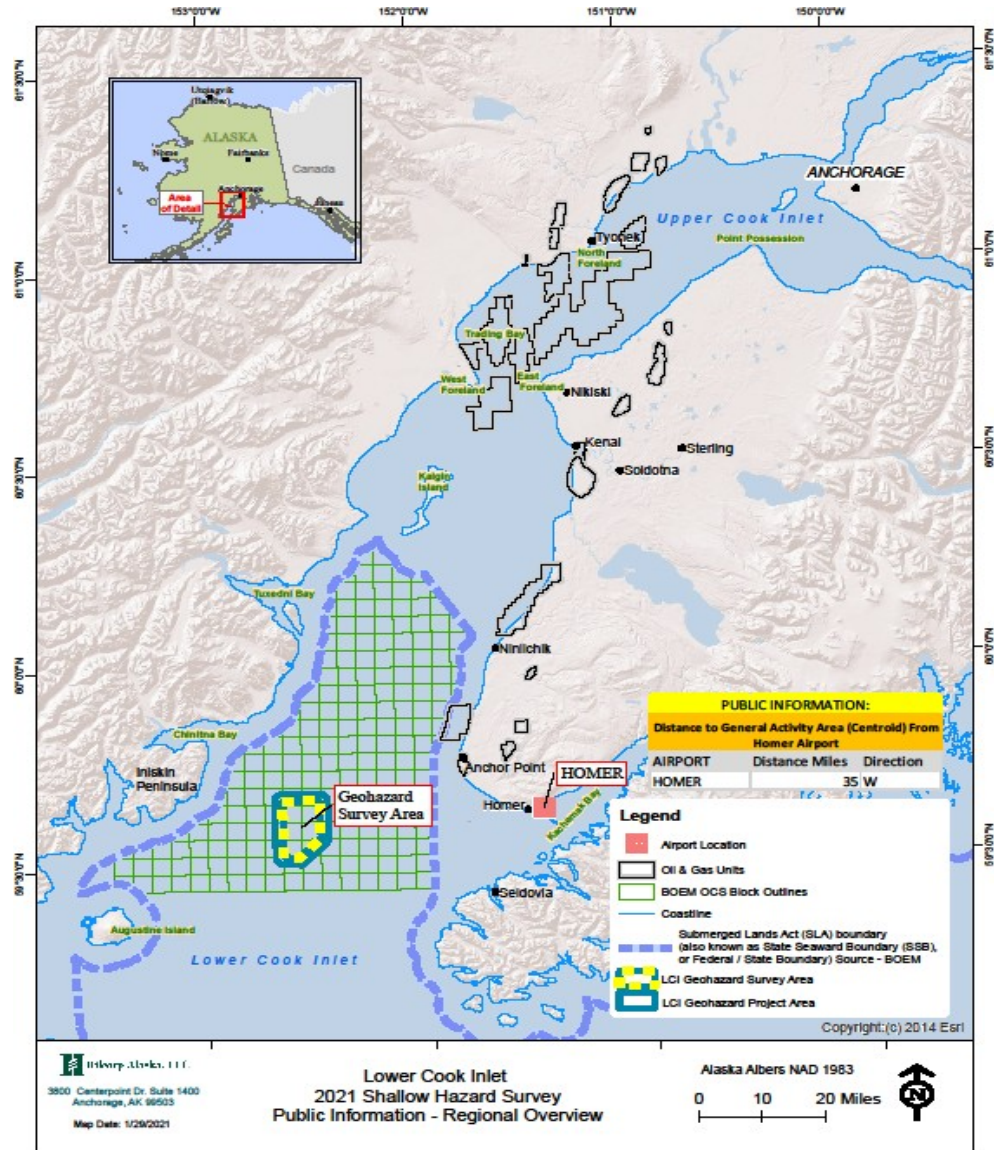


Alaska Outer Continental Shelf

Hilcorp Alaska, LLC
Geological and Geophysical Exploration
Cook Inlet, Alaska

August 2021

ENVIRONMENTAL ASSESSMENT



U.S. Department of the Interior
Bureau of Ocean Energy Management
Alaska OCS Region

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ACRONYMS AND ABBREVIATIONS

3D	three dimensional
4MP	Marine Mammal Monitoring and Mitigation Plan
ADEC	Alaska Department of Environmental Conservation
AFSC	Alaska Fisheries Science Center
AWQS	Alaska Water Quality Standards
BO	Biological Opinion
BOEM	U.S. Dept. of the Interior, Bureau of Ocean Energy Management
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO ₂	carbon dioxide
CO _{2e}	carbon dioxide emissions
Court	Alaska District Court
dB	decibels
dB _{RMS}	decibels root mean square
DPS	Distinct Population Segment
EA	environmental assessment
EFH	essential fish habitat
EP	Exploration Plan
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FEIS	Final Environmental Impact Statement
FMP	Fishery Management Plan
G&G	Geological and Geophysical
GHG	greenhouse gases
GOA	Gulf of Alaska
HAK	Hilcorp Alaska, LLC
Hz	hertz
ITR	Incidental Take Regulations
kHz	kilohertz
km	kilometers
kts	knots
LOA	Letter of Authorization
LS	Lease Sale
m	meters
mi	miles
MARPOL	International Convention for the Prevention of Pollution from Ships
MMPA	Marine Mammal Protection Act
MMT	million metric tons
mph	miles per hour
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service

OAA	National Oceanic and Atmospheric Administration
NPDES	National Pollution Discharge Elimination System
NPFMC	North Pacific Fishery Management Council
NTL	Notice to Lessees
OCS	Outer Continental Shelf
OCSLA	Outer Continental Shelf Lands Act
PSO	Protected Species Observers
PTS	permanent threshold shift
RMS	root mean square
RPM	Reasonable and Prudent Measures
R/V	Research Vessel
SEL	sound exposure level
SHPO	State Historic Preservation Office
SOA	State of Alaska
SPL	sound pressure level
SSV	sound source verification
T&C	Terms and Conditions
TTS	temporary threshold shift
UME	unusual mortality event
USC	United States Code
USCG	U.S. Coast Guard
USFWS	U.S. Fish and Wildlife Service
yr	year

CHAPTER 1. PURPOSE AND NEED

Hilcorp Alaska, LLC (HAK) submitted a permit application to conduct geological and geophysical exploration off-lease (G&G permit 21-01) to the Bureau of Ocean Energy Management (BOEM) on January 28, 2021 and a notice of Ancillary Activities (AA015) covering on-lease activities on January 29, 2021. Together, the activities described in these documents comprise a proposed survey of seafloor conditions on and near HAK leases where exploration drilling could occur in the future. The purpose of the proposed survey is to gather data required to locate a jackup rig in a safe and environmentally sensitive manner, including the identification of unstable soil, steep slopes, or surface faults; assessment of possible scour risk around jackup legs or soil failure if near a submarine channel with steep banks; and identification of shallow gas pockets.

HAK must conduct a shallow hazards assessment for each of its proposed wells and submit the assessment in an Exploration Plan (EP) per 30 Code of Federal Regulations (CFR) § 550.214. Notice to Lessees (NTL) 2005-A01 requires the evaluation of the entire area around a well site to a distance of 2,400 meters (m) (approximately 1.5 miles (mi)). HAK's proposed well site locations require them to survey off-lease areas in order to meet the requirements of NTL 2005-A01. As the on- and off-lease actions are "connected actions" as per 40 CFR § 1501.9(e)(1), both are considered in this Environmental Assessment (EA). Subsequent references to the "Proposed Action" and "Proposed Survey" in this document do not distinguish between the activities described in the G&G permit 21-01 application and the Ancillary Activities Notice.

The need for this action is to further the orderly development of Outer Continental Shelf (OCS) resources in accordance with the Outer Continental Shelf Lands Act (OCSLA) (43 United States Code (USC) § 1331 et seq.). OCSLA requires the OCS to be made available for expeditious and orderly development, subject to environmental safeguards, in a manner consistent with the maintenance of competition and other national needs (43 USC § 1332 (3)).

BOEM has prepared this EA to determine whether the Proposed Action would result in significant effects to the environment, and to assist the agency in making an informed decision on HAK's proposed activities. BOEM reviews notices of ancillary activities to ensure that the activities described therein comply with certain performance standards and to identify instances where submission of a proposed EP or other type of plan is required. 30 CFR § 550.209. BOEM reviews G&G permit applications to determine whether to approve or disapprove the application (30 CFR Part 551).

1.2 The Lease Sale 244 EIS and Other Existing Analyses

In December 2016, BOEM completed the Final Environmental Impact Statement (FEIS) for the Cook Inlet Planning Area Oil and Gas Lease Sale 244 (hereafter LS 244 FEIS) to analyze the impacts of holding Lease Sale 244 in Cook Inlet. The LS 244 FEIS recognized that the "proposed OCS lease sale in Cook Inlet may lead to oil and gas exploration, development, and production," (LS 244 FEIS, p.1-1) and included analyses on potential impacts of post-lease activities, including geohazard surveys. The LS 244 FEIS also considered mitigation measures designed to avoid and/or minimize impacts to beluga whale critical habitat, northern sea otter critical habitat, and the gillnet fishery. The Proposed Action takes place entirely within the area analyzed in the LS 244 FEIS. BOEM has incorporated by reference relevant portions of the LS 244 FEIS applicable to this Proposed Action.

BOEM and other federal agencies have also completed analyses of other Cook Inlet OCS activities and resources found within Cook Inlet. Documents relevant to the current analysis include, but are not limited to:

- Environmental Assessment, SAExploration, Inc. 3D Cook Inlet Geological and Geophysical Seismic Survey, 2015.
- U.S. Fish and Wildlife Service Biological Opinion for Oil and Gas Activities Associated with Lease Sale 244 (USFWS, 2017).
- National Marine Fisheries Service Biological Opinion for Oil and Gas Activities Associated with Lease Sale 244 (NMFS, 2017).
- National Marine Fisheries Service Biological Opinion for Hilcorp Alaska and Harvest Alaska Oil and Gas Activities, Cook Inlet, Alaska Incidental Take Regulations AKRO-2018-00381 (NMFS, 2019).
- Environmental Assessment, Hilcorp Alaska, LLC. Geological and Geophysical Exploration. Cook Inlet, Alaska, 2019.

BOEM National Environmental Policy Act (NEPA) documents are posted on the BOEM Alaska Region website at: <https://www.boem.gov/ak-eis-ea/>. The Biological Opinions are available on BOEM's website at <https://www.boem.gov/ak-consultations/>, or on the U.S. Fish and Wildlife Service (USFWS) or National Marine Fisheries Service (NMFS) websites, or by contacting them directly.

This EA also considers information and analyses provided in HAK's Environmental Evaluation Document submitted in January 2021. BOEM also considered the information and analyses provided in HAK's two *Petitions for Incidental Take Regulations, Hilcorp Alaska and Harvest Alaska, Oil and Gas Activities, Cook Inlet, Alaska*, submitted to the USFWS and NMFS.

CHAPTER 2. PROPOSED ACTION AND ALTERNATIVES

2.1 Proposed Action

HAK is proposing to conduct geohazard and geotechnical surveys over 4 lease blocks in the Lower Cook Inlet (6405, 6406, 6455, and 6456) between approximately June 1 and October 31, 2021 (Figure 2-1). HAK further proposes to survey off-lease areas in order to comply with NTL 2005-A01, i.e., they must survey the entire area around a potential well site location out to a distance of 2,400 meters (approximately 1.5 mi; Project Area). The surveys would take about 30 days total to complete. The Proposed Action takes place entirely within the area offered for lease in the June 21, 2017 Lease Sale 244. HAK acquired 14 lease blocks in the sale and conducted airborne gravity and magnetic survey over all 14 lease blocks in the summer of 2018. A three dimensional (3D) seismic survey was conducted over 8 of the lease blocks in fall of 2019.

HAK proposes to survey the on- and off-lease areas with survey equipment that includes a multibeam echosounder, magnetometer, sidescan sonar, sub-bottom profiler, and UHD Sparker multi-channel sub-bottom profiler. HAK proposes to collect core samples of 3-4 inches up to 25 feet below the seafloor using a Vibracore sampler. Cone penetration measurements will be collected to determine soil stability and jack-up leg penetration. The equipment proposed will be configured for 8-meter penetrations.

Shallow hazard survey equipment will be vessel-mounted or towed behind the Research Vessel (R/V) Norseman II or similar. The Norseman is a 115-foot heavy weather vessel with a 13-foot draft designed for cruising speeds up to 10 knots. A sound source verification (SSV) is required to establish distances for specific project environmental parameters for this survey; a separate vessel, such as the 70-foot R/V Thunder or similar, will be used to conduct the SSV.

The Proposed Survey is essentially the same program proposed for 2020 and authorized under AKOCSR Permit 20-10; this program was delayed due to COVID-19. These surveys will obtain information necessary to evaluate shallow hazards and conduct an archaeological evaluation in support of future oil and gas exploration and development. HAK proposes to conduct the surveys in compliance with BOEM's NTL 2005-A01 (Shallow Hazards Survey and Evaluation for OCS Exploration and Development Drilling) and NTL 2005-A03 (Archaeological Survey and Evaluation for Exploration and Development Activities). The HAK OCS Geohazard Survey is focused on HAK leases but is expected to extend beyond these leases to ensure that sufficient data is collected to support a future exploration drilling program.

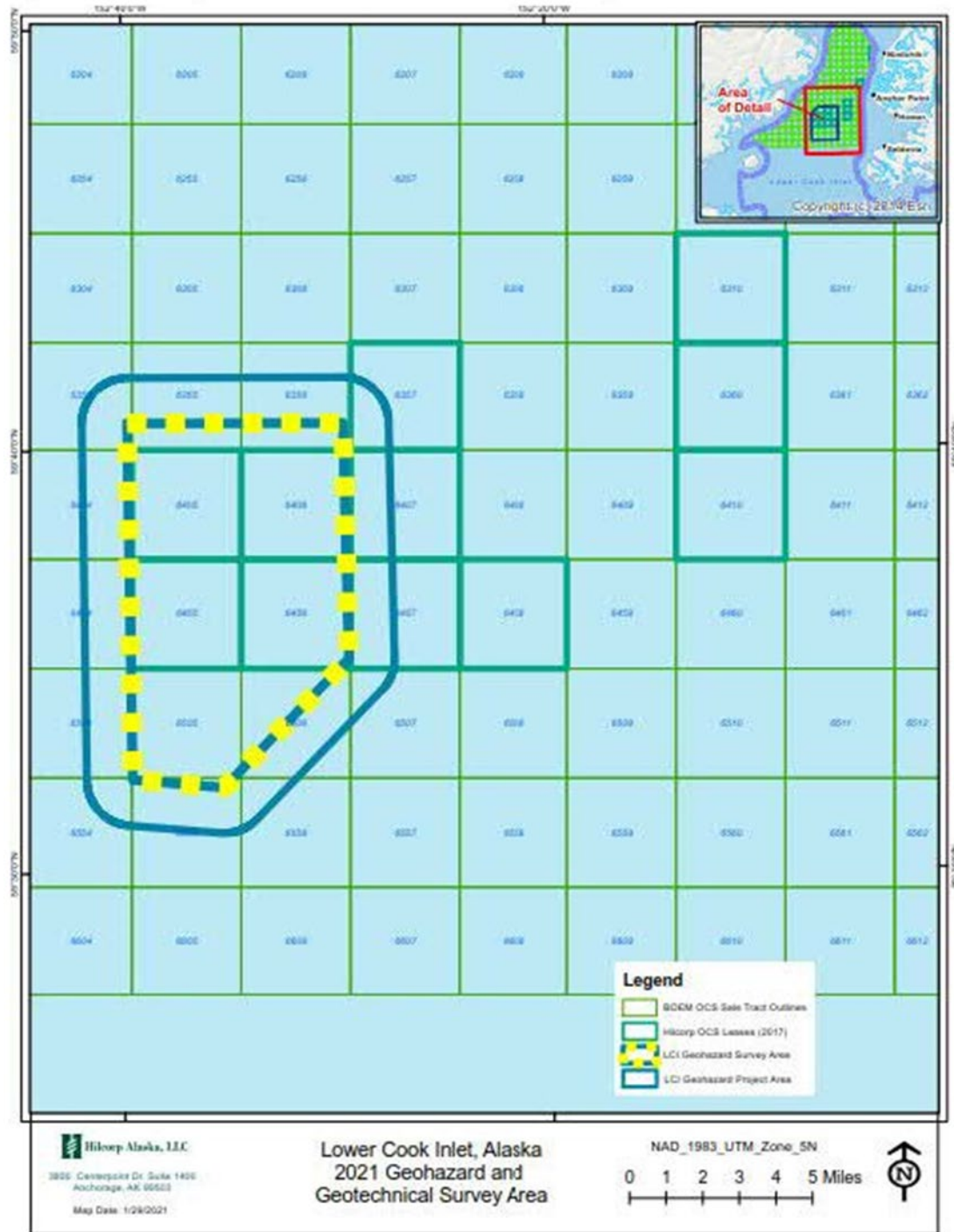


Figure 2-1 Location of Cook Inlet Geohazard Survey

2.1.1 Spill Assumptions

Because the proposed project does not entail any drilling, there would be no possibility for the release of crude oil into the marine environment. However, a diesel fuel spill could occur during vessel refueling. Vessel fueling would only occur at commercial locations such as the Homer dock; and would be in accordance with applicable U.S. Coast Guard (USCG) regulations and

HAK spill prevention practices. If a spill were to occur during fueling, it is anticipated that cleanup and containment activities would immediately commence with dockside support. Therefore, any accidental diesel fuel spills would be small, quickly cleaned up, and not anticipated to escape the immediate area. Historical OCS fuel spill data demonstrate that small spills are reasonably expected to occur although accidental spills are not part of the proposed project.

2.1.2 Design Features and Mitigation Measures Built into the Permit Application

HAK's Permit Application incorporates the following design features and mitigation measures intended to reduce potential environmental impacts from the Proposed Survey:

1. To reduce potential conflict with other user groups in the lower Cook Inlet area, HAK has implemented a Stakeholder Engagement Program. The purpose of the program is to notify interested parties about the proposed project, gather feedback about potential impacts, and work with stakeholders to mitigate impacts of the project. Stakeholders include local Alaskan communities, port authorities, fishing organizations, and interested individuals.
2. HAK would work with the USCG to publish a Notice to Mariners of the pending survey to ensure there are no conflicts with local vessels. In addition, the support vessels would monitor for local traffic on the water and use radio communications to minimize conflicts with recreational boaters and sport fishing charters.
3. HAK has established and will implement procedures approved by NMFS and USFWS to mitigate impacts to wildlife as outlined in their Marine Mammal Monitoring and Mitigation Plan (4MP) for the 2021 Shallow Hazard Survey Program (see Appendix A).

2.2 No Action Alternative

Under this alternative, BOEM would not approve HAK's G&G Exploration Permit Application and the proposed 2021 geohazard survey would not occur. HAK would not be able to gather the data required to locate a jackup rig including identification of unstable soil, steep slopes, potential paleontological or archaeological sites, surface faults, risk of possible scour around jackup legs, soil failure if near a submarine channel with steep banks, or risk of shallow gas. The environmental impacts identified in Chapter 3 would not occur.

2.3 Alternatives Considered but Not Carried Forward for Analysis

- **Use of Alternative Methods to Obtain G&G Information**

The use of geophysical tools including a multibeam echosounder, magnetometer, sidescan sonar, sub-bottom profiling equipment, and vessel-towed seismic arrays are standard industry practice. Shallow hazard surveys are necessary to collect detailed subsurface geological data and are governed by OCSLA implementing regulations at 30 CFR § 551. These regulations allow for G&G activities to occur on the OCS related to oil and gas and ensure that they are carried out in a safe and environmentally sound manner (551.2). BOEM is not aware of any alternative, feasible methods of data collection that meet industry standards, nor have commenters identified any such methods. Use of alternative methods of data collection was therefore not considered a reasonable alternative under NEPA and was not carried forward for detailed analysis.
- **Delay of G&G Survey Activities**

Delay of these activities does not advance BOEM's responsibility under OCSLA to make the OCS available for expeditious and orderly development, subject to environmental

safeguards, in a manner which is consistent with the maintenance of competition and other national needs. Delay of the Proposed Action does not allow for HAK to collect information on ocean bottom conditions for safe placement of drilling equipment. Because this alternative would not meet the Purpose and Need described in Chapter 1, it was not considered a reasonable alternative under NEPA and was not carried forward for detailed analysis.

- **Consider Alternatives to Fossil Fuels**

Search for alternative fuels does not advance BOEM's responsibility under OCSLA to make the OCS available for expeditious and orderly development, subject to environmental safeguards, in a manner which is consistent with the maintenance of competition and other national needs. Because this alternative would not meet the Purpose and Need described in Chapter 1, it was not considered a reasonable alternative under NEPA and was not carried forward for detailed analysis.

- **Cancel OCS Leases in Cook Inlet**

This Proposed Action describes a G&G survey permit application and notice of Ancillary Activities. Section 1334(a)(2) of OCSLA provides a description of circumstances under which OCS leases could be cancelled. Nothing in BOEM's administration of HAK's leases or evaluation of this Proposed Survey implicate any of the circumstances that would warrant lease cancellation. Therefore, this was not considered a reasonable alternative under NEPA and was not carried forward for detailed analysis.

CHAPTER 3. AFFECTED ENVIRONMENT AND IMPACTS

This chapter describes the elements of the marine, coastal, and human environment that would be impacted by the Proposed Action and analyzes the potential effects to that environment resulting from the Proposed Action and the No Action Alternative.

The analyses in this chapter apply a scale to categorize the potential impacts to specific resources and evaluate the significance of those impacts. The scale takes into account the context and intensity of the impact based on four parameters: detectability, duration (i.e., short-term or long-lasting), spatial extent (i.e., localized or widespread), and magnitude (i.e., less than severe or severe, where the term “severe” refers to impacts with a clear, long-lasting change in the resource’s function in the ecosystem or cultural context).

Subject matter experts used the best available information and their professional judgment to determine where a particular effect falls in the continuum on a relative scale from “negligible” to “major.” Impacts that fall in the category of “major” are considered to be significant under NEPA. For biological resources, impacts were determined based on changes to the stock or population.

The impacts scale is as follows:

- Negligible: little or no impact
- Minor: impacts are short-term and/or localized, and less than severe
- Moderate: impacts are long-lasting and widespread, and less than severe
- Major: impacts are severe

In applying this scale and the terms that describe impact categories (levels of effect), analysts take into consideration the unique attributes and context of the resource being evaluated. For example, for impacts to biological resources, attributes such as the distribution, life history, and susceptibility of individuals and populations to impacts should be considered, among other factors. For impacts to subsistence activities, factors to be considered include the fundamental importance of these activities to cultural, individual and community health, and well-being. Based on the unique characteristics, impacts to subsistence activities may be considered long-lasting and severe, and thus, major and significant, if they would disrupt subsistence activities, make subsistence resources unavailable or undesirable for use, or only be available in greatly reduced numbers for a substantial portion of a subsistence season.

3.1 Current and Expected Future Conditions

The LS 244 FEIS identifies past and current actions that have occurred or are occurring on the Cook Inlet OCS and identifies possible future trends (LS 244 FEIS, p.5-1 to 5-25).

General categories of actions that potentially impact the marine, coastal, and human environments in Cook Inlet are listed in Table 3-1.

Table 3-1 Relevant Ongoing Activities in Cook Inlet

Category	Area	Type of Action
Oil and Gas Activities	Cook Inlet onshore, nearshore, and offshore	Geological and geophysical surveys; infrastructure construction (e.g., dock), expansion, and/or maintenance; energy exploration, development, and production; maintenance of existing facilities
Marine Vessel Traffic	Cook Inlet waters	Industry vessels, oil field support and transports; research vessels
Aircraft Traffic	Cook Inlet onshore, nearshore, and offshore	Industry crew transfers; commercial and private flights; expansion of airfields; research flights; wildlife viewings
Scientific Research Activities	Cook Inlet onshore, nearshore, and offshore	Studies and Surveys: oceanographic; biological; geophysical; archaeological; socioeconomic
Military/Homeland Security Activities	Cook Inlet onshore, nearshore, and offshore	JBER past and on-going site impacts; vessel and aircraft presence; training exercises; onshore infrastructure
Subsistence Harvest	Cook Inlet onshore, nearshore, and offshore	Marine mammal, terrestrial mammal, fish and avian harvest
Commercial and Recreational Activities	Cook Inlet onshore, nearshore, and offshore	Commercial/sport fishing vessels; commercial/sport guiding or hunting; vessel and aircraft presence

Cook Inlet is considered a mature oil and gas field; oil and gas exploration and production activities have occurred there since the discovery of the Swanson River Field on the Kenai Peninsula in 1957.

Activities on existing and expected future oil and gas facilities can be year-round. Marine vessel traffic in the area may consist of large and small vessels engaged in activities such as subsistence, support of oil and gas activities, scientific research, military activity, and commercial/recreational fishing. Aircraft traffic could include both fixed-wing and helicopter flights for scientific programs such as marine mammal surveys, cargo and passenger flights, hunting/fishing/sightseeing, commercial flights to support oil and gas activities (such as crew changes and supply flights), air ambulance and search and rescue emergency flights, and multi-governmental military flights.

3.2 Air Quality

3.2.1 Affected Environment

The U.S. Environmental Protection Agency (EPA) finds the air quality within the project area does not exceed federal health-based standards defining good air quality. The existing condition of air quality in the vicinity of the Proposed Survey is largely a function of the few emission sources existing on the east and west coastline of lower Cook Inlet, and the complex interactions between meteorological conditions, mainly wind, and the topographical features of the basin. The waters of lower Cook Inlet typically experience winds from the west and southwest averaging 5-10 miles per hour (mph), with the highest average winds occurring in the early summer. Winds in this range have a tendency to disperse and mix air pollutants within the surrounding air. Thus, the wind conditions over lower Cook Inlet together with the relatively few pollutant sources onshore or offshore, cause the quality of the air over the affected area to be consistently better than required by federal standards.

3.2.2 Impacts

3.2.2.1 Proposed Action

The operation of diesel-electric marine propulsion and auxiliary engines on the two vessels proposed for the geohazard survey have the potential to emit pollutants into the air above lower Cook Inlet.

Lower Cook Inlet regularly has dozens of vessels, including commercial and sport fishing vessels, barges, fuel tankers, and cruise liners, transiting around every day throughout the summer season. Even with this high level of activity, onshore air quality adjacent to the project area has remained good. The amounts of emissions released from one to two vessels operating for 30 days as a part of this survey are expected to be similar to the everyday emissions from vessels regularly operating in the area. The resulting air quality impact would be localized to the immediate area and would last only for the duration of the survey. Within hours of the completion of the survey, the air quality would recover and return to pre-exercise levels. It is unlikely that during any point of the survey (or after) the amounts of air pollution in the area would result in an exceedance of National Ambient Air Quality Standards (NAAQS). Because of the mobile nature of the vessels used for the geohazard survey and the temporary conditions under which they operate, the air quality impact from the Proposed Action to lower Cook Inlet and surrounding areas within the Kenai Peninsula Borough would be negligible.

The estimated emissions of greenhouse gases (GHG) from the Proposed Survey are 101.7 tons per year (yr) of carbon dioxide (CO₂e).¹ The GHG analysis focuses on gross tonnage of emissions, not concentrations of pollutants onshore. Because some GHG such as CO₂ may persist in the atmosphere for up to a century, the potential impacts of any source may extend well beyond the active lifetime of the Proposed Survey. How these emissions would impact the Proposed Survey Area would depend on emissions from the Proposed Survey together with emissions on a national and global scale. According to the EPA's Greenhouse Gas Reporting Program, in 2017 the U.S. oil and gas industry as a whole released 284 million metric tons (MMT)/yr of CO₂e (EPA, 2018), of which 7 MMT/yr (or 0.03%) was from offshore production and only 0.25% of those offshore emissions originated from Alaskan waters.

Anthropogenic emissions of GHGs are the main contributor to climate change. BOEM recognizes the global scope of the impacts of GHG emissions and acknowledges the effects of agency actions to global concentrations. While the contribution of GHGs from the Proposed Action is small compared to Alaska's annual emissions (101.7 tons/yr and 40 MMT/yr of CO₂e, respectively), the activities associated with the Proposed Action would produce GHG emissions that contribute incrementally to climate change.

3.2.2.2 No Action Alternative

Under the No Action Alternative, BOEM would not approve HAK's 2021 Geohazard Survey Permit Application and the Proposed Survey would not occur. There would be no effects on air quality and no contributions of GHGs attributable to the Proposed Survey.

¹ CO₂e applies the global warming potential for CO₂, CH₄, and N₂O, per 40 CFR 98, Table A-1.

3.3 Water Quality

3.3.1 Affected Environment

The water quality of lower Cook Inlet is rated as good based on the Alaska Department of Environmental Conservation's (ADEC) Southcentral Alaska Coastal Survey (ADEC, 2010). There are no waterbodies identified as impaired by ADEC per Section 303 of the Clean Water Act that directly drain into the Proposed Survey area (ADEC, 2010). Data collected at approximately 20 locations in Cook Inlet assessed a wide variety of parameters including hydrographic properties, dissolved oxygen, nutrients, chlorophyll, suspended sediment, trace metals, and hydrocarbon components. All samples met Alaska Water Quality Standards (AWQS) criteria for all marine water uses including aquaculture; growth and propagation of fish, shellfish, and other aquatic life and wildlife; and harvesting mollusks or other raw aquatic life (Saupe, Gendron, and Dasher, 2005). Water with a large variety of naturally occurring inorganic and organic compounds is transported into Cook Inlet by surrounding streams and rivers, and by currents from the Gulf of Alaska. Substances suspended or dissolved in the water column are rapidly dispersed by strong tidal currents and winds. While contaminants have been reported, many are attributed to erosion of local soils, rocks, and ores, and few can be unambiguously linked to human activities (Glass et al., 2004). However, anthropogenic input of pollutants at urban centers surrounding Cook Inlet has deleteriously impacted sections of local streams and lakes (e.g. Chester Creek; Brabets and Whitman, 2004).

For a more detailed examination of nutrients, streamload and suspended sediment, sedimentary and dissolved trace metals, hydrocarbon constituents, persistent organic compounds, and toxicity studies in Cook Inlet, see Cook Inlet Planning Area, Final Environmental Impact Statement, Volume 1 (BOEM, 2016).

3.3.2 Impacts

3.3.2.1 Proposed Action

The Proposed Survey could affect offshore marine water quality via operational discharges from the two vessels to be used during the survey. Local water quality could be impacted by the introduction of total suspended solids, nutrients, organics, oil and grease, and waters with higher temperatures and salinity than ambient waters. Degradation of localized surface and near-surface water quality would be highest at the point of discharge near the vessel.

Cook Inlet is a high-energy environment with strong tidal currents and mixing that produces a rapid dispersion of soluble and particulate pollutants. The impacts from temporary increases of suspended sediment, turbidity, and vessel discharges would be localized, brief, and fleeting. Compliance with applicable permitting requirements for vessel discharges by the State of Alaska (SOA), USCG, EPA serves to minimize and mitigate discharges with no lasting impacts to water quality expected. Impacts to water quality resulting from the Proposed Survey are negligible because vessel discharges over the 30-day operation are temporary, short-term, and of limited volume, and thus would not contribute appreciable levels of contaminants to Cook Inlet nor add impacts from other activities. Overall, the level of effects of the Proposed Survey on water quality would be negligible.

3.3.2.2 No Action Alternative

Under the No Action Alternative, BOEM would not approve HAK's 2021 Geohazard Survey Permit Application and the Proposed Survey would not occur. There would be no effects attributable to the Proposed Survey on water quality.

3.4 Fish and Invertebrates

3.4.1 Affected Environment

Cook Inlet has a rich and diverse flora and fauna of fish, invertebrates, and algae (Lees and Driskell, 2006). Generally, these communities live in the water column (pelagic) or are associated with the seafloor (benthic), which can include shallow intertidal or deeper subtidal areas. Lower trophic invertebrate communities occupy multiple habitat types from the intertidal zone to the open ocean and are an integral part of the food web. Fish also occupy both the pelagic and benthic zones, and certain species of fish travel between fresh and marine water depending on their stage of life. Some fish and invertebrates are commercially important including salmon, shrimp, crabs, and clams (Trowbridge and Goldman, 2006). Sections 3.2.1 and 3.2.2 of the Cook Inlet LS 244 FEIS provide more detailed information about fish and invertebrate species, their ecological roles, and discussions of the marine habitats and food webs in Cook Inlet.

The open water habitat of Cook Inlet, where the Proposed Survey would occur, has highly productive plankton blooms in the spring and summer (Piatt, 2002; Strom, Fredrickson, and Bright, 2016). Copepods, euphausiids, pteropods, and other pelagic species feed on plankton blooms (Cooney, 1987; Piatt, 2002), and in turn are often prey for higher-level predators such as fish and birds. Depth, substrate type, time of year, and nutrient supply from the pelagic realm heavily influence seafloor communities. Shallow and intertidal invertebrate communities include algae, herbivores (sea urchins, chitons, and limpets), suspension feeders (mussels, clams, polychaetes, bryozoans, and sponges), and predators/scavengers (crustaceans, sea stars, snails, and crabs) (Lees et al., 1980; Foster et al., 2010; Pentec Environmental, Inc., 2011). Deeper invertebrate communities consist primarily of crabs (Tanner, snow, and king crabs), shrimps, and sea urchins (Feder and Jewett, 1987; Lees et al., 1980).

Cook Inlet is home to freshwater, anadromous, and marine species (Piatt et al., 1999) which include pelagic and groundfishes. Pelagic fish, such as salmon and herring, inhabit the water column while groundfish, which include Pacific cod, flatfish, sculpins, and pollock, inhabit the seafloor sometime during their life cycle (Nemeth et al., 2007). Some species are also forage fish, a term which applies to small schooling fishes that are prey to marine mammals, seabirds, and larger fishes (Springer and Speckman, 1997). Forage fish, which are widely distributed throughout Cook Inlet, play an important role linking trophic levels because they are nutritionally dense. Forage fish are key indicators of the health of the Cook Inlet/Northern Gulf of Alaska marine ecosystem by supporting the marine food web of the region (Fechhelm et al., 1999; Springer and Speckman, 1997). Common forage fish species in Cook Inlet are herring, pollock, sandlance, capelin, and eulachon. While abundance and distribution of these schooling fish vary, forage fish occur throughout Cook Inlet with fish densities greatest during early summer. Most groundfish species are present year-round (Rumble, Russ, and Russ, 2016). In contrast, anadromous fish such as salmon live in the marine environment while growing to maturity and then migrate to freshwater spawning grounds (Moulton, 1997). These migrations usually occur in Cook Inlet from May to November, depending on the species.

3.4.2 Impacts

3.4.2.1 Proposed Action

Impacts on lower trophic organisms and fish from the Proposed Action may result from the energy emitted by survey equipment, vessel discharge, and possible introduction of invasive species from vessel operations.

Fish may be temporarily displaced from the area where vessels are operating, and survey equipment is in use. If survey activity occurs in areas where spawning migrations are occurring, some fish may have to swim farther to avoid the noise on the way to their spawning grounds. Although individual fish may be damaged by the seismic activity, it is unlikely to affect the timing or success of the runs or to have population level impacts. The most intense survey activity will be occurring away from spawning streams and will be in an area where fish can divert around the source of disturbance.

The severity of the impact to organisms is dependent on a variety of factors, including distance from the source and the bathymetry of the area. Cook Inlet ambient noise levels are high (NMFS, 2003), and most of the detectable impacts would be limited to the time and space around the vessels and survey activity. Impacts to lower trophic communities would be reduced if surveys do not occur during high spring bloom activity, although the timing of the spring bloom can be variable. Planktonic communities can recolonize from adjacent areas through water currents and have short lifecycles coupled with high reproductive potential (Abbriano et al., 2011). Impacts to fish and invertebrates from geohazard survey operations, even if repeated, would likely be undetectable once survey vessels have left the area, currents have recolonized the area with plankton, and fish have resumed use of the area.

Vessel operations in the area may result in temporary, localized decreases in water quality from discharges and deck runoff (see Section 3.3.2). Impacts from this would not likely be detectable for fish or invertebrates because the area of impact would be extremely limited. Vessels used in the Proposed Survey from outside the Cook Inlet area may be potential vectors for introducing aquatic invasive species through fouled vessel hulls, ballast water discharge, and equipment placed overboard. Aquatic invasive species can impact resident communities through competition for resources or habitat, predation, or introduction of pathogens. However, the probability that the Proposed Survey would introduce invasive species is small because HAK's adherence to the requirements regarding vessel discharges (i.e., National Pollution Discharge Elimination System (NPDES) and the International Convention for the Prevention of Pollution from Ships (MARPOL)) would serve to minimize the risk of any vessel transporting invasive species to the project.

Effects of the Proposed Survey on fish and invertebrates would be limited to the areas surrounding the vessel activity and would likely not be detectable once the vessels have left the area. Population level impacts are not expected. The effects described above, because they are limited to discrete locations and times, would not persist and would not appreciably add to impacts from other activities. Therefore, the level of effects for the Proposed Survey with respect to fish and invertebrate species is negligible.

3.4.2.2 No Action Alternative

Under the No Action Alternative, BOEM would not approve the Application Permit and the Proposed Survey would not occur. There would be no effects attributable to the Proposed Survey on fish and invertebrate species.

3.5 Birds

3.5.1 Affected Environment

A variety of birds use the Lower Cook Inlet Project Area, with overall marine bird densities generally high throughout the year (Renner, Kuletz, and Labunski, 2017). Seabirds are expected to be the most common marine bird type in the offshore Project Area. Lower Cook Inlet is one of the most productive areas for seabirds in Alaska, with over 2 million breeding and nonbreeding seabirds foraging in summer (Piatt, 1994). Seabirds likely to be found foraging during the time period of the Proposed Action include black-legged kittiwake, common murre, glaucous-winged and other gulls, northern fulmar, sooty and short-tailed shearwaters, fork-tailed storm petrel, tufted and horned puffins, and marbled and Kittlitz's murrelets (Renner, Kuletz, and Labunski, 2017; Kuletz et al., 2011). Most of these seabirds depend on small or "forage" fish such as capelin, Pacific sand lance, or young-of-the-year walleye pollock (see Section 3.4.1). This includes the surface-feeding kittiwake and gulls, and the murre, puffins, and murrelets which dive and swim underwater for food (Kuletz et al., 2015). Murrelets and the surface-feeding or shallow-diving fulmar, shearwaters, and storm petrel eat zooplankton as well as fish (Dragoo, Renner, and Irons, 2009).

Marine forage fish and zooplankton are patchy and often spatially and temporally unpredictable food resources that require many seabirds to range widely to locate and obtain sufficient energy. Starvation die-off events and failures of entire nesting colonies can occur, and have become more frequent in the Gulf of Alaska, including Lower Cook Inlet, where several large-scale events (i.e., affecting thousands or more birds and most of the colonies) have occurred in recent years (Piatt, et al., 2020). During the summer nesting season, breeding birds are constrained to certain areas by how much food they can find and deliver back to the nest per day. In order to successfully fledge chicks (i.e., raise for weeks or months until they can fly and forage independently), many Lower Cook Inlet seabirds must make several foraging trips a day of up to 3 hours or more round-trip and 60 km (37 mi) one-way from the nest (Piatt (ed.), 2002).

Thousands of seabirds nest annually at a few dense coastal island colonies roughly within 60 km from the Project Area (e.g., Chisik Island/Tuxedni Bay, Gull Island/Kachemak Bay), and therefore may depend in part on the Project Area for foraging to support successful reproduction. Many additional thousands or tens of thousands of nonbreeding seabirds are expected to feed at some time or other over the course of the year in the Project Area. The Project Area lies within the Lower Cook Inlet Important Bird Area, so designated by The National Audubon Society for the importance of these waters to post-breeding and wintering birds including glaucous-winged gull and other seabirds (Audubon Alaska, 2014). These also include the shearwaters that all nest in the southern hemisphere during winter and occur in abundance in Lower Cook Inlet as nonbreeders during Alaska's summer. Shearwaters and many other seabirds like gulls and storm petrels are frequently nocturnally active and are known to be attracted to bright lights of vessels at various times, not limited to migration (Greer, Day, and Bergman, 2010).

Waterfowl, primarily seaducks, are also expected to be common in the waters of the Project Area year-round, particularly late summer until spring. Seaducks are diving ducks that depend on marine waters most of their lifecycle. Abundant in relatively nearshore shallow waters of Lower Cook Inlet where they can feed on benthic invertebrates like small clams, some seaducks are also regularly found in the deeper offshore waters. White-winged scoter and harlequin duck are among the seaducks most likely to be observed in offshore waters (Renner, Kuletz, and Labunski, 2017). Scoters and other seaducks are often seen paddling on the surface in dense flocks or “rafts” of a few hundred or more birds. Steller’s eider is another seaduck expected to occur in Project Area waters in late summer, fall, and winter. A few thousand of this seaduck species, the entire Alaska breeding population, are listed as Threatened under the Endangered Species Act (ESA) (62 FR 31748). During post-breeding and winter periods this small and potentially vulnerable population of ESA-listed birds mingle indistinguishably in southcentral and western Alaska seas with many more thousands of non-listed Steller’s eiders from Russian breeding grounds. In late July, Steller’s eider in Lower Cook Inlet are typically beginning a 3-week flightless molt in nearshore waters before wintering over in these or other southcentral or western Alaska coastal areas (USFWS, 2002). A few regularly range into offshore waters and may occasionally be seen in the Project Area in the non-breeding months between late July and late April or early May. Wintering seaduck numbers in general peak in nearshore waters in January through February. In April and May most waterfowl move to surrounding land or beyond the Cook Inlet vicinity to breed (USFWS, 2011; Safine, 2005), although some failed breeders or nonbreeders are observed in marine waters year-round.

Loons and red-necked phalarope are also expected to be common marine birds in Project Area waters. Pacific and common loons are relatively large-bodied species that breed in territorial pairs on freshwater lakes all around the Cook Inlet area in the summer months (Renner, Kuletz, and Labunski, 2017). Loons are most commonly expected in Lower Cook Inlet’s marine environment post-breeding in late summer through winter, singly or in small groups and diving for forage fish. Phalaropes are unique shorebird species that forage most frequently not as waders in the intertidal zone but as swimmers on open water, where they paddle in tight circles at the surface to concentrate planktonic food. In the spring months (March to May) red-necked phalarope is among the most abundant lower Cook Inlet marine bird species (Renner, Kuletz, and Labunski, 2017), and a few occur in Cook Inlet year-round.

Besides the water habitat it provides for foraging and resting marine birds, Cook Inlet is also part of a spring and/or fall migratory flyway for many of them, plus other shorebirds, geese, swans, and many landbirds like passerines (“songbirds”), raptors (e.g., peregrine falcon, northern goshawk, etc.), and sandhill crane (Erickson, 1977; Day, et al., 2005). Tens of thousands of birds or more fly over Lower Cook Inlet between March and May as they migrate from wintering areas to various Alaskan breeding grounds, and/or again over a longer period between July and November in the post-breeding southward migration. Many birds, including waterfowl and most passerines like numerous species of sparrows, warblers, thrushes, blackbirds, and other small songbirds, make this critical and energetically expensive migration nocturnally.

The best available scientific evidence indicates that some combination of climate change, marine heatwaves, potential biotoxin events, and related rapid trophic regime changes or prey unavailability has recently led to periodic poor foraging conditions and starvation for many Cook Inlet seabirds. These conditions are strongly associated with several recent years of Cook Inlet (part of broader Gulf of Alaska (GOA)) seabird die-offs and subsequent colony failures (Zador and Yasumisshi, editors, 2018; von Biela, et al., 2019). Piatt and Harding (2007) believe other

ocean regime shifts in recent decades have substantial ongoing impacts on certain GOA seabird populations.

3.5.2 Impacts

3.5.2.1 Proposed Action

Impacts on birds could potentially result from underwater geohazard survey noise, vessel traffic, and light attraction and collision hazards.

Underwater Noise

During normal feeding behavior, some diving seabirds, seaducks, or loons could be disturbed by underwater noise from nearby geohazard survey activities. Diving birds are able to hear underwater (Hansen et al., 2017). Many of these birds routinely dive to 10 or more m in depth and/or spend more of their foraging time submerged than on the surface. Foraging could be interrupted if birds and a prey concentration happen to be near the survey operation, and either the birds displace themselves from where they detect and avoid the sounds, or prey is locally displaced by underwater sounds (see Section 3.4.1). Given the time of year of the survey, it is possible that some breeding seabirds from a few local colonies could be temporarily displaced. However, even considering the recent starvation-related acceleration of colony die-offs, it is unlikely that a month of a two-boat Proposed Action survey activity would occur during peak late summer chick-rearing and close enough to a significant number of parents to displace them from enough good forage for enough days or weeks to affect their nest-delivery rate and reproductive success. The vessels will be frequently or continually moving to different areas during the course of the Project Action, and no more than short-term displacement of a few birds within a few hundred m would be expected, resulting in no more than localized and temporary impacts.

Vessel Traffic

The operation of vessels could disturb birds at sea by their movement and presence, not just by underwater survey noise as discussed above. Individual and flocks of birds generally move away from vessel activity (Hentze, 2006). Many species, including flight-capable eiders and scoters, typically take flight to avoid a fast-approaching vessel, and often the larger the flock of seaducks, the greater the distance at which they flush on vessel approach (Kahlert, 2006; Schwemmer, et al., 2011). While flocks of flight-capable seabirds may occasionally be temporarily displaced from the vicinity of an approaching vessel, no rafts of flightless molting birds are likely to be present as far offshore as the Project Area. Many birds would return quickly; a few murrelets, seaducks and loons could be displaced from preferred foraging habitats for 6–8 hours or more (Agness et al., 2008; Lacroix et al., 2003; Schwemmer et al., 2011). Most foraging birds, however, would experience no more than a one-time exposure to disturbances and would quickly recover without measurable impact as vessels moved through the area. As with underwater survey noise, it is unlikely that Project vessel traffic would occur in the presence of a concentration of feeding birds in a good prey area during peak chick-rearing season for a long enough period of time to have greater than temporary or localized impacts.

Light Attraction and Collisions

The bright artificial lighting of vessels can attract and disorient migrating birds under certain environmental conditions (Bruinzeel, van Belle, and Davids, 2009; Merkel and Johansen, 2011).

These lit vessels therefore become collision hazards to some individuals or flocks, particularly during dark nights or other poor visibility conditions in spring and fall migration such as fog or precipitation (Day, Prichard, and Rose, 2005; Ronconi, Allard, and Taylor, 2015; Montevecchi et al., 1999).

Exact times and routes of peak migration numbers can vary interannually and are not expected to occur precisely in the presence of (i.e., be “exposed” to) the lights of the Project vessels. However, given the large total of migrating birds and length of migration periods overall that could overlap (other than in June) with some of the weeks proposed for the Project Action, a few birds or flocks could be attracted to vessel lights. This attraction can cause birds to lose valuable energy in a disoriented circling of the lights, alight on a vessel in exhaustion, and/or ultimately be injured or killed in collision with the vessel or equipment. (Bird collisions are frequently unseen, under-reported, and ultimately fatal, and for purpose of analysis BOEM considers any bird that appears aboard a vessel, dead or alive but apparently unable to depart on its own, as a fatal “collision.”) Based on consideration of typical flight patterns and history of light attraction and vessel collisions in Alaska, a wide variety of birds, singly or in one or two flocks of a dozen or more individuals, could collide with the Project vessels. These include seabirds (e.g., gulls, fulmars, shearwaters, storm petrels, jaegers), waterfowl (e.g., eiders), shorebirds (e.g., phalaropes), and passerines (Day et al., 2017; Greer, Day and Bergman 2010; USFWS, 2012). Several fatalities may be incurred by a single breeding population, but most would be from disparate, widespread breeding populations.

An operating protocol that includes basic monitoring, lighting control, and, if needed, adaptive management, is commonly recognized as an appropriate strategy for tracking and reducing collision mortalities on vessels. Comprehensive monitoring, following scientifically approved protocols, of collisions and ultimate fates of grounded birds, improves assessments of any site-specific factors associated with vessel attraction (Wiese, et. al., 2001; Ellis, et. al., 2013). Reduced and shielded vessel lighting minimizes the deleterious impacts of lighting attraction to birds (Ronconi, Allard, and Taylor, 2015; Miles, et. al., 2010). Adaptive management may further reduce impacts if, for example, monitoring reveals a specific attractant problem or timing of heavy migration where and when lighting operation can be safely adjusted.

BOEM assumes that attraction to the Project vessels could cause one or two collisions, and in a few cases as many as 5 or 10, of each of several species of birds during the course of the survey period. With only a single survey season and two vessels, and given the very low chance that more than one or two birds from a vulnerable (i.e., low-number) population (e.g., listed Steller’s eider) would be exposed to attraction and collision risk, no measurable population level effect is expected to result. This level of effect is also based on BOEM’s assumption that a mitigation protocol of monitoring and reduced and shielded lighting will be implemented on the Project Action vessels. Details of assumed monitoring and lighting measures follow.

BOEM completed ESA consultation with the USFWS to assess potential effects to listed Steller’s eiders (see Section 4.1) from certain exploration activities in Lower Cook Inlet, including G&G surveys. The USFWS Biological Opinion (BO) (USFWS, 2017) provided BOEM with a non-jeopardy opinion and an incidental take statement for listed eiders. BOEM would require HAK to conduct the Proposed Survey in accordance with appropriate Reasonable and Prudent Measures (RPMs) / Terms and Conditions (T&Cs) of that BO. Because T&Cs 1.1–1.3 are non-specific (i.e., they require that lighting protocols be developed and that a reporting/monitoring program be implemented, but did not provide any details about how to accomplish the task), the following recommendations would serve to implement the intent of the

RPMs/T&Cs and mitigate adverse effects of the Proposed Survey to listed species, as well as other birds:

1. All vessel operators shall be instructed that the use of high-intensity exterior lighting on, and the radiation outward of high-intensity lighting from, vessels shall be minimized where safety allows. During periods of darkness or inclement weather, exterior lights shall be used only as necessary to illuminate active, on-deck work areas or safety; otherwise, they shall be turned off. Exterior-facing window coverings shall be closed in illuminated rooms during periods of darkness except as required for specific work or safety purposes. Interior and navigation lights may remain on as needed for safety.
2. HAK shall report to BOEM specific information about any birds found on vessels while at sea. An individual report entry shall be generated for each bird (i.e., “strike” or “collision”; downed bird that is either found on board dead or apparently unable to depart on its own). This information shall be compiled and submitted to BOEM in electronic format (e.g., spreadsheet) within 30 days of the conclusion of the Project Action and shall include:
 - vessel name, and the date, time, and location (latitude/longitude) determined as closely as possible for actual or estimated time of strike;
 - bird species (if known), number, and condition (alive with no visible injury, injured, dead); photograph (indicating size of bird if species not determined), including in situ if safety allows;
 - visibility and vessel lighting conditions (determined as closely as possible for actual or estimated time of strike); and
 - if known or speculated, notes on potential cause of strike.

Other on-going local activities, including oil and gas exploration projects and commercial development, contribute to impacts on birds in Lower Cook Inlet. These activities have increased, and will continue to increase, with the presence of humans and infrastructure and are associated with ongoing collision risk; disturbance and displacement from vessel and aircraft traffic; habitat alteration; and risk of encountering oil spills. A very large oil spill, the Exxon Valdez oil spill, originated from tanker vessel transit in adjacent Prince William Sound in 1989, and impacts to some Cook Inlet bird populations may linger (Esler et al., 2018).

In the Cook Inlet area, potential impacts of rapid ocean regime shifts on birds that are dependent on patchy forage fish prey are anticipated to be relatively widespread and/or long-term. The particular state of the birds from the die-offs and colony failures at the time of the Proposed Survey, however, are unlikely to influence the analysis of the impacts from the Proposed Survey. This is because the potential Proposed Survey’s impacts would be highly localized and brief (i.e., often measured in days), and unlikely to contribute to population level impacts for the large seabird populations that are affected by the regime shift impacts and have a widespread range beyond the Project Area.

In summary, the Proposed Action is expected to affect a few birds via displacement caused by vessel operations, and attraction and collision caused by vessel lighting. Most swimming birds would only be briefly displaced with no measurable impacts. Attractant and collision hazards can be lethal; however, exposures of most avian populations to such hazards associated with the Proposed Survey over the relatively short project duration (i.e., 30 days) would be brief and likely affecting too few individuals to have measurable population level impacts. Overall, Cook Inlet bird populations are not expected to experience more than temporary, localized, and therefore minor impacts. The required development of lighting protocols measures would serve

to further reduce bird strike numbers, although overall impact level is not expected to be reduced to negligible.

3.5.2.2 No Action Alternative

Under the No Action Alternative, BOEM would not authorize the Proposed Action and the Proposed Survey would not occur. There would be no effects on birds attributable to the Proposed Survey.

3.6 Marine Mammals

3.6.1 Affected Environment

Marine mammals that could be encountered in lower Cook Inlet during the Proposed Action are beluga, fin, humpback, minke, killer, and gray whales; Dall's and harbor porpoises; harbor seals; Steller sea lions; and northern sea otters (Table 3-2, Muto et al., 2019). No marine mammal critical habitats would be affected by the Proposed Survey.

The LS 244 FEIS provided detailed species descriptions of marine mammals in the area in Section 3.2.3, pages 3-46 through 3-87. This information is incorporated by reference in this EA. The information presented here has been updated and focuses on HAK's current Proposed Action rather than the suite of activities considered in the LS 244 materials.

3.6.1.1 Beluga Whale

The Cook Inlet beluga whale Distinct Population Segment (DPS) is a small isolated population that largely remains within Cook Inlet (O'Corry-Crowe et al., 1997; Laidre et al., 2000; Speckman and Piatt, 2000; and Rugh et al., 2000; 2005). It was originally estimated at 1,300 whales in 1979 and has been the focus of management concerns after a dramatic decline in the 1990s (Calkins, 1989). Between 1994 and 1998, the stock declined 47 percent because of unrestrained subsistence hunting (Muto et al., 2020). In 2000, NMFS declared the stock depleted, and in 2008 listed it as endangered under the ESA (73 FR 62919). Critical habitat for the stock was designated in April 2011 (76 FR 20179) (Figure 3-1). In January 2020, the Alaska Fisheries Science Center (AFSC) released a report containing abundance estimates and population trends for the Cook Inlet beluga whale (AFSC, 2020). This report indicated the population had declined at approximately 2.5 percent per year, and there were fewer belugas than previously thought. It adjusted the most recent population estimate from 328 in 2016 to 279 in 2018. This adjustment did not represent a sudden loss of animals but instead applied more accurate analysis techniques and included more data to provide corrected population estimates from 2004 onward (AFSC, 2020). The cause of the continued decline is not known, but recent demographic modelling and analysis of stranding data suggests low survival rates for adults of reproductive age may be limiting the population (Jacobson et al., 2020; McGuire et al. 2020).

The Proposed Survey would occur in lower Cook Inlet, outside of beluga whale critical habitat. But belugas are not confined to designated habitat areas and may be present near the activities. During the summer and fall, belugas reside in upper Cook Inlet (Figure 3-1), particularly near the large river and stream mouths where they can feed on migrating eulachon and salmon (Nemeth et al., 2007; Moore et al., 2000). In winter, they shift southward to deeper waters in lower Cook Inlet south of Kalgin Island and to shallow areas along the western Cook Inlet shoreline near Kamishak and Kachemak bays (76 FR 20179).

Table 3-2 Stock Size Estimates, Stock Designation, and ESA Status of Marine Mammals Inhabiting the Cook Inlet Action Area

Species	Stock	Status ESA (MMPA)	Stock Estimate	Seasonal Presence in Cook Inlet ¹
Beluga Whale (<i>Delphinapterus leucas</i>)	Cook Inlet Stock	Endangered (Depleted)	279 ²	Year-long
Humpback Whale (<i>Megaptera novaeangliae</i>)	Central North Pacific Stock	Endangered (Depleted)	10,103 ³	Spring, Summer, and Fall in lower inlet
	Western North Pacific Stock	Endangered (Depleted)	1,107 ³	Spring, Summer, and Fall in lower inlet
Fin Whale (<i>Balaenoptera physalus</i>)	Northeast Pacific	Endangered (Depleted)	3,168 ^{**3}	Spring, Summer, and Fall in lower inlet
Gray Whale (<i>Eschrichtius robustus</i>)	Eastern North Pacific Stock	N/A (Not Depleted)	26,960 ⁴	Spring and Fall in lower inlet
Minke Whale (<i>Balaenoptera acutorostra</i>)	Alaska Stock	N/A (Not Depleted)	UNKNOWN (possibly 1,000–2,000 in Alaska between 2000-2010 ^{**}) ³	Spring, Summer, and Fall in lower inlet
Killer Whale (<i>Orcinus orca</i>)	Gulf of Alaska, Aleutian Islands, and Bering Sea Transient Stock	N/A (Not Depleted)	587 ^{*3}	Year-long in ice-free waters
	Alaska Resident Stock	N/A (Not Depleted)	2,347 ³	Year-long in ice free waters
Dall's Porpoise (<i>Phocoenoides dalli</i>)	Alaska Stock	N/A (Not Depleted)	UNKNOWN (83,400 in ~1990 ^{**}) ³	Year long
Harbor Porpoise (<i>Phocoena phocoena</i>)	Gulf of Alaska Stock	N/A (Not Depleted)	UNKNOWN (31,046 in 1998) ³	Year-long in lower inlet. Ice-free season in upper inlet.
Pacific White-sided Dolphin (<i>Lagenorhynchus obliquidens</i>)	North Pacific	N/A (Not Depleted)	26,880 ^{**3}	Year-long in lower inlet
Steller Sea Lion (<i>Eumetopia jubatus</i>)	Western U.S. Stock	Endangered (Depleted)	53,642 ^{*3}	Year-long in lower inlet. Ice-free season in upper inlet.
Harbor Seal (<i>Phoca vitulina</i>)	Cook Inlet/Sheikof Strait Stock	N/A (Not Depleted)	28,411 ³	Year-long in lower inlet. Ice-free season in upper inlet.
Northern Sea Otter (<i>Enhydra lutris kenyoni</i>)	Southcentral Alaska Stock	N/A (Not Depleted)	18,297 ⁵	Year-long
	Southwest Alaska Stock,	Threatened (Depleted)	54,771 ⁵	Year-long

¹ “Upper” Cook Inlet is north of Latitude 60.7° N, “Lower” Cook Inlet is south of this line. See Figure 3-1.

² Alaska Fisheries Science Center, 2020

³ Muto et al., 2019

⁴ Carretta et al., 2020

⁵ USFWS 2014a

* Minimum population estimate

** Uncertain, provisional, or outdated estimate, see source document for more information

Beluga whales have been reported near the Proposed Survey area. Castellote et al. (2020) conducted passive acoustic monitoring of marine mammal vocalizations near the Proposed Survey area during HAK's 3D seismic surveys in 2019. At least one beluga was acoustically detected in lower Cook Inlet beyond the southern boundary of the species' normal range. HAK employed observers during the 3D seismic surveys to monitor effects on marine mammals. The observers reported two dead whales. Both were in moderate states of decomposition and deaths were not attributed to survey activities (Fairweather Science LLC, 2020). This indicates that Cook Inlet belugas are unlikely to be in the Proposed Survey area during the work, but their presence is possible.

3.6.1.2 Humpback Whale

Humpback whales in lower Cook Inlet are most likely from the Central and Western North Pacific stocks, which migrate from Hawaii to Alaska in the summer to feed then return to Hawaii or Asia to overwinter (Muto et al., 2019). They have often been detected during aerial surveys of Cook Inlet, but their use of the area is largely confined to lower Cook Inlet, particularly near Kachemak Bay, and anecdotally near Anchor Point and Cape Starichkof (Rugh et al., 2005). Castellote et al. (2020) recorded sounds produced by humpback whales in Chinitna and Iniskin bays, near Port Graham, and near the southwest corner of the Proposed Survey area during September, October, and/or November 2019. Several humpbacks could occur in the Proposed Survey area at any given time.

3.6.1.3 Fin Whale

Individual animals from the Northeast Pacific stock of fin whales sometimes enter lower Cook Inlet. The total stock size was estimated to be 3,168 in 2016 (Rone et al., 2017) with a minimum population estimate of 2,554 individuals in the stock (Muto et al., 2019). Zerbini et al. (2006) estimated 1,652 individuals between Kenai Fjords National Park and Preserve and the central Aleutian Islands, with most sightings in the Aleutians. Fin whales have occasionally been detected in Cook Inlet. Two sightings were recorded during aerial surveys in June 2014 (Shelden et al. 2015), and Castellote et al. (2020) recorded fin whale sounds near the southwest corner of the Proposed Survey area in September, October, and November 2019.

3.6.1.4 Gray Whale

Presently, the Eastern gray whale stock size has increased to approximately 26,960 individuals (Carretta et al., 2020). During spring, they migrate from the Sea of Cortez northward along the coast to shelf waters in the Bering, Chukchi, and to a lesser extent, Beaufort seas, and return in like manner to the Sea of Cortez to overwinter (Rice and Wolman, 1971). Some gray whales forgo making the full Baja-Chukchi migration, and remain in select coastal areas, including lower Cook Inlet, Alaska (Rice, Wolman, and Braham, 1984; Moore et al., 2007). During Buccaneer's Cosmopolitan drilling program in 2013, gray whales were seen in waters off Cape Starichkof (Owl Ridge, 2014). In 2020, a young gray whale entered upper Cook Inlet but probably didn't survive. It stranded in shallow water for about a week before heading back toward lower Cook Inlet where a carcass was found shortly thereafter (NOAA, 2020). This whale was part of an ongoing unusual mortality event (UME) in which 93 dead gray whales were found in Alaska from January 2019 to February 2021 (NOAA, 2021). The cause of the UME has not been determined, but it is widespread along the Pacific coast and is not related to localized oil and gas activities.

3.6.1.5 Minke Whale

Minke whales are the smallest (lengths up to 35 feet), and most common baleen whales. Zerbini et al. (2006) estimated the coastal population between Kenai Fjords and the Aleutian Islands at 1,233 animals; however, no reliable population estimates for the entire Alaska stock have been produced. Minke whales have periodically been observed in Cook Inlet (Sheldon et al., 2017), but sightings are less likely in winter when most are thought to leave the region (Consiglieri et al., 1982). Most likely, only solitary animals or small numbers of minke whales would be near the survey area in lower Cook Inlet during the Proposed Survey, particularly since the majority of the sightings described by Zerbini et al. (2006) occurred in the Aleutian Islands rather than in the Gulf of Alaska.

3.6.1.6 Killer Whale

Two different stocks of killer whales use the Cook Inlet region of Alaska: the Alaska Resident stock and the Transient stock (Bering Sea, Gulf of Alaska, and Aleutian Islands) (Muto et al., 2019). The resident stock is estimated at 2,347 animals and occurs from Southeast Alaska to the Bering Sea (Muto et al., 2019). They feed exclusively on fish and are genetically distinct from the transient stock (Saulitis et al., 2000). Killer whales from the transient stock feed primarily on marine mammals (Saulitis et al., 2000). The transient killer whales in the Gulf of Alaska, Aleutian Islands, and the Bering Sea are considered part of a single population, but these groups each show some unique genetic markers suggesting some sub-population structure (Muto et al., 2019). Killer whales from both stocks are occasionally seen in lower Cook Inlet, especially near Homer and Port Graham (Shelden et al., 2003, Rugh et al., 2005). The few whales photographically identified in lower Cook Inlet belong to resident groups more commonly found in nearby Kenai Fjords and Prince William Sound (Shelden et al., 2003), but during surveys near the southern Kenai Peninsula in 2008, researchers identified 4 of 10 groups as transient whales (Matkin et al., 2011). Killer whales could occur in the survey area and might be encountered during the Proposed Survey.

3.6.1.7 Dall's Porpoise

Dall's porpoises are widely distributed throughout the North Pacific Ocean (Muto et al., 2019), preferring deep offshore and shelf slope waters, and are among the more numerous cetacean species found in Alaskan waters. They have occasionally been observed in lower Cook Inlet, particularly around Kachemak Bay, Iniskin Bay, and Anchor Point (Rugh et al., 2005), and could occur in the project area during the Proposed Survey.

3.6.1.8 Harbor Porpoise

Harbor porpoises are small (1.5 m in length), dark, and relatively inconspicuous. The Gulf of Alaska Stock occurs from Cape Suckling to Unimak Pass (Muto et al., 2019). They mostly occur in coastal waters less than 100 m (300 feet) deep and feed on Pacific herring, eulachon, other schooling fishes, and cephalopods (Hobbs and Waite, 2010). They are frequently observed in aerial marine mammal surveys of Cook Inlet, and most sightings have been concentrated around Chinitna and Tuxedni bays on the west side of lower Cook Inlet (Rugh et al., 2005). Dahlheim et al. (2000) estimated the 1991 Cook Inlet-wide sub-population was limited to 136 animals; however, along with belugas and harbor seals, they are among the most numerous marine mammals regularly seen in Cook Inlet (Nemeth et al., 2007). They are likely to be present in the survey area during the Proposed Survey.

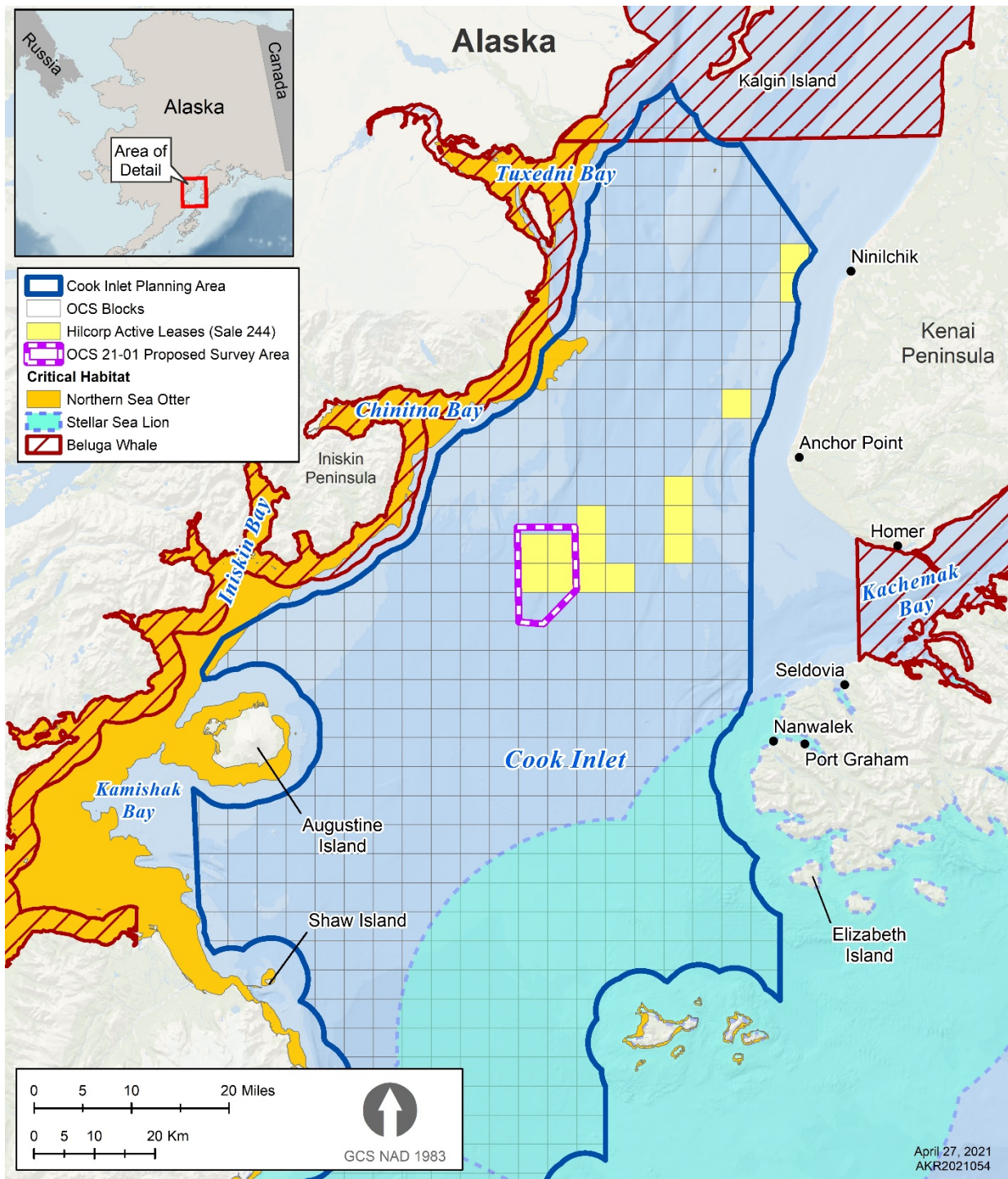


Figure 3-1 Critical Habitat Areas for Northern Sea Otters, Steller Sea Lions, and Beluga Whales

3.6.1.9 Pacific White-Sided Dolphin

Pacific white-sided dolphins are small toothed whales that may occur in the Proposed Action area. They primarily feed on small schooling fishes. The North Pacific stock ranges from British Columbia to the Western Aleutians. The stock’s population size is highly uncertain but was last

estimated to be 26,880. Although uncommon in Cook Inlet, acoustic detections were recorded in 2019 near the southwest corner of the Proposed Survey area and in Iniskin Bay (Castellote et al., 2020). They are highly gregarious, and if present, could number in the dozens.

3.6.1.10 Steller Sea Lion

The Western DPS of the Steller sea lion is defined as all populations west of longitude 144°W to the western end of the Aleutian Islands. The stock was listed as threatened under the ESA in 1990 (55 FR 49204) and listed as endangered in 1997 (62 FR 24345). Critical habitat was designated in 1993 (58 FR 45269), and is defined as a 20 nautical mile radius around all major rookeries and haulout sites (Figure 3-1). Steller sea lions inhabit lower Cook Inlet, especially in the vicinity of haulout sites at Shaw Island and Elizabeth Island (Nagahut Rocks) (Rugh et al., 2005; Nemeth et al., 2007). Marine mammal observers associated with Buccaneer’s drilling project off Cape Starichkof observed 7 Steller sea lions in 2013 (Owl Ridge, 2014). A few to several Steller sea lions have regularly been observed during aerial surveys over Cook Inlet conducted by NMFS in June or July (e.g., Shelden and Wade, 2019; Shelden et al., 2015; 2017), and they could be encountered in the Proposed Survey area.

3.6.1.11 Harbor Seal

Harbor seals are commonly encountered in lower Cook Inlet, feeding on fishes such as Pacific cod, salmon, Pacific herring, and eulachon, and sometimes squid. The Cook Inlet/Shelikof Stock is estimated to number 28,411 (Muto et al., 2019), and is distributed from Anchorage into lower Cook Inlet during summer (Boveng, London, and Ver Hoef, 2012). Large numbers concentrate at the river mouths and embayments of lower Cook Inlet, particularly Kachemak Bay and the southern end of Kalgin Island (Rugh et al., 2005; Boveng et al., 2011). Montgomery, Ver Hoef, and Boveng (2007) recorded over 200 haulout sites in lower Cook Inlet and found seals move in response to local steelhead and salmon runs. Harbor seals would likely be encountered in the survey area.

3.6.1.12 Sea Otter

Two stocks of sea otters occur near the Proposed Survey area: the southcentral and southwest Alaska stocks (Muto et al., 2019; USFWS, 2014a, b). The southwest Alaska sea otter stock is listed as threatened under the ESA (70 FR 46366) and is depleted under the Marine Mammal Protection Act (MMPA). The southcentral Alaska stock is not listed or depleted. Critical habitat for the southwest Alaska stock was designated in 2009 (74 FR 51988; see Figure 3-1). Sea otters are year-round residents within Cook Inlet, including the Proposed Survey area. Sea otters generally inhabit nearshore waters <35 m (115 feet) deep. Sea otters forage in the nearshore benthos of rocky and soft-sediment communities. During summer (June–August), sea otters predominantly use areas within 40 m of shore where foraging opportunities are best (Bodkin, Monson, and Esslinger, 2003; Riedman and Estes, 1990; Schneider, 1976). Sometimes they occur in offshore areas, rafting together while transiting through deeper waters (Schneider, 1976). Most of the survey area occurs in water too deep to serve as good sea otter habitat. Sea otters would most likely be encountered along the east and west peripheries of the Proposed Survey area.

3.6.2 Impacts

3.6.2.1 Proposed Action

The Proposed Survey may impact marine mammals by exposing animals to underwater noise produced during the Proposed survey and by adding to the number of vessels in Cook Inlet.

Noise from Survey Equipment

Marine mammals use sound, sight, smell, and somatic (orientation of the body) senses to interact with their environment. Activities that produce underwater sound can affect marine mammals by disrupting behavior, creating physiological stress, or causing injuries such as hearing loss (temporarily or permanently). In addition to behavioral and physiological impacts, loud noises in some frequency bands can mask other environmental noises which could temporarily compromise an individual animal's ability to communicate, navigate, find food, and avoid hazard or predators.

The likelihood of impact depends on sound intensity, frequency, distance of the animal from the sound source, type of noise (impulsive vs. continuous), and duration of exposure. Noises outside of a marine mammal's hearing range do not usually result in direct impacts. The generalized hearing ranges of marine mammals that are likely to be in the Proposed Survey area are listed in Table 3-3.

Table 3-3 Marine Mammal Hearing Groups

Hearing Group	Generalized Hearing Range*
Fin, humpback, gray, and minke whales	7 Hz to 35 kHz
Beluga and killer whales	150 Hz to 160 kHz
Dall's and Harbor porpoises	275 Hz to 160 kHz
Harbor seals	50 Hz to 86 kHz
Steller sea lions, and Northern sea otters	60 Hz to 39 kHz

* Frequency ranges follow those identified in NMFS (2018).

Low-level noise exposure may not elicit any observable response, while at moderate exposure levels, noise may cause a change in behavior. Noise exposure at high levels or over a long duration can induce injury. The most common noise-induced injury is hearing loss. The National Oceanic and Atmospheric Administration (NOAA) has established thresholds of noise exposure that when exceeded, will cause a marine mammal to be injured or harassed (NMFS, 2018). USFWS has adopted similar thresholds for sea otters (84 FR 37716). These thresholds were developed by NMFS and USFWS based on the best available science. Thresholds incorporate both peak sound pressure levels (SPL_{peak}) and continuous exposure levels (24-hour continuous sound exposure level (SEL_{24})), and are shown in Table 3-4.

Table 3-4 NOAA Fisheries Current In-Water Acoustic Thresholds

Species	Injury (Level A Harassment*)				Behavioral Response (Level B Harassment*)	
	PTS ¹ Impulsive	PTS ¹ Non-impulsive	TTS ² Impulsive	TTS ² Non-impulsive	Behavior Impulse	Behavior Non-impulse
Humpback, Fin, Gray, and Minke Whales	219 dB SPL _{peak} 183 dB SEL ₂₄	199 dB SEL ₂₄	213 dB SPL _{peak} 168 dB SEL ₂₄	179 dB SEL ₂₄	160 dB _{RMS}	120 dB _{RMS}
Beluga and Killer Whales	230 dB SPL _{peak} 185 dB SEL ₂₄	198 dB SEL ₂₄	224 dB SPL _{peak} 170 dB SEL ₂₄	178 dB SEL ₂₄	160 dB _{RMS}	120 dB _{RMS}
Dall and Harbor Porpoises	202 dB SPL _{peak} 155 dB SEL ₂₄	173 dB SEL ₂₄	196 dB SPL _{peak} 140 dB SEL ₂₄	153 dB SEL ₂₄	160 dB _{RMS}	120 dB _{RMS}
Harbor Seals	218 dB SPL _{peak} 185 dB SEL ₂₄	201 dB SEL ₂₄	212 dB SPL _{peak} 170 dB SEL ₂₄	181 dB SEL ₂₄	160 dB _{RMS}	120 dB _{RMS}
Steller Sea Lions and *Northern Sea Otters	203 dB SEL ₂₄ 232 dB SPL _{peak}	219 dB SEL ₂₄	188 dB SEL ₂₄ 226 dB SPL _{peak}	199 dB SEL ₂₄	160 dB _{RMS}	120 dB _{RMS} **160 dB _{RMS}

* Level A and Level B Harassment are defined in the Marine Mammal Protection Act (16 USC 1362)

¹ PTS = Permanent Threshold Shift: a permanent shift in the lowest perceivable level of sound, indicating permanent hearing loss

² TTS = Temporary Threshold Shift: a temporary shift in the lowest perceivable level of sound, indicating temporary hearing loss

SPL_{peak} = peak received sound pressure level

SEL₂₄ = 24-hour cumulative sound exposure level

dB_{RMS} = dB root mean square; measurement of the intensity of sound

Source: NMFS (2018), except ** from USFWS (84 FR 37716)

BOEM's Center for Marine Acoustics evaluated the sound signals produced by various types of G&G equipment to better understand potential effects on marine mammals. Sound characteristics have been documented by the equipment manufacturers (e.g., Applied Acoustics, 2020) and collated by NMFS (Table 2 in 84 FR 36054). These sound characteristics (source level and frequency) were then compared against the range of audible frequencies and exposure thresholds of marine mammals summarized by NMFS (2018) and USFWS (84 FR 37716). The result is a generalized characterization of the types of equipment likely to cause marine mammal harassment and the types with effects that are "de minimus" (too small to merit concern) (Figure 3-2).

BOEM's analysis determined that impacts from the following sources are generally de minimis: multibeam echosounders, side scan sonars, hull-mounted sub-bottom profilers, towed sub-bottom profilers, lowest-power sparkers, split beam echosounders, 3-plate boomers, acoustic doppler current profilers, pingers, and acoustic tracking devices. The following sources could potentially cause harassment depending on the specific equipment and context of use: parametric sub-bottom profilers, bubble guns, 1- and 2-plate boomers, towed sub-bottom profilers with higher source levels, and higher-powered sparkers. Sources that will always have the capacity to harass marine mammals include seismic air guns and pile driving.

HAK would use a suite of noise-generating survey equipment including an equipment positioning system, multibeam echosounder, side scan sonar, sub-bottom profiler, and/or UHD Sparker (a multi-channel sub-bottom profiler). Sub-bottom profilers include high-resolution systems and low-resolution systems. High resolution systems generally emit energy in the frequency bands of 2 to 24 kilohertz (kHz), have typical beam width of 15 to 24 degrees, and generate a pulse rate of 3 to 10 hertz (Hz). Low resolution systems are used when necessary to increase sub-bottom profile penetration. A typical low-resolution system emits energy in the frequency bands of 1 to 4 kHz.

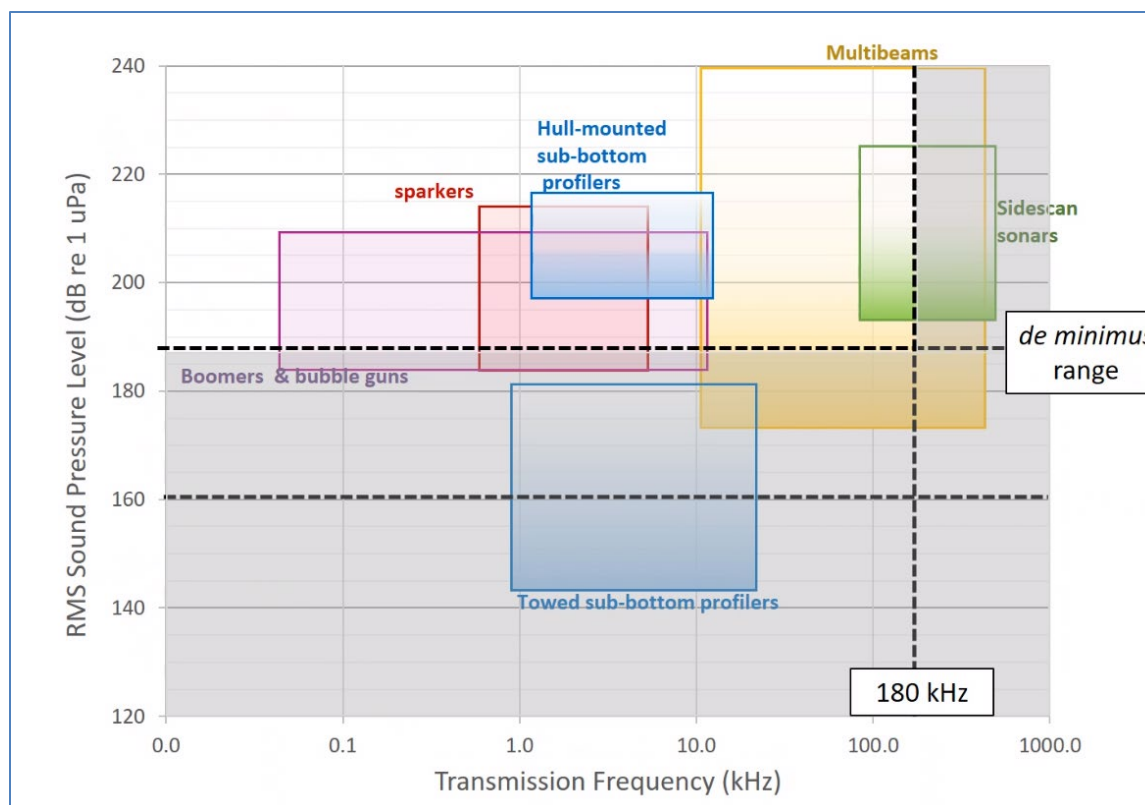


Figure 3-2 Geological and Geophysical Equipment Sound Source Characteristics in Relation to Effects on Most Marine Mammals

Colored boxes represent the range of sound pressure levels and frequencies produced by various G&G survey equipment. Dashed lines show generalized thresholds for potential impacts. The gray shaded area indicates the equipment is likely to produce sounds with de minimus effects on marine mammals.

Sound levels produced by HAK's equipment positioning system can reach 100 decibels (dB), while the other equipment types can produce up to 210 dB from the source. The models and operational frequencies of the equipment proposed for use by HAK are as follows: Kongsberg 351P high precision ultra-short baseline acoustic positioning system, 30kHz; R2Sonic 2024 Multibeam Echosounder, 200-450 kHz; EdgeTech 2000-DSS with side scan sonar, 400 kHz, and sub-bottom profiler (chirper), 2-16 kHz; Dura-Spark UHD 400 Sub-Bottom Profiling System (sparker), 300 Hz-1.2 kHz.

HAK's multibeam echosounder and side scan sonar would operate at frequencies above 200 kHz making them inaudible to marine mammals in Cook Inlet. The positioning system would generate sound levels below those which are likely to cause harassment, as determined by NMFS (2018) and USFWS (84 FR 37716). They are therefore considered to have de minimus effects. HAK's sub-bottom profilers are the only equipment proposed for use in this survey with potential effects that cannot clearly be considered de minimus. HAK would use both high- and low-resolution sub-bottom profilers during the Proposed surveys. This equipment, including the specific models proposed for use during this survey, can produce high-level sound audible to marine mammals and could cause harm or acoustic harassment.

To reduce the risk of impacts to marine mammals, HAK will apply design features and mitigation measures described in a 4MP (see Appendix A). HAK must also comply with additional avoidance and minimization measures specified in incidental take authorizations issued by

USFWS and NMFS under the MMPA and ESA (NMFS, 2019; USFWS, 2017; 2019; 84 FR 12330; 84 FR 37716). These measures are described in Section 2.1.2 and include, but are not limited to:

- placement of Protected Species Observers (PSOs) on vessels to constantly scan the area for the presence of marine mammals during the use of sub-bottom profilers;
- placement and confirmation of Exclusion Zones and Safety Zones with Sound Source Verification to identify whether a marine mammal is too close to sound-generating equipment and to determine whether to shut operations down;
- use of appropriate means to avoid/minimize impacts if marine mammals are sighted, including shutting down the sub-bottom profilers, ramping up (gradually increase noise volume); and speed or course alteration (maneuver a vessel speed and/or change course).

HAK is required to monitor, document, and report the effects of their actions on marine mammals. PSOs will be stationed aboard the project vessels to document the visible responses of marine mammals to the project activities.

HAK’s avoidance and mitigation measures will reduce, but not eliminate the risk of impacts, so additional steps were taken to determine the net effects to marine mammals. The first step was to calculate for each type of equipment the size of the area in which sound levels of audible frequencies will exceed the thresholds for injury and behavioral response established by NMFS (2018) and USFWS (84 FR 37716) (Table 3-4). This is the “ensonified area” and is measured by modelling the attenuation of sound as it travels through water until the received level of sound is below the thresholds for injury and harassment (Table 3-5). The total size of the ensonified area for each day was then determined based on the planned movements of the vessel and the equipment to be used. Next, the density or occurrence of marine mammals within these ensonified areas was determined based on the best available data on distribution and abundance of each population or stock. Finally, these estimates were combined to predict the total number of individuals of each species or stock that are likely to be inside the ensonified areas throughout the survey period. This is the total number of animals that are expected to be injured or harassed by underwater sound from the Proposed Survey and is summarized in Table 3-6. Details of these analyses are provided in incidental take authorizations issued to HAK by USFWS and NMFS under the MMPA and ESA (NMFS, 2019; USFWS, 2017; 2019; 84 FR 12330; 84 FR 37716).

Table 3-5 Estimated Radius of the Zone of Ensonification for Injury and Harassment of Cook Inlet Marine Mammals

Sound Metric	Approximate Radius of Ensonification Zone Where Injury is Likely (Level A Harassment ¹)					Approx. Radius of Harassment (Level B Harassment ²) for All Species
	Fin, Gray, Humpback, and Minke Whales	Beluga and Killer Whales	Dall’s and Harbor Porpoises	Harbor Seals	Steller Sea Lions and Northern Sea Otters	
SPL _{pk}	< 1 m	< 1 m	5 m	< 1 m	< 1 m	2,929 m
SEL ₂₄	76.48 m	4 m	1,108 m	48 m	< 1 m	

NOTES: ¹ Level A Harassment as defined by the Marine Mammal Protection Act (16 USC 1362)

² Level B Harassment as defined by the Marine Mammal Protection Act (16 USC 1362)

Zones extend outward from HAK’s sub-bottom profilers and were calculated based on a source level of 212 dB_{RMS} at 1 m and thresholds developed by NMFS (2018) and USFWS (84 FR 37716).

Table 3-6 The Estimated Number of Individuals of Each Species Likely to be Injured or Harassed during Hilcorp’s Lower Cook Inlet Shallow Hazard Surveys^{1, 2}

Species	Estimated Number of Injuries ³	Estimated Number of Harassment Events ⁴
Humpback whale	0.09	3.40
Minke whale	0.00	0.02
Gray whale	0.00	0.14
Fin whale	0.02	0.60
Killer whale	0.00	1.15
Beluga whale	0.00	0.00
Dall’s porpoise	0.11	0.30
Harbor porpoise	3.20	8.42
Harbor seal	7.39	447.52
Steller sea lion	0.00	14.59
Sea otter	0.01	46.3

NOTES: ¹ 84 FR 12330² 84 FR 37716³ Level A Harassment as defined by the Marine Mammal Protection Act (16 USC 1362).⁴ Level B Harassment as defined by the Marine Mammal Protection Act (16 USC 1362).

The Proposed Action is expected to cause a small number of injuries among marine mammals in Cook Inlet. A few harbor porpoises and harbor seals may experience sound levels high enough to cause injury by hearing damage. For humpback whales, fin whales, Dall’s porpoises, and sea otters, the estimated number of individuals predicted to be injured is greater than 0 but less than 0.5. This suggests that although injury to one individual is possible, it is not likely. Minke whales, gray whales, killer whales, Steller sea lions, and beluga whales are not expected to be injured.

These estimates do not account for animal movements away from underwater sound or HAK’s avoidance and mitigation measures. The estimates predict, for example, that a harbor porpoise would have to remain within 1,108 m of the operating sub-bottom profiler for 12 hours out of a 24-hour period to experience injury. A harbor seal would likewise have to remain within 48 m. This is unlikely, given the ability of these species to detect and move away from a sound source before being injured. The estimates have not been corrected because there is not enough information on movement patterns in response to sub-bottom profilers or on the effectiveness of mitigation measures to make accurate corrections to the predicted numbers of marine mammals affected.

Behavioral effects or short-term hearing loss are predicted for humpback whales, fin whales, killer whale, harbor porpoises, harbor seals, Steller sea lions, and sea otters. The most common behavioral response among these species would be displacement. Animals will be displaced to regions outside of the ensonified area. Affected animals may also cease feeding, nursing, breeding, resting, or engaging in other biologically important behaviors. Affected animals are likely to resume normal behaviors soon after leaving the ensonification area or after the activities are complete. These conclusions are based on documented responses of marine mammals to seismic surveys conducted using airgun arrays (e.g. Cerchio et al., 2014; Soule and Wilcock, 2013; Nieukirk et al., 2012; Di Lorio and Clark, 2010; Koski et al., 2009; Weir, 2008; Gailey, Würsig, and McDonald, 2007; Stone and Tasker, 2006; Miller et al., 2005; Nieukirk et al., 2004; Gordon et al., 2003; Moulton and Lawson, 2002; Harris, Miller, and Richardson, 2001; McCauley et al., 2000; Richardson, Wursig, and Greene, 1986). More research is needed to document specific marine mammal responses to sub-bottom profilers versus other survey equipment. Seismic surveys that use airgun arrays typically generate higher sound levels than surveys conducted with sub-bottom profilers, and marine mammals are likely

to have more severe reactions. Therefore, conclusions based on effects of airguns will overestimate effects from this Proposed Survey.

The underwater sound produced by the Proposed Survey is likely to have adverse effects on a few individual marine mammals in Cook Inlet but will not impact the populations. Per the ESA and MMPA, NMFS and USFWS may not authorize impacts to marine mammals that compromise the conservation of these species. These agencies evaluated the effects of HAK's exploration work in Cook Inlet and determined the effects could be authorized (NMFS 2019, USFWS, 2017; 2019; 84 FR 12330; 84 FR 37716). USFWS and NMFS authorizations must be revisited if new information suggests there will be impacts that have not been fully considered. New information has become available on the numbers and trends of marine mammals in the region (Muto et al., 2019), including the Cook Inlet beluga whale population (AFSC, 2020). BOEM has recently conducted a broad assessment of effects of various types of G&G survey equipment and identified those with de minimus effects. New information is available from passive acoustic monitoring of Cook Inlet marine mammals during seismic surveys (Castellote, 2020). BOEM reviewed the new information carefully to determine whether new or additional impacts beyond those already predicted would result from survey noise. The recent information does not change the assessment or conclusions reached by USFWS or NMFS. See Chapter 4, Consultation and Coordination, for additional information.

Vessel Noise and Presence

HAK will use the 115-ft R/V Norseman II or a similar vessel for the Proposed surveys, and the 70-foot R/V Thunder or similar for support activities. Vessels in transit are major contributors to the overall acoustic environment (Richardson et al., 1995). Marine mammals in Cook Inlet are regularly exposed to sound from large vessels in Cook Inlet. A 2012 Cook Inlet vessel traffic study report by Cape International, Inc. (2012) described 480 port calls or transits through Cook Inlet by vessels over 300 gross tons during 2010. Noise from this large-vessel class is characterized by broadband source levels of 160 to 200 dB (Richardson et al., 1995). Small ships (55–85 m) and boats (<55 m) generally emit noise levels of 170–180 dB_{RMS} and 152–170 dB_{RMS} respectively; however, actual noise would vary with individual vessel characteristics (Greene and Moore, 1995). Vessels may also generate noise when using dynamic positioning to maneuver the vessel when anchoring is not possible. Ireland and Bisson (2016) measured source levels from 148.5 dB re 1 μ Pa rms at 1 m at 2,000 Hz to 174.5 dB re 1 μ Pa rms at 1 m at 10 Hz with 100% use of all four thrusters.

Typical responses of marine mammals to vessel noise range from tolerance to avoidance. Most of the studies that have documented responses reported that animals reduced their visibility at the surface and moved away (Lusseau 2003; 2006; Bain et al., 2006). Other responses include increased dive time, increased swimming speed, or change in direction of travel (Kruse, 1991; Evans et al., 1994). Vessels occasionally collide with marine mammals, killing or injuring them. Humpback whales and fin whales are among the marine mammals most prone to vessel strikes. Belugas and other small whales are less common and more agile and therefore less likely to be struck, but vessel strikes have been documented (NMFS, 2019). The best predictor of vessel strikes is speed (Vanderlann and Taggart, 2007). Most deaths occur when vessels are travelling faster than 24 kilometers (km) per hour (km/h) (15 mph or 13 knots (kts)) (Laist et al., 2001).

The low speeds (4–7 kts per hour) used by survey vessels will minimize marine mammal disturbance and likelihood of collision. Furthermore, HAK's 4MP includes use of PSOs to look for marine mammals in the water and avoid close approaches them with when possible. For these reasons, no injuries to marine mammals are expected to occur from vessel operations in

the Proposed Survey area, and the most likely impacts would be a few instances where individual marine mammals are briefly displaced from the vicinity of vessels that are underway. Impacts from vessel traffic would be temporary, localized, and short term. NMFS (2019) concluded the risk of disturbance and collision due to normal vessel operations (other than G&G surveys) was discountable.

Effects to Habitat

Sea otters, Steller sea lions, and beluga whales have designated critical habitat in Cook Inlet. The Proposed Survey will not occur within these areas, nor will the ensonification areas overlap with critical habitat. Although sea lion rookeries and haul-outs are found in lower Cook Inlet, no rookeries or haul-outs are found in or adjacent to the Proposed Survey area. Vessels in transit will pass through critical habitat, causing disturbance and temporarily reducing the value of the habitat. No lasting effects will remain after the vessels depart the immediate area. Zooplankton, fish, and benthic organisms that provide food for marine mammals may be affected by noise from the Proposed Survey when very close to the sound source. No population level effects would occur, and the highly mobile marine mammals of Cook Inlet would be able to find food resources outside of the localized area of impact. Oil and hazardous material spills could occur during HAK's work. The largest possible spill would not exceed the tank capacity of the R/V Norseman II (1,048 barrels), and therefore would not have large widespread effects on marine mammals or their habitat. The largest possible spill would only result from events such as sinking or hull failure, which are extremely unlikely.

Conclusions

BOEM's analyses found that impacts to Cook Inlet marine mammals from noise associated with geohazard survey equipment as described in the Proposed Action would range from negligible to minor. The most likely effects would be behavioral responses that are short-term and non-injurious. Impacts from vessel activities and habitat alteration are not expected. Mitigation measures and monitoring will be conducted as proposed by HAK in the permit application and notice of ancillary activities and as stipulated by incidental take authorizations issued under the ESA and MMPA. Requirements include pre-survey clearances, ramp-up procedures, visual monitoring by PSOs stationed aboard vessels, vessel speed limits, and operational shutdowns. These measures will serve to minimize the impacts of survey noise and vessel traffic on all marine mammals, including whales, seals, dolphins/porpoises, and sea otters.

BOEM has reviewed the proposal to ensure the Proposed Action has been previously been reviewed and fully evaluated in the LS244 FEIS (Section 4.3.6, Marine Mammals). Furthermore, the Proposed Action evaluated here does not entail any additional vessel traffic nor introduce any anthropogenic noise levels/sources not previously considered by NMFS and USFWS for compliance with the MMPA and ESA. NMFS and USFWS evaluated the potential effects of the Proposed Action as part of a suite of exploration activities planned by HAK (NMFS 2019, USFWS, 2017; 2019; 84 FR 12330; 84 FR 37716). They found the Proposed Action, together with the other exploration activities, would result in impacts to a small number of individuals of each marine mammal stock, would have a negligible impact to the affected stocks, and would not have unmitigable adverse effects to the subsistence uses of these stocks. For ESA-listed species, they found the total impact would not jeopardize the continued existence of these species, nor would it adversely modify critical habitats. HAK has also requested Letters of Authorization (LOAs) from USFWS and NMFS to cover these activities under the current (August 1, 2019–August 1, 2024) Incidental Take Regulations (ITRs). The Proposed Survey will contribute only a part of the total impact analyzed and authorized by NMFS and USFWS.

Previous conclusions concerning HAK's proposed survey have been updated with new information, but the scope of work, seasonal timing, type of equipment, area of work, and anticipated impacts have not changed in any substantial way since previous evaluations. Only the year in which work is planned has changed from 2020 to 2021 due to delays caused by COVID-19. The level of effects of the Proposed Survey on marine mammals would therefore be negligible to minor. However, while survey activities have the potential to affect individual marine mammals in Cook Inlet, impacts would be short-term (30 days) and localized.

The Proposed Survey would overlap both spatially and temporally with other current activities that may also affect marine mammals. Reasonably foreseeable future activities that will affect marine mammals include oil and gas exploration, development and production; marine vessel traffic, including shipping; aircraft traffic; subsistence harvest; commercial and recreational activities; and scientific activities. Effects from these activities include exposure of marine mammals to increased noise and pollution from coastal development and/or oil and gas activities; increased risk of strikes, noise disturbance, and/or pollution from vessel and aircraft traffic; competition for prey with, and potential entanglement from, commercial, recreational, and subsistence fisheries; mortality from subsistence hunting (a moratorium was placed on hunting beluga whales in 2005, but subsistence hunting of other marine mammals, especially seals and sea otters, still occurs); and disturbance or mortality associated with scientific studies. Despite the continued exposure to these activities, most marine mammal populations remain stable to increasing in Cook Inlet. This includes the listed population of fin whales, humpback whales, and Steller sea lions, but does not include beluga whales, whose population continues to decline.

The activities proposed by HAK are likely to result in an incremental contribution to the impacts of other activities already affecting marine mammals in Cook Inlet. However, only a small fraction of any population of marine mammal in Cook Inlet is likely to be affected by HAK's activities. Required monitoring and mitigation measures, designed to minimize interactions between HAK's activities and marine mammals, will help limit the severity of any interactions and ensure there will be no effects to marine mammals at the population level. Therefore, the Proposed Survey is expected to contribute a minor increase over and above the effects of other activities that are already occurring or are expected to occur in the timeframe of the Proposed Survey. An incremental increase in the impacts to marine mammals in Cook Inlet that is minor and temporary is not expected to result in a significant impact to the human environment.

3.6.2.2 No Action Alternative

Under the No Action Alternative, BOEM would not authorize the Proposed Action and the Proposed Survey would not occur. There would be no effects on marine mammals attributable to the Proposed Survey.

3.7 Subsistence Activities

3.7.1 Affected Environment

Residents of Seldovia, Port Graham, and Nanwalek are the primary subsistence harvesters in the lower Kenai Peninsula and lower Cook Inlet. Five species of Pacific Salmon, Pacific halibut, and invertebrates (e.g., clams, chitons, octopuses) are the most important marine resources used for subsistence purposes by households in the four communities (Jones and Kostick, 2016). Some halibut and cod are harvested using subsistence longlines, and residents who fish commercially often remove salmon and halibut from their commercial catches for subsistence

purposes (Fall and Koster, 2017; Jones and Kostick, 2016). A substantial amount of subsistence fishing occurs 20 to 40 mi offshore inside the lower Cook Inlet.

During mid-June and extending through September, residents of Seldovia fish for salmon in marine waters using a variety of methods. Seldovia residents harvest halibut and Pacific cod offshore with rod and reel, and they harvest clams and mussels in near shore areas (Jones and Kostick, 2016). Harvesters travelled up to 40 mi from town in search of salmon and reported focusing search efforts in marine waters to the west of Seldovia (Jones and Kostick, 2016).

Residents of Nikiski travel to the waters of lower Cook Inlet to participate in offshore salmon and halibut fisheries and to Chinitna Bay to harvest clams (Jones and Kostick, 2016).

Harvesters in Nanwalek and Port Graham primarily search for salmon, halibut, harbor seals (and sometimes sea lions), and marine invertebrates in nearshore waters. Residents of Port Graham practice some halibut fishing farther offshore to the north and west of town (Jones and Kostick, 2016).

Subsistence activities in Cook Inlet occur within the context of climate-related environmental changes that affect subsistence resources and communities. Changing conditions in the region could affect timing of fish and animal migrations and shifts in distribution or abundance of species used for subsistence purposes. For example, shellfish harvested for subsistence could decline due to ocean acidification, invasive species, and/or other changing conditions in benthic habitats. The environmental conditions affecting subsistence resources and communities are expected to continue to change in response to climate change and related impacts.

3.7.2 Impacts

3.7.2.1 Proposed Action

For Nanwalek and Port Graham, there would be no spatial overlap of the Proposed Action with subsistence use areas, which are located closer to shore (Jones and Kostik, 2016). There is potential for overlap in time and space of the Proposed Action with offshore salmon, halibut, and cod subsistence fishing for residents of Nikiski and Seldovia. The survey area is located approximately 25–30 mi from Seldovia and is within the area used by Seldovia harvesters for fishing. When harvesters travel to and from fishing and clamming grounds and while fishing, there could be short-term and localized space-use conflicts and interferences between the survey vessel and subsistence fishing vessel.

Most subsistence fishing occurs mid-June through September. HAK's proposed activities are expected to be conducted between June and October 31, 2021 and would take 30 days. Consequently, there is potential for overlap between the project and subsistence fishing, depending on when the survey occurs within the proposed time period.

BOEM estimates short-term and localized impacts to offshore subsistence fishing. The impacts would be temporary and occur in specific places in or near the survey area. Interference from space-use conflicts could delay subsistence fishers and they could miss some potential harvest. They would have prior notification of the specific timing of the activity and would most likely have time to fish at other locations during any single trip and at other times and places during the season. For nearshore subsistence fishing and harvest of seals and marine invertebrates near the communities, BOEM estimates little to no adverse impacts from the Proposed Survey because there would be no space-use conflicts.

HAK has implemented a Stakeholder Engagement Program that would help minimize conflicts with other user groups in lower Cook Inlet including subsistence users, along with port authorities, fishing organizations, and interested individuals. HAK would coordinate with these groups to avoid conflicts to the maximum extent practicable. In addition, HAK would work with USCG to publish a Notice to Mariners to inform vessel operators of location and timing of their activities.

Relevant ongoing activities in Cook Inlet, listed in Table 3-1, that could overlap with the short-term and localized impacts from the Proposed Action include vessel traffic associated with industrial activities, commercial and recreational fishing, and other vessel traffic near the survey area. Space use conflicts with vessels associated with other activities could enlarge the area in which subsistence fishers from Seldovia and Nikiski encounter potential conflict with other vessels, if the activities occur near, and at the same time as, the Proposed Action. While vessel traffic supports oil and gas activities in State waters, existing SOA oil and gas units are well north of the Proposed Survey area (ADNR, 2020) and are not expected to overlap with survey vessels. Commercial and recreational fishing are ongoing activities in Cook Inlet, and there is potential for space use conflicts to occur between different fishing groups. An aspect of subsistence fishing in Cook Inlet to note when considering overlap with commercial fishing is that some subsistence harvesters from Seldovia and Nikiski also fish commercially and remove a portion of their harvest for subsistence use (Jones and Kostick, 2016). For these harvesters, commercial and subsistence fishing activity is essentially one and the same. Overall, interactions of impacts of other activities in Cook Inlet with impacts from the Proposed Action would remain short-term and localized, given the limited area affected by the Proposed Action (relative to the entire lower Cook Inlet) and the short timeframe of the activity. Long-term impacts on subsistence activities in Cook Inlet related to climate-driven ecosystem changes are unlikely to influence the analysis of the impacts from the Proposed Survey. This is because the potential Proposed Survey's impacts would be highly localized and brief (i.e., often measured in days), and are unlikely to carry over to future subsistence harvest seasons.

In conclusion, there is potential for space-use conflicts between subsistence fishing vessels and survey vessels used in the Proposed Survey. Overall, BOEM estimates negligible to minor impacts to subsistence activities from the Proposed Survey.

3.7.2.2 No Action Alternative

Under the No Action Alternative, BOEM would not approve HAK's Permit Application and the Proposed Survey would not occur. However, such conflicts would be short term and localized and would be reduced through notification procedures that allow subsistence fishers to target other areas during specific survey activities. There would be no adverse impacts to subsistence activities as a result of the Proposed Survey.

3.8 Sport Fishing

3.8.1 Affected Environment

There are a number of saltwater sport fishing opportunities in the lower Cook Inlet fisheries management area, including fishing for halibut and rockfish in Kachemak Bay and lower Cook Inlet, trolling for salmon during seasonal migrations, trolling for Chinook salmon year-round in these waters, and harvesting clams from beaches in Cook Inlet and the south side of Kachemak Bay. Section 3.3.7 of the Cook Inlet LS 244 FEIS provides more detailed information about sport fisheries in Cook Inlet.

In the lower Cook Inlet management area, saltwater king salmon fishing occurs year-round in the nearshore waters of Kachemak Bay and east Cook Inlet. The sport fishery targets a mixture of Chinook salmon stocks. Mature (spawning) king salmon are caught April through August in the summer fishery, while immature king salmon are caught year-round.

Sport fishers access the sport fisheries in lower Cook Inlet via the Sterling Highway. Ninilchik, Deep Creek, Anchor Point, and Homer have many services to support fishing charter boats and individual sport fishers. Daily air charter services are available from Anchorage to Homer. Access to sport fisheries is possible via boat, water taxi, and private charter. Some sport fishing charters launch from the beach.

3.8.2 Impacts

3.8.2.1 Proposed Action

Most sport fishing occurs mid-June through September. HAK plans to complete the Proposed Survey in early Spring, if possible, but may have to extend operations through October. Thus, there would be some potential for overlap with the peak sport fishing season. The primary impact would be from short-term and extremely localized displacement of fishing boats and charters from fishing grounds when the one or two boats associated with the Proposed Action were actively surveying. Changing environmental conditions could affect access to sport fishery resources.

HAK has implemented a stakeholder engagement program to enable survey operators and sport fishers to clearly communicate schedules and timing of their spring and summer activities, to minimize or avoid space-use conflicts and vessel interference. Since August 2018, HAK has sought input from stakeholders. HAK has been in regular communication with stakeholder groups via email and meetings, and provided presentations to tribal groups, fisherman/guide groups, the Cook Inlet Regional Citizens Advisory Council, and relevant city managers.

For sport king salmon fishing that occurs in April to mid-June and October, there would be little to no adverse impacts because it occurs in nearshore waters outside the survey area. There will be little to no impacts to people clamming on beaches because there would be no space-use conflicts with the Proposed Survey.

The effects of climate change could be long-lasting and widespread and will continue much longer than the potential effects from the Proposed Survey. Effects from all other activities could be exacerbated by impacts from climate change. Climate change could affect timing of fish migrations and spawning events. Changing environmental conditions could affect access to sport fishery resources. Sport fishing opportunities could be adversely affected by shifts in fishing seasons due to shifts in distribution or abundance of species caught in sport fisheries. Coastal communities of the lower Kenai Peninsula could experience economic losses due to decreased sport fishing in the area. The short-lived Proposed Survey would not substantially increase the effects of climate change or appreciably add to impacts from other activities.

In conclusion, BOEM estimates negligible to minor adverse impacts to sport fisheries from the Proposed Survey.

3.8.2.2 No Action Alternative

Under the No Action Alternative, BOEM would not approve the Proposed Action and the Proposed Survey would not occur. There would be no adverse impacts to sport fishing activities as a result of the Proposed Survey.

3.9 Commercial Fishing

3.9.1 Affected Environment

All five species of Pacific salmon, Pacific herring, and smelt are commercially harvested in the Cook Inlet area. Section 3.3.2 of the Cook Inlet LS 244 FEIS provides more detailed information about commercial fisheries in Cook Inlet. Commercial fishers harvest numerous groundfish species including Pacific halibut, Pacific cod, sablefish, lingcod, and black rockfish (BOEM, 2016; ADF&G, 2018a). Species commercially harvested in the Cook Inlet area are octopus, razor clams, and scallops. Managers have divided commercial fisheries in Cook Inlet into two distinct management areas: the Upper Cook Inlet Management Area and the Lower Cook Inlet Management Area (ADF&G, 2018b). The Upper Cook Inlet Management Area is outside the Proposed Survey area and would not be impacted by the Proposed Survey.

The Lower Cook Inlet Management Area is located within the Proposed Survey area. It is comprised of all waters west of the longitude of Cape Fairfield, north of the latitude of Cape Douglas, and south of the latitude of Anchor Point. Commercial salmon fishing in federal waters, where the Proposed Survey will take place, was shut down in 2020 by the North Pacific Fisheries Management Council (NPFMC) and remains closed. Commercial salmon fishing may still occur within state waters. Commercially harvested chum and sockeye are the most economically valuable salmon in lower Cook Inlet. Commercial salmon fishing occurs in early June through mid-September. The estimated commercial salmon harvest for 2018 was 2.0 million salmon, including 381 Chinook, 370,460 sockeye, 15,387 silver, 1.6 million pink, and 48,729 chum salmon (ADF&G, 2018c).

Cook Inlet provides opportunity for commercial harvest of halibut, rockfish, and other groundfish. Authorities manage the Pacific Halibut Stock under the Pacific Halibut treaty between Canada and the United States. Lower Cook Inlet is within Pacific Halibut Regulatory Area 3A, which includes the ports of Homer, Kodiak, and Seward (IPHC, 2018). The commercial halibut season usually occurs from late March to early November.

Important stakeholders in these fisheries include two commercial fishing associations with oversight of activities in Cook Inlet. The Kenai Peninsula Fishermen's Association and the United Cook Inlet Drift Association focus on activities in Cook Inlet and get involved with local issues and projects.

3.9.2 Impacts

3.9.2.1 Proposed Action

The geohazard survey vessel could have very short-term and localized space-use conflicts with commercial fishing activities, which could be readily mitigated with careful planning and timing with commercial fishery openings (Impact Assessment, Inc., 2004, p. 56). The Proposed Survey occurs south of the federal waters that were targeted by gillnetters prior to the 2020 shutdown of

commercial salmon fishing in federal waters, and is outside of State waters, where gillnetting for salmon is still permitted.

To mitigate any impacts, HAK has convened a stakeholder engagement program to enable survey operators and commercial fishers to clearly communicate schedules and timing of their activities, which would minimize or avoid space-use conflicts and vessel interference. The operator would also issue a Local Notice to Mariners, which would specify the survey dates and locations and recommended avoidance requirements for commercial fishers.

Changing environmental conditions could affect access to commercial fishery resources. The short-lived Proposed Survey would not substantially increase the effects of climate change or appreciably add to impacts from other activities. BOEM estimates the minor increase in vessel activity from the Proposed Survey could result in spatially localized and short-term, thus minor, adverse impacts to commercial fishing.

3.9.2.2 No Action Alternative

Under the No Action Alternative, BOEM would not authorize the Proposed Action and the Proposed Survey would not occur. There would be no adverse impacts to commercial fishing activities as a result of the Proposed Survey.

3.10 Archaeological Resources

3.10.1 Affected Environment

Archaeological resources are any material remains of human life or activities that are at least 50 years of age and that are of archaeological interest (30 CFR 551.1). Underwater archaeology can be divided into two discrete parts: (a) shipwrecks and aircraft and any remains associated thereof and (b) submerged landscapes and sites, both prehistoric and historic, that have been inundated by rising sea levels.

A review of the Alaska Heritage Resources Survey and NOAA's Automated Wreck and Obstruction Information System did not reveal previously recorded ship or plane wrecks or other obstructions in the lease blocks identified for geotechnical survey. However, the LS244 FEIS, which included the specified lease blocks, indicates 68 known wrecks, obstructions, archaeological sites, occurrences, or sites marked as "unknown" were identified within or in the vicinity of the proposed lease sale area. The exact locations and conditions of many of these features is not known, and it is possible that additional unrecorded shipwrecks occur in Cook Inlet.

Evidence of prehistoric coastal cultures may exist in areas of Cook Inlet that were once above sea level and available for human occupation. The LS244 FEIS describes the criteria BOEM applied in a prehistoric resource analysis to identify high probability locations for paleolandforms within the Lease Sale area. A portion of the survey area is within the region of Cook Inlet identified as potential prehistoric resource areas. BOEM prohibits disturbing archaeological resources while conducting survey activities.

3.10.2 Impacts

3.10.2.1 Proposed Action

Seafloor disturbing activities described in the Proposed Action include collection of soil core samples and cone penetration tests to allow HAK to assess soil characteristics on their lease blocks within the Proposed Survey area. The coring and cone penetration locations will be surveyed during the geohazard survey and determined clear of anomalies and surface hazards before sampling. Any such anomalies and surface hazards, if discovered, would be avoided, unless a qualified marine archeologist reviews the survey data and determines the anomalies do not represent historic properties. The probability of disturbing a submerged and buried prehistoric site is considered unlikely given the limited scope of seafloor disturbance over a large area. BOEM's archaeological resource protection NTL (2005-A03) includes requirements for protection of resources discovered in the course of survey activities. Examination of the lease blocks for potential historic and prehistoric resources is one of the objectives of the Proposed Survey, so the activity has potential to contribute to overall understanding of submerged archaeological resources in Cook Inlet. Overall, little to no, and therefore negligible, impacts on archaeological resources are expected to result from the Proposed Survey.

3.10.2.2 No Action Alternative

Under the No Action Alternative, BOEM would not authorize the Proposed Action and the Proposed Survey would not occur. There would be no disturbance attributable to the Proposed Survey and no effects on archaeological resources.

3.11 Environmental Justice

There is an important nexus between a subsistence way of life and environmental justice communities. The Council on Environmental Quality (CEQ) directs Federal agencies to consider populations with differential patterns of subsistence consumption of fish and wildlife. BOEM focused this environmental justice analysis on Section 4-4 of Executive Order 12898, entitled Subsistence Consumption of Fish and Wildlife, to address human populations with differential patterns of subsistence. Any high and adverse environmental effects to subsistence activities or resources from the Proposed Survey could disproportionately affect those communities or populations that depend most on subsistence resources (CEQ, 1997). Nikiski, Seldovia, Nanwalek, and Port Graham have disproportionately high consumption patterns of fish and wildlife and other subsistence resources compared to the Kenai Peninsula as a whole.

Overall, BOEM estimates that impacts to the following resources would range from negligible to minor: air quality, water quality; fish and invertebrates; birds; marine mammals; and subsistence activities and harvest patterns. These effects do not constitute disproportionately high and adverse impacts to Nikiski, Seldovia, Nanwalek, and Port Graham. In conclusion, there would be no disproportionately high and adverse impacts to environmental justice communities from the Proposed Survey.

CHAPTER 4. CONSULTATION AND COORDINATION

4.1 Endangered Species Act Consultation

Section 7(a)(2) of the ESA requires Federal agencies to ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in the adverse modification of designated critical habitat. BOEM has participated in ESA consultation with both USFWS and NMFS concerning the effects of oil and gas leasing and exploration activities in Cook Inlet (NMFS 2017, 2019; USFWS, 2017). In 2017, NMFS provided BOEM with a non-jeopardy BO but deferred the issuance of an incidental take statement until specific projects were proposed. In 2017, USFWS provided BOEM with a non-jeopardy BO, an incidental take statement, and non-discretionary RPMs and T&Cs. USFWS also provided revised RPMs and T&Cs soon thereafter.

In 2018, HAK applied to USFWS for an ITR under the MMPA. The analyses for the ITR indicated a need for BOEM to reinitiate consultation on the BO to clarify the acoustic thresholds and distances from the vessel that are necessary to avoid or minimize take of sea otters. BOEM reinitiated consultation, and in 2019 the USFWS provided an Incidental Take Authorization (84 FR 37716) and an updated BO with revised RPMs/T&Cs (USFWS, 2019).

In 2018, HAK and Harvest Alaska also applied to NMFS for an ITR under the MMPA. NMFS conducted an ESA consultation on HAK's proposed activities in which BOEM was a co-action agency (AKRO-2018-00381; NMFS, 2019). This consultation focused on the specific details of actions, including G&G surveys, rather than the broad suite of possible activities considered under the Lease Sale BO (NMFS, 2017). NMFS issued a non-jeopardy BO and incidental take statement, with RPMs and T&Cs (NMFS, 2019). NMFS also issued an incidental take authorization to HAK under the MMPA (84 FR 37716).

In 2019, the Center for Biological Diversity and Cook Inlet Keeper challenged NMFS' issuance of an ITR for proposed activities in Cook Inlet. The legal challenge stated that NMFS did not adequately analyze the effects of tugboat noise on beluga whales. The tugboats would be used to tow drilling rigs necessary to drill production wells at existing HAK platforms, and/or to drill exploratory wells at new sites (where those new sites could be determined as a result of the surveys proposed here). On May 29, 2021, the Alaska District Court (Court) vacated HAK's approval to use tugboats to tow drill rigs to sites other than the Tyonek Platform. However, the Court did not vacate HAK's other activities that were included in the ITR, including those described here.

BOEM has determined that HAK's Proposed Survey has not changed substantially and is fully within the scope of oil and gas leasing and exploration activities analyzed in the USFWS and NMFS BOs (USFWS, 2017; 2019; NMFS, 2017; 2019). A re-initiation of ESA consultation is triggered if there is a change that affects the listed species or critical habitat in a manner not considered in a BO. G&G surveys were planned and evaluated under the existing BOs. Some minor project details have changed since the BOs were completed, but these do not affect the evaluations and determinations because conservative estimates were used in these BOs in anticipation of minor changes. For example, USFWS and NMFS used higher than average sound source levels in their sub-bottom profiler calculations to ensure that the specific equipment selected would not generate more noise than predicted. Although HAK's actions, planned for 2020, were delayed due to Covid-19, the BO remains valid. BOEM considered the effects of conducting the Proposed Survey work in 2021 rather than 2020 and found no effects that were not evaluated previously.

BOEM has evaluated all available new information about the Proposed Action and ESA-listed species. New information can trigger reinitiation of a BO, specifically when "new information reveals effects of the agency action on listed species or designated critical habitat in a manner or to an extent not considered," per 50 CFR 402.16(a)(2). The new information on Unusual Mortality Events (NOAA, 2021), recent strandings (Fairweather Science, LLC, 2020; also see Appendix B), and size of the Cook Inlet Beluga population (AFSC, 2020) was carefully considered to determine whether reinitiation was warranted. NMFS and BOEM corresponded regarding Cook Inlet belugas early in 2020. NMFS examined the recent trend data in the context of the 2019 BO and informed BOEM that the new population numbers did not alter the previous conclusions. NMFS directed BOEM that reinitiating ESA consultation was not necessary (NMFS Memo to BOEM dated March 23, 2020, Appendix B). Otherwise, the circumstances surrounding HAK's proposed activities remain largely unchanged, and no new scientific studies, regulatory changes, or other information that would influence BOEM's analysis of impacts have become available. As detailed above, nothing in the Proposed Action represents a change or departure from those activities or impacts already considered in the LS244 FEIS and associated consultations. BOEM does not intend to reinitiate consultation for the Proposed Action.

4.2 Essential Fish Habitat Consultation

The Magnuson-Stevens Fishery Conservation and Management Act (16 USC 1801-1884) mandates the identification of Essential Fish Habitat (EFH) for managed species and requires Federal agencies to consult with NMFS on actions that may adversely affect EFH. The NPFMC has produced several Fishery Management Plans (FMPs) that identify EFH for Alaska waters. Those FMPs relevant to the Proposed Survey area are for salmonids (NPFMC, 2012), GOA groundfish (NPFMC, 2015), and scallops (NPFMC, 2014). BOEM provided an EFH assessment to NMFS regarding the potential effects on EFH for Pacific salmon, groundfish, and scallops for Cook Inlet Lease Sale 244. The EFH consultation included the area of the current Proposed Survey and was completed on November 21, 2016. That consultation also included potential survey activities of the type proposed here. NMFS did not provide any conservation recommendations. Therefore, BOEM considers its consultation obligations to be complete with respect to HAK's Proposed Survey.

4.3 National Historic Preservation Act (Section 106) Consultation

The Proposed Survey constitutes an undertaking under Section 106 of the National Historic Preservation Act and its regulations, 36 CFR Part 800. In accordance with Section 106, BOEM consulted with the State Historic Preservation Officer (SHPO) via letter dated March 16, 2021. The geotechnical survey activities (core sampling and cone penetration tests) have potential to affect historic properties because they include seafloor disturbance. In its letter to SHPO, BOEM indicated its finding that no historic properties would be affected by the proposed activities. The coring and cone penetration locations would be surveyed during the geohazard survey and determined clear of anomalies and surface hazards before sampling. Any such anomalies and surface hazards, if discovered, would be avoided, unless a qualified marine archeologist reviews the survey data and determines the anomalies do not represent historic properties. While BOEM cannot rule out the presence of submerged and buried prehistoric sites, the probability of disturbing one during this survey is considered unlikely given the limited scope of seafloor disturbance over a large area. The survey itself is intended to help identify potential historic and prehistoric resources on these lease blocks and may contribute to overall understanding of submerged archaeological resources in Cook Inlet. In a letter dated March 26, 2021 SHPO responded its concurrence with BOEM's finding.

4.4 Public Involvement

BOEM notified the public of its receipt of the HAK 2021 G&G Survey Application on February 10, 2021 through its website. BOEM then commenced a review of the Permit Application to verify its completeness. A notice of preparation of an EA to evaluate the environmental impacts of the Proposed Action was published on March 11, 2021 at <https://www.regulations.gov> (docket BOEM-2021-0023) and posted on the Alaska OCS Region website. The notice stated that BOEM was seeking public involvement for preparing an EA of a geohazard survey in Cook Inlet. Comments were accepted through March 22, 2021. BOEM received three public comments from non-government organizations. Issues identified in the public comments included: inadequacy of the marine mammal mitigation measures required by NMFS (84 FR 37442), including concern for beluga whales; fish population declines in Cook Inlet due to climate change (specifically Pacific Cod); and the climate crisis as related to oil and gas leasing in Cook Inlet. BOEM’s consideration of these comments is included in Appendix C.

4.5 Preparers

The individuals responsible for preparing this EA are listed below:

Name	Role in NEPA Process
Meghan Cornelison	Subsistence, Archaeology, Environmental Justice
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APPENDIX A

Marine Mammal Monitoring and Mitigation Plan

**MARINE MAMMAL MONITORING AND MITIGATION PLAN
FOR
HILCORP ALASKA, LLC
2021 SHALLOW HAZARD PROGRAM IN
LOWER COOK INLET, ALASKA**

Prepared for

Hilcorp Alaska, LLC

3800 Centerpoint Drive, Suite 1400

Anchorage, Alaska 99503



March 2021

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ACRONYMS AND ABBREVIATIONS

4MP	Marine Mammal Monitoring and Mitigation Plan
BOEM	Bureau of Ocean Energy Management
dB re 1 μ Pa	decibels referenced to one microPascal
EZ	Exclusion Zone
Hilcorp	Hilcorp Alaska, LLC
hrs	hours
ITR	Incidental Take Regulations
km	kilometers
L _{pk}	peak level
LOA	Letters of Authorization
m	meters
MMPA	Marine Mammal Protection Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
OCS	Outer Continental Shelf
PSO	Protected Species Observer
PTS	permanent threshold shift
rms	root-mean-square
SEL	sound exposure level
SPL	sound pressure level
SSV	sound source verification
SZ	Safety Zone
TTS	temporary threshold shift
USFWS	United States Fish and Wildlife Service

1.0 INTRODUCTION

Hilcorp Alaska, LLC (Hilcorp) petitioned the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) and the United States Fish and Wildlife Service (USFWS) to promulgate regulations pursuant to Section 101(a)(5) of the Marine Mammal Protection Act (MMPA) for the non-lethal unintentional taking of small numbers of marine mammals incidental to oil and gas exploration, development, and production activities in Cook Inlet, Alaska for the period of five years beginning August 1, 2019 extending through August 1, 2024. Hilcorp requested and received Letters of Authorization (LOAs) from NMFS and USFWS for activities in the first year (Year 1) under the promulgated incidental take regulations (ITRs) for the period of August 1, 2019 through August 1, 2020 and for the second year (Year 2) April 1, 2020 through April 1, 2021. Additionally, Hilcorp requested an LOA from NMFS and USFWS for the third year (Year 3) from April 1, 2021 through March 31, 2022.

The geographic area of activity for the shallow hazard program covers a total of approximately 228 square kilometers (km²) in Cook Inlet. It includes Federal Bureau of Ocean Energy Management (BOEM) Outer Continental Shelf (OCS) waters.

This document summarizes the marine mammal monitoring and mitigation plan (4MP) for the shallow hazard activities planned for 30 days between April 1, 2021 and October 31, 2021. The preferred survey window will be in the fall to accommodate additional planning time required as a result of the Covid-19 pandemic and to avoid potential conflict with subsistence activities in the spring and summer. Marine mammal monitoring and mitigation methods have been designed to meet the requirements and objectives typically specified in LOAs; after the LOAs have been issued any additional requirements will be incorporated into a revised 4MP.

2.0 MONITORING AND MITIGATION

Hilcorp will implement a robust monitoring and mitigation program for the protection of marine mammals using NMFS/USFWS approved Protected Species Observers (PSOs) during shallow hazard activities. Marine mammal monitoring and mitigation methods have been designed to meet the requirements and objectives specified in the ITRs promulgated by NMFS and USFWS and associated LOAs to date. Should additional provisions be required in the Year 3 LOAs, this 4MP will be updated accordingly.

Hilcorp will use the following PSOs for the program:

- 2 PSOs on source vessel, 1 on watch at a time

The specific objectives of the monitoring and mitigation program provide:

- the basis for real-time mitigation, as required by the various permits;
- information needed to estimate the number of “takes” of marine mammals by harassment, which must be reported to NMFS and USFWS;
- data on occurrence, distribution, and activities of marine mammals in the areas where the activity covered by the LOA was conducted; and,
- information to compare distances, distributions, behaviors, and movements of marine mammals relative to the activity covered under the LOA.

2.1 MONITORING

2.1.1 Protected Species Observers

Shallow hazard operations will be conducted 24-hours (hrs) a day, but the sub-bottom profiler will be used only during daytime hours. PSOs will be on watch during all daylight periods. The PSOs will watch for marine mammals from the best available vantage point on the source vessel. Ideally this vantage point is elevated, stable, and provides the PSOs with an unobstructed 360° view of the water. The PSOs will systematically scan with the naked eye and with binoculars. One PSO will be on watch at a time for no more than 4 hrs in a row.

2.1.2 Equipment

Monitoring equipment includes:

- Hand-held binoculars (7X magnification or better) with built-in reticles
- GPS equipment
- Rangefinder
- Digital camera
- Data collection system
- VHF radios, portable radios, and cell phones for communication

2.1.3 PSO Handbook

A PSO handbook with specifics of the program will be prepared and distributed to all PSOs during training. The handbook will contain copies of important documents (e.g., LOAs, 4MP), descriptive text, and maps, and is intended to provide reference material and guidance to trained PSOs. The following topics will be covered in the PSO Handbook:

- Summary description of the project, marine mammals and underwater sound energy, the 4MP, the NMFS and USFWS LOAs, and other regulations/permits.
- Responsibilities of PSOs and vessel crew regarding the 4MP.
- Instructions for PSOs and vessel crew regarding the 4MP.
- Monitoring and mitigation objectives and procedures, including Level A and Level B harassment zones, as well as the exclusion and safety zones.
- List of species that might be encountered: identification, natural history, behavior.
- Use of specialized field equipment (e.g., reticle binoculars, GPS, rangefinders).
- Reticle binocular distance scale.
- Data recording procedures.
- Data QA/QC and submission procedures.
- Table of wind speed, Beaufort wind force, and sea state codes.
- Offshore safety precautions.
- Crew and/or personnel discord; conflict resolution.
- Drug and alcohol policy and testing.
- Scheduling of watches.
- Communication protocol.
- Suggested literature or literature cited.
- Field reporting requirements and procedures.

2.1.4 Data Collection

Environmental conditions, marine mammal sightings, and project activities data will be collected either electronically or via hardcopy. Both electronic and hardcopy paper forms will consist of the same variables and collect the same information.

PSOs will document environmental and sighting data objectively and accurately. High quality data records ensure accurate data interpretation and will facilitate post-season data QA/QC, analyses, and reporting. Survey data will also contribute to existing scientific knowledge, inform management decisions, and determine permit stipulations.

2.1.4.1 Effort Data

The PSOs will document monitoring efforts, environmental conditions, and project activities. PSOs will document the start and stop times of all monitoring efforts. Environmental conditions will be documented at the beginning and end of every monitoring period and every half hour, or as conditions change. Data collected will include PSO names, vessel name, time and date of observation, location, water depth, sea state, visibility, glare, and cloud cover. PSOs will also document the vessel activity, speed, and mitigation measures implemented. Clearing, ramp up, and shut down timing will be recorded.

2.1.4.2 Sightings Data

All marine mammals observed will be documented. The data collected will include date, start and end times of the sighting, location, species, group size, age class, behavior, distance at first observation, closest observed distance from the vessel, vessel activity, potential behavioral reaction, and mitigation measure(s) enacted (if necessary).

2.2 MITIGATION MEASURES

2.2.1 Applicable Noise Criteria

Under the MMPA, NMFS and USFWS have defined levels of harassment for marine mammals. Level A harassment is defined as "...any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal or marine mammal stock in the wild." Level B harassment is defined as "...any act of pursuit, torment, or annoyance which 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."

For Level A, the NOAA Technical Memorandum NMFS-OPR provides guidelines for assessing the onset of permanent and temporary threshold shifts (TTS, PTS) from anthropogenic sound. Under this guideline, marine mammals are separated into five functional hearing groups; source types are separated into impulsive and non-impulsive and require analyses of the distance to the peak received sound pressure level (SPL, L_{pk}) and 24-hr cumulative sound exposure level (SEL_{24h}). The Level A thresholds for otariid pinnipeds are considered a proxy for sea otters.

The current NMFS Level B (disturbance) threshold for assessing disturbance for impulsive sound is 160 decibels referenced to one microPascal (dB re 1 μ Pa) root mean square (rms) for impulsive and 120 dB re 1 μ Pa rms for non-impulsive sound for all marine mammals. The current USFWS Level B (disturbance) threshold for both impulsive and non-impulsive sounds is 160 dB re 1 μ Pa rms.

Table 1 provides a summary of the disturbance guidelines. For purposes of this section, all underwater SPLs are reported as dB re 1 μ Pa.

Table 1. Summary of NMFS acoustic thresholds.

Marine Mammals	Injury (Level A) Threshold		Disturbance (Level B) Threshold	
	Impulsive	Non-Impulsive	Impulsive	Non-Impulsive
Low-Frequency Cetaceans	219 dB L _{pk} 183 dB SEL	199 dB SEL	160 dB rms	120 dB rms
Mid-Frequency Cetaceans	230 dB L _{pk} 185 dB SEL	198 dB SEL	160 dB rms	120 dB rms
High-Frequency Cetaceans	202 dB L _{pk} 155 dB SEL	173 dB SEL	160 dB rms	120 dB rms
Phocid Pinnipeds	218 dB L _{pk} 185 dB SEL	201 dB SEL	160 dB rms	120 dB rms
Otariid Pinnipeds	232 dB L _{pk} 203 dB SEL	219 dB SEL	160 dB rms	120 dB rms
Sea Otters	232 dB L _{pk} 203 dB SEL	219 dB SEL	160 dB rms	

The calculated distances to the Level A and Level B thresholds for the sub-bottom profiler are provided in Section 6 of the ITR petition and LOA application. The distances are summarized in Table 2.

Table 2. Calculated distances (in meters) to NMFS and USFWS thresholds.

LF Cetaceans		MF Cetaceans		HF Cetaceans		Phocids		Otariids/Sea Otters		All
219 dB L _{pk}	183 dB SEL	230 dB L _{pk}	185 dB SEL	202 dB L _{pk}	155 dB SEL	218 dB L _{pk}	185 dB SEL	232 dB L _{pk}	203 dB SEL	160 dB rms
<1	19	<1	1	5	277	<1	12	<1	<1	2,929

2.2.2 Description of Exclusion and Safety Zones

The Exclusion Zone (EZ) is defined as the area in which all sub-bottom profiler operations are **shut down** in the event a marine mammal enters, or is about to enter this zone. There are different EZs depending on the species. The EZ for sea otters is based on USFWS requirements, which are different than NMFS for Level A. Shut down will occur whenever a beluga whale is observed at any distance from project vessels.

The Safety Zone (SZ) is an area larger than the EZ that can be adequately monitored. The SZ does not always match the Level B zone as it is based on what is considered reasonable for detection of marine mammals by PSOs. The Level B zone is a larger zone based on the distance to the 160-dB disturbance zone. Table 3 summarizes the applicable zones for the shallow hazard program.

Table 3. Radii of exclusion zone (EZ), safety zone (SZ), and Level B zone for sub-bottom profiler from LOAs.

Exclusion Zone (EZ) Radius		Safety Zone (SZ) Radius		Level B Zone Radius
Sea Otters	All Other Marine Mammals	All Other Marine Mammals	Sea Otters	All Marine mammals
50 m	100 m	1,500 m	3,000 m	3,000 m

2.2.3 Sound Source Verification Survey

Hilcorp will conduct a sound source verification (SSV) of the sub-bottom profiler to characterize the sound levels, propagation characteristics, calculate distances to the appropriate thresholds, and to verify the monitoring zones. The results of the SSV will be submitted to NMFS and USFWS within 72 hrs of completion with the request for modification of the Level A and B distances and SZ for sea otters and beluga whales, if warranted.

2.2.4 Mitigation Measures

2.2.4.1 Clearing Zone

Because the NMFS LOA is for 1-year of Hilcorp activity throughout Cook Inlet, Level A and B takes must be managed for all Hilcorp operations, not just the sub-bottom profiler activity. Therefore, we have defined a **Clearing Zone** that may be adjusted throughout the project, depending on the tally of exposures.

- 3,000 meters (m) for beluga whales, Dall’s porpoises, and minke whales (based on Level B zone)
 - *Annual Level B takes for Dall’s porpoises and minke whales were exceeded for the 2019 3D seismic activity and Hilcorp will operate with a more conservative clearing zone as a result.*
- 100 m for all other marine mammals (based on EZ)
- 50 m for sea otters (based on EZ)

Prior to the start of sub-bottom profiler activity for the day, or when activities have been stopped for longer than a 30-minute period, the PSO will clear the Clearing Zone for a period of 30 minutes. This means no marine mammals have been observed within the species-specific Clearing Zone for that 30-minute period. If any marine mammals have been observed within their respective Clearing Zones, ramp up cannot start until the marine mammal has left its respective Clearing Zone or has not been observed for a 30-minute period.

For the entire project, during periods of low visibility (such as nighttime, fog, or inclement weather), the use of the sub-bottom profiler is not allowed if the Clearing Zone is not visible. Operations may continue if already operating when fog/weather came in.

2.2.4.2 Shut Down Procedures

A shut down occurs when all sub-bottom profiler activity is suspended. The sub-bottom profiler will be shut down completely if a marine mammal approaches the Clearing Zone. Once a marine mammal has been

determined in or about to enter the Clearing Zone, the shut down procedure will be accomplished within 1 minute.

The animal will be considered to have exited the Clearing Zone if it:

- Is visually observed to have left the Clearing Zone
- Has not been seen within the Clearing Zone for 15 minutes in the case of pinnipeds and harbor porpoises
- Has not been seen within the Clearing Zone for 30 minutes in the case of cetaceans and sea otters

2.2.4.3 Nighttime Operations

Nighttime operations involving all equipment EXCEPT the sub-bottom profiler are allowed.

2.2.4.4 Speed or Course Alteration

If a marine mammal is detected outside the EZ and, based on its position and relative motion, is likely to enter the EZ, the vessel's speed and/or direct course may, when practical and safe, be changed. This technique also minimizes the effect on the shallow hazard program. The marine mammal activities and movements relative to the source vessel will be closely monitored to ensure the marine mammal does not enter the EZ. If the mammal appears likely to enter the EZ, further mitigative actions will be taken, i.e., either further course alterations or shut down of the sub-bottom profiler.

2.2.5 Communications

Communication methods and protocols for implementing the above mitigation measures will be established between the PSOs, vessel crew, and any other relevant personnel to ensure all parties understand their roles and responsibilities before activities commence. A standard operating procedures document will be drafted pre-deployment for reference, and the Field Lead PSO will modify the document as necessary with the vessel crew. Roles are highlighted below:

- **Vessel Crew:** The crew will work directly with the Field Lead PSO to tailor standard operating procedures to the specific vessel. The crew will work with all PSOs to ensure mitigation measures are enacted as stipulated in the permits.
- **Field Lead PSO:** The Field Lead PSO is responsible for refining the standard operating procedures with the vessel crew. The Field Lead PSO will participate in daily operational meetings and will be aware of the activities planned for the day. This will be communicated to the rest of the PSO team.
- **PSO:** All PSOs are responsible for monitoring for marine mammals, collecting required data, requesting mitigation measures (as necessary), and reporting to the Field Lead PSO.

2.2.6 Vessel Mitigation Measures

Project vessels will operate in such a manner as to minimize potential impacts to marine mammals. Mitigation measures for vessel operators include:

- Maintaining a vigilant watch for marine mammals to avoid vessel strikes.
- Avoiding approach within 100 m of marine mammals. Operators will observe direction of travel of marine mammals and attempt to maintain a distance of 100 m or greater between the animal and the vessel by working to alter vessel course or velocity.
- Vessels must remain at least 500 m from rafts of otters unless safety is a concern.

- Avoid placing the vessel between members of a group of marine mammals in a way that may cause separation of individuals in the group from other individuals in that group. A group is defined as three or more whales observed within a 500-m area and displaying behaviors of directed or coordinated activity (e.g., group feeding).
- If the vessel approaches within 1.6 km of observed whales, except in emergency situations, the vessel operator will take reasonable precautions to avoid potential interaction with the whales by taking one or more of the following actions, as appropriate:
 - Steering to the rear of the direction of travel of the whale(s) to avoid causing changes in their direction of travel.
 - Maintaining vessel speed of 10 knots or less when transiting to minimize the likelihood of lethal vessel strikes.
 - Reducing vessel speed to less than 5 knots within 274 m of the whale(s).
 - Taking reasonable steps to alert other vessels in the vicinity of whale(s).
 - Not purposely approaching within 3 nautical miles (nm; 5.5 km) of major Steller sea lion rookeries or haulouts, where vessel safety requirements allow and/or where practicable.
 - Not allowing tow to remain in the water.
- Preventing trash or other debris from being thrown overboard.
- Implementing measures to minimize risk of spilling hazardous substances.

3.0 REPORTING

3.1 DATA

The PSO monitoring results for shallow hazard activities, including estimates of exposure to key sound levels, will be presented in weekly reports during the shallow hazard project and a final technical report due 90 days after project completion. Reporting will address requirements established by NMFS and USFWS in the LOAs.

Weekly reports will include:

- Vessel activity summary – dates and locations
- Environmental summary – sea state, visibility, etc
- Marine mammal sightings – species, numbers, locations, behaviors, distance from the vessel
- Estimates of exposure for each species
- Mitigation measures enacted

The technical report will include:

- Summaries of monitoring effort – total hours, total distances, and distribution of marine mammals throughout the study period compared to sea state and other factors affecting visibility and detectability of marine mammals
- Analyses of the effects of various factors influencing detectability of marine mammals – sea state, number of observers, fog/glare, etc.
- Species composition, occurrence, and distribution of marine mammal sightings, including numbers, age/size/sex categories (when discernable), group sizes, date, and water depth
- Summary of implemented mitigation measures

- Sighting rates of marine mammals during periods with and without project activities (and other variables that could affect detectability)
 - Initial sighting distances versus project activity
 - Closest point of approach versus project activity
 - Observed behaviors and types of movements versus project activity
 - Numbers of sightings/individuals seen versus project activity
 - Distribution around the vessels versus project activity
 - Numbers of animals recorded in the EZ and SZ
- Analyses of the effects of project activities on listed marine mammals
- An electronic database of all PSO visual observations

3.2 UNAUTHORIZED TAKE

In the unanticipated event the specified activity causes take of a marine mammal in a manner not authorized by the LOAs, such as an injury to or mortality of a marine mammal, the incident will be reported to NMFS or USFWS as soon as practicable and within 24 hrs of the occurrence. A report documenting marine mammal takes will be submitted in a digital format that can be queried, and will include:

- Information that must be included in PSO data collection;
- Date, time, and location of the incident;
- Species identification or description of the animal(s) involved;
- Number of animals affected;
- Environmental conditions immediately preceding the incident;
- Cause of the event;
- Vessel speed during and leading up to the incident;
- Vessel course/heading and what operations were being conducted;
- Status of all sound sources in use;
- Time the animal(s) was first observed and last observed;
- Description of avoidance measures/requirements that were in place at the time of the incident and what additional measures were taken, if any;
- Description marine mammal behavior immediately preceding and following the incident;
- If available, description of the presence and behavior of any other marine mammals immediately preceding the incident;
- Estimated fate of the animal (e.g., dead, injured but alive, injured and moving, blood or tissue observed in the water, status unknown, disappeared); and,
- To the extent practicable, photographs or video footage of the animal(s).

3.3 DISCOVERY OF INJURED OR DEAD MARINE MAMMALS

In the event personnel involved in activities covered by the authorizations discover an injured or dead marine mammal, Hilcorp must report the incident to the NMFS Office of Protected Resources (OPR) and Alaska Regional Stranding Coordinator as soon as feasible. Injured, dead, or distressed sea otters that are not associated with project activities will be reported to USFWS within 48 hrs of discovery. The report will include:

- Time, date, and location (latitude/longitude) of the first discovery;
- Species identification (if known) or description of animal;

- Condition of animal (including carcass condition if animal is dead);
- Observed behaviors of the animal, if alive;
- Photographs or video footage of the animal, if available;
- General circumstances under which animal was discovered.

3.4 VESSEL STRIKE

In the event a ship strikes a marine mammal by a vessel involved in activities covered by the authorizations, Hilcorp must report the incident to the NMFS OPR and Alaska Regional Stranding Coordinator as soon as feasible. The report must include:

- Time, date, and location (latitude/longitude) of the incident;
- Species identification (if known) or description of animal involved;
- Vessel's speed during and leading up to the incident;
- Vessels' course/heading and what operations were being conducted, if applicable;
- Status of all sound sources in use;
- Description of avoidance measures/requirements that were in place at the time of the strike and what additional measures were taken, if any, to avoid the strike;
- Environmental conditions (e.g., wind speed and direction, Beaufort Sea state, cloud cover, visibility) immediately preceding the strike;
- Estimated size and length of animal that was struck;
- Description of marine mammal behavior immediately preceding the strike;
- If available, description of the presence and behavior of any other marine mammals immediately preceding the strike;
- Estimated fate of the animal (e.g., dead, injured by alive, injured and moving, blood or tissue observed in the water, status unknown, disappeared); and
- To the extent practicable, photographs or video footage of the animal.

3.5 NMFS NOTIFICATIONS

Hilcorp will immediately cease survey operations involving the use of active sound sources and notify NMFS and/or USFWS if the number of takes for any of the respective agency's trust marine mammal species is met or exceeded.

If, over the course of annual operations, 30 or more beluga whales are observed within the Level B zone during the operation of sound sources, NMFS will be immediately notified so monitoring and mitigation measures may be evaluated and modified, as necessary.

APPENDIX B

NMFS March 23, 2020 Memorandum to BOEM on Reinitiation of Biological Opinion



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration

National Marine Fisheries Service

P.O. Box 21668

Juneau, Alaska 99802-1668

March 23, 2020

MEMORANDUM FOR: Donna S. Wieting
Director, Office of Protected Resources

FROM:  James W. Balsiger, Ph.D.
Administrator, Alaska Region

SUBJECT: Analysis of Potential Reinitiation of Section 7 Consultation in Light of New Information on Cook Inlet Beluga Whales, Biological Opinion Covering Hilcorp Alaska and Harvest Alaska's Oil and Gas Activities, Cook Inlet, Alaska

The Alaska Region received the March 20, 2020 memorandum from the Office of Protected Resources requesting our input on whether reinitiation of consultation under section 7 of the Endangered Species Act is necessary to address new information for the subject biological opinion. We have determined that reinitiation is not required.

Background

On January 28, 2020, the Alaska Fisheries Science Center (AFSC) released its report containing the biennial abundance estimate for the Cook Inlet beluga whale (AFSC, "Aerial Surveys, Distribution, Abundance, and Trend of Belugas (*Delphinapterus leucas*) in Cook Inlet, Alaska," June 2018). That report employed new analytical methods compared to previous abundance and trend estimates, and also included data from a 2018 aerial survey that observed fewer belugas than previously. It indicates that, as of 2018, the Cook Inlet beluga whale population consists of 279 animals and the population trend is -2.3% per year. When the National Marine Fisheries Service (NMFS) finalized its biological opinion concerning the effects of issuing five-year Marine Mammal Protection Act (MMPA) incidental take regulations associated with Hilcorp's oil and gas activities in Cook Inlet, the best scientific and commercial data available (using a previous methodology that was superseded by the new approach) indicated that, as of 2016, the population was 328 animals and the population trend was -0.5% per year. Applying the new and more reliable methodology to the 2016 data, NMFS now estimates that the abundance in 2016 was more likely around 293 animals.

In light of this new information and in light of reports of whale strandings in the fall of 2019, the Center for Biological Diversity sent a letter dated January 31, 2020, indicating its intent to sue NMFS for, among other things, failing to reinitiate the consultation based on the new abundance and trend estimates. This memorandum reviews the new information and addresses whether that information "reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered" in the biological opinion per 50 C.F.R. 402.16(a)(2). While the new information suggests a concerning trend in the species' status, we



conclude that the new information does not reveal effects of the action that may affect Cook Inlet beluga whales in a manner or to an extent not previously considered.¹

With the implementation of mitigation measures as part of the action, the biological opinion found that the effects from the following stressors are highly unlikely to occur or will be immeasurably small in impact: exposure to noise from vessels, drilling, well construction, aircraft, dynamic positioning, underwater hydraulic grinding, pingers, echosounders, sonar, sea floor disturbance, fill and rock placement, and jack-up rig placement; vessel strikes; marine debris; and unintentional discharge or spill of petroleum. The opinion concludes that these stressors are not reasonably certain to result in any takes of Cook Inlet beluga whales. That conclusion does not change in light of the lower estimates of abundance and population trend. With the incorporation of the mitigation measures into the action, these stressors, individually and cumulatively, are still not reasonably certain to result in take. Thus, the new information does not reveal effects from these stressors in an amount or to an extent not previously considered.

The biological opinion also concluded that exposure to the following stressors is reasonably certain to result in take of Cook Inlet beluga whales over the five-year period covered by the incidental take regulations (totaling 57.65 animals, rounded up to 58 instances of exposure to sound sources that constitute MMPA level B harassment):

- 2D seismic exploration noise;
- sub-bottom profiler noise;
- vertical seismic profiling noise;
- pipe pile driving noise;
- sheet pile driving noise; and
- water jet noise.

The total takes authorized for beluga whales over the entirety of this five-year project is 58. Some of these instances of take may represent repeated takes of the same individual. All takes represent takes by harassment only, which NMFS interprets as involving a significant disruption of normal behavioral patterns such as breeding, feeding, or sheltering.² In our analysis, we considered take due to anthropogenic sound to occur whenever an animal is likely to be exposed

¹ We also conclude that the new population and trend information does not implicate the biological opinion's conclusions regarding the action's potential effects on critical habitat. We see no discernible relationship between the new population and trend information and the status of the physical and biological features of that habitat (designated as the following: intertidal and subtidal waters, prey species, waters free of toxins, unrestricted passage, and waters with in-water noise levels below thresholds causing abandonment); therefore, we do not discuss any further the biological opinion's analysis of the action's potential effects on those features.

² Specifically, NMFS has stated that it "will interpret harass in a manner similar to the USFWS regulatory definition for non-captive wildlife: 'Create the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering.'" Memorandum of October 21, 2016 from D. Wieting, Director, Office of Protected Resources, NMFS, to Regional Administrators.

to underwater impulsive sounds greater than 160 dB or non-impulsive sounds greater than 120 dB. All expected take resulting from Hilcorp's proposed activities is expected to result from acoustic harassment. While such harassment may result in significant disruptions of normal behavior patterns, in no instance are such disruptions expected to result in a reduction in fitness or survival of any whales. The new information (i.e., the new estimates of abundance and trend) does not suggest there will be any new stressors or effects causing take of any whales, nor does it suggest that take would be of a different type or greater severity than those considered in our analysis. If we had a basis to conclude that harassment of the 58 belugas would have adverse consequences for the population, such as diminished reproductive success, then we would need to reinitiate consultation to determine whether those consequences are likely to jeopardize the continued existence of the species in light of the new (and worse) estimates of abundance and trend. However, with no anticipated effects on fitness or survival of individual whales, and thus no adverse consequences for the population, we find no basis to reinitiate consultation.

The reduction in our Cook Inlet beluga whale point estimate and population trend is extremely concerning. However, we have concluded that the new information on the whale's abundance and trend does not reveal that there may be effects on the species that were not considered, nor does it reveal that the previously analyzed effects may affect the species to an extent not previously considered. The biological opinion's analysis and conclusion with respect to the species from the exposure to a variety of noise sources resulting in 58 instances of non-lethal take over five years — which are not expected to result in a reduction in survival or fitness for any taken whales — remains valid in light of the new information. Fifty-eight takes will not affect the species at the (lower) population level to a greater extent because all takes are in the form of behavioral harassment and will not affect fitness, reproduction, or survival of any individual whale. Absent such effects on individual whales, there cannot be population-level effects. That is, we conclude that the new information concerning the population estimate and trend does not reveal effects of the action that may affect the Cook Inlet beluga whale (population or individuals) in a manner or to an extent not considered in the current biological opinion.

We also considered how the new population estimate and trend information could affect our estimate of takes. The new point estimate for the Cook Inlet beluga population is 4.7% lower than the population estimate we used in our biological opinion. It is, however, very difficult to modify our take estimates with reliable precision to account for this small change in abundance. A corresponding 4.7% reduction in our take estimate is not justifiable because we do not expect that belugas occur throughout the action area (nor throughout their range) at a uniform density. Moreover, a simple 4.7% reduction, from 58 takes to 55 takes, would not warrant a change in our terms and conditions or cause us to work with the action agency to revise mitigation measures.

It is also worth noting that we have received a draft report of Hilcorp's 2019 Cook Inlet seismic survey activities. Because our take estimates were based upon beluga densities derived by Goetz et al. (2012) (beluga density = 0.0000 in lower Cook Inlet, where the surveys occurred), we had not expected any takes of belugas during these 3D seismic surveys. The draft report, based on protected species observer data, does not indicate that there were any takes from Hilcorp's 2019 3D seismic surveys, and we have no contrary information. In short, the results of the 2019 seismic surveys are consistent with the biological opinion's analysis.

In its letter, the Center for Biological Diversity also stated that at least four dead Cook Inlet beluga whales were reported on a certain date in the fall of 2019. During the fall of 2019 (from 11 September through 14 October), NMFS received reports of 12 dead Cook Inlet beluga whales. This number is commensurate with numbers from reports from the previous five years (11 in 2014, 4 in 2015, 7 in 2016, 13 in 2017, and 7 in 2018). The biological opinion describes past stranding events in the baseline section (section 5.8.3) and notes that a total of 214 dead belugas have been documented in Cook Inlet from 1988 through 2015, some of which were victims of gunshot wounds inflicted during unregulated subsistence hunting that was subsequently shut down. Given the small number of Cook Inlet belugas that die each year, and the sparsely populated coastal area throughout most of their range, the reporting rate for dead Cook Inlet belugas is largely dependent upon where the carcasses strand relative to human activity. As such, reporting rates are assumed to be variable, with reports typically in the single or very low double digits per year.

The biological opinion also describes the action's potential effects on whale stranding events. The opinion explains (section 6.2.1.3):

Behavioral responses by ESA-listed species, such as avoidance, will likely be the most common response observed during seismic activity. There is no direct evidence that noise from Cook Inlet seismic exploration activity has caused physical injury, death, or stranding to any marine mammal.

Given that the stranding reports from the fall of 2019 are consistent with past reports, we conclude that the reports from the fall of 2019 do not constitute new information, let alone new information that reveals there will be effects on the species in a manner or to an extent not previously considered by the biological opinion.

Conclusion

After reviewing the new information concerning the Cook Inlet beluga whale's population estimate and trend and the information relating to reports of 12 stranding events in the fall of 2019, we conclude that NMFS and the Bureau of Ocean Energy Management do not need to reinitiate consultation.

APPENDIX C

Public Comments and BOEM Responses

Public Comments & BOEM Responses for Hilcorp G&G EA (G&G Permit 21-01)

Commenter	Comment Summary	Response
Defenders of Wildlife	BOEM should provide a public comment period on a draft EA and the draft permit. Also make available any requirements or procedures that must be implemented under OCSLA or other authorities informing the public of relevant permitting framework.	Consistent with BOEM Alaska’s practices to provide public notice of preparation of an EA, a description of the proposed activity was posted to regs.gov, placed on BOEM’s regional website, and emailed directly to stakeholders including NGOs; tribes and tribal governments; state and federal agencies; and other interested parties. Comments from the public regarding the scope of the EA were solicited, received, and considered in developing the EA. Additionally, because marine mammals, especially the beluga whale are of particular concern, BOEM invited NMFS to be a cooperating agency. Providing a draft EA for public comment is not required, nor warranted in the present situation, where the effects of the proposed activities are well-established, are not scientifically controversial, and were recently considered in the BOEM NEPA process (for LS 244) and Service ITR process, all of which entailed public comment on draft analyses.
Defenders of Wildlife	<p>HAK project fails to reflect mitigation measures identified in the NMFS and FWS ITRs. They state BOEM should require more specifics.</p> <p>For example: number of PSOs, required additional mitigation vessel, and safety and exclusion zones.</p>	Hilcorp is responsible for complying with the terms of their ITRs regardless of whether they are listed in Hilcorp’s 2021 Environmental Evaluation Document (EED) or BOEM’s EA. That said, Hilcorp’s EED did state they will implement procedures approved by NMFS and USFWS and outlined in their 4MP for the 2021 Shallow Hazard Survey Program (see Appendix A). BOEM’s EA evaluates the potential impacts of Hilcorp’s survey as proposed. This includes the conditions applied to Hilcorp’s activities by the FWS and NMFS authorizations. Although our NEPA evaluation is separate from the MMPA and ESA processes, we do consider the scope and depth of the evaluations done by NMFS and FWS, and we consider their findings in our EA. For instance, we have reviewed the FWS LS 244 BO which evaluates effects to sea otters and Steller's eiders and critical habitat of the sea otter. We also reviewed the 2019 reinitiation of that opinion

Commenter	Comment Summary	Response
		(USFWS, 2019) ¹ , the FWS ITR for 2019–2024 activities (84 FR 37716), the FWS LOA for the 2021 activities, NMFS’s BO for Lease Sale 244 (NMFS, 2017), the NMFS ITR for 2019–2024 and the associated NMFS BO (which included BOEM as a co-action agency), and the preliminary NMFS LOA for 2021 activities.
Defenders of Wildlife	<p>BOEM should address marine mammal mitigation and monitoring items not addressed by the ITRs and should require the use of the best available technology for reducing impacts.</p> <p>For example, they state BOEM should require monitoring of the Level B harassment area, rather than the SZ, and that BOEM should require HAK to shut down operations if a beluga is sighted in Level B area.</p>	<p>For compliance with ESA and MMPA, NMFS and USFWS require mitigation measures that reduce the effect of incidental take to the greatest extent practicable.</p> <p>BOEM upholds the conditions required by NMFS and FWS for avoiding or reducing effects to marine mammals. The promulgation of the ITRs by FWS and NMFS were each a public process for management of these agencies’ trust species. BOEM accepts the management actions and assessment of environmental impacts on marine mammals from these agencies, and we consider their judgement regarding actions under their jurisdiction. This includes the requirements for mitigation and monitoring in ESA and MMPA authorizations.</p>
AK Oil and Gas Association	The survey was previously approved in 2020 and not conducted due to Covid-19.	BOEM is aware of this information and has considered it in the preparation of the EA.
AK Oil and Gas Association	The survey area is south of areas for beluga whales, but protocols are still included for the protection of this species. Support approval.	BOEM is aware of this information and has considered it in the preparation of the EA.
Cook Inlet Keepers	State BOEM should deny permit and cancel leases in Cook Inlet.	BOEM’s Alaska Office of Environment is preparing an EA in response to HAK’s request for G&G Permit 21-01 application, and its Notice to Conduct Ancillary Activities. The decision on whether to issue a FONSI and approve the permit is pending and will be rendered based on the environmental analysis in the EA. Section 1334(a)(2) of the OCSLA provides information about circumstances that may

¹ On March 11, 2019, BOEM requested re-initiation of consultation on Cook Inlet LS 244 (Consultation 2016-F-0226) in order to revise and clarify T&C 3.2 of the May 26, 2017 BO.

Commenter	Comment Summary	Response
		lead to lease cancellation. Overall cancellation of leases in Cook Inlet is outside the scope of this EA.
Cook Inlet Keepers	States that the LS244 EIS was not sufficient and new or supplemental EIS is necessary.	<p>BOEM prepared the LS 244 EIS to disclose the potential environmental impacts of conducting a lease sale in Lower Cook Inlet and to assist with planning and decision making. At the lease sale stage, BOEM uses a hypothetical exploration and development scenario to provide a set of post-lease activities that may occur as a result of leasing. At a broad scale, the LS 244 EIS analyzed the impacts of activities typically associated with the development of oil and gas, including the G&G surveys proposed here. The Notice of Availability for Record of Decision for LS 244 was published on May 22, 2017. The legal sufficiency of the FEIS analysis and ROD were not challenged.</p> <p>Prior to authorizing post-lease activities, BOEM conducts additional site-specific NEPA analyses that account for project information (e.g., timing, location and spatial extent, number of vessels) not available at the lease sale stage, as well as any new environmental information that becomes available. BOEM prepared an EA for Hilcorp’s airgun surveys in 2019 and an EA for this proposed project.</p>
Cook Inlet Keepers	State that continued oil and gas activity is inconsistent with addressing the climate crisis and jeopardizes national security. States that another effect of the climate crisis is collapsing fish populations (Pacific cod). States the old LS 244 EIS did not appropriately consider the climate impacts of new leasing.	<p>Strategies to address climate change, along with national security ramifications, are beyond the scope of this EA.</p> <p>The EIS for LS 244 addressed the impacts of climate change “Chapter 5 Cumulative Effects”, including impacts on fish populations (Section 5.2.5).</p> <p>This concern is also addressed in the EA (Section 3.2.4.1): “Effects of the Proposed Survey on fish and invertebrates would be limited to the areas surrounding the vessel activity and would likely not be detectable once the vessels have left the area. Population level impacts are not expected. The effects described above, because they are limited to discrete locations and times, would not persist and would not appreciably add to impacts from other activities. Therefore,</p>

Commenter	Comment Summary	Response
		the level of effects for the Proposed Survey with respect to fish and invertebrate species is negligible.”
Cook Inlet Keepers	States the GHG emission estimates in the old LS244 were flawed.	Allegations of deficiencies in the GHG analysis performed for the LS 244 FEIS are beyond the scope of this EA. At this juncture, BOEM is evaluating a site-specific project that consists of a geohazard and geotechnical surveys in the vicinity of 4 lease blocks.
Cook Inlet Keepers	States the LS244 EIS did not sufficiently address impacts to beluga whales. Discusses NMFS 5-yr plan “Species in the Spotlight”, and 2016 Recovery Plan. State that Recovery plan lists oil spills, cumulative effects of multiple stressors, and noise as highest threats.	The LS 244 EIS reviewed impacts to beluga whales in Chapter 4, Environmental Consequences. This evaluation included effects of noise and oil spills. Chapter 5, Cumulative Effects, evaluated the specific contribution of the Lease Sale activities to the ongoing and reasonably foreseeable activities in Cook Inlet that affect Cook Inlet beluga whales. BOEM has continued to evaluate new information about Cook Inlet beluga whales as it becomes available. No new information has become available that reveals effects of the action that may affect belugas or their critical habitat in a manner or to an extent not considered in the LS 244 EIS. For additional detail see the response to Cook Inlet Keeper’s comment addressing reinitiation of Section 7, Consultation, below.
Cook Inlet Keepers	States LS244 EIS did not properly examine cumulative effects.	The EIS for LS 244 addressed the impacts of climate change in “Chapter 5, Cumulative Effects” consistent with CEQ guidelines at that time and at an appropriate level of detail for the decision at hand. The extent to which effects of Hilcorp’s proposed survey could add to, combine with, or be influenced by effects from other actions and/or climate change is fully considered in this EA.
Cook Inlet Keepers	State that supplemental EIS and re-initiation of ESA consultation should be done (new information regarding “dire status of Cook Inlet beluga whales”) (NMFS January 2020).	This concern is addressed in the EA, Section 4.1: “The new information on Unusual Mortality Events (NOAA, 2021), recent strandings (Fairweather Science, LLC, 2020; also see Appendix B), and size of the Cook Inlet Beluga population (AFSC, 2020) was carefully considered to determine whether reinitiation was warranted. NMFS and BOEM corresponded regarding Cook Inlet belugas early in 2020. NMFS examined the recent trend data in the context of the 2019 BO and informed BOEM that the new population numbers did not alter the previous conclusions. NMFS directed BOEM that

Commenter	Comment Summary	Response
		reinitiating ESA consultation was not necessary (NMFS’ Memo to BOEM dated March 23, 2020, Appendix B).” BOEM considered all new relevant information concerning Cook Inlet beluga whales when developing this EA.
Cook Inlet Keepers	States NMFS 2019 regulations do not provide adequate protection for belugas.	BOEM upholds the conditions required by NMFS and FWS for avoiding or reducing effects to marine mammals. The promulgation of the ITRs by FWS and NMFS were each a public process for management of these agencies’ trust species. BOEM accepts the management actions and assessment of environmental impacts on marine mammals from these agencies, and we acknowledge their judgment regarding actions under their jurisdiction. This includes the requirements for mitigation and monitoring in ESA and MMPA authorizations. For the reasons explained in this EA, impacts to belugas from the Proposed Survey would be minor and temporary.
Cook Inlet Keepers	State HAK has poor record for environmental safety and accidents.	BOEM conducts environmental reviews for OCS activities while the Bureau of Safety & Environmental Enforcement (BSEE) is responsible for safety and environmental enforcement on the OCS. BSEE ensures that operators and leasees subject to their jurisdiction comply with all required environmental laws, regulations and standards. https://www.bsee.gov/what-we-do/safety-enforcement