Billing Code 4333–15

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

[FWS–R7–ES–2018–N010; FXES111607MRG01–189–FF07CAMM00]

Marine Mammals; Incidental Take During Specified Activities; Proposed Incidental Harassment Authorization for Northern Sea Otters in Cook Inlet, Alaska; Availability of Draft Environmental Assessment; Request for Comments

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Notice of receipt of application; proposed incidental harassment authorization; availability of draft environmental assessment; request for comments.

SUMMARY: We, the U.S. Fish and Wildlife Service, in response to a request under the Marine Mammal Protection Act of 1972, as amended, from Hilcorp Alaska, LLC, propose to authorize nonlethal, incidental take by harassment of small numbers of northern sea otters between May 23, 2018, and September 30, 2018. The applicant has requested this authorization for take that may result from aircraft overflights in Cook Inlet, Alaska. Aerial surveys are needed to collect gravitational and magnetic data for oil and gas exploration. This proposed authorization, if finalized, will be for take by Level B harassment only; no take by injury or death will be authorized. The application package and the references cited herein are available for viewing at http://www.fws.gov/alaska/fisheries/mmm/iha.htm or may be requested as described under **FOR FURTHER INFORMATION CONTACT**.

DATES: Comments on the proposed incidental harassment authorization and draft

environmental assessment will be accepted on or before [INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*].

ADDRESSES: *Document availability:* You may obtain a copy of the draft environmental assessment and a list of the references cited in this document by the methods set out below.

Comment submission: You may submit comments by one of the following methods:

- U.S. mail or hand-delivery: Public Comments Processing, Attention: Ms. Kimberly Klein, U.S. Fish and Wildlife Service, MS 341, 1011 East Tudor Road, Anchorage, Alaska 99503;
- Fax: (907) 786–3848, Attention: Ms. Kimberly Klein; or
- Email: fw7_ak_marine_mammals@fws.gov.

See **Request for Public Comments** below for more information.

FOR FURTHER INFORMATION CONTACT: Ms. Kimberly Klein, by mail (see **ADDRESSES**); by email at kimberly_klein@fws.gov; or by telephone at 1–800–362–5148.

SUPPLEMENTARY INFORMATION:

Background

Section 101(a)(5)(D) of the Marine Mammal Protection Act of 1972, as amended (MMPA; 16 U.S.C. 1361, et seq.), authorizes the Secretary of the Interior (Secretary) to allow, upon request, the incidental but not intentional taking of small numbers of marine mammals of a species or population stock by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified region during a period of not

more than 1 year. Incidental take may be authorized only if statutory and regulatory procedures are followed and the U.S. Fish and Wildlife Service (hereafter, "the Service" or "we") make the following findings: (i) take is of a small number of animals, (ii) take will have a negligible impact on the species or stock, and (iii) take will not have an unmitigable adverse impact on the availability of the species or stock for subsistence uses by coastal-dwelling Alaska Natives.

The term "take," as defined by the MMPA, means to harass, hunt, capture, or kill, or to attempt to harass, hunt, capture, or kill any marine mammal (16 U.S.C. 1362(13)). Harassment, as defined by the MMPA, means any act of pursuit, torment, or annoyance that (i) has the potential to injure a marine mammal or marine mammal stock in the wild (the MMPA calls this "Level A harassment"), or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (the MMPA calls this "Level B harassment").

The terms "negligible impact," "small numbers," and "unmitigable adverse impact" are defined in the Code of Federal Regulations at 50 CFR 18.27, the Service's regulations governing take of small numbers of marine mammals incidental to specified activities. "Negligible impact" is defined as an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival. "Small numbers" is defined as a portion of a marine mammal species or stock whose taking would have a negligible impact on that species or stock. However, we do not rely

on that definition here, as it conflates the terms "small numbers" and "negligible impact," which we recognize as two separate and distinct requirements (see *Natural Res. Def. Council, Inc.* v. *Evans*, 232 F. Supp. 2d 1003, 1025 (N.D. Cal. 2003)). Instead, in our small numbers determination, we evaluate whether the number of marine mammals likely to be taken is small relative to the size of the overall population. "Unmitigable adverse impact" is defined as an impact resulting from the specified activity (1) that is likely to reduce the availability of the species to a level insufficient for a harvest to meet subsistence needs by (i) causing the marine mammals to abandon or avoid hunting areas, (ii) directly displacing subsistence users, or (iii) placing physical barriers between the marine mammals and the subsistence hunters; and (2) that cannot be sufficiently mitigated by other measures to increase the availability of marine mammals to allow subsistence needs to be met.

If the requisite findings are made, we may issue an Incidental Harassment Authorization (IHA), which sets forth the following: (i) permissible methods of taking; (ii) other means of effecting the least practicable impact on marine mammals and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of marine mammals for taking for subsistence uses by coastal-dwelling Alaska Natives; and (iii) requirements for monitoring and reporting take.

Summary of Request

On November 2, 2017, Hilcorp Alaska, LLC (hereafter "Hilcorp" or "the

applicant") submitted a request to the Service's Marine Mammals Management Office (MMM) for authorization to take a small number of northern sea otters (*Enhydra lutris kenyoni*, hereafter "sea otters" or "otters"). Hilcorp expects that take by unintentional harassment may occur during their planned oil and gas exploration activities in Cook Inlet, Alaska.

Hilcorp originally requested an IHA for take of sea otters resulting from both aerial and in-water seismic surveys planned for April 1, 2018, through June 30, 2018. Aerial surveys measure the gravitational and magnetic signatures of the Earth's crust to detect subsurface oil and gas deposits. Seismic surveys measure sound waves reflected off the sea floor to detect offshore oil and gas deposits. Both survey types create noise that may cause sea otters to be harassed. Hilcorp later notified the Service that the seismic work will not be conducted as part of the 2018 project. On December 22, 2017, Hilcorp submitted an amended request withdrawing the seismic work. They retained the aerial survey work as originally planned and adjusted the proposed dates to the period May 23, 2018, through July 1, 2018. We evaluated possible effects of conducting the project between May 23, 2018, and September 30, 2018, rather than between May 23, 2018, and June 30, 2018, in order to provide flexibility should additional time be needed to complete the proposed work. We evaluated the effects of conducting the same amount of work over a longer period, but we did not consider the effects of conducting additional work. There is no expected change in the amount of take that would be authorized.

Description of Specified Activities and Geographic Area

The specified activity (the "project") consists of Hilcorp's 2018 Lower Cook Inlet geophysical survey program. Hilcorp will conduct aerial surveys over Cook Inlet between May 23, 2018, and July 1, 2018. Data will be collected by sensitive equipment mounted aboard aircraft. All data collection is passive; no signals will be emitted from the equipment.

The surveys will be conducted by flying a prescribed pattern of transect lines over the Federal and State waters of lower Cook Inlet and the shoreline of Alaska between 151.7° and 153.6° W., and 59.4° and 60.5° N. This is the specified geographic area of the project. Two aircraft types will be used, a fixed-wing Basler BT-67 turboprop (a modified remanufactured Douglas DC-3) and an AS-350 B3 helicopter. The helicopter will be flown over land and within 4.8 kilometers (km) (3 miles (mi)) of the coast, while the DC-3 will be flown over the offshore waters only. The DC-3 will fly at about 333 kilometers per hour (km/h) or 207 miles per hour (mi/h) while the AS-350 will fly at about 100 km/h (62 mi/h).

Fixed-wing transect lines will be flown in a northeast/southwest direction, generally parallel to the coast of Cook Inlet, and will be approximately 100 km (62 mi) long. Helicopter transects will run roughly east/west and will be about 25 km (15.5 mi) long. Both sets of transect lines will be spaced 500 m (0.3 mi) apart and will be connected by perpendicular tie lines at 5,000 meters (m) (3.1 mi) apart. The fixed-wing survey will be flown at approximately 152 m (500 feet (ft)) above sea level (ASL), and the helicopter will fly at 91 to 152 m (300 to 500 ft) above ground level (AGL).

Aerial surveys are expected to take approximately 14 days total within a 2-month period, although work days may not be consecutive due to weather or equipment delays. Standard fixed-wing and helicopter operational limitations apply, and weather delays, flight ceilings, etc., will be at the discretion of the flight contractor.

Description of Marine Mammals in the Specified Area

The northern sea otter is currently the only marine mammal under the Service's jurisdiction that normally occupies Cook Inlet, Alaska. Sea otters in Alaska are represented by three stocks. Those in Cook Inlet belong to either the southwest Alaska stock or the southcentral Alaska stock, depending on whether they occur west or east of the center of Cook Inlet, respectively. A third stock occurs in southeast Alaska.

The southwest stock of the northern sea otter corresponds to the southwestern Distinct Population Segment (DPS), which was listed as threatened under the Endangered Species Act of 1973 (ESA; 16 U.S.C. 1531, et seq.) on August 9, 2005 (70 FR 46366). Detailed information about the biology and conservation status of the listed DPS can be found at https://www.fws.gov/alaska/fisheries/mmm/seaotters/otters.htm. Stock assessment reports for the listed DPS and non-listed populations are available at https://www.fws.gov/alaska/fisheries/mmm/stock/stock.htm.

Sea otters may occur anywhere within the specified project area other than upland areas. The number of sea otters in Cook Inlet was estimated from an aerial survey conducted by the Service in cooperation with the U.S. Geological Survey (USGS) in May 2017 (USFWS and USGS, unpublished data). The sea otter survey was conducted in all

areas of Cook Inlet south of approximately 60.3° N. within the 40 m (131 ft) depth contour, including Kachemak Bay in southeastern Cook Inlet and Kamishak Bay in southwestern Cook Inlet. This survey was designed to estimate abundance in Cook Inlet while accounting for the variable densities and observability of sea otters in the region. Total abundance was estimated to be 19,889 sea otters (standard error = 2,988). Within the project area, the highest densities of sea otters were found in the outer Kamishak Bay area, with 3.5 otters per square km (km^2), followed by the eastern shore of Cook Inlet (1.7 otters per km^2). Distribution of the population during Hilcorp's project is likely to be similar to that detected during sea otter surveys, as their work will be conducted during the same time of year that the sea otter surveys were completed.

Sea otters generally occur in shallow water near the shoreline. They are most commonly observed within the 40 m (131 ft) depth contour (USFWS 2014a, b) although they can be found in areas with deeper water. Depth is generally correlated with distance to shore, and sea otters typically remain within 1 to 2 km (0.62 to 1.24 mi) of shore (Riedman and Estes 1990). They tend to remain closer to shore during storms, but they venture farther out during good weather and calm seas (Lensink 1962; Kenyon 1969).

The documented home range sizes and movement patterns of sea otters illustrate the types of movements that could be seen among otters responding to Hilcorp's activities. Sea otters are non-migratory and generally do not disperse over long distances (Garshelis and Garshelis 1984). They usually remain within a few kilometers of their established feeding grounds (Kenyon 1981). Breeding males remain for all or part of the year in a breeding territory covering up to 1 km (0.62 mi) of coastline. Adult females

have home ranges of approximately 8 to 16 km (5 to 10 mi), which may include one or more male territories. Juveniles move greater distances between resting and foraging areas (Lensink 1962; Kenyon 1969; Riedman and Estes 1990; Estes and Tinker 1996).

Although sea otters generally remain local to an area, they are capable of long-distance travel. Otters in Alaska have shown daily movement distances greater than 3 km (1.9 mi) at speeds up to 5.5 km/h (3.4 mi/h) (Garshelis and Garshelis 1984). In eastern Cook Inlet, large numbers of sea otters have been observed riding the incoming tide northward and returning on the outgoing tide, especially in August. They are presumably feeding along the eastern shoreline of Cook Inlet during the slack tides when the weather is good and remaining in Kachemak Bay during periods of less favorable weather (Gill 2009; BlueCrest 2013). In western Cook Inlet, otters appear to move in and out of Kamishak Bay in response to seasonal changes in the presence of sea ice (Larned 2006).

Potential Effects of the Activities

Exposure of Sea Otters to Noise

Hilcorp has requested authorization for Level B incidental harassment of sea otters. Sea otters in Cook Inlet will be exposed to the visual and auditory stimulation associated with Hilcorp's aerial surveys. Fixed-wing and helicopter traffic is common in Cook Inlet, and the visual presence of aircraft alone is unlikely to cause sea otters to be harassed. If sea otters are disturbed, it will more likely be due to the airborne noise associated with Hilcorp's flyovers, or possibly, the noise in tandem with the sight of the aircraft. Hilcorp's aerial surveys will generate noise that is louder and recurs more

frequently than noise from regular air traffic due to the survey's particular aircraft, low flight altitudes, and parallel transect pattern. Flyovers may cause disruptions in the sea otter's normal behavioral patterns, thereby resulting in incidental take by Level B harassment.

We expect the actual number of otters experiencing Level B take due to harassment by noise to be 578 or fewer. Otters may be taken more than once; the total number of incidental takes of sea otters is expected to be less than 693. Hilcorp's project, as it is currently proposed, will not introduce anything into the water, alter habitat, generate sound below the water's surface, or expose any marine mammals to direct contact with people, equipment, or vessels. Take will be limited to incidental, unintentional Level B harassment; no take from other sources is expected.

Noise from Hilcorp's Aircraft

Whether a specific noise source will affect a sea otter depends on several factors, including the distance between the animal and the sound source, the sound intensity, background noise levels, the noise frequency, duration, and whether the noise is pulsed or continuous. The actual noise level perceived by individual sea otters will depend on distance to the aircraft, whether the animal is above or below water, atmospheric and environmental conditions, and the operational conditions of the aircraft.

Noise production has been measured for the DC-3 and the AS-350. Noise levels herein are given in decibels (dB) referenced to 20 µPa for airborne sound. All dB levels are dB_{RMS} unless otherwise noted; dB_{RMS} refers to the root-mean-squared dB level, the

square root of the average of the squared Sound Pressure Level (SPL) typically measured over 1 second. See Richardson *et al.* (1995), Götz *et al.* (2009), Hopp *et al.* (2012), Navy (2014), or similar resources for descriptions of acoustical terms and measurement units in the context of ecological impact assessment.

Standardized noise testing has been conducted for compliance with Federal Aviation Administration (FAA) regulations at 14 CFR part 36. During these tests, the DC-3 produced noise levels of 82.4 dB_{EPN} (Effective Perceived Noise level) during takeoff, and 91.9 dB_{EPN} on approach (USDOT 2012). Other field-testing of the DC-3 produced a peak SPL of 90 dB_{PEAK} during level flyovers at 265 km/hr (165 mi/hr) measured at 305 m (1,000 ft) from the flightpath (Ollerhead 1971; Fink 1977). During a gliding flight path at 152.4 m (500 ft) altitude and airspeeds around 278 km/hr (173 mi/h), a maximum of 79.6 dB was recorded (Healy 1974). See 14 CFR part 36 for calculation of dB_{EPN} from field measurements of sound.

Documented noise levels of the AS-350 recorded for FAA compliance measured 89.8 to 91.1 dB_{EPN} during takeoff and 91.3 to 91.4 dB_{EPN} on approach; level straight-line flyovers at an altitude of 305 m (1,000 ft) produced noise levels from 86.8 to 87.1 dB_{EPN} (USDOT 2012). Newman and Rickley (1979) reported 91.2 dB_{EPN} on approach, 89.2 dB_{EPN} during takeoff, and 87.2 dB_{EPN} during level flyovers at approximately 150 m (492 ft) altitude. Falzarano and Levy (2007) reported that overflights by the AS-350 at a distance of 122 m (400 ft) AGL produced an FAA-certified 83.5 dBA Sound Exposure Level (SEL; normally referenced to 20 μPa^2-s).

Turboprop aircraft such as the DC-3 are generally perceived to produce noise

levels 10 to 20 dB higher than helicopters, which in turn are 10 to 20 dB noisier than piston aircraft (Ollerhead 1971). Based on information on aircraft type, airspeed, and altitude, we assume the sound levels generated by Hilcorp's aircraft during aerial gravitation and magnetic surveys will not exceed a maximum of approximately 90 dB at the water's surface.

Sea Otter Hearing

Sound frequencies produced by Hilcorp's aircraft will fall within the hearing range of sea otters and will be audible to animals during flyovers. Controlled sound exposure trials on southern sea otters (*E. l. nereis*) indicate that otters can hear frequencies between 125 hertz (Hz) and 38 kilohertz (kHz) with best sensitivity between 1.2 and 27 kHz (Ghoul and Reichmuth 2014). Aerial and underwater audiograms for a captive adult male southern sea otter in the presence of ambient noise suggest the sea otter's hearing was less sensitive to high-frequency (greater than 22 kHz) and low-frequency (less than 2 kHz) sounds than terrestrial mustelids but similar to that of a sea lion. Dominant frequencies of southern sea otter vocalizations are between 3 and 8 kHz, with some energy extending above 60 kHz (McShane *et al.* 1995; Ghoul and Reichmuth 2012). During FAA testing, the test aircraft produced sound at all frequencies measured (50 Hz to 10 kHz) (Healy 1974; Newman and Rickley 1979). At frequencies centered at 5 kHz, jets flying at 300 m (984 ft) produced 1/3 octave band noise levels of 84 to 124 dB, propeller-driven aircraft produced 75 to 90 dB, and helicopters produced 60 to 70 dB (Richardson *et al.* 1995).

Exposure to high levels of sound may cause changes in behavior, masking of communications, temporary or permanent changes in hearing sensitivity, discomfort, and injury. Species-specific criteria for sea otters have not been identified for preventing harmful exposures to sound. Thresholds have been developed for other marine mammals, above which exposure is likely to cause behavioral disturbance and injuries (Southall *et al.* 2007; Finneran and Jenkins 2012; NMFS 2016). Because sea otter hearing abilities and sensitivities have not been fully evaluated, we relied on the closest related proxy to evaluate the potential effects of noise exposure.

California sea lions (*Zalophus californianus*) (otariid pinnipeds) have shown a frequency range of hearing most similar to that of southern sea otters (Ghoul and Reichmuth 2014) and provide the closest related proxy for which data are available. Sea otters and pinnipeds share a common mammalian aural physiology (Echteler *et al.* 1994; Solntseva 2007). Both are adapted to amphibious hearing, and both use sound in the same way (primarily for communication rather than feeding).

Exposure Thresholds

Noise exposure thresholds have been established by the National Marine Fisheries Service (NMFS) for identifying underwater noise levels capable of causing Level A harassment (injury) of marine mammals, including otariid pinnipeds (NMFS 2016). Those thresholds are based on estimated levels of sound exposure capable of causing a permanent shift in sensitivity of hearing (*e.g.*, a Permanent Threshold Shift (PTS) (NMFS 2016)). Thresholds for non-impulse sound are based on cumulative SEL (SELcum)

during a 24-hour period and include weighting adjustments for the sensitivity of different species to varying frequencies. These injury thresholds were developed from Temporary Threshold Shifts (TTS) detected in lab settings during sound exposure trials. Studies were summarized by Finneran (2015). Thresholds based on TTS have been used as a proxy for Level B harassment (*i.e.*, 70 FR 1871, January 11, 2005; 71 FR 3260, January 20, 2006; and 73 FR 41318, July 18, 2008).

The NMFS (2016) guidance neither addresses thresholds for preventing injury or disturbance from airborne noise, nor provides thresholds for avoidance of Level B take. However, it does provide a framework for assessment of potential consequences of noise exposure. Exposure to airborne noise has been estimated to cause TTS in the California sea lion after 1.5 to 50 minutes of exposure to sound at SPLs of 94 to 133 dB; TTS onset was estimated to occur at 159 dB SELcum (Kastak *et al.* 2004, 2007). The U.S. Navy adopted 159 dB SELcum as a TTS threshold level and used it to estimate onset of PTS and set a threshold for otariid pinnipeds at 168 dB SELcum (Finneran and Jenkins, 2012). Southall *et al.* (2007) reviewed the literature and recommended dual injury thresholds for PTS for sea lions exposed to discrete non-pulsed airborne noise of 149 dB_{PEAK} and 172.5 dB SELcum.

Acoustic thresholds can be reached from acute exposure to high sound levels or from long periods of exposure to lower levels. Both the sound levels and durations of exposure from Hilcorp's aircraft will depend primarily on a sea otter's distance from the transect during a flyover. Airborne sound attenuation rates are affected by characteristics of the atmosphere and topography, but can be conservatively generalized for line sources

(such as flight lines) over acoustically "hard" surfaces like water (rather than "soft" surfaces like snow) by a loss of 3 dB per doubling of distance from the source. At this attenuation rate, a sound registering 90 dB directly below a flyover at 91 to 152 m (300 to 500 ft) ASL will attenuate to 80 dB in 1 to 1.5 km (0.6 to 0.9 mi). The same noise level will attenuate to 68 dB (the upper range of ambient conditions near Cook Inlet per Blackwell (2005)) within 15 to 24 km (9 to 15 mi).

At rates of speed proposed for Hilcorp's aircraft (333 km/hr (207 mi/h) for the DC-3 and 100 km/hr (62 mi/h) for the AS-350 helicopter) sea otters will be exposed to sound levels between 80 and 90 dB for up to 1 minute per flyover by either aircraft. Sea otters will experience sound levels less than 80 dB but greater than ambient for up to 2.5 minutes as the DC-3 passes by, and up to 13.5 minutes when the AS-350 helicopter flies by. About 15 to 18 passes per day will be required to complete the survey during the allotted period. This scenario suggests that otters within the helicopter survey area could potentially be exposed to continual sound levels that are higher than ambient for the duration of each day's work.

No value representing the upper limit of safety for prolonged exposure has been identified for sea otters, but a sea lion exposed to an SPL of 94 dB for 12 minutes did not show a statistically significant TTS (Kastak *et al.* 2007). In humans, prolonged exposure to 80 dBA is unlikely to cause hearing loss (dBA is the decibel level weighted at frequencies sensitive to human hearing). Although the decibel levels here have not been weighted for the sensitivity of sea otters to specific frequencies, weighting adjustments generally reduce the dB level of sounds at frequencies outside of the range of greatest

sensitivity. We therefore assume prolonged exposure to 80 dB (unweighted) will not cause TTS in sea otters.

We then considered the potential effect of repeated 1-minute exposures to SPLs greater than 80 dB. The SELcum of a sea otter positioned below the aircraft can be estimated based on the duration of exposure and sound level at the location of the animal. Cumulative SEL is linearly related to the SPL and logarithmically related to the exposure time, meaning that SELcum will increase or decrease on a 1:1 basis with increasing or decreasing SPL, and increase or decrease by 3 dB for each doubling or halving of exposure time, respectively (Finneran *et al.* 2015). Based on this relationship, we can estimate the SELcum from flyover exposures. For example, using a simple equation SPL + $10\log_{10}$ (duration of exposure, expressed in seconds) (NMFS 2016), SELcum may reach 120 dB for the anticipated activities ($90 + 10\log_{10}(1{,}080) \approx 120.3$ dB, where 1,080 represents 18 passes at 60 seconds each). This specific model is generally used in underwater applications, and it assumes a constant received sound level that does not change over space and time (*e.g.*, Urick 1983; ANSI 1986; Madsen 2005). Additionally, Hilcorp's flight lines do not cover the same area multiple times, so sea otters are unlikely to be exposed to sound from all passes in a day. Therefore, this model is expected to overestimate a sea otter's cumulative exposure to sound during flyovers, but it demonstrates that the airborne noise generated by Hilcorp's aircraft during gravitational and magnetic surveys will not cause TTS in sea otters, even for an otter located at the closest point of approach during multiple flyovers.

Response to Disturbance

The potential that Hilcorp's aerial surveys will cause take due to changes in the hearing abilities (TTS or PTS) of sea otters is negligible. However, the project may result in Level B take by harassment due to an individual's reaction to project noise. The actual number of takes will depend on the number of times individual sea otters perceive Hilcorp's activities and respond with a significant behavioral change in a biologically important activity.

Direct and Indirect Effects

The reactions of wildlife to disturbance can range from short-term behavioral changes to long-term impacts that affect survival and reproduction. When disturbed by noise, animals may respond behaviorally (*e.g.*, escape response) or physiologically (*e.g.*, increased heart rate, hormonal response) (Harms *et al.* 1997; Tempel and Gutierrez 2003). The energy expense and associated physiological effects could ultimately lead to reduced survival and reproduction (Gill and Sutherland 2000; Frid and Dill 2002). In an example described by Pavez *et al.* (2015), South American sea lions (*Otaria byronia*) visited by tourists exhibited an increase in the state of alertness and a decrease in maternal attendance and resting time on land, thereby potentially reducing population size. In another example, killer whales (*Orcinus orca*) that lost feeding opportunities due to boat traffic faced a substantial (18 percent) estimated decrease in energy intake (Williams *et al.* 2006). Such disturbance effects can have population-level consequences. Increased disturbance rates have been associated with a decline in abundance of

bottlenose dolphins (*Tursiops* sp.) (Bejder *et al.* 2006; Lusseau *et al.* 2006).

These examples illustrate direct effects on survival and reproductive success, but disturbances can also have indirect effects. Response to noise disturbance is considered a nonlethal stimulus that is similar to an antipredator response (Frid and Dill 2002). Sea otters are susceptible to predation, particularly from killer whales and eagles, and have a well-developed antipredator response to perceived threats. For example, Limbaugh (1961) reported that sea otters were apparently undisturbed by the presence of a harbor seal (*Phoca vitulina*), but they were quite concerned with the appearance of a California sea lion. They demonstrated their fear by actively looking above and beneath the water when a sea lion was swimming nearby.

Although an increase in vigilance or a flight response is nonlethal, a tradeoff occurs between risk avoidance and energy conservation. An animal's reactions to noise disturbance may cause stress and direct an animal's energy away from fitness-enhancing activities such as feeding and mating (Frid and Dill 2002; Goudie and Jones 2004). For example, Southern sea otters in areas with heavy recreational boat traffic demonstrated changes in behavioral time budgeting showing decreased time resting and changes in haulout patterns and distribution (Benham *et al.* 2005; Maldini *et al.* 2012). Chronic stress can also lead to weakened reflexes, lowered learning responses (Welch and Welch 1970; van Polanen Petel *et al.* 2006), compromised immune function, decreased body weight, and abnormal thyroid function (Seyle 1979).

Changes in behavior resulting from anthropogenic disturbance can include increased agonistic interactions between individuals or temporary or permanent

abandonment of an area (Barton *et al.* 1998). The type and extent of response may be influenced by intensity of the disturbance (Cevasco *et al.* 2001), the extent of previous exposure to humans (Holcomb *et al.* 2009), the type of disturbance (Andersen *et al.* 2012), and the age and/or sex of the individuals (Shaughnessy *et al.* 2008; Holcomb *et al.* 2009). Despite the importance of understanding the effects of disturbance from sound, few controlled experiments or field observations have been conducted on sea otters to address this topic.

Evidence from Sea Otter Studies

The available studies of sea otter behavior indicate that sea otters are somewhat more resistant to the effects of sound than other marine mammals (Riedman 1983, 1984; Ghoul *et al.* 2012a, b; Reichmuth and Ghoul 2012). Southern sea otters off the California coast showed only mild interest in boats passing within hundreds of meters and appeared to have habituated to boat traffic (Riedman 1983; Curland 1997). Southern sea otters in an area with frequent railroad noise appeared to be relatively undisturbed by pile-driving activities, many showing no response and generally reacting more strongly to passing vessels than to the sounds of pile driving equipment (ESA 2016). When sea otters have displayed behavioral disturbance in response to acoustic stimuli, these responses were short-lived, and the otters quickly become habituated and resumed normal activity (Ghoul *et al.* 2012b). Sea otters may be less sensitive to noise because whereas many marine mammals depend on acoustic cues for vital biological functions such as orientation, communication, locating prey, and avoiding predators, sea otters do not rely on sound to

orient themselves, locate prey, or communicate underwater.

In locations without frequent human activity, sea otters appear to be more easily disturbed. Sea otters in Alaska have shown signs of disturbance (escape behaviors) in response to the presence and approach of vessels. Behaviors included diving or actively swimming away from a boat, hauled-out sea otters entering the water, and groups of sea otters disbanding and swimming in multiple different directions (Udevitz *et al.* 1995). Sea otters in Alaska have also been shown to avoid areas with heavy boat traffic but return to those same areas during seasons with less traffic (Garshelis and Garshelis 1984). In Cook Inlet, otters were observed riding the tides past a new offshore drilling platform while drilling was being conducted; otters drifting on a trajectory that would have taken them within 500 m (0.3 mi) of the rig tended to swim to change their angle of drift to avoid a close approach although noise levels from the work were near the ambient level of underwater noise (BlueCrest 2013).

Disturbances of sea otters due to aircraft have been observed in Alaska. Biologists conducting aerial surveys for the Service and the USGS to determine sea otter abundance between 2008 and 2015 reported disturbances of sea otters (USFWS and USGS unpublished data). Bodkin and Udevitz (1999) conducted sea otter surveys and reported disturbances caused by various flight patterns. Sea otter disturbances were also reported between 2009 and 2012 during aerial surveys conducted to determine bird and marine mammal distribution in Cook Inlet (ABR, Inc. 2010–2013). From all sources, the mean rate of disturbance during aerial surveys was 18.3 percent (2,288 out of 30,611 sea otters observed), ranging from 8.0 to 29.2 percent (USFWS and USGS unpublished data,

Bodkin and Udevitz 1999, ABR, Inc. 2010–2013). Most of the disturbances involved otters diving, swimming out of the area, or swimming erratically during overflights. Flying a more intensive search pattern (circling overhead) or flying at lower altitudes resulted in greater disturbance rates than straight-line flights at higher altitudes. Among these surveys, the reported rate of Level B harassment was below 0.1 percent (0 to 0.8 percent); 18 confirmed Level B takes were recorded among 19,500 animals observed (USFWS and USGS unpublished data).

Some degree of disturbance is possible from Hilcorp's activities. Individual sea otters in Cook Inlet will show a range of responses to noise from Hilcorp's aircraft. Some may abandon the survey area and return when the disturbance has ceased. Based on the observed movement patterns of wild sea otters (i.e., Lensink 1962; Kenyon 1969, 1981; Garshelis and Garshelis 1984; Riedman and Estes 1990; Estes and Tinker 1996, and others) we expect some individuals, independent juveniles, for example, will respond to Hilcorp's proposed activities by dispersing to areas of suitable habitat nearby, while others, especially breeding-age adult males, will not be displaced by overflights.

Some otters will likely show startle responses, change direction of travel, or dive. Sea otters reacting to overflights may divert time and attention from biologically important behaviors, such as feeding. Some effects may be undetectable in observations of behavior, especially the physiological effects of chronic noise exposure. Air traffic, commercial and recreational, is routine in Cook Inlet. Some sea otters in the area of activity may become habituated to noise caused by the project due to the existing continual air traffic in the area and will have little, if any, reaction to flyovers. However,

noise levels from aircraft will be louder and will recur more frequently than that from regular air traffic in the region.

Effects on Habitat

Habitat areas of significance for sea otters exist near the project area. Sea otter critical habitat was designated under the ESA (74 FR 51988, October 8, 2009). In Cook Inlet, critical habitat occurs along the western shoreline south of approximately Redoubt Point. It extends from mean high tide line out to 100 m (328.1 ft) from shore or to the 20 m (65.6 ft) depth contour. Physical and biological features of critical habitat essential to the conservation of sea otters include the benthic invertebrates (urchins, mussels, clams, etc.) eaten by otters and the shallow rocky areas and kelp beds that provide cover from predators. Other important habitat in the Hilcorp project area includes outer Kamishak Bay between Augustine Island and Iniskin Bay within the 40 m (131 ft) depth contour where high densities of otters have been detected. Sea otters within this important area and within the critical habitat may be affected by aerial surveys conducted by Hilcorp. The MMPA allows the Service to identify avoidance and minimization measures for effecting the least practicable impact of the specified activity on important habitats. However, the project, as currently proposed, will have no effect on habitat.

Mitigation and Monitoring

If an IHA for Hilcorp's project is issued, it must specify means for effecting the least practicable impact on sea otters and their habitat, paying particular attention to

habitat areas of significance, and on the availability of sea otters for taking for subsistence uses by coastal-dwelling Alaska Natives. Hilcorp has proposed to minimize the effects of their action by maintaining minimum flight altitudes, providing training to aircraft pilots to identify and monitor otters, reporting observations of otters to the Service, and coordinating with subsistence hunting communities. These measures are specified under **Proposed Authorization**, part *B. Avoidance and Minimization*.

We evaluated various alternatives to these proposed mitigation measures to determine the means of effecting the least practicable impact to sea otters and their availability for subsistence use. Decreasing the survey length and increasing flight altitudes were not considered practicable for accomplishing the magnetic and gravitational survey. Hilcorp suggested temporarily increasing flight altitude or diverting away from the flight path when groups of sea otters were encountered. We evaluated this option, but at the requisite flight speeds and initial altitudes, it is unlikely that otters can be spotted until the survey aircraft is too close to avoid disturbance. Evasive maneuvers such as an abrupt increase in altitude or change in direction will result in increased noise production due to the additional engine power and changes in aircraft configuration necessary for these tasks. These maneuvers would probably increase, rather than decrease, the level of noise exposure. Additionally, the pilot would later need to return to the same flight path to complete the transect, potentially encountering the same otters and causing another disturbance.

Estimated Incidental Take

Characterizing Take by Level B Harassment

An individual sea otter's reaction will depend on its prior exposure to low-flying aircraft, its need or desire to be in the particular area, its physiological status, or other intrinsic factors. The location, timing, frequency, intensity, and duration of the encounter are among the external factors that will also influence the animal's response.

Relatively minor reactions such as increased vigilance or a short-term change in direction of travel are not likely to disrupt biologically important behavioral patterns and are not considered take by harassment as defined by the MMPA. These types of responses typify the most likely reactions of the majority of sea otters that will be exposed to Hilcorp's activities. Extreme behavioral reactions capable of causing injury are characterized as Level A harassment events, which are unlikely to result from the proposed project and will not be authorized. Examples include separation of mothers from young or repeatedly flushing sea otters from a haulout.

Intermediate reactions that disrupt biologically significant behaviors and may potentially result in decreased fitness for the affected animal meet the criteria for Level B harassment under the MMPA. In 2014, the Service identified the following sea otter behaviors as indicating possible Level B take:

- Swimming away at a fast pace on belly (*i.e.*, porpoising);
- Repeatedly raising the head vertically above the water to get a better view (spyhopping) while apparently agitated or while swimming away;
- In the case of a pup, repeatedly spyhopping while hiding behind and holding onto

its mother's head;

- Abandoning prey or feeding area;
- Ceasing to nurse and/or rest (applies to dependent pups);
- Ceasing to rest (applies to independent animals);
- Ceasing to use movement corridors along the shoreline;
- Ceasing mating behaviors;
- Shifting/jostling/agitation in a raft so that the raft disperses;
- Sudden diving of an entire raft;
- Flushing animals off a haulout.

This list is not meant to encompass all possible behaviors, other situations may also indicate Level B take.

Estimating Exposure Rates

To estimate the numbers of sea otters likely to experience Level B take, we first calculated the number of otters in Cook Inlet that occur within the Hilcorp project area. Number of otters was calculated from density multiplied by project area. Density was estimated according to region in Cook Inlet. Density data for Kamishak and the East side of Cook Inlet along the shore of the Kenai Peninsula was derived from aerial surveys conducted in May 2017 (USFWS and USGS, unpublished data). Surveys were not conducted for central Cook Inlet in 2017, and 2017 surveys did not yield useful results for western Cook Inlet north of Kamishak, so the density for those regions was derived from the 2002 surveys conducted by Bodkin *et al*. (2003) and corrected for population

growth proportional to the growth rate of Cook Inlet as a whole, as determined from comparison of the 2002 and 2017 surveys. Density values (in otters per km^2) were 1.7 in East Cook Inlet (excluding Kachemak Bay and the outer Coast of Kenai Peninsula south and east of Seldovia), 3.5 in Kamishak Bay, and 0.026 in West and Central Cook Inlet.

Hilcorp's project area boundary contains about 6,625 km^2 (2,558 square mi (mi^2)) excluding land. Of this area, 1,039 km^2 (401 mi^2) is in East Cook Inlet, 830 km^2 (310 mi^2) in Kamishak Bay, and 1,870 km^2 (722 mi^2) in West and Central Cook Inlet. The total number of otters within the Hilcorp project area was calculated to be 4,753 otters ($(1{,}039 \times 1.7) + (831 \times 3.53) + (1{,}870 \times 0.026) \approx 4{,}753$).

Predicting Behavioral Response Rates

Although we cannot predict the outcome of each encounter between a sea otter and one of Hilcorp's aircraft, it is possible to consider the most likely reactions. The best predictor of behavioral response for sea otters exposed to airborne sound is the distance at which the encounter occurs in relation to the sound level produced.

To predict the total number of Level B takes, we distributed a questionnaire to professional biologists with experience conducting aerial surveys in regions with sea otters. The survey requested information about the respondent, the aircraft used, the flight altitude, and the reactions of otters to aircraft. Six useable responses were received in the time allotted; four were from professional sea otter biologists who have each conducted more than five sea otter surveys.

Survey responses reported that, on average, 26 percent of sea otters located

directly below the aircraft appear to react to the presence of the aircraft. Survey respondents reported that at a point on the water's surface 100 m (328 ft) perpendicular to the flight line, the disturbance rate dropped to just below 20 percent. At 250 m (820 ft) from the flight line, just over 10 percent of sea otters reacted to aircraft, and at 500 m (1,640 ft) away, less than seven percent reacted. At 1,000 m (3,281 ft), less than one percent of otters were disturbed by aircraft overflights.

We then evaluated whether Hilcorp's project will expose sea otters to comparable noise levels to those during surveys conducted by questionnaire respondents. Hilcorp will use an AS-350 and a modified DC-3. Hilcorp's aerial surveys will be conducted at 92 to 152 m (300 to 500 ft) for the AS-350 and 152 m (500 ft) for the DC-3. Small fixed-wing aircraft such as the Piper PA-18 Super Cub, Cessna 185 and 206, and 18-GCBC Scout were most often used by questionnaire respondents and were generally flown at 92 to 152 m (300 to 500 ft) ASL. Larger twin-engine aircraft were also used, including the Aero Commander and the Partenavia P.68. Questionnaire respondents indicated the use of the Partenavia P.68 flown at 61 m (200 ft) ASL during surveys for southern sea otters. Helicopters used during sea otter surveys included the Hughes 500 and Hughes 369 flown at 92 to 152 m (300 to 500 ft) ASL.

Field tests for the Hughes 500 have demonstrated a maximum overall SPL of 87.6 dB as measured at ground level on the centerline of the flight path during straight-line flyovers at 150 m (492 ft) altitude and at a stable airspeed of 111 km/h (69 mi/h) (Newman and Rickley 1979). The Hughes 500 and the AS-350 should generally produce a similar level of noise at the same altitude, although the AS-350 will be slightly louder.

Indeed, Newman *et al.* 1982 reported signatures for the AS-350 that were about 5 to 7 dB higher than those of the Hughes 500.

The Aero Commander was the largest aircraft used during sea otter surveys. It produces a maximum of 75.4 dB during a gliding flight path at 152.4 m (500 ft) altitude and airspeeds up to 324 km/hr (201 mi/hr) (Healy 1974). The Aero Commander is expected to be roughly 5 dB quieter than the DC-3. The second largest aircraft, the Partenavia, produced noise levels measured for FAA compliance up to 78.2 dBA during flyovers at 305 m (1000 ft). The Piper PA-18 produced 65.9 dBA, and the Cessna 206 ranged from 75.4 to 79.4 dBA at 305 m (1,000 ft) (USDOT 2012).

For the Partenavia, back calculating from FAA standards using an estimated 3 to 6 dB loss per doubling of distance indicates this aircraft at 200 ft ASL may have exposed sea otters to 85 to 92 dB while a Cessna 206 at 300 ft would have generated from 84.6 to 89.8 dB. Both of these are within the possible range of noise produced by the DC-3. The Piper PA-18 flying at 91 m (300 ft) would likely expose sea otters to sound pressure levels ranging from 71.1 to 76.4 dB.

In conclusion, there is overlap in the sound levels that will be produced by Hilcorp's project and those generated during sea otter surveys conducted by questionnaire respondents. Therefore, disturbance rates from Hilcorp's activities will be adequately represented by the rates of sea otter disturbance reported by biologists.

Calculating Take

We then used the estimated response rates of sea otters, as described by

questionnaire responses provided by professional biologists, to predict the total number of possible reactions that could result from Hilcorp's project. To do this, we multiplied the size of the project area by the density of otters and the probability of disturbance according to the distance from the flight line. Details follow.

The area within which sea otters may be disturbed was calculated on a per day basis in ArcGIS® using transect lines provided by Hilcorp. The total transect length was divided into 14 polygons representing 4 helicopter and 10 fixed-wing "flight days." The ends of fixed-wing transects were connected by a line of the minimum length necessary to circle a 1-nautical-mile perimeter, based on the turn radius of a DC-3. The ends of helicopter transects were joined with straight lines to connect one to the next. Both fixed-wing and helicopter transect lines were connected in a zigzag pattern to simulate minimal off-transect travel routes. Transects in each of the 14 flight days were then buffered to represent the area per day of potential disturbance effects.

Multi-ring buffers were created around transect lines to represent zones with variable probabilities of disturbance determined by distance from the center line of the flight path as measured along the water's surface to a point directly below the aircraft. Rings were established at distance categories of 20, 100, 250, 500, 750, and 1,000 m (66, 328, 820, 1,640, 2,461, and 3,281 ft) from the transect lines. Overlapping rings within the same distance categories were merged within, but not between flight days. The total area of each ring was summed in ArcGIS®. Table 1 shows the area calculated within each ring by distance from the transect.

Next, the density of otters within each region in Cook Inlet was multiplied by the

area within each transect buffer to represent the number of otters potentially affected by Hilcorp's project according to categorical distance from the centerline of the nearest overflight. Table 2 shows the calculated numbers of otters within each transect buffer ring by region in Cook Inlet.

A probability multiplier was then applied to each ring to represent the probability of disturbance for otters within a given distance from a transect. Alternately, the multipliers represent the declining sound exposure levels with increasing distance from an aircraft flight line. As described previously, the multipliers were identified by polling sea otter biologists regarding the likelihood of disturbance during overflights when otters were located at each respective distance from the centerline of a survey flight path. The questionnaire responses were averaged to determine the appropriate probability multiplier for each distance category. The maximum distance at which a reaction could possibly be expected was predicted to be 1,000 m (3,281 ft). This distance was supported in the responses given by survey respondents. Multipliers are given in Table 3 as the proportion of otters in each distance category that are likely to be disturbed during flyovers.

Finally, the total number of disturbances in response to Hilcorp's flyovers was estimated by multiplying the number of otters within each distance category (Table 2) by the applicable probability multiplier for each category of distance from the centerline of a survey flight path (Table 3). The total number of disturbances was then summed by region in Cook Inlet and by stock. A total of 693 behavioral responses are likely. Of these, 523 and 170 will occur among otters belonging to the southwestern and southcentral stocks, respectively.

To estimate the number of individual otters taken, we again calculated the area within each distance category; but this time, we merged polygons both within and between flight days to remove repeated exposures. All other calculations were repeated. We estimated 578 individual otters could be disturbed by Hilcorp's project. Of these, 410 belong to the southwest stock, and 168 belong to the southcentral stock (Table 5).

Table 1. Area (km^2) of potential aircraft disturbance within specified distances (m) from aircraft flight lines by region of Cook Inlet. Area within each distance category was measured in ArcGIS® by creating concentric buffers of the specified width extending outward from the aircraft flight lines. Area is given by region within Cook Inlet (CI) and by stock (SC=Southcentral, SW=Southwestern).

Region in Cook Inlet (Stock)	Area (km^2) within Distance categories					
	20 m	100 m	250 m	500 m	750 m	1000 m
Kamishak (SW)	74.10	292.75	533.01	104.80	95.45	92.57
Upper West (SC)	119.67	476.95	897.08	188.25	174.83	172.86
East Cook Inlet (SW)	50.20	198.65	371.20	52.59	47.08	47.34
Central CI (SC)	87.44	348.42	648.00	124.23	116.10	109.88
Central CI (SW)	121.49	484.49	901.24	164.51	157.44	151.76

Table 2. Estimated number of otters within specified distances (m) of Hilcorp's proposed flight lines by region of Cook Inlet. Numbers were estimated by multiplying density of sea otters in each region by area within distance categories given in Table 1.

Region in Cook Inlet (Stock)	Density (Sea otters per km^2)	Distance categories					
		20 m	100 m	250 m	500 m	750 m	1000 m
Kamishak (SW)	3.530	261.58	1033.48	1881.66	369.98	336.97	326.78
Upper West (SC)	0.026	3.11	12.39	23.30	4.89	4.54	4.49
East Cook Inlet (SW)	1.705	85.57	338.65	632.79	89.66	80.25	80.69
Central CI (SC)	0.026	2.27	9.05	16.83	3.23	3.02	2.85
Central CI (SW)	0.026	3.16	12.58	23.41	4.27	4.09	3.94

Table 3. Estimated probability of behavioral responses of sea otters by distance from flight line, as measured outward across the water surface from a point directly below the flight line transect.

Distance (meters)	20	100	250	500	750	1000
Probability	0.258	0.198	0.107	0.068	0.030	0.004

Table 4. Estimated number of behavioral responses (Level B takes) calculated as the total number of disturbances potentially caused by aircraft overflights according to distance from the flightpath. Entries were calculated by multiplying values in Table 2 by those in Table 3.

Distance (meters)	20	100	250	500	750	1000	Total No. of Disturbances by Region
Region (Stock)							
Kamishak (SW)	67.58	204.97	200.71	25.29	10.11	1.31	509.96
Upper West (SW)	0.80	2.46	2.49	0.33	0.14	0.02	6.23
East Cook Inlet (SC)	22.11	67.17	67.50	6.13	2.41	0.32	165.63
Central CI (SC)	0.59	1.79	1.80	0.22	0.09	0.01	4.50
Central CI (SW)	0.82	2.50	2.50	0.29	0.12	0.02	6.24
Total No. of Disturbances, by Distance from Flightpath	91.89	278.89	274.99	32.26	12.87	1.68	Overall Total: 692.56
Totals by Stock	SW:	522.43	SC:	170.13			

Table 5. Estimated number of otters experiencing disturbance (Level B take) from aircraft overflights by distance from flightpath, region, and stock. Entries were calculated in the same manner as for Table 4, with the exception that in areas where project activities overlapped between days, behavioral responses were counted only once.

Distance (meters)	20	100	250	500	750	1000	Total No. of Otters Disturbed, by Region
Region (Stock)							
Kamishak (SW)	54.55	166.43	165.54	8.76	3.12	0.41	398.80
Upper West (SW)	0.79	2.42	2.46	0.06	0.02	0.00	5.75
East Cook Inlet (SC)	22.11	67.17	67.32	4.98	1.70	0.21	163.48
Central CI (SC)	0.59	1.80	1.79	0.03	0.01	0.00	4.23
Central CI (SW)	0.82	2.49	2.49	0.02	0.01	0.00	5.83
Total No. of Otters Disturbed, by Distance from Flight Path	91.89	278.89	274.99	32.26	12.87	1.68	Overall total: 578.10
Totals by Stock	SW: 410.38		SC: 167.71				

Critical Assumptions

We propose to authorize up to 693 takes of 578 sea otters by Level B harassment from Hilcorp's aerial survey program. In order to conduct this analysis and estimate the potential amount of Level B take, several critical assumptions were made.

Level B take by harassment is equated herein with behavioral responses that indicate harassment or disturbance. There are likely to be a proportion of animals that respond in ways that indicate some level of disturbance but do not experience significant biological consequences. A correction factor was not applied, although we considered using the rate of Level B take reported by Service biologists during sea otter surveys

conducted between 2008 and 2015 (below 0.01 percent; USFWS and USGS, unpublished data). The Service's 2014 efforts to characterize behaviors that indicate take were applied in the field in 2016. The reported rate of take prior to 2016 may not represent the current definition; and therefore, it was not deemed appropriate for use in determining the ratio of behavioral response to Level B take. This will result in overestimation in take calculations.

We assumed that the mean behavioral response rates of sea otters indicated by the questionnaires returned by biologists are representative of responses of sea otters exposed to Hilcorp's work. There are several underlying assumptions. Noise levels produced by aircraft used by biologists versus those used by Hilcorp were examined and found to be comparable. The otters in Cook Inlet are assumed to exhibit a similar range of reactions to comparable levels of aircraft noise. The validity of this assumption has not been examined, but mean disturbance rates reported by questionnaire respondents (Table 3) are within the expected range reported by Bodkin and Udevitz (1999), the Service and the USGS (unpublished data), and ABR, Inc., (2010–2013), suggesting that these disturbance rates may also be appropriate in Cook Inlet.

Our estimates do not account for variable responses by age and sex. The available information suggests that sea otters are generally resilient to low levels of disturbance. Females with dependent pups and with pups that have recently weaned are physiologically the most sensitive (Thometz *et al.* 2014) and most likely to experience take from disturbance. There is not enough information on composition of the Cook Inlet sea otter population in the Hilcorp survey area to incorporate individual variability based

on age and sex or to predict its influence on take estimates. Our estimates are derived from a variety of sample populations with various age and sex structures, and we assume the response rates are applicable.

The estimates of behavioral response presented here do not account for the individual movements of animals away from the Hilcorp survey area or habituation of animals to the survey noise. Our assessment assumes animals remain stationary; *i.e.*, density does not change. There is not enough information about the movement of sea otters in response to specific disturbances to refine this assumption. This situation is likely to result in overestimation of take.

Level B harassment due to Hilcorp's project will be some fraction of the estimated number of behavioral responses elicited from sea otters; but, because of the unresolved assumptions and lack of information, we have conservatively estimated Level B take to equal rates of disturbance. For this reason, we propose to authorize up to 693 takes of 578 sea otters by Level B harassment from Hilcorp's aerial survey program.

Potential Impacts on the Sea Otter Stock

The estimated level of take by harassment is small relative to the most recent stock abundance estimates for the sea otter. Take of 578 otters includes 410 from the southwest stock, and 168 from the southcentral stock. Take of 410 animals is 1 percent of the best available estimate of the current population size of 45,064 animals in the southwest stock (USFWS 2014a) (410 / 45,064 ≈ 0.009). Take of 168 is about 1 percent of the 18,297 animals in the southcentral stock (USFWS 2014b) (168 / 18,297 ≈ 0.009).

Although an estimated 693 instances of take of 578 otters by Level B harassment are possible, most events are unlikely to have significant consequences for the health, reproduction, or survival of affected animals.

Noise levels are not expected to reach levels capable of causing harm. Animals in the area are not expected to incur hearing impairment (*i.e.*, TTS or PTS). Level A harassment is not expected to occur. Aircraft noise may cause behavioral disturbances. Sea otters exposed to sound produced by the project are likely to respond with temporary behavioral modification or displacement. With the adoption of the measures proposed in Hilcorp's mitigation and monitoring plan and required by this proposed IHA, we conclude that the only anticipated effects from noise generated by the proposed project would be the short-term temporary behavioral alteration of sea otters.

Aircraft activities could temporarily interrupt the feeding, resting, and movement of sea otters. Because activities are expected to occur for 14 days during a 60- to 150-day period, impacts associated with the project are likely to be temporary and localized. The anticipated effects include short-term behavioral reactions and displacement of sea otters near active operations.

Animals that encounter the proposed activities may exert more energy than they would otherwise due to temporary cessation of feeding, increased vigilance, and retreat from the project area, but we expect that most would tolerate this exertion without measurable effects on health or reproduction. In sum, we do not anticipate injuries or mortalities to result from Hilcorp's operation, and none will be authorized. The takes that are anticipated would be from short-term Level B harassment in the form of startling

reactions or temporary displacement.

Potential Impacts on Subsistence Uses

The proposed activities will occur near marine subsistence harvest areas used by Alaska Natives from the villages of Ninilchik, Salamatof, Tyonek, Nanwalek, Seldovia, and Port Graham. Between 2013 and 2017, approximately 145 sea otters were harvested from Cook Inlet, averaging 29 per year (although numbers from 2017 are preliminary). The large majority were taken in Kachemak Bay. Harvest occurs year-round, but peaks in April and May, with about 40 percent of the total taken at this time. February and March are also high harvest periods, with about 10 percent of the total annual harvest occurring in each of these months.

The proposed project area will avoid Kachemak Bay and therefore avoid significant overlap with subsistence harvest areas. Hilcorp's activities will not preclude access to hunting areas or interfere in any way with individuals wishing to hunt. Hilcorp's aircraft may displace otters, resulting in changes to availability of otters for subsistence use during the project period. Otters may be more vigilant during periods of disturbance, which could affect hunting success rates. Hilcorp will coordinate with Native villages and Tribal organizations to identify and avoid potential conflicts. If any conflicts are identified, Hilcorp will develop a Plan of Cooperation (POC) specifying the particular steps that will be taken to minimize any effects the project might have on subsistence harvest.

Findings

Small Numbers

For small numbers analyses, the statute and legislative history do not expressly require a specific type of numerical analysis, leaving the determination of "small" to the agency's discretion. In this case, we propose a finding that the Hilcorp project may result in approximately 693 takes of 578 otters, of which, 522 takes of 410 animals will be from the southwest stock and 170 takes of 168 otters will be from the southcentral stock. This represents about 1 percent of each stock, respectively (USFWS 2014a, b). Predicted levels of take were determined based on estimated density of sea otters in the project area and the mean rates of aircraft disturbance based on the opinions of professional biologists in the field of study. Based on these numbers, we propose a finding that the Hilcorp project will take only a small number of animals.

Negligible Impact

We propose a finding that any incidental take by harassment resulting from the proposed project cannot be reasonably expected to, and is not reasonably likely to, adversely affect the sea otter through effects on annual rates of recruitment or survival and would, therefore, have no more than a negligible impact on the species or stocks. In making this finding, we considered the best available scientific information, including: the biological and behavioral characteristics of the species, the most recent information on species distribution and abundance within the area of the specified activities, the potential sources of disturbance caused by the project, and the potential responses of

animals to this disturbance. In addition, we reviewed material supplied by the applicant, other operators in Alaska, our files and datasets, published reference materials, and species experts.

Sea otters are likely to respond to proposed activities with temporary behavioral modification or displacement. These reactions are unlikely to have consequences for the health, reproduction, or survival of affected animals. Sound production is not expected to reach levels capable of causing harm, and Level A harassment is not authorized. Most animals will respond to disturbance by moving away from the source, which may cause temporary interruption of foraging, resting, or other natural behaviors. Affected animals are expected to resume normal behaviors soon after exposure, with no lasting consequences. Some animals may exhibit more severe responses typical of Level B harassment, such as fleeing, ceasing feeding, or flushing from a haulout. These responses could have significant biological impacts for a few affected individuals, but most animals will also tolerate this type of disturbance without lasting effects. Thus, although the Hilcorp project may result in approximately 522 takes of 410 animals from the southwest stock and 170 takes of 168 otters from the southcentral stock, we do not expect this type of harassment to affect annual rates of recruitment or survival or result in adverse effects on the species or stocks.

Our proposed finding of negligible impact applies to incidental take associated with the proposed activities as mitigated by the avoidance and minimization measures identified in Hilcorp's mitigation and monitoring plan. These mitigation measures are designed to minimize interactions with and impacts to sea otters. These measures, and the

monitoring and reporting procedures, are required for the validity of our finding and are a necessary component of the IHA. For these reasons, we propose a finding that the 2018 Hilcorp project will have a negligible impact on sea otters.

Impact on Subsistence

We propose a finding that the anticipated harassment caused by Hilcorp's activities would not have an unmitigable adverse impact on the availability of sea otters for taking for subsistence uses. In making this finding, we considered the timing and location of the proposed activities and the timing and location of subsistence harvest activities in the area of the proposed project. We also considered the applicant's consultation with subsistence communities, proposed measures for avoiding impacts to subsistence harvest, and commitment to development of a POC, should any adverse impacts be identified.

Required Determinations

National Environmental Policy Act (NEPA)

We have prepared a draft Environmental Assessment in accordance with the NEPA (42 U.S.C. 4321 et seq.). We have preliminarily concluded that approval and issuance of an authorization for the nonlethal, incidental, unintentional take by Level B harassment of small numbers of sea otters in Alaska during activities conducted by Hilcorp in 2018 would not significantly affect the quality of the human environment, and that the preparation of an environmental impact statement for these actions is not required

by section 102(2) of NEPA or its implementing regulations.

Endangered Species Act

Under the ESA, all Federal agencies are required to ensure the actions they authorize are not likely to jeopardize the continued existence of any threatened or endangered species or result in destruction or adverse modification of critical habitat. The southwestern DPS of the northern sea otter was listed as threatened on August 9, 2005 (70 FR 46366). A portion of Hilcorp's project will occur within sea otter critical habitat. Prior to issuance of this IHA, the Service will complete intra-Service consultation under section 7 of the ESA on our proposed issuance of an IHA, which will consider whether the effects of the proposed project will adversely affect sea otters or their critical habitat. These evaluations and findings will be made available on the Service's website at *http://www.fws.gov/alaska/fisheries/mmm/iha.htm*.

Government-to-Government Coordination

It is our responsibility to communicate and work directly on a Government-to-Government basis with federally recognized Alaska Native tribes and organizations in developing programs for healthy ecosystems. We seek their full and meaningful participation in evaluating and addressing conservation concerns for protected species. It is our goal to remain sensitive to Alaska Native culture, and to make information available to Alaska Natives. Our efforts are guided by the following policies and directives: (1) The Native American Policy of the Service (January 20, 2016); (2) the

Alaska Native Relations Policy (currently in draft form); (3) Executive Order 13175 (January 9, 2000); (4) Department of the Interior Secretarial Orders 3206 (June 5, 1997), 3225 (January 19, 2001), 3317 (December 1, 2011), and 3342 (October 21, 2016); (5) the Alaska Government-to-Government Policy (a departmental memorandum issued January 18, 2001); and (6) the Department of Interior's policies on consultation with Alaska Native tribes and organizations.

We have evaluated possible effects of the proposed activities on federally recognized Alaska Native Tribes and organizations. Through the IHA process identified in the MMPA, the applicant has presented a communication process, culminating in a POC if needed, with the Native organizations and communities most likely to be affected by their work. Hilcorp has engaged these groups in informational meetings.

Through these various interactions, we have determined that the issuance of this proposed IHA is permissible. We invite continued discussion, either about the project and its impacts, or about our coordination and information exchange throughout the IHA/POC process.

Proposed Authorization

We propose to authorize up to 522 takes of 410 animals from the southwest stock and 170 takes of 168 otters from the southcentral stock. Authorized take will be limited to disruption of behavioral patterns that may be caused by aircraft overflights conducted by Hilcorp in Cook Inlet, Alaska, between May 23 and September 30, 2018. We anticipate no take by injury or death to northern sea otters resulting from these aircraft overflights.

A. General Conditions for Issuance of the Proposed IHA

1. The taking of sea otters whenever the required conditions, mitigation, monitoring, and reporting measures are not fully implemented as required by the IHA will be prohibited. Failure to follow measures specified may result in the modification, suspension, or revocation of the IHA.

2. If take exceeds the level or type identified in the proposed authorization (*e.g.*, greater than 693 incidents of take of 578 otters by Level B harassment, separation of mother from young, injury, or death), the IHA will be invalidated and the Service will reevaluate its findings. If project activities cause unauthorized take, Hilcorp must take the following actions: (i) cease its activities immediately (or reduce activities to the minimum level necessary to maintain safety); (ii) report the details of the incident to the Service's MMM within 48 hours; and (iii) suspend further activities until the Service has reviewed the circumstances, determined whether additional mitigation measures are necessary to avoid further unauthorized taking, and notified Hilcorp that it may resume project activities.

3. All operations managers and aircraft pilots must receive a copy of the IHA and maintain access to it for reference at all times during project work. These personnel must understand, be fully aware of, and be capable of implementing the conditions of the IHA at all times during project work.

4. The IHA will apply to activities associated with the proposed project as described in this document and in Hilcorp's amended application (Fairweather Science

2017a). Changes to the proposed project without prior authorization may invalidate the IHA.

5. Hilcorp's IHA application will be approved and fully incorporated into the IHA, unless exceptions are specifically noted herein or in the final IHA. The application includes:

- Hilcorp's original request for an IHA, dated November 2, 2017;
- Hilcorp's response to a request for additional information from the Service, dated November 30, 2017;
- The letter requesting an amendment to the original application, dated December 22, 2017; and
- The *Marine Mammal Monitoring and Mitigation Plan* prepared by Fairweather Science, LLC (2017b).

6. Operators will allow Service personnel or the Service's designated representative to visit project work sites to monitor impacts to sea otters and subsistence uses of sea otters at any time throughout project activities so long as it is safe to do so. "Operators" are all personnel operating under Hilcorp's authority, including all contractors and subcontractors.

B. Avoidance and Minimization

7. Aircraft operators must take reasonable precautions to avoid harassment to sea otters.

8. Aircraft must maintain a minimum altitude of 305 m (1,000 ft) when

approaching and departing survey areas to avoid unnecessary harassment of sea otters outside of the survey areas, except when a lower flight altitude is necessary for safety due to weather or restricted visibility.

9. Aircraft may not be operated in such a way as to separate members of a group of sea otters from other members of the group.

10. All aircraft must avoid areas of active or anticipated subsistence hunting for sea otters as determined through community consultations.

C. Monitoring

11. Pilots will be provided training and resources for identifying and collecting information on sea otters. Pilots will record information during aerial surveys when it is safe and practical to do so.

12. Data collection will include locations and numbers of sea otters and the dates and times of the corresponding aerial surveys. When feasible, data will also include aircraft heading, speed, and altitude; visibility, group size, and composition (adults/juveniles); initial behaviors of the sea otters before responding to aircraft; and descriptions of any apparent reactions to the aircraft.

D. Measures to Reduce Impacts to Subsistence Users

13. Prior to conducting the work, Hilcorp will take the following steps to reduce potential effects on subsistence harvest of sea otters: (i) avoid work in areas of known sea otter subsistence harvest; (ii) discuss the planned activities with subsistence stakeholders

including Cook Inlet villages, traditional councils, and the Cook Inlet Regional Citizens Advisory Council; (iii) identify and work to resolve concerns of stakeholders regarding the project's effects on subsistence hunting of sea otters; and (iv) if any unresolved or ongoing concerns remain, develop a POC in consultation with the Service and subsistence stakeholders to address these concerns.

E. Reporting Requirements

14. Hilcorp must notify the Service at least 48 hours prior to commencement of activities.

15. Reports will be submitted to the Service's MMM weekly during project activities. The reports will summarize project work and monitoring efforts.

16. A final report will be submitted to the Service's MMM within 90 days after completion of work or expiration of the IHA. It will include a summary of monitoring efforts and observations. All project activities will be described, along with any additional work yet to be done. Factors influencing visibility and detectability of marine mammals (*e.g.*, sea state, number of observers, fog, and glare) will be discussed. The report will describe changes in sea otter behavior resulting from project activities and any specific behaviors of interest. Sea otter observation records will be provided in the form of electronic database or spreadsheet files. The report will assess any effects Hilcorp's operations may have had on the availability of sea otters for subsistence harvest and if applicable, evaluate the effectiveness of the POC for preventing impacts to subsistence users of sea otters.

17. Injured, dead, or distressed sea otters that are not associated with project activities (*e.g.*, animals found outside the project area, previously wounded animals, or carcasses with moderate to advanced decomposition or scavenger damage) must be reported to the Service within 48 hours of discovery. Photographs, video, location information, or any other available documentation shall be provided to the Service.

18. All reports shall be submitted by email to *fw7_mmm_reports@fws.gov*.

19. Hilcorp must notify the Service upon project completion or end of the work season.

Request for Public Comments

If you wish to comment on this proposed authorization, the associated draft environmental assessment, or both documents, you may submit your comments by any of the methods described in **ADDRESSES**. Please identify if you are commenting on the proposed authorization, draft environmental assessment or both, make your comments as specific as possible, confine them to issues pertinent to the proposed authorization, and explain the reason for any changes you recommend. Where possible, your comments should reference the specific section or paragraph that you are addressing. The Service will consider all comments that are received before the close of the comment period (see **DATES**).

Comments, including names and street addresses of respondents, will become part of the administrative record for this proposal. Before including your address, telephone number, email address, or other personal identifying information in your comment, be

advised that your entire comment, including your personal identifying information, may be made publicly available at any time. While you can ask us in your comments to withhold from public review your personal identifying information, we cannot guarantee that we will be able to do so.

Dated: March 27, 2018.

_____

Karen P. Clark

Acting Regional Director, Alaska Region.

[FR Doc. 2018-08760 Filed: 4/25/2018 8:45 am; Publication Date: 4/26/2018]