National Marine Fisheries Service
Endangered Species Act Section 7 Consultation
Biological and Conference Opinion

Agency:	Permits and Conservation Division of the Office of Protected Resources, National Marine Fisheries Service
Activity Considered:	Biological and Conference Opinion on the proposal to issue Permit Number 16479 to Gregory Kaufman to authorize research on humpback whales in Maui County waters, Hawaii, pursuant to Section 10(a)(1)(A) of the Endangered Species Act of 1973
Consultation Conducted by:	ESA Interagency Cooperation Division of the Office of Protected Resources, National Marine Fisheries Service
Approved by:	
Date:	SEP 17 2012

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 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 and Conservation Division. The consulting agency is the NMFS' Office of Protected Resources – ESA Interagency Cooperation Division.

This document represents the NMFS' biological and conference opinion (Opinion) of the effects of the proposed research on endangered humpback whales and this 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 and Conservation Division's draft Environmental Assessment, draft permit 16479, the permit application from Gregory Kaufman, 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 and Conservation Division (Permits Division) requested consultation with the NMFS' ESA Interagency Cooperation Division on the proposal to issue scientific research permit authorizing studies on endangered humpback whales (*Megaptera novaeangliae*). Issuance of the permit constitutes a federal action, which may affect marine species listed under the ESA.

On December 23rd, 2011, the Permits Division requested initiation of Section 7 consultation to issue a new permit to Gregory Kaufman, and the ESA Interagency Cooperation Division formally initiated consultation with the Permits Division on January 3rd, 2012.

Due to a change in the permit, the Permits Division had to re-submit the application for public comment. Received the additional information on June 13th, 2012, and proceeded with the consultation.

Biological and Conference Opinion

Description of the proposed action

NMFS' Office of Protected Resources – Permits and Conservation 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 16479 to Mr. Gregory Kaufman (Principal Investigator) would authorize research on endangered humpback whales in the waters surrounding Hawaii. 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 off the coast of Hawaii. All lifestages and both sexes could be targeted.

Species	ESA Status	Lifestage	"Take" limit Annual no. of individuals	Takes per Individual	Procedures
Humpback whale	Endangered (Range-wide)	All	189	3	Behavioral observations from vessels, photo-identification; Photograph/Video
False killer whale, Hawaiian insular	Proposed Endangered (Hawaiian Insular DPS)	All	240	5	Incidental harassment

Vessel surveys

Mr. Kaufman proposes to conduct vessel surveys using line-transect sampling methods would be used to collect data for estimating probabilities of vessel strikes of humpback whales. Sightings would be conducted from the platform of a 26.5' World Cat research vessel manned by a captain, two observers and a photographer. Survey starting point and direction of travel along the line would be randomized for each survey day. Survey speed would be increased every 15 min in 5 mph increments from 5 mph to 20 mph maximum. Every 15 minutes, a 360°-one-minute scan for individual humpback whales found within a one kilometer radius off the vessel would be

[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."

conducted by the observers and the waypoint where the scan was started would be taken. Distances from the observer to the whale would be estimated using a Bushnell 7x50 reticle binocular and the angle to the sighting would be read from the binoculars' compass. Each whale observed would be counted only once during the scan. Additional variables collected would be visibility, percent cloud cover, Beaufort sea state, Douglas sea state, percent glare on both sides of the vessel, water depth, and other vessels present in the area.

Surprise encounters would be recorded continuously while the vessel travels along the survey line. In addition, a near miss is defined as a surprise encounter which within 45 degrees left and right of the bow and at a distance of 80m or less. When a surprise encounter occurs, the time, depth, environmental conditions as described above and the distance and angle to the whale would be recorded. The boat speed would also be recorded.

After a surprise encounter, the boat would stop and observe the subsequent surfacing of the whale(s) involved to determine surface and dive intervals, direction of travel, and group composition, for a maximum observation time of 30 minutes. Subsequently, the whale would be approached within 20 m for photo-identification (using both dorsal fin and flukes) and for size estimation. To minimize effects of photo-identification on whale behavior, whales would be approached at a speed of less than 5 mph, from the rear and only for the purpose of taking a clear picture of the rear of the fluke. The crew would limit unnecessary movement and conversation on board and would remain in the vicinity of the whale only for the time required to take the photos needed. Once photos are obtained, the vessel would slowly move away from the whale and either leave or continue observations at a distance of 100 yards or more.

The researchers intend to conduct the surveys annually from January through May. They would operate approximately 3 days per week (8 hour days), weather dependent, each field season in Hawaii. The permit would thus be valid for five years from date of issuance.

Hawaiian insular false killer whales would not be targeted for research under this permit, and would only be incidentally harassed when in association with humpback whales that are approached for observation and photo-identification. The Pacific Whale Foundation is currently authorized under the General Authorization, Letter of Confirmation No. 13427-03, to conduct research on Hawaiian false insular killer whales until their listing under the ESA takes effect.

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:

Measures to minimize effects to animals would include:

- 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.

- To minimize disturbance of the subject animals the Permit Holder 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. Measures to minimize effects to animals would include:
  - 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, constitutes a take and must be counted and reported.
  - Individual humpbacks would not be "taken" more than 3 times per day by close approach, and not more than once per day if harassment is apparent (e.g., change of behavior, obvious reactions, etc.).
  - No animal would be taken more than three times per field season.
  - Animals would be approached at a slow speed and obliquely (rather than direct movement towards them) to allow them to continue their activities, and to not overtake or disturb. Researchers would remain parallel to the animals, matching speed with the group, minimizing changes in speed, and terminating activities if active avoidance is occurring.
  - Researchers would not travel in front of or too close to, or block any intended path for pairs or small groups of whales that are attempting to stay together.
  - Researchers would cease approach after suitable identification photographs have been obtained topside.
  - Researchers would avoid multiple approaches of same groups of whales on a given day.
  - Activities would be suspended if researchers determine that activities result in any disruption of normal whale activities.
  - Researchers must approach mothers and calves gradually to minimize or avoid any startle response, especially where females with calves are resting at depth, and must not approach any mother or calf while the calf is actively nursing.
  - Researchers would be especially prudent and cautious when approaching any mother/calf pods, assess behavior prior to close approach, and have stationed experienced observers looking for any indication of take. They would avoid separating or coming between a mother/calf pair, and must not position the research vessel between the mother and calf.
  - Researchers would not work any humpback whale mother/calf group that does not seem "at ease" with an approach or that does not remain in rest mode.
  - Must immediately terminate efforts if there is any evidence that the activity may be interfering with pair-bonding or other vital functions;
  - An experienced collection team would conduct research.
  - Researchers would coordinate activities with other researchers and avoid unnecessary duplication and harassing the same pods.

[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.

- When practicable, researchers should monitor and record the behavior of target animals at least 15 minutes before and after conducting research activities. Observed negative impacts should be included in annual reports.

- To minimize disturbance of Hawaiian monk seals the Permit Holder must 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 to: NMFS Pacific Islands Fisheries Science Center, Marine Mammal Research Program, 1601 Kapiolani Boulevard, Suite 1110, Honolulu, HI 96814-4700; phone (808)944-2174; fax (808)944-2200.
- For research on Hawaiian humbacks, at all times when vessels engaging in research activities are on the water ("port-to-port") in Hawaii, such vessels must fly a clearly visible triangular pennant. The pennant must be yellow in color with a minimum dimensions of 18"H x 26:L and with the permit number displayed in 6" high black numerals.
- This permit does not authorize takes of any protected species not identified in Table 1 of Appendix 1 of the permit, including those species under the jurisdiction of the USFWS. Should other protected species be encountered during the research activities authorized under this permit, researchers must exercise caution and remain a safe distance from the animal(s) to avoid take, including harassment.

Reports

- The Permit Holder must submit annual, final, and incident reports, and papers or publications resulting from the research authorized herein to the Permits Division.
- Reports may be submitted through the online system at https://apps.nmfs.noaa.gov, by email attachment to the permit analyst for this permit, or by hard copy mailed or faxed to the Chief, Permits Division, Office of Protected Resources, NMFS, 1315 East-West Highway, Suite 13705, Silver Spring, MD 20910; phone (301)713-2289; fax (301)713-0376.
- Written incident reports related to serious injury and mortality events or to exceeding authorized takes, must be submitted to the Chief, Permits Division within two weeks of the incident. The incident report must include a complete description of the events and identification of steps that will be taken to reduce the potential for additional research related mortality or exceedence of authorized take.
- An annual report must be submitted to the Chief, Permits Division at the conclusion of each year for which the permit is valid.
- A final report must be submitted to the Chief, Permits Division within 180 days after expiration of the permit, or, if the research concludes prior to permit expiration, within 180 days of completion of the research.
- Research results must be published or otherwise made available to the scientific community in a reasonable period of time.

Notification and Coordination

- The Permit Holder must provide written notification of planned field work to the Assistant Regional Administrator(s) for Protected Resources at the address of the NMFS regional

office. Such notification must be made at least two weeks prior to initiation of a field trip/season and must include the locations of the intended field study and/or survey routes, estimated dates of research, and number and roles (for example: PI, CI, veterinarian, boat driver, safety diver, animal restrainer, Research Assistant "in training") of participants.

- To the maximum extent practical, the Permit Holder must coordinate permitted activities with activities of other Permit Holders conducting the same or similar activities on the same species, in the same locations, or at the same times of year to avoid unnecessary disturbance of animals. The Regional Office may be contacted at the address listed above for information about coordinating with other Permit Holders.

Approach to the assessment

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

The activities would be conducted in the winter season (December through mid-May) in the waters surrounding primarily Maui County, Hawaii (Figure 1).

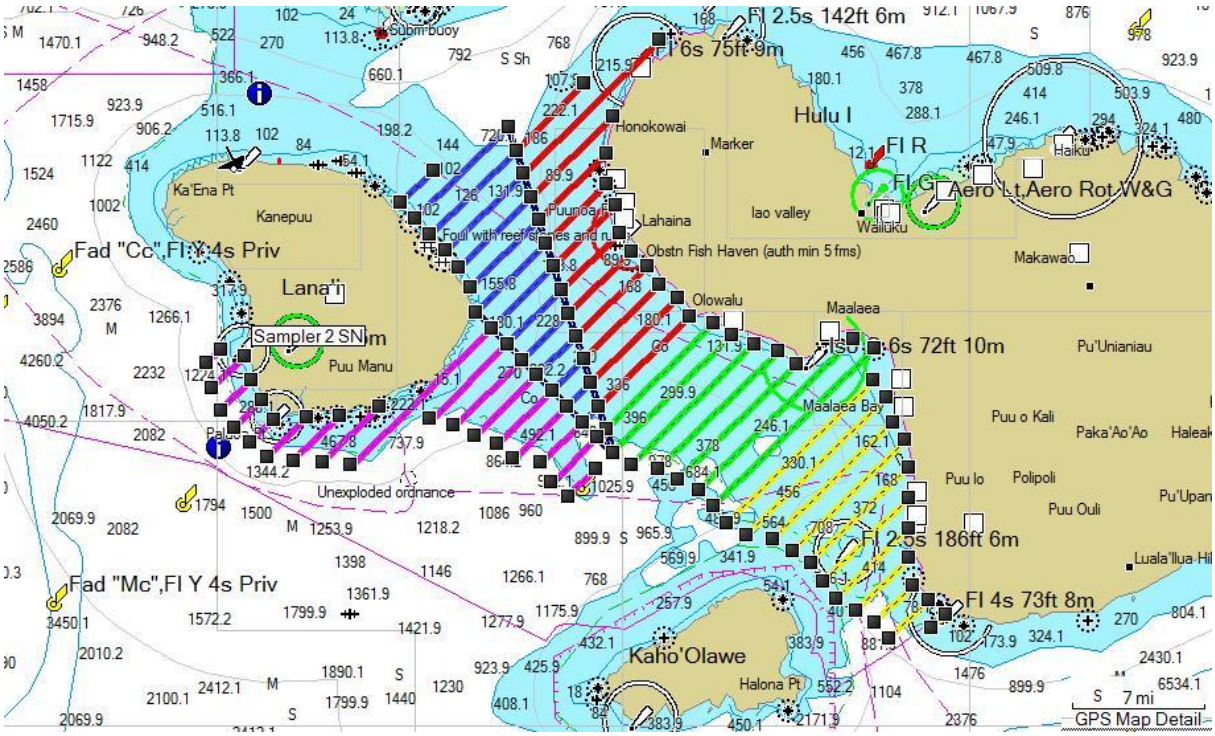

Figure 1: Proposed Transect Lines in Maui County Waters, Hawaii

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
Cetaceans		
Blue whale	*Balaenoptera musculus*	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
Hawaiian insular false killer whale	*Pseudorca crassidens*	Endangered (proposed)
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.

Hawaiian monk seals, blue, 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 have designated habitat in the general area of proposed research, 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.

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 time span (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).

Environmental Contamination

Coastal runoff and river discharges carry large volumes of petrochemical and other contaminants from agricultural activities, cities and industries into the oceans. Marina and dock construction, dredging, aquaculture, oil and gas exploration and extraction, increased under water noise and boat traffic can degrade marine habitats used by marine mammals (Colburn *et al*. 1996). The development of marinas and docks in inshore waters can negatively impact nearshore habitats. An increase in the number of docks built increases boat and vessel traffic. Fueling facilities at marinas can sometimes discharge oil, gas, and sewage into sensitive estuarine and coastal

habitats. 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, impairing the overall fitness so that it is less able to withstand other natural and anthropogenic stressors.

Although these contaminant concentrations do not likely affect the more pelagic waters, the humpbacks analyzed in this Opinion travel between near shore and offshore habitats and may be exposed to and accumulate these contaminants during their life cycles. 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 24 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
781-1824-10	NMFS, NWFSC	4/14/2011	AK to CA	Level A & B
532-1822-11	Center for Whale Research	4/14/2012	CA to WA	Level B only
540-1811-24	Cascadia Research Collective	4/14/2012	CA, OR, WA	Level A & B
1058-1733-01	WHOI	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
727-1915-03*	Scripps	2/1/2013	HI, CA to WA	Level A & B
10018-01*	Keiki Kohola Project	6/30/2013	HI	Level B
1127-1921-01*	Hawaii Marine Mammal Consortium	6/30/2013	HI	Level A & B
14610-04	AK Dept of Fish and Game	5/31/2015	AK	Level A & B
14097-10*	NMFS, SWFSC	6/30/2015	Pacific Ocean / international and U.S. territorial waters of the Pacific and Southern Oceans	Level A & B
13846-01*	Whale Trust	7/31/2015	HI, WA, AK	Level A & 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**
14353*	Cetos Research Organization	7/31/2015	HI	Level A & B
14451-01*	University of Hawaii	7/31/2015	Pacific and Atlantic Ocean	Level B
14585-01*	University of Hawaii	7/31/2015	Western North Pacific Ocean, CA to AK, HI	Level A & B
14122-02	University of Alaska	7/31/2015	AK	Level A & B
14296-03	University of Alaska	7/31/2015	AK	Level A & B
14534-01	NOAA Science and Technology	7/31/2015	Eastern Pacific Ocean, CA	Level A & B
14599-03	Alaska Whale Foundation	7/31/2015	AK	Level A & B
14682-04*	University of Alaska	11/15/2015	HI	Level A & B
15271-01	Moss Landing Marine Labs	3/31/2016	CA,OR,WA	Level A & B
14245*	NMFS NMML	5/01/2016	AK, WA, OR, CA, HI, and Atlantic Ocean	Level A & B
15330*	Cascadia Research Collective	8/01/2016	AK, WA, OR, CA, HI, territories (e.g., Palmyra, American Samoa, Guam, Wake) and international waters	Level A & B
15247-01*	Hawaii Whale Research Foundation	11/15/2016	HI, AK	Level B only
15750	ABR, Inc. Environmental Research and Services	11/30/2016	WA	Level B only

* 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.

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 close approaches by research vessels for photo-identification from ships as a possible stressor associated with the proposed permitted activities.

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 Gregory Kaufman. Most of the activities would be conducted in the winter season (December through mid-May) in the waters surrounding Maui County, Hawaii.

Table 1 identifies the numbers of humpback whales and Hawaiian insular false killer whales that Mr. Kaufman would be authorized to approach, photograph/video from ships annually under the five-year permit, total of 189 humpback whales and 240 Hawaiian insular false killer whales would be permitted to be exposed to the suite of procedures covered under the proposed permit annually.

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.

Based on data of humpbacks to vessel interactions from similar researchers' annual reports, 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.

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.

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 2009-2012 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 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 Gregory Kaufman authorizing research on humpback whales in the waters surrounding Hawaii.

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 would be exposed to close approaches by research vessels for photo-identification from ships. For each year of the five-year proposed permit, we estimate that up to 189 humpback whales and 240 Hawaiian insular false killer whales could be exposed.

We believe short-lived stress responses due to close approach by research vessels 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. 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 16479, 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' ESA Interagency Cooperation 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 ESA Interagency Cooperation 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. 16479 to Gregory Kaufman 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. 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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