ENVIRONMENTAL ASSESSMENT FOR THE ISSUANCE OF REGULATIONS AND LETTERS OF AUTHORIZATION FOR THE TAKE OF MARINE MAMMALS INCIDENTAL TO HILCORP ALASKA LLC OIL AND GAS ACTIVITIES IN COOK INLET, ALASKA

LEAD AGENCY: U.S. Department of Commerce
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National Marine Fisheries Service

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LOCATION: Cook Inlet, Alaska

ABSTRACT: National Marine Fisheries Service proposes to issue regulations and letters of authorization to Hilcorp Alaska LLC for the take of marine mammals incidental to oil and gas activities in Cook Inlet, Alaska.

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Chapter 1 Introduction and Purpose and Need

1.0 Introduction and Background

The National Marine Fisheries Service (NMFS) received an application from Hilcorp Alaska LLC (Hilcorp), requesting incidental take of marine mammals from oil and gas activities associated with exploration and development. NMFS is required to review applications and, if appropriate, issue regulations and subsequent Letters of Authorization (LOAs) pursuant to the Marine Mammal Protection Act of 1972, as amended (MMPA; 16 U.S.C. 1361 et seq.). In addition, the National Environmental Policy Act (NEPA), 40 Code of Federal Regulations (CFR) Parts 1500 -1508, and the National Oceanic and Atmospheric Administration (NOAA) policy and procedures[1] require all proposals for major federal actions be reviewed with respect to environmental consequences on the human environment. Therefore, NMFS conducted an environmental review of Hilcorp's application and determined an Environmental Assessment (EA) is appropriate for NMFS consideration to issue regulations and LOAs to Hilcorp.

This Chapter presents a summary of NMFS authority to authorize incidental take of marine mammals, a summary of the applicant's request, and identifies NMFS proposed action and purpose and need. This Chapter also explains the background and environmental review process associated with the applicant's request and provides other information relevant to the analysis in this EA, such as the scope of the analysis and compliance with environmental laws and regulations. The remainder of this EA is organized as follows:

- Chapter 2 describes the applicant's activities and the alternatives carried forward for analysis as well as alternatives not carried forward for analysis.
- Chapter 3 describes the baseline conditions of the affected environment.
- Chapter 4 describes the direct, indirect and cumulative impacts to the affected environment, specifically impacts to marine mammals and their habitat associated with NMFS's proposed action and alternatives.
- Chapter 5 lists document preparers and Chapter 6 lists references cited.

1.1 Marine Mammal Protection Act Overview

The MMPA prohibits, with certain exceptions, the "take[2]" of marine mammals in U.S. waters by U.S. citizens. The MMPA allows, upon request, the incidental, but not intentional, taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity within a specified geographic region.

Take of a marine mammal falls under three categories: mortality, serious injury, or harassment (i.e., injury and behavioral effects). Harassment is defined as any act of pursuit, torment or annoyance that has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment) or has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of

[1] National Oceanic and Atmospheric Administration Administrative Order (NAO) 216-6A "Compliance with the National Environmental Policy Act and Executive Order 12114 Environmental Effects Abroad of Major Federal Actions 11988 and 13690 Floodplain Management; and 11990 Protection of Wetlands" and the Companion Manual for NAO 216-6A.

[2] "Take" means to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal.

behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering but which does not have the potential to injure a marine mammal or marine mammal stock in the wild (Level B harassment).

The exceptions to the prohibition on take in Sections 101(a)(5)(A) and (D) of the MMPA gives NMFS the authority to authorize the incidental but not intentional take of small numbers of marine mammals by harassment, provided certain determinations are made and statutory and regulatory procedures are met. The full text of the MMPA is available for review on NOAA Fisheries website: http://www.nmfs.noaa.gov/pr/laws/mmpa/

NMFS also promulgated regulations to implement the provisions of the MMPA governing the taking and importing of marine mammals, 50 Code of Federal Regulations (CFR) Part 216 and produced Office of Management and Budget (OMB)-approved application instructions (OMB Number 0648-0151) that prescribe the procedures necessary to apply for permits. All applicants must comply with these regulations and application instructions in addition to the provisions of the MMPA.

1.2 Summary of Hilcorp Incidental Take Authorization Request

NMFS has received a request from Hilcorp Alaska, LLC (Hilcorp), for authorization to take marine mammals incidental to oil and gas exploration and development activities in Cook Inlet. An authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s), will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses (where relevant), and if the permissible methods of taking and requirements pertaining to the mitigation, monitoring and reporting of such takings are set forth.

The proposed project includes 2D and 3D seismic surveys, geohazard surveys, vibratory sheet pile driving, and drilling of exploratory wells. The work is expected to span five years includes: 30 days of 2D seismic survey, 45-60 days of 3D seismic survey, geohazard surveys in the Outer Continenal Shelf (OCS) (30 days), middle Cook Inlet subseawall area (14 days), and Trading Bay (30 days), exploratory wells in the OCS (40-60 days per well, 2-4 wells annually for three years) and Trading Bay (120-150 days), Iniskin Peninsula exploration and development (180 days annually for two years), platform and pipeline maintenance (180 days annually for five years), middle Cook Inlet well abandonment (90 days), and Drift River terminal decommissioning (120 days).

1.3 Purpose and Need

1.3.1 Description of Proposed Action

NMFS proposed action is the issuance of regulations to Hilcorp pursuant to Section 101(a)(5)(A) of the MMPA and 50 CFR Part 216. The rule and LOAs will be valid for five years from date of issuance and would authorize takes of marine mammals, by Level A and Level B harassment, incidental to Hilcorp's proposed oil and gas activities. NMFS's proposed action is a direct outcome of Hilcorp's request for authorization. The proposed action is also described in the notice of a proposed rule published in the *Federal Register* (XXXX, DATE), under "Summary of Request" and "Description of Specified Activities" and further explained in Chapter 2 of this EA.

1.3.2 Purpose

The purpose of NMFS's action is to authorize take of marine mammals incidental to the oil and gas activities by Hilcorp, consistent with applicable legal requirements. NMFS may issue an incidental take authorization allowing the take of a small number of marine mammals only if the taking would have no more than a "negligible impact" on those marine mammal species or stocks, and not have an "unmitigable adverse impact" on the availability of the species or stock for "subsistence" uses. In issuing an ITA, NMFS must prescribe the permissible methods of taking and other means of effecting the least practicable impact on the species or stocks of marine mammals and their habitat, paying particular attention to rookeries, mating grounds, and other areas of similar significance. NMFS must also prescribe means of effecting the least practicable impact on the availability of the species or stocks of marine mammals for subsistence uses. Finally, ITAs must include requirements or conditions pertaining to monitoring and reporting, in large part to increase NMFS understanding of the effects of such taking on the species.

1.3.3 Need

U.S. citizens seeking to obtain authorization for the incidental take of marine mammals under NMFS's jurisdiction must submit such a request in the form of an application. Because Hilcorp submitted an adequate and complete application demonstrating the need and potential eligibility for a rulemaking under the MMPA, NMFS has a corresponding duty to determine whether and how to authorize take of marine mammals incidental to the activities described in the application. Therefore, NMFS's responsibilities under section 101(a)(5)(A) of the MMPA and its implementing regulations establish and frame the need for NMFS proposed action.

1.4 Environmental Review Process

In accordance with NEPA and CEQ Regulations, NMFS, to the fullest extent possible, integrates the requirements of NEPA with other regulatory processes required by law or by agency practice so that all procedures run concurrently, rather than consecutively. This includes coordination within the National Oceanic Atmospheric and Administration (NOAA), (e.g., the Office of the National Marine Sanctuaries) and with other regulatory agencies (e.g., the U.S. Fish and Wildlife Service), as appropriate, during NEPA reviews prior to implementation of a proposed action to ensure that requirements are met. Regarding the issuance of ITAs, we rely substantially on the public process required by the MMPA for preparing proposed ITAs to develop and evaluate relevant environmental information and provide a meaningful opportunity for public participation when we prepare associated NEPA documents. We fully consider public comments received in response to the publication of proposed rule during the NEPA review process.

1.4.1 Scoping and Public Involvement

The NEPA process is intended to enable NMFS to make decisions based on an understanding of the environmental consequences and take actions to protect, restore, and enhance the environment. An integral part of the NEPA process is public involvement. Although agency procedures do not require publication of the draft EA prior to finalizing an EA, NMFS relied substantially on the public process pursuant to the MMPA to develop and evaluate environmental information relevant to an analysis under NEPA. NMFS

made the rulemaking application available for public review and comment during publication of the Notice of Receipt (83 FR 54088, October 26, 2018). Separately, NMFS will published the proposed rulemaking in the *Federal Register* with a public comment period. There, NMFS alerted the public it intended to use the MMPA public review process for the proposed rulemaking to solicit relevant environmental information and provide the public an opportunity to submit comments.

1.5 Other Environmental Laws or Consultations

NMFS must comply with all applicable federal environmental laws and regulations necessary to implement a proposed action. NMFS evaluation of and compliance with environmental laws and regulations is based on the nature and location of the applicants proposed activities and NMFS proposed action. Therefore, this section only summarizes environmental laws and consultations applicable to NMFS' issuance of regulations to Hilcorp.

1.5.1 The Endangered Species Act

The ESA established protection over and conservation of threatened and endangered species (T&E) and the ecosystems upon which they depend. An endangered species is a species in danger of extinction throughout all or a significant portion of its range. A threatened species is one that is likely to become endangered within the near future throughout all or in a significant portion of its range. The USFWS and NMFS jointly administer the ESA and are responsible for the listing of species (designating a species as either threatened or endangered) and designating geographic areas as critical habitat for T&E species. The ESA generally prohibits the "take" of an ESA-listed species unless an exception or exemption applies. The term "take" as defined in section 3 of the ESA means to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Section 7(a)(2) requires each federal agency to ensure that any action it authorizes, funds or carries out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat of such species. When a federal agency's action may affect a listed species, that agency is required to consult with NMFS and/or the USFWS under procedures set out in 50 CFR Part 402. NMFS and USFWS can also be action agencies under section 7. Informal consultation is sufficient for species the action agency determines are not likely to be adversely affected if NMFS or USFWS concurs with the action agency's findings, including any additional measures mutually agreed upon as necessary and sufficient to avoid adverse impacts to listed species and/or designated critical habitat.

NMFS' issuance of regulations is a federal action that is also subject to the requirements of Section 7 of the ESA. As a result, we are required to ensure that the issuance of regulations to Hilcorp is not likely to jeopardize the continued existence of any T&E species or result in the destruction or adverse modification of designated critical habitat for these species. Because the Cook Inlet beluga whale, fin whale, humpback whale, and Steller sea lion are ESA-listed species with confirmed or possible occurrence in Cook Inlet, NMFS OPR Permits and Conservation Division initiated consultation with the NMFS' Alaska Regional Protected Resources Division on the proposed issuance of regulations to Hilcorp, pursuant to section 7 of the ESA, on DATE.

1.5.2 Magnuson-Stevens Fishery Conservation and Management Act

Under the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), Federal agencies are required to consult with the Secretary of Commerce with respect to any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken, by such agency which may adversely affect essential fish habitat (EFH) identified under the MSFCMA. Although EFH was identified in Cook Inlet for walleye Pollock, rock sole, Pacific cod, skate, weathervane scallop, Pacific salmon, and sculpin, we do not anticipate NMFS' proposed action of authorizing take of marine mammals and the associated mitigation and monitoring to impact EFH; therefore, an EFH consultation was not conducted.

1.6 Document Scope

This EA was prepared in accordance with NEPA (42 USC 4321, et seq.), CEQ Regulations CEQ Regulations (40 CFR 1500-1508) and NOAA policy and procedures (NAO 216-6A and the Companion Manual for the NAO 216-6A).. The analysis in this EA addresses potential direct, indirect, and cumulative impacts to marine mammals and their habitat, resulting from NMFS' proposed action to authorize incidental take associated with the oil and gas activities proposed by Hilcorp. However, the scope of this analysis is limited to the decision for which we are responsible (*i.e.*, whether to issue the regulations). This EA is intended to provide focused information on the primary issues and impacts of environmental concern, which is our issuance of the regulations authorizing the take of marine mammals incidental to Hilcorp's oil and gas activities, and the mitigation and monitoring measures to minimize the effects of that take. For these reasons, this EA does not provide a detailed evaluation of the effects to the elements of the human environment listed in Table 1 below.

Table 1. Elements of the Environment Not Carried Forward for Analysis

Biological	Physical	Socioeconomic/Cultural
Humans	Air Quality	Commercial Fishing
Fisheries Resources and Essential Fish Habitat	Farmland Geography	Historic and Cultural Resources
Invertebrates	Geology/sediments	Indigenous Cultural Resources
Invasive Species	Land Use	Low Income Populations
Marine and Coastal Birds	Oceanography	Military Activities
Sea Turtles	State Marine Protected Areas	Minority Populations
Threatened and Endangered Fishes	Federal Marine Protected Areas	National Historic Preservation Sites
Benthic Communities	National Estuarine Research Reserves	Other Marine Uses: Military activities, Shipping and marine transportation, and Boating
	National Marine Sanctuaries	Recreational Fishing
	National Wildlife Refuges	Public Health and Safety
	Park Land	

Biological	Physical	Socioeconomic/Cultural
	Water Quality	
	Wetlands	
	Wild and Scenic Rivers	

Chapter 2 Alternatives

2.0 Introduction

As indicated in Chapter 1, the National Marine Fisheries Service (NMFS) Proposed Action is to issue an regulations and subsequent LOAS to Hilcorp to authorize the take of small numbers of marine mammals incidental to oil and gas activities. NMFS's Proposed Action is triggered by Hilcorp's request for LOAs per the MMPA of 1972, as amended (16 U.S.C. 1361 et seq.). In accordance with the National Environmental Policy Act (NEPA) and Council on Environmental Quality (CEQ) Regulations, NMFS is required to consider a reasonable range of alternatives to a Proposed Action as well as the No action Alternative Reasonable alternatives are viable options for meeting the purpose and need for the proposed action. The evaluation of alternatives under NEPA assists NMFS with understanding, and as appropriate, minimizing impacts through an assessment of alternative ways to achieve the purpose and need for our Proposed Action. Reasonable alternatives are carried forward for detailed evaluation under NEPA while alternatives considered but determined not to meet purpose and need are not carried forward. For the purposes of this EA, an alternative will only meet the purpose and need if it satisfies the requirements under section 101(a)(5)(A) of the MMPA. Therefore, NMFS applied the screening criteria and considerations outlined in Section 2.1 to the alternatives to identify which alternatives to carry forward for analysis.

2.1 Criteria and Considerations for Selecting Alternatives

Under Section 101(a)(5)(A) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to such activity, and other means of effecting the least practicable adverse impact on such species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of such species or stock for taking for certain subsistence uses ("least practicable adverse impact"). Consideration of the availability of marine mammal species or stocks for taking for subsistence uses pertains only to Alaska. NMFS does not have a regulatory definition for "least practicable adverse impact." However, NMFS's implementing regulations require applicants for incidental take authorizations to include information about the availability and feasibility (economic and technological) of equipment, methods, and manner of conducting such activity or other means of effecting the least practicable adverse impact upon the affected species or stocks and their habitat (50 CFR 216.104(a)(11)). In evaluating how mitigation may or may not be appropriate to ensure the least practicable adverse impact on species or stocks and their habitat, we carefully consider two primary factors:

(1) The manner in which, and the degree to which, implementation of the measure(s) is expected to reduce impacts to marine mammal species or stocks, their habitat, and their availability for subsistence uses (when relevant). This analysis will consider such things as the nature of the potential adverse impact (such as likelihood, scope, and range), the likelihood that the measure will be effective if implemented, and the likelihood of successful implementation.

(2) The practicability of the measure for applicant implementation. Practicability of implementation may consider such things as cost, impact on operations, personnel safety, and practicality of implementation.

While the language of the least practicable adverse impact standard calls for minimizing impacts to affected

species or stocks, we recognize that the reduction of impacts to those species or stocks accrues through the application of mitigation measures that limit impacts to individual animals. Accordingly, our analysis focuses on measures designed to avoid or minimize impacts on marine mammals from activities that are likely to increase the probability or severity of population-level effects, including auditory injury or disruption of important behaviors, such as foraging, breeding, or mother/calf interactions. In order to satisfy the MMPA's least practicable adverse impact standard, we propose a suite of basic mitigation protocols that are required regardless of the status of a stock. Additional or enhanced protections are proposed for species whose stocks are in poor health and/or are subject to some significant additional stressor that lessens that stock's ability to weather the effects of the specified activity without worsening its status.

In the evaluation of specific measures, the details of the specified activity will necessarily inform each of the two primary factors discussed above (expected reduction of impacts and practicability), and will be carefully considered to determine the types of mitigation that are appropriate under the least practicable adverse impact standard. Analysis of how a potential mitigation measure may reduce adverse impacts on a marine mammal stock or species and practicability of implementation are not issues that can be meaningfully evaluated through a binary lens. The manner in which, and the degree to which, implementation of a measure is expected to reduce impacts, as well as its practicability in terms of these considerations, can vary widely. For example, a time/area restriction could be of very high value for decreasing population-level impacts (e.g., avoiding disturbance of feeding females in an area of established biological importance) or it could be of lower value (e.g., decreased disturbance in an area of high productivity but of less firmly established biological importance). Regarding practicability, a measure might involve operational restrictions that completely impede the operator's ability to acquire necessary data (higher impact), or it could mean additional incremental delays that increase operational costs but still allow the activity to be conducted (lower impact). Expected effects of the activity and of the mitigation as well as status of the stock all weigh into these considerations. Accordingly, the greater the likelihood that a measure will contribute to reducing the probability or severity of adverse impacts to the species or stock, the greater the weight that measure is given when considered in combination with practicability to determine the appropriateness of the mitigation measure, and vice versa. No quantitative formula is provided by the MMPA or by regulation, and it is not reasonable to expect an assessment of the mitigation required to achieve the least practicable adverse impact other than as described here.

The emphasis given to a measure's ability to reduce the impacts on a species or stock considers the degree, likelihood, and context of the anticipated reduction of impacts to individuals as well as the status of the species or stock. The ultimate impact on any individual from a disturbance event (which informs the likelihood of adverse species- or stock-level effects) is dependent on the circumstances and associated contextual factors, such as duration of exposure to stressors. Though any proposed mitigation needs to be evaluated in the context of the specific activity and the species or stocks affected, measures with the following types of goals are often applied to reduce the likelihood or severity of adverse species- or stock-level impacts:

- avoiding or minimizing injury or mortality;
- limiting interruption of known feeding, breeding, mother/calf, or resting behaviors;
- minimizing the abandonment of important habitat (temporally and spatially);
- minimizing the number of individuals subjected to these types of disruptions; and
- limiting degradation of habitat.

Mitigating these types of effects is intended to reduce the likelihood that the activity will result in energetic or other types of impacts that are more likely to result in reduced reproductive success or survivorship. It is also important to consider the degree of impacts that were expected in the absence of mitigation in order to assess the benefit of any potential measures. Finally, because the least practicable adverse impact standard authorizes NMFS to weigh a variety of factors when evaluating appropriate mitigation measures, it does not compel mitigation for every kind of individual take, even when practicable for implementation by the applicant.

2.2 Description of Hilcorp's Proposed Activities

A thorough description of Hilcorp's proposed oil and gas activities is in the notice of the proposed rulemaking under "Summary of Request" and "Description of Specified Activities" and is incorporated by reference in the following subsections.

Hlcorp proposes to conduct oil and gas exploration, development, production, and decommissioning. The work expected to span five years includes: 30 days of 2D seismic survey, 45-60 days of 3D seismic survey, geohazard surveys in the Outer Continenal Shelf (OCS) (30 days), middle Cook Inlet subseawall area (14 days), and Trading Bay (30 days), exploratory wells in the OCS (40-60 days per well, 2-4 wells annually for three years) and Trading Bay (120-150 days), Iniskin Peninsula exploration and development (180 days annually for two years), platform and pipeline maintenance (180 days annually for five years), middle Cook Inlet well abandonment (90 days), and Drift River terminal decommissioning (120 days).). The proposed activities are depicted below in Table 1.

Table 1. Summary of planned activities included in ITR Petition.

Project Name	Cook Inlet Region	Year(s) Planned	Seasonal Timing	Anticipated Duration	Anticipated Noise Sources
Anchor Point 2D seismic survey	Lower Cook Inlet, Anchor Point to Kasilof	2021 or 2022	April-October	30 days	Marine: 1 source vessel with airgun, 1 node vessel Onshore/Intertidal: Shot holes, tracked vehicles, helicopters
OCS 3D seismic survey	Lower Cook Inlet OCS	2019	April-June	45-60 days	1 source vessel with airguns, 2 support vessels, 1 mitigation vessel potentially
OCS geohazard survey	Lower Cook Inlet OCS	2019 or 2020	Fall 2019 or spring 20202	30 days	1 vessel with chosounders and/or sub-bottom profilers
OCS exploratory wells	Lower Cook Inlet OCS	2020-2022	April-October	40-60 days per well, 2-4 wells per year	1 jack-up rig, drive pipe installation, vertical seismic profiling, 2-3 tugs for towing rig, support vessels, helicopters
Iniskin Peninsula exploration and development	Lower Cook Inlet, west side	2019-2020	April-October	180 days	Construction of causeway, vibratory sheet pile driving, dredging, vessels
Platform & pipeline maintenance	Middle Cook Inlet	2019-2024	April-October	180 days	Vessels, water jets, hydraulic grinders, pingers, helicopters, and/or sub-bottom profilers

North Cook Inlet Unit subseawell geohazard survey	Middle Cook Inlet	2020	May	14 days	1 vessel with echosounders and/or sub- bottom profilers
North Cook Inlet Unit well abandonment activity	Middle Cook Inlet	2020	May-July	90 days	1 jack-up rig, tugs towing rig, support vessel, helicopters
Trading Bay area geohazard survey	Middle Cook Inlet	2020	May	30 days	1 vessel with echosounders and/or sub- bottom profilers
Trading Bay area exploratory wells	Middle Cook Inlet	2020	May-October	120-150 days	1 jack-up rig, drive pipe installation, vertical seismic profiling, tugs towing rig, support vessel, helicopters
Drift River terminal decommissioning	Lower Cook Inlet, west side	2023	April-October	120 days	Vessels

2.2.1. 2D Seismic Survey

Based on potential future lease sales in both State and Federal waters, operators collect two-dimensional (2D) seismic data to determine the location of possible oil and gas prospects. Generally, 2D survey lines are spaced farther apart than three-dimensional (3D) surveys and are conducted in a regional pattern that provides less detailed geological information. 2D surveys are used to cover wider areas to map geologic structures on a regional scale. Airgun arrays sizes used during 2D surveys are similar to those used during 3D surveys.

During the time frame of this Petition, the region of interest to conduct a 2D survey is in the marine, intertidal, and onshore area on the eastern side of Cook Inlet from Anchor Point to Kasilof. The area of interest is approximately 8 km (5 miles) on each side of the coastline. The anticipated timing of the planned 2D survey is in the open water season (April through October) in either 2020 or 2021. The actual survey duration will take approximately 30 days in either year.

The 2D seismic data are acquired using airguns in the marine zone, airguns in the intertidal zone when the tide is high and drilled shot holes in the intertidal zone when the tide is low and drilled shot holes in the land zone. The data are recorded using an autonomous nodal system (i.e., no cables) that are deployed in the marine, intertidal, and land zones. The planned source lines (airgun and shot holes) are approximately 16 km (10 mi) in length running perpendicular to the coastline (Figure 3). The source lines are spaced every 8 km (5 mi) in between Anchor Point and Kasilof, with approximately 9-10 lines over the area of interest.

In the marine and high tide intertidal zones, data will be acquired using a shallow water airgun towed behind one source vessel. Although the precise volume of the airgun array is unknown at this time, Hilcorp will use an airgun array similar to what has been used for surveys in Cook Inlet by Apache (2011-2013) and SAExploration (2015): either a 2,400 cubic inch (cui) or 1,760 cui array. A 2,4000 cubic inch airgun was assumed for analysis in this proposed rule. In addition, the source vessel will be equipped with a 440 cui shallow water source which it can deploy at high tide in the intertidal area in less than 1.8 meter (6 feet) of water. Source lines are oriented along the node line. A single vessel is capable of acquiring a source line in approximately 1-2 hours (hrs). In general, only one source line will be collected in one day to allow for all

the node deployments and retrievals, and intertidal and land zone shot holes drilling. There are up to 10 source lines, so if all operations run smoothly, there will only be 2 hr per day over 10 days of airgun activity. Hilcorp anticipates the entire operation to take approximately 30 days to complete to account for weather and equipment contingencies.

The recording system that will be employed is an autonomous system "nodal" (i.e., no cables), which is expected to be made up of at least two types of nodes; one for the land and one for the intertidal and marine environment. For the intertidal and marine zone, this will be a submersible multi-component system made up of three velocity sensors and a hydrophone. These systems have the ability to record continuous data. Inline receiver intervals for the node systems are approximately 50 m (165 ft). For 2D seismic surveys, the nodes are deployed along the same line as the seismic source. The deployment length is restricted by battery duration and data storage capacity. The marine nodes will be placed using one node vessel. The vessels required for the 2D seismic survey include just a source vessel and a node vessel.

In the marine environment, once the nodes are placed on the seafloor, the exact position of each node is required. In very shallow water, the node positions are either surveyed by a land surveyor when the tide is low, or the position is accepted based on the position at which the navigator has laid the unit. In deeper water, a hull or pole mounted pinger to send a signal to the transponder which is attached to each node will be used. The transponders are coded and the crew knows which transponder goes with which node prior to the layout. The transponders response (once pinged) is added together with several other responses to create a suite of range and bearing between the pinger boat and the node. Those data are then calculated to precisely position the node. In good conditions, the nodes can be interrogated as they are laid out. It is also common for the nodes to be pinged after they have been laid out. Onshore and intertidal locating of source and receivers will be accomplished with Differential Global Positioning System/roving units (DGPS/RTK) equipped with telemetry radios which will be linked to a base station established on the source vessel. Survey crews will have both helicopter and light tracked vehicle support. Offshore source and receivers will be positioned with an integrated navigation system (INS) utilizing DGPS/RTK link to the land base stations. The integrated navigation system will be capable of many features that are critical to efficient safe operations. The system will include a hazard display system that can be loaded with known obstructions, or exclusion zones.

2.2.2 3D Seismic Survey

During the time frame of this Petition, Hilcorp plans to collect 3D seismic data for approximately 45-60 days starting May 1, 2019 over 8 of the 14 OCS lease blocks in lower Cook Inlet. The 3D seismic survey is comprised of an area of approximately 790 km2 (305 mi2) through 8 lease blocks (6357, 6405, 6406, 6407, 6455, 6456, 6457, 6458). Hilcorp submitted an application for an Incidental Harassment Authorization (IHA) in late 2017 for a planned survey in 2018 but withdrew the application and now plan for the survey to take place in 2019. The survey program is anticipated to begin May 1, 2019 and last for approximately 45-60 days through June 2019 in compliance with identified BOEM lease stipulations. The length of the survey will depend on weather, equipment, and marine mammal delays (contingencies of 20% weather, 10% equipment, 10% marine mammal were assumed in this analysis).

Polarcus is the intended seismic contractor and the general seismic survey design is provided below. The 3D seismic data will be acquired using a specially designed marine seismic vessel towing between 8 and 12

~2,400-m (1.5 mi) recording cables with a dual air gun array. The survey will involve one source vessel, one support vessel, one chase vessel, and potentially one mitigation vessel. The anticipated seismic source to be deployed from the source vessel is a 14-airgun array with a total volume of 1,945 in3. Crew changes are expected to occur every four to six weeks using a helicopter or support vessel from shore bases in lower Cook Inlet. The proposed seismic survey will be active 24 hours (hrs) per day. The array will be towed at a speed of approximately 7.41 km/hr (4 knots), with seismic data collected continuously. Data acquisition will occur for approximately 5 hours, followed by a 1.5-hour period to turn and reposition the vessel for another pass. The turn radius on the seismic vessel is approximately 3,200 m (2 mi).

The data will be shot parallel to the Cook Inlet shorelines in a north/south direction. This operational direction will keep recording equipment/streamers in line with Cook Inlet currents and tides and keep the equipment away from shallow waters on the east and west sides. The program may be modified if the survey cannot be conducted as a result of noise conditions onsite (i.e., ambient noise). The airguns will typically be turned off during the turns, however, depending on the daylight hours and length of the turn, Hilcorp may use the smallest gun in the array (45 in3) as a mitigation airgun where needed. The vessel will turn into the tides to ensure the recording cables/streamers remain in line behind the vessel.
Hilcorp plans to use an array that provides for the lowest possible sound source to collect the target data.

The proposed array is a Bolt 1900 LLXT dual gun array. The airguns will be configured as two linear arrays or “strings;” each string will have 7 airguns shooting in a “flip-flop” configuration for a total of 14 airguns. The airguns will range in volume from 45 to 290 in3 for a total of 1,945 in3. The first and last are spaced approximately 14 m (45.9 ft) apart and the strings are separated by approximately 10 m (32.8 ft). The two airgun strings will be distributed across an approximate area of 30 x 14 m (98.4 x 45.9 ft) behind the source vessel and will be towed 300-400 m (984- 1,312 ft) behind the vessel at a depth of 5 m (16.4 ft). The firing pressure of the array is 2,000 pounds per square inch (psi). The airgun will fire every 4.5 to 6 seconds, depending on the exact speed of the vessel. When fired, a brief (25 milliseconds [ms] to 140 ms) pulse of sound is emitted by all airguns nearly simultaneously. Hilcorp proposes to use a single 45 in3 airgun, the smallest airgun in the array, for mitigation purposes.

Hilcorp intends to use 8 Sercel-type solid streamers or functionally similar for recording the seismic data (Figure 5). Each streamer will be approximately 2,400 m (150 mi) in length and will be towed approximately 8-15 m (26.2-49.2 ft) or deeper below the surface of the water. The streamers will be placed approximately 50 m (165 ft) apart to provide a total streamer spread of 400 m (1,148 ft). Hiclorp recognizes solid streamers as best in class for marine data acquisition because of unmatched reliability, signal to noise ratio, low frequency content, and noise immunity.

The survey will involve one source vessel, one support vessel, one or two chase vessel, and potentially one mitigation vessel. The source vessel tows the airgun array and the streamers. The support vessel provides general support for the source vessel, including supplies, crew changes, etc. The chase vessel monitors the in-water equipment and maintains a security perimeter around the streamers. The mitigation vessel provides a viewing platform to augment the marine mammal monitoring program.

2.2.3. Geohazard and Geotechnical Surveys

Upon completion of the 3D seismic survey over the lower Cook Inlet OCS leases, Hilcorp plans to conduct

a geohazard survey on site-specific regions within the area of interest prior to conducting exploratory drilling. The precise location is not known, as it depends on the results of the 3D seismic survey, but the location will be within the lease blocks. The anticipated timing of the activity is in either the fall of 2019 or the spring of 2020. The actual survey duration will take approximately 30 days.

The suite of equipment used during a typical geohazards survey consists of single beam and multi-beam echosounders, which provide water depths and seafloor morphology; a side scan sonar that provides acoustic images of the seafloor; a sub-bottom profiler which provides 20 to 200 m (66 to 656 ft) sub-seafloor penetration with a 6- to 20-centimeter (cm, 2.4-7.9-inch [in]) resolution. Magnetometers, to detect ferrous items, may also be used. Geotechnical surveys are conducted to collect bottom samples to obtain physical and chemical data on surface and near sub-surface sediments. Sediment samples typically are collected using a gravity/piston corer or grab sampler. The surveys are conducted from a single support vessel.

The echosounders and sub-bottom profilers are generally hull-mounted or towed behind a single vessel. The ship travels at 3-4.5 knots (5.6-8.3 km/hr). Surveys are site specific and can cover less than one lease block in a day, but the survey extent is determined by the number of potential drill sites in an area. BOEM guidelines at NTL-A01 require data to be gathered on a 150 by 300 m (492 by 984 ft) grid within 600 m (1,969 ft) of the surface location of the drill site, a 300 by 600 m (984 by 1,969 ft) grid along the wellbore path out to 1,200 m (3,937 ft) beyond the surface projection of the conductor casing, and extending an additional 1,200 m beyond that limit with a 1,200 by 1,200 m grid out to 2,400 m (7,874 ft) from the well site.

The multibeam echosounder, single beam echosounder, and side scan sonar operate at frequencies of greater than 200 kHz. Based on the frequency ranges of these pieces of equipment and the hearing ranges of the marine mammals that have the potential to occur in the action area, the noise produced by the echosounders and side scan sonar are not likely to result in take of marine mammals and are not considered further in this document.

The geophysical surveys include use of a low resultion and high resolution sub-bottom profiler. The proposed high-resolution sub-bottom profiler operates at source level of 210 dB re 1 μPa RMS at 1 m. The proposed system emits energy in the frequency bands of 2 to 24 kHz. The beam width is 15 to 24 degrees. Typical pulse rate is between 3 and 10 Hz. The secondary low-resolution sub-bottom profiler will be utilized as necessary to increase sub-bottom profile penetration. The proposed system emits energy in the frequency bands of 1 to 4 kHz.

2.2.4 Exploratory Drilling

Operators will drill exploratory wells based on mapping of subsurface structures using 2D and 3D seismic data and historical well information. Hilcorp plans to conduct the exploratory drilling program April to October between 2020 and 2022. The exact start date is currently unknown and is dependent on the results of the seismic survey, geohazard survey, and scheduling availability of the drill rig. It is expected that each well will take approximately 40- 60 days to drill and test. Beginning in spring 2020, Hilcorp Alaska plans to possibly drill two and as many as four exploratory wells, pending results of the 3D seismic survey in the lower Cook Inlet OCS leases. After testing, the wells may be plugged and abandoned.

Hilcorp Alaska proposes to conduct its exploratory drilling using a rig similar to the Spartan 151 drill rig. The Spartan 151 is a 150 H class independent leg, cantilevered jack-up drill rig with a drilling depth capability of 7,620 m (25,000 ft) that can operate in maximum water depths up to 46 m (150 ft). Depending on the rig selection and location, the drilling rig will be towed on site using up to three ocean- going tugs licensed to operate in Cook Inlet. Rig moves will be conducted in a manner to minimize any potential risk regarding safety as well as cultural or environmental impact. While under tow to the well sites, rig operations will be monitored by Hilcorp and the drilling contractor management. Very High Frequency (VHF) radio, satellite, and cellular phone communication systems will be used while the rig is under tow. Helicopter transport will also be available.

Similarly to transiting vessels, although some marine mammals could receive sound levels in exceedance of the general acoustic threshold of 120 dB from the tugs towing the drill rig during this project, take is unlikely to occur, primarily because of the predictable movement of vessels and tugs. Marine mammal population density in the project area is low (see Estimated Take section below), and those that are present are likely habituated to the existing baseline of commercial ship traffic. Further, there are no activity-, location-, or species-specific circumstances or other contextual factors that would increase concern and the likelihood of take from towing of the drill rig.

The drilling program for the well will be described in detail in an Exploration Plan to BOEM. The Exploration Plan will present information on the drilling mud program; casing design, formation evaluation program; cementing programs; and other engineering information. After rig up/rig acceptance by Hilcorp Alaska, the wells will be spudded and drilled to bottom-hole depths of approximately 2,100 to 4,900 m (7,000 to 16,000 ft) depending on the well. It is expected that each well will take about 40-60 days to drill and up to 10-21 days of well testing. If two wells are drilled, it will take approximately 80-120 days to complete the full program; if four wells are drilled, it will take approximately 160-240 days to complete the full program.

Primary sources of rig-based acoustic energy were identified as coming from the D399/D398 diesel engines, the PZ-10 mud pump, ventilation fans (and associated exhaust), and electrical generators. The source level of one of the strongest acoustic sources, the diesel engines, was estimated to be 137 dB re 1 µPa rms at 1 m in the 141-178 Hz bandwidth. Based on this measured level, the 120 dB rms acoustic received level isopleth would be 50 m (154 ft) away from where the energy enters the water (jack-up leg or drill riser). Drilling and well construction sounds are similar to vessel sounds in that they are relatively low-level and low-frequency. Since the rig is stationary in a location with low marine mammal density, the impact of drilling and well construction sounds produced from the jack up rig is expected to be lower than a typical large vessel. There is open water in all directions from the drilling location. Any marine mammal approaching the rig would be fully aware of its presence long before approaching or entering the zone of influence for behavioral harassment, and we are unaware of any specifically important habitat features (e.g., concentrations of prey or refuge from predators) within the rig's zone of influence that would encourage marine mammal use and exposure to higher levels of noise closer to the source. Given the absence of any activity-, location-, or species-specific circumstances or other contextual factors that would increase concern, we do not expect routine drilling noise to result in the take of marine mammals.

When planned and permitted operations are completed, the well will be suspended according to Bureau of Safety and Environmental Enforcement (BSEE) regulations. The well casings will be landed in a mudline

hanger after each hole section is drilled. When the well is abandoned, the production casing is sealed with mechanical plugging devices and cement to prevent the movement of any reservoir fluids between various strata. Each casing string will be cutoff below the surface and sealed with a cement plug. A final shallow cement plug will be set to approximately 3.05 m (10 ft) below the mudline. At this point, the surface casing, conductor, and drive pipe will be cutoff and the three cutoff casings and the mudline hanger are pulled to the deck of the jack-up rig for final disposal. The plugging and abandonment procedures are part of the Well Plan which is reviewed by BSEE prior to being issued an approved Permit to Drill.

A drive pipe is a relatively short, large-diameter pipe driven into the sediment prior to the drilling of oil wells. The drive pipe serves to support the initial sedimentary part of the well, preventing the looser surface layer from collapsing and obstructing the wellbore. Drive pipes are installed using pile driving techniques. Hilcorp proposed to drive approximately 60 m of 76.2-cm pipe at each well site prior to drilling using a Delmar D62-22 impact hammer (or similar). This hammer has an impact weight of 6,200 kg (13,640 lbs). The drive pipe driving event is expected to last one to three days at each well site, although actual pounding of the pipe will only occur intermittently during this period. Conductors are slightly smaller diameter pipes than the drive pipes used to transport or "conduct" drill cuttings to the surface. For these wells, a 50.8-cm [20-in] conductor pipe may be drilled, not hammered, inside the drive pipe, dependent on the integrity of surface formations.

Once the well is drilled, accurate follow-up seismic data may be collected by placing a receiver at known depths in the borehole and shooting a seismic airgun at the surface near the borehole, called vertical seismic profiling (VSP). These data provide high-resolution images of the geological layers penetrated by the borehole and can be used to accurately correlate original surface seismic data. The actual size of the airgun array is not determined until the final well depth is known, but typical airgun array volumes are between 600 and 880 cui. VSP typically takes less than two full days at each well site.

2.2.5 Iniskin Peninsula Exploration

Hilcorp Alaska initiated baseline exploratory data collection in 2013 for a proposed land-based oil and gas exploration and development project on the Iniskin Peninsula of Alaska, near Chinitna Bay. The proposed project is approximately 97 km (60 mi) west of Homer on the west side of Cook Inlet in the Fitz Creek drainage. New project infrastructure includes material sites, a 6.9 km (4.3 mi) long access road, prefabricated bridges to cross four streams, an air strip, barge landing/staging areas, fuel storage facilities, water wells and extraction sites, an intertidal causeway, a camp/staging area, and a drill pad. Construction is anticipated to start in 2020.

An intertidal rock causeway is proposed to be constructed adjacent to the Fitz Creek staging area to improve the accessibility of the barge landing during construction and drilling operations. The causeway will extend seaward from the high tide line approximately 366 m (1,200 ft) to a landing area 46 m (150 ft) wide. A dock face will be constructed around the rock causeway so that barges will be able to dock along the causeway. Rock placement for the causeway is not known to generate sound at levels expected to disturb marine mammals. The causeway is also not proposed at a known pinniped haulout or other biologically significant location for local marine mammals. Therefore, rock laying for the causeway is not considered further in this document.

The causeway will need to be 75% built before the construction of the dock face will start. The dock face will be constructed with 18-m (60-ft) tall Z-sheet piles, all installed using a vibratory hammer. It will take approximately 14-25 days, depending on the length of the work shift, assuming approximately 25% of the day actual pile driving. The timing of pile driving will be in late summer or early winter, after the causeway has been partially constructed. Illingworth & Rodkin (2007) compiled measured near-source (10 m [32.8 ft]) SPL data from vibratory pile driving for different pile sizes ranging in diameter from 30.5 to 243.8 cm (12 to 96 in).

2.2.6 Offshore Production Platforms

Of the 17 production platforms in central Cook Inlet, 15 are owned by Hilcorp.
Hilcorp performs routine construction on their platforms, depending on needs of the operations. Construction activities may take place up to 24 hrs a day. In-water activities include support vessels bringing supplies five days a week up to two trips per day between offshore systems at Kenai (OSK) and the platform. Depending on the needs, there may also be barges towed by tugs with equipment and helicopters for crew and supply changes.

Hilcorp routinely conducts development drilling activities at offshore platforms on a regular basis to meet the asset's production needs. Development drilling activities occurs from existing platforms within the Cook Inlet through either open well slots or existing wellbores in existing platform legs. Drilling activities from platforms within Cook Inlet are accomplished by using conventional drilling equipment from a variety of rig configurations.

Some other platforms in Cook inlet have permanent drilling rigs installed that operate under power provided by the platform power generation systems, while others do not have drill rigs, and the use of a mobile drill rig is required. Mobile offshore drill rigs may be powered by the platform power generation (if compatible with the platform power system) or self-generate power with the use of diesel fired generators.

Helicopter logistics for development drilling programs operations will include transportation for personnel and supplies. The helicopter support will be managed through existing offshore services based at the OSK Heliport to support rig crew changes and cargo handling. Helicopter flights to and from the platform while drilling is occurring is anticipated to increase (on average) by two flights per day from normal platform operations.

Major supplies will be staged on-shore at the OSK Dock in Nikiski. Required supplies and equipment will be moved from the staging area to the platform in which drilling occurring by existing supply vessels that are currently in use supporting offshore operations within Cook Inlet. Vessel trips to and from the platform while drilling is occurring is anticipated to increase (on average) by two trips per day from normal platform operations. During mobile drill rig mobilization and demobilization, one support vessel is used continuously for approximately 30 days to facilitate moving rig equipment and materials.

2.2.7 Oil and Gas Pipeline Maintenance

Each year, Hilcorp Alaska must verify the structural integrity of their platforms and pipelines located within Cook Inlet. Routine maintenance activities include: subsea pipeline inspections, stabilizations, and repairs; platform leg inspections and repairs; and anode sled installations and/or replacement. In general, pipeline

stabilization and pipeline repair are anticipated to occur in succession for a total of 6-10 weeks. However, if a pipeline stabilization location also requires repair, the divers will repair the pipeline at the same time they are stabilizing it. Pipeline repair activities are only to be conducted on an as-needed basis whereas pipeline stabilization activities will occur annually. During underwater inspections, if the divers identify an area of the pipeline that requires stabilization, they will place Sea-Crete bags at that time rather than waiting until the major pipeline stabilization effort that occurs later in the season.

Natural gas and oil pipelines located on the seafloor of the Cook Inlet are inspected on an annual basis using ultrasonic testing (UT), cathodic protection surveys, multi-beam sonar surveys, and sub-bottom profilers. Deficiencies identified are corrected using pipeline stabilization methods or USDOT-approved pipeline repair techniques. The Applicant employs dive teams to conduct physical inspections and evaluate cathodic protection status and thickness of subsea pipelines on an annual basis. If required for accurate measurements, divers may use a water jet to provide visual access to the pipeline. For stabilization, inspection dive teams may place Sea-Crete bags beneath the pipeline to replace any materials removed by the water jet. Results of the inspections are recorded and significant deficiencies are noted for repair. Multi-beam sonar and sub-bottom profilers may also be used to obtain images of the seabed along and immediately adjacent to all subsea pipelines. Elements of pipeline inspections that could produce underwater noise include: the dive support vessel, water jet, multi-beam sonar/sub-bottom profiler and accompanying vessel.

A water jet is a zero-thrust water compressor that is used for underwater removal of marine growth or rock debris underneath the pipeline. The system operates through a mobile pump which draws water from the location of the work. Water jets likely to be used in Cook Inlet include, but are not limited to, the CaviDyne CaviBlaster® and the Gardner Denver Liqua-Blaster. Noise generated during the use of the water jets would be very short in duration (30 minutes or less at any given time) and intermittent.

If necessary, Hilcorp may use an underwater pipe cutter to replace existing pipeline segments in Cook Inlet. The following tools are likely to be used for pipeline cutting activities:

- A diamond wire saw used for remote cutting underwater structures such as pipes and I-Beams. These saws use hydraulic power delivered by a dedicated power source. The saw usually uses a method that pushes the spinning wire through the pipe.
- A hydraulically-powered Guillotine saw which uses an orbital cutting movement similar to traditional power saws.

Scour spans beneath pipelines greater than 23 m (75 ft) have the potential to cause pipeline failures. To be conservative, scour spans of 15 m (50 ft) or greater identified using multi-beam sonar surveys are investigated using dive teams. Divers perform tactile inspections to confirm spans greater than 15 m (50 ft). The pipeline is stabilized along these spans with Sea-Crete concrete bags. While in the area, the divers will also inspect the external coating of the pipeline and take cathodic protection readings if corrosion wrap is found to be absent. Elements of pipeline stabilization that could produce underwater noise include: dive support vessel and water jet.

Significant pipeline deficiencies identified during pipeline inspections are repaired as soon as practicable using methods including, but not limited to, USDOT-approved clamps and/or fiber glass wraps, bolt/flange replacements, and manifold replacements. In some cases, a water jet may be required to remove sand and

gravel from under or around the pipeline to allow access for assessment and repair. The pipeline surface may also require cleaning using a hydraulic grinder to ensure adequate repair. If pipeline replacement is required, an underwater pipe cutter such as a diamond wire saw or hydraulically-powered Guillotine saw may be used. Elements of pipeline repair that could produce underwater noise include: dive support vessel, water jet, hydraulic grinder, and underwater pipe cutter.

2.6.8 Platform Leg Inspection and Repair

Hilcorp's platforms in Cook Inlet are inspected on a routine basis. Divers and certified rope access technicians visually inspect subsea platform legs. These teams also identify and correct significant structural deficiencies. Platform leg integrity and pipeline-to-platform connections beneath the water surface are evaluated by divers on a routine basis. Platform legs, braces, and pipeline-to-platform connections are evaluated for cathodic protection status, structure thickness, excessive marine growth, damage, and scour. If required, divers may use a water jet to clean or provide access to the structure. If necessary, remedial grinding using a hydraulic under water grinder may be required to determine extent damage and/or to prevent further crack propagation. All inspection results are recorded and significant deficiencies are noted for repair. Elements of subsea platform leg inspection and repair that could produce underwater noise include: dive support vessel, hydraulic grinder, water jet.

Platform leg integrity along the tidal zone is inspected on a routine basis. Difficult-to-reach areas may be accessed using either commercially-piloted unmanned aerial systems (UAS). Commercially-piloted UASs may be deployed from the top-side of the platform to obtain images of the legs. Generally, the UAS is in the air for 15-20 minutes at a time due to battery capacity, which allows for two legs and part of the underside of the platform to be inspected. The total time to inspect a platform is approximately 1.5 hrs of flight time. The UAS is operated at a distance of up to 30.5 m (100 ft) from the platform at an altitude of 9-15 m (30-50 ft) above sea level. To reduce potential harassment of marine mammals, the area around the platform would be inspected prior to launch of the UAS to ensure there are no flights directly above marine mammals. As no flights will be conducted directly over marine mammals, the effects of drone use for routine maintenance are not considered further in this application.

2.6.9 North Cook Inlet Unit Subsea Well Plugging and Abandonment

The discovery well in the North Cook Inlet Unit was drilled over 50 years ago and is planned to be abandoned, so Hilcorp Alaska plans to conduct a geohazard survey to locate the well and conduct P&A activities for a previously drilled subsea exploration well in 2020. The geohazard survey location is approximately 402-804 m (¼-½ mi) south of the Tyonek platform and will take place over approximately seven days with a grid spacing of approximately 250 m (820 ft). The suite of equipment used during a typical geohazards survey consists of single beam and multi-beam echosounders, which provide water depths and seafloor morphology; a side scan sonar that provides acoustic images of the seafloor; a sub-bottom profiler which provides 20 to 200 m (66 to 656 ft) sub-seafloor penetration with a 6- to 20-cm (2.4-7.9-in) resolution. The echosounders and sub-bottom profilers are generally hull-mounted or towed behind a single vessel. The vessel travels at 3-4.5 knots (5.6-8.3 km/hr).

After the well has been located, Hilcorp plans to conduct plugging and abandonment activities over a 60-90 day time period in May through July in 2020. The jack-up rig will be similar to what is described above (the

Spartan 151 drill rig, or similar). The rig will be towed onsite using up to three ocean-going tugs. Once the jack-up rig is on location, divers working off a boat will assist in preparing the subsea wellhead and mudline hanger for the riser to tie the well to the jack-up. Once the riser is placed, the BOP equipment is made up to the riser. At this point, the well will be entered and well casings will be plugged with mechanical devices and cement and then cutoff and pulled. A shallow cement plug will be set in the surface casing to 3.05 m (10 ft) below the mudline hanger. The remaining well casings will be cutoff and the mudline hanger will be recovered to the deck of the jack-up rig for disposal. The well abandonment will be performed in accordance to AOGCC regulations.

2.6.10 Trading Bay Exploratory Drilling

Hilcorp plans to conduct exploratory drilling activities in the Trading Bay area. The specific sites of interest have not yet been identified, but the general area is shown in Figure 3. Hilcorp will conduct geohazard surveys over the areas of interest to locate potential hazards prior to drilling with the same suite of equipment as described above for exploratory drilling in the lower Inlet. The survey is expected to take place over 30-60 days in 2019 from a single vessel.

The exploratory drilling and well completion activities will take place in site-specific areas based on the geohazard survey. Hilcorp plans to drill 1-2 exploratory wells in this area in the open water season of 2020 with the same equipment and methods as described above for lower Inlet exploratory drilling. The noise of routine drilling is not considered further as explained in the description of activities in the Lower Inlet. However, drive pipe installation and vertical seismic profiling will be considered further.

2.3 Description of Alternatives

2.3.1 Alternative 1 – Issuance of Authorization with Mitigation, Monitoring, and Reporting Measures

Under this alternative, NMFS would issue regulations and LOAs to Hilcorp allowing the incidental take, by Level A harassment and Level B harassment, of marine mammals consistent with the activities described in Section 2.2 and more thoroughly in the proposed rule, subject to additional mitigation and monitoring requirements prescribed by NMFS.

Proposed Mitigation Measures :

(1)Exclusion and safety zones - The Exclusion Zone (EZ) is defined as the area in which all operations are shut down in the event a marine mammal enters or is about to enter this zone based on distances to Level A or what can be effectively monitored for the species. The Safety Zone (SZ) is an area larger than the EZ and is defined as the area within which operations may power down in the event a marine mammal enters, is about to enter or may be considered a Level B harassment. For all activities, if a marine mammal for which take is not authorized is seen approaching the SZ, operations will shut down. A minimum 10 meter shutdown zone will be observed for all in-water construction and heavy machinery.

(2) NMFS proposes that Hilcorp shut down if a beluga is observed approaching or inside of the EZ or SZ for any activity.

(3) NMFS proposes to require aerial overflights to clear the intended area of seismic survey activity of beluga whales on a daily basis. Hilcorp will fly over the action area searching for belugas not more than three hours prior to ramp up of seismic airguns and ramp up will not commence until the flights have confirmed the area appears free of beluga whales. This measure would only apply to 2D and 3D seismic surveying, not to other sound sources related to geohazard survey or well construction.

(4) Monitoring and carefully record any marine mammal behavior if a marine mammal is observed with the project area. No new operational activities would be started until the animal leaves the area. PSOs will also collect behavioral information on marine mammals beyond the safety zone.

(5) Abide by NMFS marine mammal viewing guidelines while operating vessels or land-based personnel (for hauled-out pinnipeds), including not actively approaching marine mammals within 100 yards and slowing vessels to the minimum speed necessary. NMFS Alaska Marine Mammal Viewing Guidelines may be found at https://alaskafisheries.noaa.gov/pr/mm-viewing-guide.

Proposed monitoring and reporting measures:

(1) Utilize NMFS-qualified, vessel-based Protected Species Observer (PSO) to visually watch for and monitor marine mammals from vessels during mobile surveys (from nautical twilight-dawn to nautical twilight-dusk) or from platforms during drilling related activities.

(2) In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by these Authorizations, serious injury or mortality, all applicants shall immediately cease the specified activities and immediately report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, her designees, and the Alaska Regional Stranding Coordinators. The report must include the following information:

- Time, date, and location (latitude/longitude) of the incident;
- The name and type of vessel involved (if ship strike);
- The vessel's speed during and leading up to the incident (if ship strike);
- Description of the incident;
- Status of all operational activities;
- Water depth;
- Environmental conditions (e.g., wind speed and direction, Beaufort sea state, cloud cover, and visibility);
- Description of marine mammal observations in the 24 hours preceding the incident;
- Species identification or description of the animal(s) involved;
- The fate of the animal(s); and
- Photographs or video footage of the animal (if equipment is available).

(3) Activities shall not resume until NMFS is able to review the circumstances of the prohibited take.

NMFS shall work with the applicants to determine what is necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. Applicants may not resume their activities until notified by NMFS via letter or email, or telephone.

(4) In the event that an applicant discovers an injured or dead marine mammal, and the lead PSO determines that the cause of the injury or death is unknown and the death is relatively recent (i.e., in less than a moderate state of decomposition as described in the next paragraph), applicants would immediately report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, designees, and the NMFS Alaska Stranding Hotline. The report must include the same information identified in the paragraph above. Activities may continue while NMFS reviews the circumstances of the incident. NMFS would work with applicants to determine whether modifications in the activities are appropriate.

(5) In the event that an applicant discovers an injured or dead marine mammal, and the lead PSO determines that the injury or death is not associated with or related to the authorized activities (e.g., previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), applicants shall report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, her designees, the NMFS Alaska Stranding Hotline, and the Alaska Regional Stranding Coordinators within 24 hours of the discovery. Applicants shall provide photographs or video footage (if available) or other documentation of the stranded animal sighting to NMFS and the Marine Mammal Stranding Network. Activities may continue while NMFS reviews the circumstances of the incident.

(6) Hilcorp will submit weekly and monthly reports to NMFS' Permits and Conservation Division and a final report within 90 days after the end of each project year. The monthly shall include a summary of marine mammal sightings and operations as well as PSO observer log sheets. The annual report will include:

- Summaries of monitoring effort (e.g., total hours, total distances, and marine mammal distribution through the study period, accounting for sea state and other factors affecting visibility and detectability of marine mammals);
- Analyses of the effects of various factors influencing detectability of marine mammals (e.g., sea state, number of observers, and fog/glare);
- Species composition, occurrence, and distribution of marine mammal sightings, including date, water depth, numbers, age/size/gender categories (if determinable), group sizes, and ice cover; and
- Analyses of the effects of authorized activities.

(7) NMFS will review the draft annual report. Applicants must submit a final annual report to the Chief, Permits and Conservation Division, Office of Protected Resources, NMFS, within 30 days after receiving comments from NMFS on the draft annual report. If NMFS decides that the draft annual report needs no comments, the draft report shall be considered to be the final report.

2.3.2. Alternative 2 – No Action Alternative

In accordance with NOAAs implementing procedures, the Companion Manual (CM) for NAO 216-6A, Section 6.B.i , NMFS is defining the No Action alternative as not authorizing the requested incidental take of marine mammals under Section 101(a)(5)(A) of the MMPA. This is consistent with our statutory obligation under the MMPA to either: (1) deny the requested authorization or (2) grant the requested authorization and prescribe mitigation, monitoring, and reporting requirements. Under the No Action Alternative, NMFS would not issue the rulemaking and LOAs to Hilcorp, in which case we assume this applicant would not proceed with their proposed oil and gas activities as described in the application. The requested take would not occur and mitigation, monitoring and reporting for marine mammals would not be implemented. Although the No Action Alternative would not meet the purpose and need to allow incidental takes of marine mammals under certain conditions (i.e., when the statutory requirements are satisfied), the CEQ Regulations require consideration and analysis of a No Action Alternative for the purposes of presenting a comparative analysis to the action alternatives. The No Action Alternative, consistent with CEQ Guidance and the CM, serves as a baseline against which the impacts of the Preferred Alternative will be compared and contrasted.

2.3.3. Alternatives Considered but Rejected from Further Consideration

In developing the Proposed Action, variations of the Preferred Alternative were identified during the preparation of the proposed rule. The variations of the Preferred Alternative included issuing the rule without mitigation, monitoring and reporting required by NMFS. However, NMFS determined these alternatives did not meet the purpose and need for the Proposed Action or merit further analysis for the reasons noted below. Thus, the analyses of alternatives in this EA are limited to the Preferred Alternative and the No Action Alternative.

- Not requiring mitigation, monitoring or reporting would be in violation of the MMPA and its implementing regulations
- NMFS is not aware of alternative techniques available that would allow Hilcorp to conduct oil and gas exploration and development activities without generating noise, which is the primary activity that has the potential to take marine mammals by harassment.

Chapter 3 Affected Environment

NMFS reviewed all possible environmental, cultural, historical, social, and economic resources based on the geographic location associated with NMFS proposed action and alternatives and the applicant's request for an incidental take authorization for the proposed oil and gas activities in Cook Inlet. Based on this review, this section describes the affected environment and existing (baseline) conditions for select resource categories (e.g., marine environment). As explained in Chapter 1, certain resource categories not affected by NMFS proposed action and alternatives were not carried forward for further consideration or evaluation in this EA (See Table 1) and where appropriate, the analysis in the proposed rule related to the marine environment is incorporated by reference. Chapter 4 provides an analysis and description of environmental impacts associated with the affected environment.

3.1 Physical Environment

As discussed in Chapter 1, our proposed action and alternatives relate only to the authorization of incidental take of marine mammals and not to the physical environment. However, marine mammal habitat is one aspect of the physical environment that is relevant to our proposed action.

Cook Inlet is a complex Gulf of Alaska estuary (as described in BOEM 2016) that covers roughly 7,700 square miles (mi^2; 20,000 square kilometers (km^2)), with approximately 840 miles (mi) (1,350 linear kilometer (km)) of coastline (Rugh *et al.*, 2000). The physical oceanography of Cook Inlet is characterized by complex circulation with variability at tidal, seasonal, annual, and inter-annual timescales (Musgrave and Statscewich, 2006). This region has the fourth largest tidal range in the world and as a result, extensive tidal mudflats that are exposed at low tides occur throughout Cook Inlet, especially in the upper reaches.The project area is located throughout Middle and Lower Cook Inlet, with activities like 3D seismic surveys taking place offshore, while 2D seismic and shallow hazard surveys would continue right up to the shoreline.

3.1.1. Marine Mammal Habitat

3.2 Biological Environment

3.3 Socioeconomic Environment

Chapter 4 Environmental Consequences

The National Marine Fisheries Service (NMFS) reviewed all possible direct, indirect, cumulative, short-term, and long-term impacts to marine mammals and their habitat associated with NMFS's action and alternatives. This chapter describes the potential environmental consequences for the affected resources described in Chapter 3 for each alternative

4.1.1. Effects of Alternative 1 – Issuance of Authorizations with Mitigation Measures

Alternative 1 is the Preferred Alternative where we would issue a rulemaking to Hilcorp allowing the incidental take, by Level A and Level B harassment, of eleven species of marine mammals, subject to the mandatory mitigation and monitoring measures and reporting requirements set forth in the rule (see Section 2.3.1), if issued.

4.1.2. Impacts to Marine Mammal Habitat

The proposed activities would not result in substantial damage to ocean and coastal habitats that might constitute marine mammal habitat. Drilling-related activities (e.g., trenching, pulling the pipes, dive work, etc.) would minimally and briefly (limited to when work is occurring at a particular location) impact physical habitat features, such as substrates and/or water quality. The drill platforms would be somewhat permanent structures; however, any impact from these activities on the seafloor is limited to the footprint of the drill rig and we expect benthic organisms to grow on the material left in place. Impacts from seismic and geohazard surveys on marine mammal habitat would be less direct. While sound being periodically introduced to the environment could alter the acoustic habitat, these sources and their vessels would not make contact with the substrate or alter the water quality in the project area. Additionally, these technologies will be used at slack tide periods, making the effects of seismic airguns and sub-bottom profilers period and limited to short time periods centered around slack tides. Vessels used for the project would originate from the Alaska area; therefore, the potential for ballast water to contain non-indigenous species that may be introduced or spread into the marine environment is low.

4.1.3. Impacts to Marine Mammals

4.1.3. Estimated Take of Marine Mammals by Level A and Level B Incidental Harassment

We estimate take by considering: 1) acoustic thresholds above which NMFS believes the best available science indicates marine mammals will be behaviorally harassed or incur some degree of permanent hearing impairment; 2) the area of water that will be ensonified above these levels in a day; 3) the density or occurrence of marine mammals within these ensonified areas; and, 4) and the number of days of activities. Using the best available science, NMFS uses acoustic thresholds that identify the received level of underwater sound above which exposed marine mammals would be reasonably expected to be behaviorally harassed (equated to Level B harassment) or to incur PTS of some degree (equated to Level A harassment).

For stationary sources, we estimate the ensonified area to be a circle centered at the point of the drill rig, constituting the distance calculated to the relevant 160 dB or 120 dB threshold from each sound source. For mobile sources, Hilcorp provided an estimate of the length of track line to be covered per day and the area of the trackline to be ensonified each day was calculated to multiply by density. For sources like 3D seismic surveying, which is conducted in closely placed lines with ensonified areas that overlap the previous trackline, Hilcorp provided an estimated area in square kilometers that would be ensonified each day, which was then multiplied by marine mammal densities. For every source, an ensonified area was derived, which was then multiplied by the density of marine mammals. This was then multiplied by the number of days that activity was expected to occur.

Take estimates were generated in consideration of species density in the action area (Table 4), number of days each activity would occur, the extent of ensonified area, and group size and frequency of assumed occurrence. The two latter parameters were considered if the calculated take estimate based on density was not representative of group size. For example, if calculated take was one animal but that species is typically observed in groups of 5 animals, we increased the number of take to represent a certain number of groups. Calculated take is the product of daily ensonified area, number of days for each activity type, and the density of a species, absent mitigation measures or other requirements and limiting factors. More

details on how takes were derived can be found in our notice of proposed rule. Take of marine mammals that NMFS is proposing to authorize in its rule is summarized below (Table 5).

Table 4. Density Estimates for Marine Mammals Potentially Present within the Action Area based on Cook Inlet-wide NMFS aerial surveys 2001-2016.

Species	Estimated Density (# marine mammals/km²)[3]
Beluga whale Lower and Middle Cook Inlet[1] Lower Cook Inlet[2] North Cook Inlet Unit[2] Trading Bay area[2] Iniskin Peninsula[2]	 0.00006 0.01111 0.00166 0.01505 0.02436
Humpback whale	0.00009
Minke whale	0.00000
Gray whale	0.00001
Fin whale	0.00005
Killer whale	0.00011
Dall's porpoise	0.00006
Harbor porpoise	0.00037
Harbor seal	0.00655
Steller sea lion	0.00035

[1]NMFS aerial survey combined lower and middle Cook Inlet density
[2]Goetz et al. 2012(b) habitat-based model density
[3]When using data from NMFS aerial surveys, the survey year with the greatest calculated density was used to calculate exposures.
No density available for California sea lions in Cook Inlet.

Table 5. Quantitative Assessment Results of Proposed Take, by Level A and Level B harassment across rule.

		Calculated Exposures		Takes Proposed to be Authorized		
Group	**Species**	**Level A**	**Level B**	**Level A**	**Level B**	**Percent of Stock**
LF Cetaceans	Humpback whale	16.06	99.82	16	100	13.4
	Minke whale	0.08	0.53	0	5	0.41
	Gray whale	0.68	4.21	0	5	0.02
	Fin whale	1.91	6.93	0	7	0.68
MF Cetaceans	Killer whale	0.2	20.44	0	20	0.85 resident 3.5 transient
	Beluga whale	0.05	60.17	0	35	10.67
HF Cetaceans	Dall's porpoise	1.67	9.45	5	10	0.02
	Harbor porpoise	46.97	246.12	5	250	0.82
Phocids	Harbor seal	317.07	13040.77	10	6847	25
Otariids	Steller sea lion	0.76	426.04	5	425	0.84

		Calculated Exposures		Takes Proposed to be Authorized		
	California sea lion	0	0	0	5	0.003

4.1.4. Impacts on Subsistence

Under the Alternative 1 (the Preferred Alternative), Hilcorp's oil and gas activities in in Cook Inlet are not expected to affect subsistence uses of wildlife and marine mammals in the area because subsistence use is limited to a small number of marine mammals and does not occur in the offshore region where much of the seismic work is proposed. The background and additional information about subsistence users within or near Cook Inlet is summarized below.

The ADF&G conducted studies to document the harvest and use of wild resources by residents of communities on the east and west sides of Cook Inlet (Jones and Kostick 2016). Data on wild resource harvest and use were collected, including basic information about who, what, when, where, how, and how much wild resources are being used to develop fishing and hunting opportunities for Alaska residents. Tyonek was surveyed in 2013 (Jones et al., 2015), and Nanwalek, Port Graham, and Seldovia were surveyed in 2014 (Jones and Kostick 2016). Marine mammals were harvested by three (Seldovia, Nanwalek, Port Graham) of the four communities but at relatively low rates. The harvests consisted of harbor seals, Steller sea lions, and northern sea otters (*Enhydra lutris*).

Table 6. Marine mammal harvest by Tyonek in 2013 and Nikiski, Port Graham, Seldovia, and Nanwalek in 2014

Village	Harvest (pounds per capita)	Households Attempting Harvest number (% of residents)	Number of Marine Mammals Harvested			
			Harbor Seal	Steller Sea Lion	Northern Sea Otter	Beluga Whale
Tyonek	2	6 (6 %)	6	0	0	0
Seldovia	1	2 (1 %)	5	0	3	0
Nanwalek	11	17 (7 %)	22	6	1	0
Port Graham	8	27 (18 %)	16	1	24	0

In Tyonek, harbor seals were harvested between June and September by 6 percent of the households (Jones et al. 2015). Seals were harvested in several areas, encompassing an area stretching 20 miles along the Cook Inlet coastline from the McArthur River Flats north to the Beluga River. Seals were searched for or harvested in the Trading Bay areas as well as from the beach adjacent to Tyonek (Jones et al. 2015). In Seldovia, the harvest of harbor seals (5 total) occurred exclusively in December (Jones and Kostick 2016).
In Nanwalek, 22 harbor seals were harvested in 2014 between March and October, the majority of which occur in April. Nanwalek residents typically hunt harbor seals and Steller sea lions at Bear Cove, China Poot Bay, Tutka Bay, Seldovia Bay, Koyuktolik Bay, Port Chatam, in waters south of Yukon Island, and along the shorelines close to Nanwalek, all south of the Petition region (Jones and Kosick 2016).

According to the results presented in Jones and Kostick (2016) in Port Graham, harbor seals were the most frequently used marine mammal; Tribal members harvest 16 in the survey year. Harbor seals were harvested in January, February, July, August, September, November, and December. Steller sea lions were used noticeably less (1 animal harvested) and harvested in November and December.

The Cook Inlet beluga whale has traditionally been hunted by Alaska Natives for subsistence purposes. For several decades prior to the 1980s, the Native Village of Tyonek residents were the primary subsistence hunters of Cook Inlet beluga whales. During the 1980s and 1990s, Alaska Natives from villages in the western, northwestern, and North Slope regions of Alaska either moved to or visited the south-central region and participated in the yearly subsistence harvest (Stanek 1994). From 1994 to 1998, NMFS estimated 65 whales per year were taken in this harvest, including those successfully taken for food, and those struck and lost. NMFS has concluded that this number is high enough to account for the estimated 14 percent annual decline in population during this time (Hobbs et al. 2008). Actual mortality may have been higher, given the difficulty of estimating the number of whales struck and lost during the hunts. In 1999, a moratorium was enacted (Public Law 106-31) prohibiting the subsistence take of Cook Inlet beluga whales except through a cooperative agreement between NMFS and the affected Alaska Native organizations.

On October 15, 2008, NMFS published a final rule that established long-term harvest limits on the Cook Inlet beluga whales that may be taken by Alaska Natives for subsistence purposes (73 FR 60976). That rule prohibits harvest for a 5-year period (2008–2012), if the average abundance for the Cook Inlet beluga whales from the prior five years (2003–2007) is below 350 whales. The next 5-year period that could allow for a harvest (2013–2017), would require the previous five-year average (2008–2012) to be above 350 whales. Since the Cook Inlet beluga whale harvest was regulated in 1999 requiring cooperative agreements, five beluga whales have been struck and harvested. Those beluga whales were harvested in 2001 (one animal), 2002 (one animal), 2003 (one animal), and 2005 (two animals). The Native Village of Tyonek agreed not to hunt or request a hunt in 2007, when no co-management agreement was to be signed (NMFS 2008).
The 2008 Cook Inlet Beluga Whale Subsistence Harvest Final Supplemental Environmental Impact Statement (NMFS 2008a) authorizes how many beluga whales can be taken during a 5- year interval based on the 5-year population estimates and 10-year measure of the population growth rate. Based on the 2008– 2012 5-year abundance estimates, no hunt occurred between 2008 and 2012 (NMFS 2008a). The Cook Inlet Marine Mammal Council, which managed the Alaska Native Subsistence fishery with NMFS, was disbanded by a unanimous vote of the Tribes' representatives on June 20, 2012. No harvest has occurred since then and no harvest is likely in 2018.

Residents of the Native Village of Tyonek are the primary subsistence users in Knik Arm area (73 FR 60976). No households hunted beluga whale locally in Cook Inlet due to conservation concerns (Jones et al. 2015). The proposed project should not have any effect because no beluga harvest has taken place since 2005 and beluga hunts are not expected during the next five year period.

In summary, NMFS anticipates that any effects from Hilcorp's proposed activities on marine mammals, would be short-term, site specific, and limited to inconsequential changes in behavior. NMFS does not anticipate authorized taking of affected species or stocks would reduce the availability of the species to a level insufficient for a harvest to meet subsistence needs by: (1) Causing the marine mammals to abandon or avoid hunting areas; (2) directly displacing subsistence users; or (3) placing physical barriers between the marine mammals and the subsistence hunters; and that cannot be sufficiently mitigated by other measures to

increase the availability of marine mammals to allow subsistence needs to be met.

4.2. Effects of Alternative 2 – No Action Alternative

Where a choice of "no action" by the agency would result in predictable actions by others, this consequence of the "no action" alternative should be included in the analysis." (CEQ, Forty Questions, 3.A). NMFS' view is that it is likely that the applicant would choose to undertake its action in compliance with the law rather than proceed without the take authorization. Under the No Action Alternative, NMFS would not issue the rule to Hilcorp authorizing take of marine mammals. As a result, the exceptions to the prohibition on take of marine mammals per the MMPA would not apply and Hilcorp would not conduct the oil and gas activities as described in the application. There would be no direct or indirect impacts to marine mammals or their habitat resulting from no action. The marine mammal species and their habitat conditions would remain substantially similar to the condition described in Chapter 3, "Affected Environment"..

4.3. Cumulative Effects

NEPA defines cumulative effects as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR §1508.7). Cumulative impacts can result from individually minor but collectively significant actions that take place over of time.

For purposes of this analysis, the range of past, present, and reasonably foreseeable activities that result in cumulative impacts to marine mammal populations in the proposed project area include the following: subsistence hunting, marine pollution, fisheries interactions, vessel traffic; oil and gas development; coastal zone development, marine mammal research, and climate change.

4.3.1. Subsistence Hunting

In Cook Inlet, Native hunters historically have hunted beluga whales and harbor seals for food. The subsistence harvest of beluga transcends nutritional and economic value of the whale as the harvest is an integral part of the cultural identity of the region's Alaska Native communities. Inedible parts of the whale provide Native artisans with materials for cultural handicrafts, and the hunting perpetuates Native traditions by transmitting traditional skills and knowledge to younger generations. However, due to dramatic declines in the Cook Inlet beluga whale population, on May 21, 1999, legislation was passed to temporarily prohibit (until October 1, 2000) the taking of Cook Inlet belugas under the subsistence harvest exemption in section 101(b) of the MMPA without a cooperative agreement between NMFS and the affected ANOs (Public Law No. 106-31, section 3022, 113 Stat. 57,100). That prohibition was extended indefinitely on December 21, 2000 (Public Law No. 106-553, section 1(a)(2), 114 Stat. 2762). NMFS subsequently entered into six annual co-management agreements (2000-2003, 2005-2006) with the Cook Inlet Marine Mammal Council, an ANO representing Cook Inlet beluga hunters, which allowed for the harvest of 1-2 belugas.

On October 15, 2008, NMFS published a final rule that established long-term harvest limits on Cook Inlet beluga whales that may be taken by Alaska Natives for subsistence purposes (73 FR 60976). That rule prohibits harvest for a 5-year interval period if the average stock abundance of Cook Inlet beluga whales

over the prior five-year interval is below 350 whales. Harvest levels for the current 5-year planning interval (2013-2017) are zero because the average stock abundance for the previous five-year period (2008-2012) was below 350 whales. Based on the average abundance over the 2002-2007 period, no hunt occurred between 2008 and 2012 (NMFS, 2008). The Cook Inlet Marine Mammal Council, which managed the Alaska Native Subsistence fishery with NMFS, was disbanded by a unanimous vote of the Tribes' representatives on June 20, 2012. Additional information on the Cook Inlet beluga harvest can be found in NMFS (2008a).

There is a low level of subsistence hunting for harbor seals in Cook Inlet. Seal hunting occurs opportunistically among Alaska Natives who may be fishing or travelling in the upper Inlet near the mouths of the Susitna River, Beluga River, and Little Susitna. Some detailed information on the subsistence harvest of harbor seals is available from past studies conducted by the Alaska Department of Fish & Game (Wolfe et al., 2009). In 2008, 33 harbor seals were taken for harvest in the Upper Kenai-Cook Inlet area. In the same study, reports from hunters stated that harbor seal populations in the area were increasing (28.6%) or remaining stable (71.4%). The specific hunting regions identified were Anchorage, Homer, Kenai, and Tyonek, and hunting generally peaks in March, September, and November (Wolfe et al., 2009). The timing and location of subsistence harvest of Cook Inlet harbor seals would not coincide with active hunting and this subsistence hunt is conducted opportunistically and at low levels (NMFS, 2013c); therefore, no cumulative effects from subsistence hunting are anticipated.

4.3.2. Pollution

As the population in urban areas continue to grow, an increase in amount of pollutants that enter Cook Inlet is likely to occur. Sources of pollutants in urban areas include runoff from streets and discharge from wastewater treatment facilities. Gas, oil, and coastal zone development projects (*e.g.*, the Chuitna Coal Mine) also contribute to pollutants that enter Cook Inlet through discharge. Gas, oil, and coastal zone development will continue to take place in Cook Inlet; therefore, it would be expected that pollutants could increase in Cook Inlet. However, the EPA and the ADEC will continue to regulate the amount of pollutants that enter Cook Inlet from point and non-point sources through NPDES permits. As a result, permittees will be required to renew their permits, verify they meet permit standards and potentially upgrade facilities. Additionally, the extreme tides and strong currents in Cook Inlet may contribute in reducing the amount of pollutants found in the Inlet.

4.3.3. Fisheries Interaction

Fishing is a major industry in Alaska. As long as fish stocks are sustainable, subsistence, personal use, recreational and commercial fishing will continue to take place in Cook Inlet. However, NMFS and the ADF&G manages fish stocks and monitors and regulates fishing in Cook Inlet to maintain sustainable stocks, resulting in no significant decline of prey availability due to fishing.

4.3.4. Vessel Traffic

Major contributors to vessel traffic throughout Cook Inlet include port facilities, oil and gas development, and commercial and recreational fishing. The Port of Anchorage (POA) is a major Alaskan port located adjacent to Anchorage in upper Cook Inlet. The POA provides 90 percent of the consumer goods for 85 percent of the state of Alaska. The POA handles the majority of Alaska's refined petroleum products and the bulk of jet fuel for Joint Base Elmendorf-Richardson and the Ted Stevens Anchorage International

Airport (100 and 60 percent respectively; POA, 2014). Major vessels calling to the POA include cargo ships, barges, tankers, dredgers, military ships and tug boats (POA, 2009). Based on data from 1998-2011, an average of approximately 450 vessels call to the POA annually (POA, 2014). The POA is outside the area Hilcorp is proposing to conduct oil and gas activities; however, the POA yields a high volume of vessels traffic that must pass through or near where oil and gas activities will take place. In addition, the POA is currently under construction and expanding its facilities. As a result, vessel traffic will increase once the project is complete.

Port MacKenzie is located in upper Cook Inlet and contributes to vessel traffic that passes through or near the area where oil and gas installation activities will take place. It receives about two large ships annually (i.e. a landing craft and/or a barge), which is substantially less than the POA. However, the number of ships calling to port at Port MacKenzie is expected to increase over the next five years; the Rail Extension and expanding the currently existing deep draft dock are planned for construction.

Other smaller port facilities that contribute to vessel traffic in the action area include Nikiski, the City of Kenai, Kasilof, Ninilchik, Anchor River, Tyonek and Drift River. Vessels ranging from tankers to fishing boats call to these ports (Kenai Peninsula Borough, 2003). Gas and oil development also contribute to vessel traffic in the action area, as well as commercial and recreational fishing vessels.

The proposed action is not within an active shipping lane and no pmajor changes to ports or vessel launch areas are expected. The project would increase small vessel presence and operation in the project area; however, we have accounted for the impact of these vessels through the proposed rule and in this document as acoustic sources operating from vessels are the primary form of harassment for marine mammals considered. The project would not result in any long-term use of the area beyond the life of a drilledwell (e.g., it does not involve building a dock or port) and any vessel use in the future would be limited to rig maintenance and repair.

4.3.5. Gas and Oil Development

Currently, there are no other oil and gas exploration projects proposed in Cook Inlet that may receive an MMPA authorization for incidental take. However, Hilcorp, has an IHA for pipeline construction in upper Cook Inlet that was issued in 2018. That action would not be overlapping in time or space with the Hilcorp's proposed oil and gas activities. No other companies have submitted applications for incidental take authorizations related to oil and gas activity anywhere in Cook Inlet. In addition, Hilcorp would continue maintenance and repair work on existing pipelines and platforms; however, those activities are not believed to have the potential to harass marine mammals.

4.3.6. Coastal Zone Development

Coastal zone development may result in the loss of habitat, increased vessel traffic, increased pollutants and increased noise associated with construction and noise associated with the activities of the projects after construction. In the action area, two main projects are being considered, the Chuitna Coal Mine and the Ocean Renewable Power Company (ORPC) Tidal Energy Project.

Pebble Mine Project

On October 5, 2018, NMFS received an application, pursuant to section 101(a)(5)(D) of the MMPA, from the Pebble Limited Partnership (PLP) requesting authorization to take, by Level B harassment, seven species of marine mammals in Cook Inlet. PLP is proposing to conduct geotechnical and geophysical surveys to support construction of a natural gas pipeline in lower Cook Inlet to supply energy to their proposed Pebble Mine project. Use of active acoustic equipment such as sub-bottom profilers and echosounders may incidentally harass marine mammals. The surveys would be conducted from Anchor Point on the each side of Cook Inlet to Amakdedori and Urses Cove on the western shoreline. The proposed surveys are planned to begin May 2019. NMFS is currently processing the application. Any potential issuance of an IHA would not authorize construction of the mine or any mining activities but rather would only authorize use of geotechnical equipment in a small portion of southwestern Cook Inlet. This activity would be spatially removed from Hilcorp's proposed activities and the effects of Pebble Mine's geotechnical activity would likely be lesser than those analyzed in the proposed rule for Hilcorp's oil and gas activities.

Chuitna Coal Project

PacRim Coal, LP is proposing to develop, construct and operate a coal mine and export facility 19 km (12 mi) northwest of the Village of Tyonek. Potential impacts to marine mammals in upper Cook Inlet from the Chuitna Coal Project would include the construction of the coal export facility and surface water discharge. The coal export facility that includes an overland coal conveyer and ship loading berth would extend from shore into Cook Inlet. The conveyer and ship berth would incorporate tower sites approximately 335 m (1,100 ft) apart to allow for uninhibited movement of marine life (PacRim Coal, LP, 2011). No chemical or water-based processing of the coal would take place; therefore, the expected sources of discharge from the project would include rainfall, snowmelt and groundwater (PacRim Coal,LP, 2011). Prior to discharging water into Cook Inlet, the water would be directed to sediment control structures and meet the water quality criteria described by the APDES permit (PacRim Coal, LP 2011).

ORPC Alaska Tidal Energy Projects

The ORPC is proposing two tidal energy projects in Cook Inlet. The first tidal energy project would be located on the Westside of Fire Island near Anchorage, and the second project would be located adjacent to the East Foreland in the vicinity of Nikiski on the Kenai Peninsula (ORPC, 2011). The tidal energy projects would require the installation of an array of turbine generator units and transmission cables on the seafloor to harness the tidal energy. The tidal energy will be converted to electrical energy at stations on land. These projects are still in preliminary testing and environmental monitoring phases (ORPC, 2011).

4.3.7. Marine Mammal Research

Because many important aspects of marine mammal biology remain unknown, or are incompletely studied, and because management of these species and stocks requires knowledge of their distribution, abundance, migration, population, ecology, physiology, genetics, behavior, and health, free-ranging marine mammal species are frequently targeted for scientific research and studies. Research activities normally include close approach by vessel and aircraft for line-transect surveys; behavioral observation; photo-identification and photo-video-grammetry; passive acoustic recording; attachment of scientific

instruments (tagging), both by implantable and suction cup tags; biopsy sampling, including skin and blubber biopsy and swabbing; land-based surveys; live capture for health assessments, and blood and tissue sampling, pinniped tooth extraction, and related pinniped anesthesia procedures. All researchers are required to obtain a scientific research permit from NMFS Office of Protected Resources under the MMPA and/or ESA (if an ESA-listed species is involved). Currently, the permits authorizing research on beluga whales in Cook Inlet, as wells as permits authorizing research on harbor seals, harbor porpoises, Steller sea lions, and killer whales in Alaskan waters may have cumulative effects on these species and stocks but are likely not significant. NMFS anticipates that scientific research on marine mammals in Cook Inlet will continue, and possibly expand, due to the increasing need to better understand distribution and abundance relative to temporal (seasonal, diel, or tidal) and spatial (geographic or bathymetric) parameters.

4.3.8. Climate Change

The 2007 Intergovernmental Panel on Climate Change concluded that there is very strong evidence for global warming and associated weather changes and that humans have "very likely" contributed to the problem through burning fossil fuels and adding other "greenhouse gases" to the atmosphere (IPCC, 2007). This study involved numerous models to predict changes in temperature, sea level, ice pack dynamics, and other parameters under a variety of future conditions, including different scenarios for how human populations respond to the implications of the study.

Evidence of climate change in the past few decades, commonly referred to as global warming, has accumulated from a variety of geophysical, biological, oceanographic, and atmospheric sources. The scientific evidence indicates that average air, land, and sea temperatures are increasing at an accelerating rate. Although climate changes have been documented over large areas of the world, the changes are not uniform and affect different areas in different ways and intensities. Arctic regions have experienced some of the largest changes, with major implications for the marine environment as well as for coastal communities. Recent assessments of climate change, conducted by international teams of scientists (Gitay et al., 2002 for the Intergovernmental Panel on Climate Change; (IPCC) Arctic Climate Impact Assessment, 2004; IPCC, 2007), have reached several conclusions of consequence for this EA:

- Average arctic temperatures increased at almost twice the global average rate in the last 100 years.
- Satellite data since 1978 show that perennial arctic sea ice extent has shrunk by 2.7 percent per decade, with larger decreases in sea ice extent in summer of 7.4 percent per decade.
- Arctic sea ice thickness has declined by about 40 percent during the late summer and early autumn in the last three decades of the 20^{th} century.

Marine mammals are classified as sentinel species because they are good indicators of environmental change. Arctic marine mammals are ideal indicator species for climate change, due to their circumpolar distribution and close association with ice formation. NMFS recognizes that warming of the Arctic, which results in the diminishing of ice, could be a cause for concern to marine mammals. In Cook Inlet, marine mammal distribution is dependent upon ice formation and prey availability, among other factors. For example, belugas often travel just along the ice pack and feed on prey beneath it (Richardson et al.,

1991). Any loss of ice could result in prey distribution changes or loss; however, beluga whales do not use ice for resting, reproduction, or rearing of young like pinnipeds.

It is not clear how governments and individuals will respond or how much of these future efforts will reduce greenhouse gas emissions. Although the intensity of climate changes will depend on how quickly and deeply humanity responds, the models predict that the climate changes observed in the past 30 years will continue at the same or increasing rates for at least 20 years. Although NMFS recognizes that climate change is a concern for the sustainability of the entire ecosystem in Cook Inlet, it is unclear at this time the full extent to which climate change will affect marine mammal species.

4.3.9. Conclusion

Based on the summation of activity in the area provided in this section, NMFS determined that the impact of issuing a rule for five years for Hilcorp's proposed oil and gas activities in Cook Inlet would not be expected to result in a cumulative significant impact to the human environment when added to past, present, and future activities. The potential impacts to marine mammals, their habitats, and the human environment of issuing an rule are expected to be minimal based on the limited and temporary noise footprint and the through the implementation of mitigation and monitoring requirements of the rulemaking.

Chapter 5 List of Preparers

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