permit Number 15274 to Dan Salden to authorize research on humpback whales and Hawaiian insular false killer whales in the waters surrounding Hawaii and Southeast Alaska, pursuant to Section 10(a)(1)(A) of the Endangered Species Act of 1973

Consultation Conducted by: Endangered Species Division of the Office of Protected Resources, NOAA's National Marine Fisheries Service

Approved by: _____

Date: NOV 0 8 2011

Section 7(a)(2) of the Endangered Species Act of 1973, as amended (ESA) (16 U.S.C. 1536(a)(2)) requires that each federal agency shall ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat of such species. When the action of a federal agency "may affect" a listed species or critical habitat designated for them, that agency is required to consult with either NOAA's National Marine Fisheries Service (NMFS) or the U.S. Fish and Wildlife Service, depending upon the listed resources that may be affected. For the action described in this document, the action agency is the NMFS' Office of Protected Resources – Permits, Conservation, and Education Division. The consulting agency is the NMFS' Office of Protected Resources – Endangered Species Division.

This document represents the NMFS' biological and conference opinion (Opinion) of the effects of the proposed research on endangered humpback whales and on Hawaiian insular false killer whales, which are proposed for listing as endangered, and these species' designated critical habitat, as has been prepared in accordance with Section 7 of the ESA. This Opinion is based on our review of the Permits, Conservation, and Education Division's draft Environmental Assessment, draft permit 15274, the permit application from Dr. Salden, annual reports of past research completed by the applicant, the most current marine mammal stock assessment reports, recovery plans for listed species, scientific and technical reports from government agencies, peer-reviewed literature, biological opinions on similar research, and other sources of information.

Consultation history

The NMFS' Permits, Conservation, and Education Division (Permits Division) requested consultation with the NMFS' Endangered Species Division on the proposal to issue scientific research permit authorizing studies on endangered humpback whales and on Hawaiian insular false killer whales, which are proposed for listing as endangered. Issuance of the permit constitutes a federal action, which may affect marine species listed under the ESA.

On April 15, 2011, the Permits Division requested initiation of Section 7 consultation to issue a new permit to Dr. Salden, and the Endangered Species Division formally initiated consultation with the Permits Division.

Description of the proposed action

NMFS' Office of Protected Resources – Permits, Conservation, and Education Division proposes to issue a permit for scientific research pursuant to the ESA and the Marine Mammal Protection Act of 1972, as amended (MMPA; 16 U.S.C. 1361 et seq., Section 104). Issuance of permit 15274 to Dr. Salden would authorize research on endangered humpback whales and on Hawaiian insular false killer whales, which are proposed for listing as endangered, in the waters surrounding Hawaii and southeast Alaska. If issued, the permit would be valid for five years. The proposed actions and "take" [1] authorizations for the species that are listed and proposed for listing can be found in Table 1.

Table 1. Proposed "takes" of listed or proposed-to-be-listed cetaceans during vessel surveys around Hawaii and Alaska. All lifestages and both sexes could be targeted.

Species	Maximum No. Animals per year	Maximum No. Takes per Animal per Year	Procedures
Humpback whale	3000	1	Behavioral observations from vessels, photo-identification, underwater photography/ videography, passive acoustic recording, and collection of sloughed skin.
False killer whale, Hawaiian insular	150	1	Behavioral observations from vessels, photo-identification, underwater photography/ videography, passive acoustic recording, and collection of sloughed skin.

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

Vessel surveys

Dr. Salden proposes to conduct 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-foot Sport-Cat with twin 115 hp Honda outboard motors, and a 24-foot hard hull, whaler-type boat with twin 45 hp Honda outboard motors (Big Island of Hawaii). Boat approaches would be between 25-50 yards 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 researchers were to encounter large, high intensity competitive groups, the interactions could last approximately 2-3 hours. For large whales, boat approaches would be within a whale's length from an individual (10-15 m 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 animals 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 animals would be of variable duration depending on circumstances, behaviors, social dynamics, and weather and water conditions.

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, and fins and a still or video camera in an underwater housing would enter the water within approximately 25-50 yards of the targeted group. The swimmer would approach the animals quietly at the surface until they are approximately a whale's length away (10-15m 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, which would generally be deployed in the water at a depth of 20-30 feet. 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 would be unintentionally approached for acoustic recording more than once in a day and in a season.

Collection of marine mammal parts

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.

Permit conditions

The proposed permit lists general and special conditions to be followed as part of the proposed research activities. These conditions are intended to minimize the potential adverse effects of the research activities on targeted endangered species and include the following that are relevant to the proposed permit:

- In the event of serious injury or mortality or if the permitted "take" is exceeded, researchers must suspend permitted activities and contact the Permits Division by phone within two business days, and submit a written incident report. The Permits Division may grant authorization to resume permitted activities.
- Permit holders must exercise caution when approaching animals and must retreat from animals if behaviors indicate the approach may be interfering with reproduction, feeding, or other vital functions.
- Any "approach[2]" of a cetacean constitutes a "take" by harassment and must be counted and reported. Regardless of success, any attempt, which includes close approach to photograph, videotape, collect sloughed skin, and conduct passive acoustics constitutes a take and must be counted and reported. No individual animal may be "taken" more than 3 times in one day.
- When females with calves are authorized to be taken, researchers must terminate efforts if there is any evidence that the activity may be interfering with pair-bonding or other vital functions; must not position the research vessel between mother and calf; must approach mothers and calves gradually to minimize or avoid any startle response; and must not approach any mother or calf while the calf is actively nursing.
- No more than 3 divers must be in the water at any time during underwater observations. An underwater approach/activity must be terminated if a whale is observed to exhibit adverse/evasive changes in behavior.

[2] 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.

- For research occurring in the Hawaiian Islands, and to minimize disturbance of Hawaiian monk seals the Permit Holder must consult with the NMFS monk seal research program and the U.S. Fish and Wildlife Service (USFWS) at Midway for approval of any land-based activities to avoid harassment of monk seals; not enter the water when monk seals are present, and if approached by a seal, leave the area; and report any opportunistic monk seal sightings.

Approach to the assessment

The NMFS approaches its Section 7 analyses of agency actions through a series of steps. The first step identifies those aspects of proposed actions that are likely to have direct and indirect physical, chemical, and biotic effects on listed species or on the physical, chemical, and biotic environment of an action area. As part of this step, we identify the spatial extent of these direct and indirect effects, including changes in that spatial extent over time. The result of this step includes defining the *Action area* for the consultation. The second step of our analyses identifies the listed resources that are likely to co-occur with these effects in space and time and the nature of that co-occurrence (these represent our *Exposure analyses*). In this step of our analyses, we try to identify the number, age (or life stage), and gender of the individuals that are likely to be exposed to an action's effects and the populations or subpopulations those individuals represent. Once we identify which listed resources are likely to be exposed to an action's effects and the nature of that exposure, we examine the scientific and commercial data available to determine whether and how those listed resources are likely to respond given their exposure (these represent our *Response analyses*).

The final steps of our analyses – establishing the risks those responses pose to listed resources – are different for listed species and designated critical habitat (these represent our *Risk analyses*). Our jeopardy determinations must be based on an action's effects on the continued existence of threatened or endangered species as those "species" have been listed, which can include true biological species, subspecies, or distinct population segments of vertebrate species. The continued existence of these "species" depends on the fate of the populations that comprise them. Similarly, the continued existence of populations are determined by the fate of the individuals that comprise them – populations grow or decline as the individuals that comprise the population live, die, grow, mature, migrate, and reproduce (or fail to do so).

Our risk analyses reflect these relationships between listed species, the populations that comprise that species, and the individuals that comprise those populations. Our risk analyses begin by identifying the probable risks actions pose to listed individuals that are likely to be exposed to an action's effects. Our analyses then integrate those individual risks to identify consequences to the populations those individuals represent. Our analyses conclude by determining the consequences of those population-level risks to the species those populations comprise.

We measure risks to listed individuals using the individual's "fitness," or the individual's growth, survival, annual reproductive success, and lifetime reproductive success. In particular, we examine the scientific and commercial data available to determine if an individual's probable lethal, sub-lethal, or behavioral responses to an action's effect on

the environment (which we identify during our *Response analyses*) are likely to have consequences for the individual's fitness.

When individual listed plants or animals are expected to experience reductions in fitness in response to an action, those fitness reductions are likely to reduce the abundance, reproduction, or growth rates (or increase the variance in these measures) of the populations those individuals represent (see Stearns 1992). Reductions in at least one of these variables (or one of the variables we derive from them) is a necessary condition for reductions in a population's viability, which is itself a necessary condition for reductions in a species' viability. As a result, when listed plants or animals exposed to an action's effects are not expected to experience reductions in fitness, we would not expect the action to have adverse consequences on the viability of the populations those individuals represent or the species those populations comprise (e.g., Brandon 1978; Anderson 2000; Mills and Beatty 1979; Stearns 1992). As a result, if we conclude that listed plants or animals are not likely to experience reductions in their fitness, we would conclude our assessment.

Although reductions in fitness of individuals is a necessary condition for reductions in a population's viability, reducing the fitness of individuals in a population is not always sufficient to reduce the viability of the population(s) those individuals represent. Therefore, if we conclude that listed plants or animals are likely to experience reductions in their fitness, we determine whether those fitness reductions are likely to reduce the viability of the populations the individuals represent (measured using changes in the populations' abundance, reproduction, spatial structure and connectivity, growth rates, variance in these measures, or measures of extinction risk). In this step of our analysis, we use the population's base condition (established in the *Environmental baseline* and *Status of listed resources* sections of this Opinion) as our point of reference. If we conclude that reductions in individual fitness are not likely to reduce the viability of the populations those individuals represent, we would conclude our assessment.

Reducing the viability of a population is not always sufficient to reduce the viability of the species those populations comprise. Therefore, in the final step of our analyses, we determine if reductions in a population's viability are likely to reduce the viability of the species those populations comprise using changes in a species' reproduction, numbers, distribution, estimates of extinction risk, or probability of being conserved. In this step of our analyses, we use the species' status (established in the *Status of listed resources* section of this Opinion) as our point of reference. Our final determinations are based on whether threatened or endangered species are likely to experience reductions in their viability and whether such reductions are likely to be appreciable.

To conduct these analyses, we rely on all of the evidence available to us. This evidence consists of monitoring reports submitted by past and present permit holders; reports from the NMFS Science Centers; reports prepared by natural resource agencies in States and other countries; reports from non-governmental organizations involved in marine conservation issues; the information provided by the NMFS Permits Division when it initiates formal consultation; and the general scientific literature.

We supplement this evidence with reports and other documents – environmental assessments, environmental impact statements, and monitoring reports – prepared by other federal and state agencies.

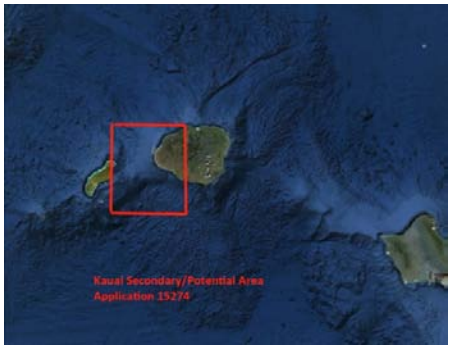
During the consultation, we conducted electronic searches of the general scientific literature. We supplemented these searches with electronic searches of doctoral dissertations and master's theses. These searches specifically tried to identify data or other information that supports a particular conclusion as well as data that do not support that conclusion. When data were equivocal or when faced with substantial uncertainty, our decisions are designed to avoid the risks of incorrectly concluding that an action would not have an adverse effect on listed species when, in fact, such adverse effects are likely (i.e., Type II error).

Action Area

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 (Figure 1). A potential secondary area in Hawaii would be around the island of Kauai (Figure 2). Research would not be conducted in the Northwest Hawaiian Islands.

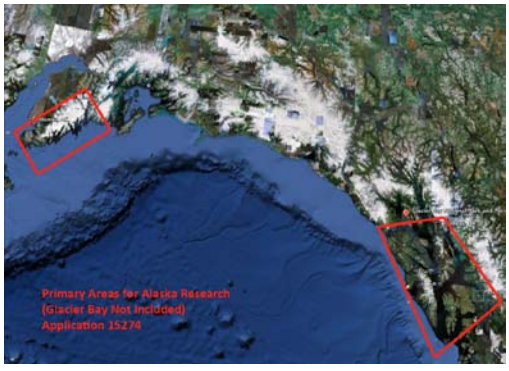
Figure 1: Primary research areas in Maui County and Kona Coast of Hawaii

Figure 2: Secondary research area in Kauai, Hawaii



The Alaskan surveys would be conducted in the waters of southest Alaska (excluding Glacier Bay) and the areas adjacent to the Kenai Peninsula (Katchemak Bay and extending around to the waters off Seward, AK) (Figure 3). These surveys would occur when ships are available.

Figure 3: Primary research areas in Alaska



Status of listed resources

NMFS has determined that the actions considered in this Opinion may affect the following listed resources provided protection under the ESA of 1973, as amended (16 U.S.C. 1531 *et seq*.):

Pinnipeds		
Hawaiian monk seal*	*Monachus schauinslandi*	Endangered
Steller sea lion* – Eastern DPS	*Eumetopias jubatus*	Threatened
Western DPS		Endangered
Cetaceans		
Beluga whale – Cook Inlet*	*Delphinapterus leucas*	Endangered
Blue whale	*Balaenoptera musculus*	Endangered
Bowhead whale	*Balaena mysticetus*	Endangered
Fin whale	*Balaenoptera physalus*	Endangered
Humpback whale	*Megaptera novaeangliae*	Endangered
North Pacific right whale*	*Eubalaena japonica*	Endangered
Sei whale	*Balaenoptera borealis*	Endangered
Sperm whale	*Physeter macrocephalus*	Endangered
Sea Turtles		
Green sea turtle – most areas	*Chelonia mydas*	Threatened
Florida and Mexico's Pacific coast breeding colonies		Endangered
Hawksbill sea turtle	*Eretmochelys imbricate*	Endangered
Leatherback sea turtle	*Dermochelyts coriacea*	Endangered
Loggerhead sea turtle	*Caretta caretta*	Threatened
Olive ridley sea turtle – most areas	*Lepidochelys olivacea*	Threatened
Mexico's Pacific coast breeding colonies		Endangered

* denote listed species with Critical Habitat in the general area of the proposed action.

Species not considered further in this opinion

To refine the scope of this Opinion, NMFS used two criteria (risk factors) to determine whether any endangered or threatened species or critical habitat are not likely to be adversely affected by vessel traffic, aircraft traffic, or human disturbance associated with the proposed actions. The first criterion was *exposure*: if we conclude that particular endangered or threatened species or designated critical habitat are not likely to be exposed to vessel traffic, aircraft traffic, or human disturbance, we must also conclude that those listed species or designated critical habitat are not likely to be adversely affected by the proposed action. The second criterion is *susceptibility* upon exposure: species or critical habitat may be exposed to vessel traffic, aircraft traffic, or human disturbance, but may not be unaffected by those activities—either because of the circumstances associated with the exposure or the intensity of the exposure-- are also not likely to be adversely affected by the vessel traffic, aircraft traffic, or human disturbance. This section summarizes the results of our evaluations.

Both DPSs of Steller sea lions, Hawaiian monk seals, Cook Inlet beluga, blue, bowhead, fin, North Pacific right, sei, and sperm whales, and green, hawksbill, leatherback, loggerhead, and olive ridley sea turtles may occur in the action area, but are not expected to be exposed to the proposed activities. If a protected whale or pinniped is observed in the action area, it would be avoided and the vessel would operate at a reduced speed, following marine mammal viewing guidelines.

Hawaiian monk seals and North Pacific right whales have designated habitat in the general area of proposed research (Hawaii and Alaska, respectively), but the research would not occur within the designated areas of critical habitat for those species, and therefore we do not consider these species' critical habitat further.

Research would be conducted within the designated critical habitat of the Steller sea lion, which includes the areas around all the major rookeries and major haulouts in Alaska. The physical and biological habitat features that have been determined to be essential to the conservation of the species are those that support reproduction, foraging, rest, and refuge, and include terrestrial, air and aquatic areas. The proposed research would not affect population ecology or population dynamics of prey species, predators, or competitors of Steller sea lions. We do not expect that changes in prey distribution would be measurable even for the short period of time researchers may be in designated critical habitat. Additionally, we do not expect the physical, chemical, and biotic features that form and maintain the critical habitat to be changed, including the space needed for population growth, cover or shelter, sites for breeding, and habitats that are protected from disturbance.

Research would be conducted within the designated critical habitat of the Cook Inlet beluga whale. The physical and biological features that have been determined to be essential to the conservation of the species are as follows: 1) intertidal and subtidal waters of Cook Inlet with depths less than 30 feet and within 4 miles of high and medium flow anadromous fish streams; 2) primary prey species consisting of four species of Pacific salmon, Pacific eulachon, Pacific cod, walleye Pollock, saffron cod, and yellowfin sole; 3) waters free of toxins or other agents of a type and amount harmful to Cook Inlet beluga whales; 4) unrestricted passage within or between critical habitat areas; and 5) waters with in-water noise below levels resulting in the abandonment of critical habitat areas by Cook Inlet beluga whales.

The issuance of the proposed research permit would not affect these primary constituent elements. The research would take place opportunistically on vessels that would be in the area already. These vessels would not affect the intertidal or subtidal waters or prey species; they would neither add toxins to the waters of Cook Inlet, nor restrict passage. Based on research by Shelden (1994), Lerczak *et al*. (2000), and others, Cook Inlet beluga whales pursued for tagging activities by research vessels never abandoned the study area; therefore we do not anticipate abandonment of critical habitat due to research vessels that would not be targeting belugas and would therefore not approach or pursue them.

Although these listed resources may occur in the action area, we believe they are either not likely to be exposed to the proposed research or are not likely to be adversely affected. Therefore, they will not be considered further in this Opinion.

Status of species considered in this opinion

The species narratives that follow focus on attributes of life history and distribution that influence the manner and likelihood that these species may be exposed to the proposed action, as well as the potential response and risk when exposure occurs. Consequently, the species' narrative is a summary of a larger body of information on localized movements, population structure, feeding, diving, and social behaviors. Summaries of the status and trends of humpback whales and Hawaiian insular false killer whales are presented to provide a foundation for the analysis of the species as a whole. We also provide a brief summary of the species' status and trends as a point of reference for the jeopardy determination, made later in this Opinion. That is, we rely on a species' status and trend to determine whether an action's direct or indirect effects are likely to increase the species' probability of becoming extinct. Similarly, each species narrative is followed by a description of its critical habitat with particular emphasis on any essential features of the habitat that may be exposed to the proposed action and may warrant special attention.

Humpback whale

Description of the species

Humpback whales are a cosmopolitan species that occur in the Atlantic, Indian, Pacific, and Southern oceans. Humpback whales migrate seasonally between warmer, tropical or sub-tropical waters in winter months and cooler, temperate or sub-Arctic waters in summer months (Gendron and Urban 1993). In both regions, humpback whales tend to occupy shallow, coastal waters. However, migrations are undertaken through deep, pelagic waters (Winn and Reichley 1985).

Stock designations

North Pacific. Based on genetic and photo-identification studies, NMFS currently recognizes four stocks of humpback whales in the North Pacific Ocean: two Eastern North Pacific stocks, one Central North Pacific stock, and one Western Pacific stock (Hill and DeMaster 1998). Humpback whales summer in 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 (Nemoto 1957; Johnson and Wolman 1984; Tomilin 1967). These whales migrate to Hawaii, southern Japan, the Mariana Islands, and Mexico during winter. The central North Pacific stock winters in the waters around Hawaii while the eastern North Pacific stock (also called the California-Oregon-Washington-Mexico stock) winters along Central America and Mexico. However, Calambokidis et al. (1997) identified individuals from several stocks wintering in the areas of other stocks, highlighting the paucity of knowledge on stock structure and the potential fluidity of stock structure.

Separate feeding groups of humpback whales are thought to inhabit western U.S. and Canadian waters, with the boundary between them located roughly at the U.S./Canadian border (Carretta et al. 2006). Humpback whales primarily feed along the shelf break and continental slope do not appear to frequent offshore waters in the region (Green et al. 1992; Tynan et al. 2005)

North Atlantic. Humpback whales range from the mid-Atlantic bight and the Gulf of Maine across the southern coast of Greenland and Iceland to Norway in the Barents Sea. Whales migrate to the western coast of Africa and the Caribbean Sea during the winter. Humpback whales aggregate in four summer feeding areas: Gulf of Maine and eastern Canada, west Greenland, Iceland, and Norway (Katona and Beard 1990; Smith et al. 1999).

Southern Hemisphere. Eight proposed stocks of humpback whales occur in waters off Antarctica. A separate population of humpback whales appears to reside in the Arabian Sea in the Indian Ocean off the coasts of Oman, Pakistan, and India and movements of this group are poorly known (Mikhalev 1997; Rasmussen et al. 2007).

Reproduction

Humpback whale calving and breeding generally occurs during winter at lower latitudes. Gestation takes about 11 months, followed by a nursing period of up to 1 year (Baraff and Weinrich 1993). Sexual maturity is reached at between 5-7 years of age in the western North Atlantic, but may take as long as 11 years in the North Pacific, and perhaps over 11 years of age in the North Pacific (e.g., southeast Alaska, Gabriele et al. 2007). Females usually breed every 2-3 years, although consecutive calving is not unheard of (Clapham and Mayo 1987; 1990; Weinrich et al. 1993; Glockner-Ferrari and Ferrari 1985).

In calving areas, males sing long complex songs directed towards females, other males, or both. The breeding season can best be described as a floating lek or male dominance polygamy (Clapham 1996). Calving occurs in the shallow coastal waters of continental shelves and oceanic islands worldwide (Perry et al. 1999).

Feeding

During the feeding season, humpback whales form small groups that occasionally aggregate on concentrations of food that may be stable for long-periods of times. Humpbacks use a wide variety of behaviors to feed on various small, schooling prey including krill and fish (Jurasz and Jurasz 1979; Hain et al. 1982; Hain et al. 1995; Weinrich et al. 1992). The principal fish prey in the western North Atlantic are sand lance, herring, and capelin (Kenney et al. 1985). There is good evidence of some territoriality on feeding and calving areas (Tyack 1981; Clapham 1996; Clapham 1994).

Status and trends

Humpback whales were originally listed as endangered in 1970 (35 FR 18319), and this status remains under the ESA. Winn and Reichley (1985) argued that the global humpback whale population consisted of at least 150,000 whales in the early 1900s, mostly in the Southern Ocean. In 1987, the global population of humpback whales was estimated at about 10,000 (NMFS 1987). Although this estimate is outdated, it appears that humpback whale numbers are increasing.

North Pacific. The pre-exploitation population size of North Pacific humpback whales may have been as many as 15,000 humpback whales, and current estimates are 6,000-8,000 whales (Calambokidis et al. 1997; Rice 1978). From 1905 to 1965, nearly 28,000 humpback whales were taken in whaling operations, reducing the number of all North

Pacific humpback whale to roughly 1,000 (Perry et al. 1999). Population estimates have risen over time from 1,407-2,100 in the 1980s to 6,010 in 1997 (Baker 1985; Baker and Herman 1987; Darling and Morowitz 1986; Calambokidis et al. 1997). Tentative estimates of the eastern North Pacific stock suggest an increase of 6-7% annually, but fluctuations have included negative growth in the recent past (Angliss and Outlaw 2005). Based upon surveys between 2004 and 2006, Calambokidis et al. (2008) estimated that the current population of humpback whales in the North Pacific consists of about 18,300 whales, not counting calves. Almost half of these whales likely occur in wintering areas around the Hawaiian Islands.

North Atlantic. The best available estimate of North Atlantic abundance comes from 1992-1993 mark-recapture data, which generated an estimate of 11,570 humpback whales (Stevick et al. 2003). Estimates of animals in Caribbean breeding grounds exceed 2,000 individuals (Balcomb and Nichols 1982). The rate of increase for this stock varies from 3.2-9.4%, with rates of increase slowing over the past two decades (Katona and Beard 1990; Barlow and Clapham 1997; Stevick et al. 2003). If the North Atlantic population has grown according to the estimated instantaneous rate of increase (r = 0.0311), this would lead to an estimated 18,400 individual whales in 2008 (Stevick et al. 2003).

Southern Hemisphere. The IWC recently compiled population data on humpback whales in the Southern Hemisphere. Approximately 42,000 Southern Hemisphere humpbacks can be found south of 60° S during the austral summer feeding season (IWC 2007).

Critical habitat

NMFS has not designated critical habitat for humpback whales.

False killer whale – Hawaiian insular DPS

Description of the species

Hawaiian insular false killer whales move widely and rapidly among the main Hawaiian Islands, traveling up to 112 km from shore, and moving between islands within days (Baird *et al.* 2005; Baird 2009; Baird *et al.* 2010; Baird *et al.* 2008b; Wearmouth and Sims 2008; Forney *et al.* 2010). However, they do not appear to move broadly within the ocean basin. Part of Hawaiian insular false killer whales range overlaps with pelagic forms of false killer whales between 42 and 112 km from shore (Baird et al. 2010; Forney et al. 2010).

Hawaiian insular false killer whales are genetically unique compared to the pelagic form in surrounding Pacific waters (Chivers et al. 2010). Genetic data suggest little immigration into the Hawaiian insular population. Additional data are being collected to identify whether other false killer whale groups are part of the Hawaiian insular population.

Reproduction

False killer whales generally reach sexual maturity at 8-11 years of age for females and 8-10 years for males (Stacey et al. 1994; Odell and McClune. 1999; Kasuya 1986). Individuals grow to 40-50% of adult body length in their first year, but males continue to

grow faster and to a larger size thereafter (Kasuya 1986). This leads to a degree of sexual dimorphism, with males larger in size than females (Ferreira 2008; Kitchener et al. 1990).

Females ovulate at least annually, apparently at random, and calving can occur year-round (Stacey et al. 1994). Ovulation rates decrease with age to the point that females over the age of 44 years are considered reproductively senescent (Ferreira 2008; Kasuya 1986). Gestation lasts 11-16 months in captivity (Brown et al. 1966), and lactation lasts 18-24 months (Perrin and Reilly 1984). Calving intervals have been estimated at roughly 7-9 years in Japan, and 4.5 years in South Africa (Stacey et al. 1994; Ferreira 2008).

Maximum lifespan for false killer whales has been reported as 63 years for females and 58 for males (Kasuya 1986). Some individuals have been resighted in Hawaiian waters over a 21-year timespan (Baird *et al.* 2008b).

Feeding

Hawaiian insular false killer whales are the only known group to exclusively exploit a shallow, productive coastal habitat (Acevedo-Gutierrez et al. 1997; Wearmouth and Sims 2008).

The primary prey of false killer whales is large pelagic fishes, but little information is available to address which specific species the Hawaiian insular DPS targets. Jacks, mahi-mahi, filefish, rainbow runner, amberjack, wahoo, tuna, marlin, moonfish, swordfish, lustrous pomfret, and others may be significant (Baird 2009; Baird *et al.* 2008b; Shallenberger 1981; Brown *et al.* 1966; Wearmouth and Sims 2008). False killer whales have been known to remove large fishes from longlines (reports indicate tuna of 50-100 kg and one marlin >227 kg), leaving only the heads (Yuen 1977; Zimmerman 1983). Attacks on large fish, such as yellowfin tuna and broadbill swordfish have also been observed (Baird *et al.* 2008b).

Feeding likely occurs cooperatively (Wearmouth and Sims 2008) and prey sharing also has been documented (Baird *et al.* 2008b; Connor and Norris 1982). Foraging occurs throughout the day and night (Baird *et al.* 2008b; Evans and Awbrey 1986). Energetic requirements from captive individuals (probably less energetically demanding than free-ranging individuals) has been found to range between 3-6% of body weight daily (Baird et al. 2009; Kastelein et al. 2000; Sergeant 1969; Van Dyke and Ridgway 1977).

Status and trends

The Hawaiian insular DPS was proposed for listing as endangered on November 17, 2010 (75 FR 70169). No historical levels for population size are known. Estimates based upon assumed biological parameters have suggested possible historical levels of 769-2,461 individuals (Wearmouth and Sims 2008). Data from 1993-1998 support a population estimate of 121 individuals, which is likely negatively biased (Mobley Jr. et al. 2000; Wearmouth and Sims 2008). The best available estimate of population size is 123 individuals, but this estimate is somewhat dated (Baird et al. 2005). It is not known whether two groups of false killer whales who have not been seen to associate with insular false killer whales are a part of the population or part of a separate population. Current estimates of population size are 151 individuals without these groups and 170 with them (Wearmouth and Sims 2008).

Aerial survey data suggest that the population has been in decline since at least 1989 (Reeves et al. 2009). Aerial surveys since 1989 through 2003 have encountered gradually fewer individuals (Mobley 2004; Mobley Jr. et al. 2000; Baird 2009). Resighting rates have also been low during this time. Findings of surveys are supported by genetic analyses, which suggest a recent population decline (Chivers et al. 2010).

Critical habitat

NMFS has not designated critical habitat for the Hawaiian insular false killer whale.

Environmental baseline

By regulation, environmental baselines for Opinions include the past and present impacts of all state, federal, or private actions and other human activities in the action area, the anticipated impacts of all proposed federal projects in the action area that have already undergone formal or early Section 7 consultation, and the impact of state or private actions that are contemporaneous with the consultation in process (50 CFR §402.02). The *Environmental baseline* for this Opinion includes the effects of several activities affecting the survival and recovery of humpback whales and Hawaiian insular false killer whales in the action area. The *Environmental baseline* focuses primarily on past and present impacts to these species.

A number of human activities have contributed to the current status of these species in the action area. Although some of those activities, such as commercial whaling, occurred extensively in the past, ceased, and no longer appear to affect these whale populations, the effects of these types of exploitation persist today. Other human activities, such as commercial fishing and vessel operations, are ongoing and continue to affect these species.

The following discussion summarizes the natural and human phenomena in the action area that may affect the likelihood these species will survive and recover in the wild. These include directed harvest, fisheries interactions, ship strikes, noise, predation, disease and parasitism, contaminants, and scientific research.

Directed harvest

Directed harvest has affected humpback whales. U.S. Commercial harvest of large whale species no longer occurs, and the IWC has moratoriums in place to protect species from commercial whaling internationally. Nonetheless, historical whaling significantly reduced large whale abundance, and the effects of these reductions likely still persist.

Fisheries interactions

Entrapment and entanglement in fishing gear is a frequently documented source of human-caused mortality in large whale species (see Dietrich et al. 2007). These entanglements also make whales more vulnerable to additional dangers (e.g., predation and ship strikes) by restricting agility and swimming speed. Some marine mammals that die from entanglement in commercial fishing gear may sink rather than strand ashore, thus making it difficult to accurately determine the extent of such mortalities. From 2003 to 2007, there were 86 reports of human-related mortalities or injuries for the central

North Pacific stock of humpbacks. Of these, 54 incidents involved commercial fishing gear, and 23 of those incidents involved serious injuries or mortalities. This estimate is considered a minimum because not all entangled animals strand and not all stranded animals are found, reported, or cause of death determined (Allen and Angliss 2010).

False killer whales in Hawaiian waters have been seen to take catches from longline and trolling lines (Nitta and Henderson 1993; Shallenberger et al. 1981). Interactions with longline and troll fishery operations appear to result in disfigurement to dorsal fins, with roughly 4% of the population showing this injury, as well as entanglement and hooking (Forney and Kobayashi. 2007; Nitta and Henderson 1993; Shallenberger *et al.* 1981; Baird and Gorgone 2005; McCracken and Forney 2010; Zimmerman 1983). Carretta et al. (2009) estimated that 7.4 individuals per year are killed or seriously injured during the course of fishing operations in the Hawaiian EEZ. In this area, false killer whales are the most frequently hooked or entangled cetacean species, with most interactions occurring in tuna-targeting longline operations (Forney and Kobayashi. 2007; McCracken and Forney 2010). In total, 31 observations of serious injury or mortality have been documented from 1994-2008, which has led to an estimated 13 false killer whales killed or seriously injured throughout the Hawaiian longline fishery (Forney and Kobayashi. 2007; McCracken and Forney 2010), although most interactions occurred well beyond the range known for the Hawaiian insular DPS (McCracken and Forney 2010). In addition, false killer whales depredate on catches from shortline fisheries at least off northern Maui, with deliberate shootings occurring in some cases (Nitta and Henderson 1993; TEC 2009; Schlais 1985; NMFS 2009). Overfishing of some pelagic fishes, including bigeye and yellowfin tuna, may be adversely affecting Hawaiian insular false killer whales.

Ship strikes

Collisions with commercial and military ships are an increasing threat to many large whale species, particularly as shipping lanes and naval operations cross important large whale breeding and feeding habitats or migratory routes. In the central North Pacific, there have been several mortalities or serious injuries of humpbacks due to ship strike reported for the period 2003 to 2007 (Allen and Angliss 2010).

Despite report of strikes, the magnitude of the risks ship traffic poses to large whales is difficult to quantify or estimate. We struggle to estimate the number of whales that are killed or seriously injured in ship strikes within the territorial seas and the Exclusive Economic Zone of the continental United States and have virtually no information on interactions between ships and commercial vessels in the western North Pacific Ocean. With the information available, we assume that interactions occur but we cannot estimate the number of interactions or their significance to the endangered whales of the western North Pacific Ocean.

Noise

The marine mammals that occur in the action area are regularly exposed to several sources of natural and anthropogenic sounds. Anthropogenic noises that could affect ambient noise arise from the following general types of activities in and near the sea, any combination of which can contribute to the total noise at any one place and time. These

noises include transportation, dredging, construction; oil, gas, and mineral exploration in offshore areas; geophysical (seismic) surveys; sonars; explosions; and ocean research activities (Richardson et al. 1995).

Noise in the marine environment has received a lot of attention in recent years and is likely to continue to receive attention in the foreseeable future. Several investigators have argued that anthropogenic sources of noise have increased ambient noise levels in the ocean over the last 50 years (Jasny et al. 2005; NRC 1994; NRC 2000; NRC 2003; NRC 2005; Richardson et al. 1995). Much of this increase is due to increased shipping as ships become more numerous and of larger tonnage (NRC 2003).

Commercial fishing vessels, cruise ships, transport boats, airplanes, helicopters and recreational boats all contribute sound into the ocean (NRC 2003). The military uses sound to test the construction of new vessels, as well as for naval operations. In some areas where oil and gas production takes place, noise originates from the drilling and production platforms, tankers, vessel and aircraft support, seismic surveys, and the explosive removal of platforms (NRC 2003). Many researchers have described behavioral responses of marine mammals to the sounds produced by helicopters and fixed-wing aircraft, boats and ships, as well as dredging, construction, geological explorations, etc. (Richardson et al. 1995). Most observations have been limited to short-term behavioral responses, which included cessation of feeding, resting, or social interactions. Several studies have demonstrated short-term effects of disturbance on humpback whale behavior (Baker et al. 1983; Bauer and Herman 1986; Krieger and Wing 1984; Hall 1982) but the long-term effects, if any, are unclear or not detectable. Carretta et al. (2001) and Jasny et al. (2005) identified the increasing levels of anthropogenic noise as a habitat concern for whales because of its potential effect on their ability to communicate.

Surface shipping is the most widespread source of anthropogenic, low frequency (0 to 1,000 Hz) noise in the oceans (Simmonds and Hutchinson. 1996). The radiated noise spectrum of merchant ships ranges from 20 to 500 Hz and peaks at approximately 60 Hz. Ross (1976) has estimated that between 1950 and 1975 shipping had caused a rise in ambient ocean noise levels of 10 dB. He predicted that this would increase by another 5 dB by the beginning of the 21st century.

Predation

Based upon prevalence of tooth marks, attacks by killer whales appear to be highest among humpback whales migrating between Mexico and California, although populations throughout the Pacific Ocean appear to be targeted to some degree (Steiger et al. 2008). Juveniles appear to be the primary age group targeted. Humpback whales engage in grouping behavior, flailing tails, and rolling extensively to fight off attacks. Calves remain protected near mothers or within a group and lone calves have been known to be protected by presumably unrelated adults when confronted with attack (Ford and Reeves 2008).

Disease and parasitism

Urinary tract diseases and kidney failure caused by nematode *Crassicauda boopis* could affect humpback whale populations (Lambertsen 1986; Lambertsen 1992), and several

other species of large whale are known to carry similar parasites (Rice 1977). Parasites and biotoxins from red-tide blooms are other potential causes of mortality of humpback whales (Perry et al. 1999).

Contaminants

The accumulation of stable pollutants is a possible human-induced source of mortality in long-lived high trophic level animals (Waring et al. 2004; NMFS 2005), and some researchers have correlated contaminant exposure to possible adverse health effects in marine mammals. Contaminants may be introduced by rivers, coastal runoff, wind, ocean dumping, dumping of raw sewage by boats and various industrial activities, including offshore oil and gas or mineral exploitation. Due to their large amount of blubber and fat, marine mammals readily accumulate lipid-soluble contaminants (O'Hara and Rice 1996).

Humpback whale blubber has been shown to contain PCB and DDT (Gauthier et al. 1997). Contaminant levels are relatively high in humpback whales, compared to blue whales; humpback whales feed higher on the food chain, where prey carry higher contaminant loads than the krill that blue whales feed on. Biopsies from Hawaiian insular false killer whales have also had high levels of PCBs and DDTs (Ylitalo *et al.* 2009).

Scientific research

A total of 25 permits authorize the harassment of one or more of the target species in the action area during research (Table 2). Permits in Table 2 are identified by ocean basin or area, but most permits authorize a smaller study area or region within an ocean basin, reducing the chance of repeated harassment of individual whales by researchers.

Table 2 – Active Scientific Research Permits and Letters of Confirmation authorizing the harassment of humpback whales and Hawaiian false killer whales in the action area of this Opinion.

Permit No.	Permit Holder	Expiration date	Ocean Basin or Area	Harassment
532-1822	Balcomb	4/14/2011	CA to AK	Level B
540-1811-03	Calambokidis	4/14/2011	North Pacific Ocean	Level A & B
*587-1767-01^*	*Salden*	*9/30/2011**	*HI, AK*	*Level B only*
727-1915^	Scripps	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	4/14/2011	AK to CA	Level A & B
945-1776	Glacier Bay National Park and Preserve	3/31/2011	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

Table 2 – Active Scientific Research Permits and Letters of Confirmation authorizing the harassment of humpback whales and Hawaiian false killer whales in the action area of this Opinion.

Permit No.	Permit Holder	Expiration date	Ocean Basin or Area	Harassment
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
14599	Sharpe	7/31/2015	AK	Level A & B
14610	AK Dept 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

* indicates that there is a one-year extension on the permit
^ indicates that the permit includes Hawaiian false killer whales. Current permits do not distinguish between Hawaiian stock and Hawaiian Insular stock; if the Hawaiian insular stock is designated, these permits will updated to account for the different levels of protection.
Italicized row indicates the permit that would be replaced by the permit issued in this action

Effects of the proposed actions

Pursuant to Section 7(a)(2) of the ESA, federal agencies are required to ensure that their activities are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat. The proposed permit by the Permits Division would expose humpback whales and Hawaiian insular false killer whales to actions that constitute "take". In this section, we describe the potential physical, chemical, or biotic stressors associated with the proposed actions, the probability of individuals of listed species being exposed to these stressors based on the best scientific and commercial evidence available, and the probable responses of those individuals (given probable exposures) based on the available evidence. As described in the *Approach to the assessment* section, for any responses that would be expected to reduce an individual's fitness (i.e., growth, survival, annual reproductive success, and lifetime reproductive success), the assessment would consider the risk posed to the viability of the population. The purpose of this assessment is to determine if it is reasonable to expect the

proposed studies to have effects on listed species affected by this permit that could appreciably reduce the species' likelihood of surviving and recovering in the wild.

For this consultation, we are particularly concerned about behavioral disruptions that may result in animals that fail to feed or breed successfully or fail to complete their life history because these responses are likely to have population-level, and therefore species level, consequences. The proposed permit would authorize non-lethal "takes" by harassment of listed species during research activities. The ESA does not define harassment nor has NMFS defined the term pursuant to the ESA through regulation. However, the Marine Mammal Protection Act of 1972, as amended, defines harassment as any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal or marine mammal population in the wild or has the potential to disturb a marine mammal or marine mammal population in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [16 U.S.C. 1362(18)(A)]. For this Opinion, we define harassment similarly: an intentional or unintentional human act or omission that creates the probability of injury to an individual animal by disrupting one or more behavioral patterns that are essential to the animal's life history or its contribution to the population the animal represents.

Potential stressors

The assessment for this consultation identified several possible stressors associated with the proposed permitted activities. These include close approaches by research vessels, photo-identification from ships, underwater photography/videography, passive acoustic recording, and collection of sloughed skin.

Exposure analysis

Exposure analyses identify the co-occurrence of ESA-listed species with the action's effects in space and time, and identify the nature of that co-occurrence. The *Exposure analysis* identifies, as possible, the number, age or life stage, and gender of the individuals likely to be exposed to the action's effects and the populations(s) or subpopulation(s) those individuals represent.

The Permits Division proposes to issue a five-year permit for scientific research to Dan Salden. 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. A potential secondary area in Hawaii would be around the island of Kauai, an expansion from the previous permit. The Alaskan surveys would be conducted in the waters of SE Alaska (excluding Glacier Bay) and the areas adjacent to the Kenai Peninsula (Katchemak Bay and extending around to the waters off Seward, AK). These surveys would occur when ships are available.

Table 1 identifies the numbers of humpback whales and Hawaiian insular false killer whales that Dr. Salden would be authorized to approach, photograph or video from ships and underwater, passively record acoustics, and collect sloughed skin from annually under the five-year permit. A total of 3000 humpback whales and 150 Hawaiian insular false killer whales would be permitted to be exposed to the suite of procedures covered under the proposed permit annually. This is the same number of humpbacks as is in the

current permit. Because the Hawaiian insular DPS of false killer whales had not been proposed for listing when the current permit was issued, the current permit did not specify the "take" levels for individual DPSs, and therefore we cannot compare the numbers.

In our assessment of potential exposure levels of humpbacks, we considered the available annual reports from the past 5 years. From 2006 to 2010, Dr. Salden's level of effort (days and hours on water) have remained relatively consistent (ranging from 60 days in 2010 to 82 days in 2007, with an annual average of 67 days on the water); however the number of humpbacks he has observed has increased from 906 in 2006 to 1510 in 2009 (annual average 1307). Based on the number of days spent on water and the numbers of humpbacks observed during these surveys, we consider it "likely" (i.e. within 4 standard deviations of the mean) that future years of research could expose up to an estimated 2600 humpback whales annually.

Average time spent with groups of whales is averages less than 1 hour and less time is spent with mother-calf groups. For underwater encounters, interactions can last longer: an average of 137 minutes and 100 minutes were spent with all groups and mother-calf groups, respectively, in 2006, although in following years, the durations of underwater encounters were shorter.

Response analysis

As discussed in the *Approach to the assessment* section of this Opinion, response analyses determine how listed resources are likely to respond after being exposed to an action's effects on the environment or directly on listed species themselves. For the purposes of consultation, our assessments try to detect potential lethal, sub-lethal (or physiological), or behavioral responses that might reduce the fitness of individuals. Ideally, response analyses would consider and weigh evidence of adverse consequences as well as evidence suggesting the absence of such consequences.

Evidence indicates that wild animals respond to human disturbance in the same way they respond to predators (Lima 1998; Beale and Monaghan 2004; Frid and Dill 2002; Frid 2003; Gill et al. 2001; Romero 2004). These responses may manifest themselves as stress responses, interruptions of essential behavioral or physiological events, alteration of an animal's time budget, or some combinations of these responses (Frid and Dill 2002; Romero 2004; Sapolsky et al. 2000; Walker et al. 2005).

Response to close approaches by research vessels

For all research activities, the presence of vessels can lead to disturbance of marine mammals, although the animals' reactions are generally short term and low impact. Reactions range from little to no observable change in behavior to momentary changes in swimming speed, pattern, orientation; diving; time spent submerged; foraging; and respiratory patterns. Responses may also include aerial displays like tail flicks and lobtailing and may possibly influence distribution (Watkins et al. 1981; Bauer and Herman 1986; Baker et al. 1983; Clapham et al. 1993; Jahoda et al. 2003). The degree of disturbance by vessel approaches is highly varied. Whales may respond differently depending upon what behavior the individual or pod is engaged in before the vessel approaches (Wursig et al. 1998; Hooker et al. 2001) and the degree to which they have

become accustomed to vessel traffic (Lusseau 2004; Richter et al. 2006); reactions may also vary by species or individuals within a species (Gauthier and Sears 1999). In addition, Baker et al. (1988) reported that changes in whale behavior corresponded to vessel speed, size, and distance from the whale, as well as the number of vessels operating in the proximity. Based on experiments conducted by Clapham and Mattila (1993), experienced, trained personnel approaching whales slowly would result in fewer whales exhibiting responses that might indicate stress.

For humpback whales, studies found patterns of disturbance in response to vessel activity that indicate such approaches are probably stressful to the humpback whales, but the consequences of this stress on the individual whales remains unknown (Baker and Herman 1989; Baker et al. 1983). Baker et al. (1983) described two responses of whales to vessels: "horizontal avoidance" of vessels 2,000 to 4,000 meters away characterized by faster swimming and fewer long dives; and "vertical avoidance" of vessels from 0 to 2,000 meters away during which whales swam more slowly, but spent more time submerged.

Hall (1982) reported that humpback whales closely approached by survey vessels in Prince William Sound, Alaska, often reacted by diving and surfacing further from the vessel or with an altered direction of travel. The author noted that whale feeding activity and social behavior did not appear to be disturbed by the approaches; however, cow-calf pairs appeared to be wary and avoided the vessel. Other studies have found that humpbacks respond to the presence of boats by increasing swimming speed, with some evidence that swimming speed then decreased after boats left the area (Au and Green 2000; Scheidat et al. 2004). A number of studies involving the close approach of humpback whales by research vessels for biopsying and tagging indicate that responses are generally minimal to non-existent when approaches were slow and careful.

When more pronounced behavioral changes occur, the responses appear to be short-lived (Gauthier and Sears 1999; Weinrich et al. 1992; Clapham and Mattila 1993; Weinrich et al. 1991). The slow and careful approach to humpback whales is important and is supported by studies conducted by Clapham and Mattila (1993) on the reactions of humpback whales to close approaches for biopsy sampling in Caribbean breeding areas. The investigators concluded that the way a vessel approached a group of whales had a major influence on the whale's response to the approach, particularly for cow and calf pairs. Smaller pods of whales and pods with calves also seem more responsive to approaching vessels (Bauer and Herman 1986; Bauer 1986). Based on their experiments with different approach strategies, researchers concluded that experienced, trained personnel approaching humpback whales slowly would result in fewer whales exhibiting responses that might indicate stress.

The applicant's annual reports provide response data of humpbacks to vessel interactions. Based on these, approximately 85% percent of humpback groups did not visibly react to the presence of the research vessel. In 9% of occasions, the whales altered course or sounded in such a manner to suggest to the researchers that they were attempting to elude the vessel's approach. Whales initiated behaviors that suggested a "friendly" or "inquisitive" reaction to the vessel 6% of the time, and less than 1% of the interactions were recorded as agonistic. In the cases of agonistic behavior, such as bubbletrailing, the researchers ceased to attempt to approach the whale.

Over the past five years, the researcher has twice had contact between the research vessel and a whale. Both events occurred when the boat was idling forward or in neutral, in both cases there was no evidence of harm to the whale, and both whales resumed normal behavior after contact was made. The applicant reported these incidents as required under the current permit, and the proposed permit has the same requirement for reporting.

Researchers surveying and tagging false killer whales, including the Hawaiian insular stock, often report whales bow-riding with research vessels (Baird *et al.* 2008a; Castro 2004). Articles discussing surveys of false killer whales did not note any agonistic or adverse reactions to approaches by boats (Baird *et al.* 2008a; Baird *et al.* 2008b). Additionally, false killer whales are known to purposely approach fishing vessels to depredate on catch (Baird 2009). We believe that Hawaiian insular false killer whales will have similar or less stress related to close approaches by research vessels, compared to humpback whales.

Although close approaches conducted under the proposed permit might still be stressful for some individuals, and might temporarily interrupt behaviors such as foraging, evidence from investigators and in the literature suggests that responses would be short-lived. Assuming an animal is no longer disturbed after it returns to pre-approach behavior, we do not expect a negative fitness consequence for the individuals approached.

Response to close approach by divers

Pack *et al*. (2002) used underwater swimmers for video/videogrammetry on humpback whales and didn't report any unusual responses to swimmers. However, Helweg et al. (1992) observed a humpback respond with an S-shaped posture to a diver, which they associate with circumstances of intense intraspecific aggressive activity. We did not identify evidence specific to false killer whales, and so we use the information regarding humpbacks as a proxy for the responses of false killer whales.

The applicant has experience having divers in the water with humpback whales. Based on the annual reports submitted to the Permits Division for 2006-2010, one whale responded to divers with a bubbletrail, a potentially agonistic response, although it is possible that it was directed at a nearby conspecific. This occurred in 2007, and no similar event was recorded in the other annual reports.

Although close approaches and observations by divers could possibly temporarily interrupt behaviors, evidence from investigators and in the literature suggests that responses would be short-lived. Assuming an animal is no longer disturbed after it returns to pre-approach behavior, we do not expect a negative fitness consequence for the individuals approached.

Response to sloughed skin and feces collection

The collection of sloughed skin and feces would not involve contact with the whale and would not be invasive. Collections could potentially be done in the vicinity of a whale, but we would not expect this to have any impact beyond the effect of the close approaches to whales assessed earlier.

Cumulative effects

Cumulative effects include the effects of future state, tribal, local or private actions that are reasonably certain to occur in the action area considered by this Opinion. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA. Sources queried include state legislature websites and Nexis. We reviewed bills passed from 2009-2011 and pending bills under consideration were included as further evidence that actions "are reasonably certain to occur."

State regulation is critical for future anthropogenic impacts in a region. Legislation from Hawaii and Alaska address maintaining healthy marine ecosystems with regulated development of industry, regulation of commercial and recreational use of ocean waters, controlling contaminants in agricultural, stormwater, and municipal effluents, resisting invasive species occurrence, and promotion of policies to decrease greenhouse gas emission and pollution, including alternative energy development.

After reviewing available information, NMFS is not aware of effects from any additional future non-federal activities in the action area that would not require federal authorization or funding and are reasonably certain to occur during the foreseeable future.

Integration and synthesis of the effects

As explained in the *Approach to the Assessment* section, risks to listed individuals are measured using changes to an individual's "fitness" – i.e., the individual's growth, survival, annual reproductive success, and lifetime reproductive success. When listed plants or animals exposed to an action's effects are not expected to experience reductions in fitness, we would not expect the action to have adverse consequences on the viability of the population(s) those individuals represent or the species those populations comprise (Anderson 2000; Brandon 1978; Mills and Beatty 1979; Stearns 1992). As a result, if the assessment indicates that listed plants or animals are not likely to experience reductions in their fitness, we conclude our assessment.

The NMFS Permits Division proposes to issue a scientific research permit to Dan Salden authorizing research on humpback whales and Hawaiian insular false killer whales in the waters surrounding Hawaii and southeast Alaska.

The *Status of listed resources* described the factors that have contributed to the reduction in population size for the species considered in this Opinion. Threats to the survival and recovery of humpbacks and the Hawaiian insular false killer whales include directed harvest, fisheries interactions, ship strikes, noise, predation, disease and parasitism, contaminants, and scientific research. NMFS expects that the current natural and anthropogenic threats described in the *Environmental Baseline* will continue. Reasonably likely future actions described in the *Cumulative effects* section that could affect the species considered in this opinion include state legislation aimed at maintaining healthy marine ecosystems with regulated development of industry and regulation of commercial and recreational use of ocean waters, and others.

Under the proposed permit, humpback whales and Hawaiian insular false killer whales would be exposed to close approaches by research vessels, photo-identification from ships, underwater photography/videography, passive acoustic recording, and collection of

sloughed skin. For each year of the five-year proposed permit, we estimate that up to 2600 humpback whales and 150 Hawaiian insular false killer whales could be exposed.

We believe short-lived stress responses due to close approach by research vessels and divers, are possible for a few individuals, as are short-term interruptions in behaviors such as foraging; however, we do not expect these responses to lead to reduced opportunities for foraging or reproduction for targeted individuals. Collection of sloughed skin and feces, even if done in the vicinity of a whale, would not have an effect beyond that of the close approach.

Overall, no individual whale is expected to experience a fitness reduction, and therefore no fitness consequence would be experienced at a population or species level.

Conclusion

After reviewing the current *Status of listed resources*; the *Environmental baseline* for the *Action area*; the anticipated effects of the proposed 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.

Incidental take statement

Section 9 of the ESA and federal regulation pursuant to Section 4(d) of the ESA prohibit the "take" of endangered and threatened species, respectively, without special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the NMFS to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of Sections 7(b)(4) and 7(o)(2), taking that is incidental and not intended as part of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

As discussed in the accompanying Opinion, only the species targeted by the proposed research activities would be harassed as part of the intended purpose of the proposed action. Therefore, the NMFS does not expect the proposed action would incidentally take threatened or endangered species.

Conservation recommendations

Section 7(a)(1) of the ESA directs federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

We recommend the following conservation recommendations, which would provide information for future consultations involving the issuance of marine mammal permits

that may affect endangered whales as well as reduce harassment related to authorized activities:

1. *Cumulative impact analysis.* The Permits Division should encourage the marine mammal research community, working with the Marine Mammal Commission as applicable, to identify a research program with sufficient power to determine cumulative impacts of existing levels of research on whales. This includes the cumulative sub-lethal and behavioral impacts of research permits on listed species.

2. *Coordination meetings*. The Permits Division should continue to work with NMFS' Regional Offices and Science Centers to conduct meetings among permit holders conducting research within a region and future applicants to ensure that the results of all research programs or other studies on specific threatened or endangered species are coordinated among the different investigators.

3. *Data sharing*. The Permits Division should continue to encourage permit holders planning to be in the same geographic area during the same year to coordinate their efforts by sharing research vessels and the data they collect as a way of reducing duplication of effort and the level of harassment threatened and endangered species experience as a result of field investigations.

In order for the NMFS' Endangered Species Division to be kept informed of actions minimizing or avoiding adverse effects on, or benefiting, listed species or their habitats, the Permits Division should notify the Endangered Species Division of any conservation recommendations they implement in their final action.

Reinitiation notice

This concludes formal consultation on the proposal to issue scientific research permit No. 15274 to Dan Salden authorizing research on endangered humpback whales and on Hawaiian insular false killer whales, which are proposed for listing as endangered, in the waters surrounding Hawaii and southeast Alaska. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this Opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this Opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of authorized take is exceeded, the NMFS Permits Division must immediately request reinitiation of Section 7 consultation.

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