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DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 217

[Docket No. 250721-0127]

RIN 0648-BN57

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to Hilcorp Alaska, LLC Oil and Gas Activities in Cook Inlet, Alaska

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Proposed rule; request for comments.

SUMMARY: NMFS has received a request from Hilcorp Alaska, LLC (Hilcorp) for regulations allowing for the take of marine mammals incidental to activities conducted in support of oil and gas exploration, development, production, and decommissioning in Cook Inlet, Alaska, over the course of 5 years (2025-2030). As required by the Marine Mammal Protection Act (MMPA), NMFS is proposing regulations to govern the requested take, and requests comments on the proposed regulations. NMFS will consider public comments prior to making any final decision on the requested MMPA regulations. Agency responses to received comments will be summarized in the final rule, if issued.

DATES: Comments and information must be received no later than [**INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER**].

ADDRESSES: A plain language summary of this proposed rule is available at *https://www.regulations.gov/docket/NOAA-NMFS-2025-0052*. Submit all electronic public comments via the Federal e-Rulemaking Portal. Go to *https://www.regulations.gov* and type NOAA-NMFS-2025-0052 in the Search box (note: copying and pasting the

FDMS Docket Number directly from this document may not yield search results). Click on the "Comment" icon, complete the required fields, and enter or attach your comments. Comments sent by any other method, to any other address or individual, or received after the end of the comment period, may not be considered by NMFS. All comments received are a part of the public record and will generally be posted for public viewing on *https://www.regulations.gov* without change. All personal identifying information (*e.g.*, name, address, etc.), confidential business information, or otherwise sensitive information submitted voluntarily by the sender will be publicly accessible. NMFS will accept anonymous comments (enter "N/A" in the required fields if you wish to remain anonymous).

Electronic copies of the application and supporting documents, as well as a list of the references cited in this document, may be obtained online at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-oil-and-gas*. In case of problems accessing these documents, please call the contact listed below.

FOR FURTHER INFORMATION CONTACT: Jaclyn Daly, Office of Protected Resources, NMFS, (301) 427-8401.

SUPPLEMENTARY INFORMATION:

Background

The MMPA prohibits the "take" of marine mammals, with certain exceptions. Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 *et seq.*) direct the Secretary of Commerce (as delegated to NMFS) to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if certain findings are made and either regulations are promulgated and a Letter of Authorization (LOA) is issued or an incidental harassment authorization (IHA) is issued.

Authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s) and will not have an unmitigable adverse impact on the availability of the species or stock(s) for taking for subsistence uses (where relevant). If such findings are made, NMFS must prescribe the permissible methods of taking and other "means of effecting the least practicable adverse impact" on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of the species or stocks for taking for certain subsistence uses (referred to in shorthand as "mitigation"); and set forth requirements pertaining to the monitoring and reporting of the takings. The definitions of applicable MMPA statutory terms are provided directly below or included in the relevant sections of this proposed rule.

- *U.S. citizen* — individual U.S. citizens or any corporation or similar entity if it is organized under the laws of the United States or any governmental unit defined in 16 U.S.C. 1362(13); 50 CFR 216.103);
- *Take* — to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal (16 U.S.C. 1362(13);
- *Incidental harassment, incidental taking, and incidental, but not intentional, taking* — an accidental taking. This does not mean that the taking is unexpected, but rather it includes those takings that are infrequent, unavoidable or accidental (50 CFR 216.103);
- *Level A harassment* — any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal or marine mammal stock in the wild (16 U.S.C. 1362(18); 50 CFR 216.3); and
- *Level B harassment* — any act of pursuit, torment, or annoyance which has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration,

breathing, nursing, breeding, feeding, or sheltering (16 U.S.C. 1362(18); 50 CFR 216.3).

Purpose of Regulatory Action

NMFS received an application from Hilcorp requesting 5-year regulations and a letter of authorization (LOA) that would authorize the take of 12 marine mammal species, comprising 15 stocks, by Level B harassment, and take by Level A harassment of 9 of those 12 species, comprising 12 stocks, incidental to activities conducted by Hilcorp in support of oil and gas exploration, development, production, and decommissioning. No serious injury or mortality is anticipated or proposed for authorization.

The proposed regulations would provide a framework for authorizing the take of marine mammals incidental to specified activities associated with Hilcorp's oil and gas exploration, development, production, and decommissioning activities in Cook Inlet, Alaska.

Legal Authority for the Proposed Action

Section 101(a)(5)(A) of the MMPA (16 U.S.C. 1371(a)(5)(A)) directs the Secretary of Commerce to allow, upon request, the incidental, but not intentional taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region for up to 5 years if, after notice and public comment, the agency makes certain findings and promulgates regulations that set forth permissible methods of taking pursuant to that activity and other means of effecting the "least practicable adverse impact" on the affected species or stocks and their habitat (see the discussion below in the **Proposed Mitigation** section), as well as monitoring and reporting requirements. Section 101(a)(5)(A) of the MMPA and the implementing regulations at 50 CFR part 216, subpart I provide the legal basis for issuing this proposed rule containing 5-year regulations and for any subsequent Letter(s) of Authorization (LOA).

Summary of Major Provisions within the Proposed Rule

The major provisions of this proposed rule are:

- Allowing NMFS to authorize, through an LOA, the take of small numbers of marine mammals by Level A harassment and/or Level B harassment incidental to Hilcorp's specified activities (no mortality or serious injury of any marine mammal would be authorized);
- Avoiding activities that may result in take of Cook Inlet beluga whales (CIBWs) within 16 kilometers (km) (10 miles, mi) of the Mean Higher High Water (MHHW) line of the Susitna Delta (Beluga River to the Little Susitna River) between April 15 and November 15 to avoid and minimize impacts when CIBWs are more likely engaging in foraging behavior;
- Requiring NMFS-approved protected species observers (PSOs) and delaying commencement of or shutting down certain activities should a marine mammal be detected within identified clearance or shutdown zones to minimize the amount and severity of take;
- Requiring a soft start for impact pile driving to allow marine mammals the opportunity to leave the area prior to being exposed to higher noise levels; and
- Requiring submission of monitoring reports including, but not limited to, a summary of marine mammal species and behavioral observations, construction shutdowns or delays, and construction work completed.

National Environmental Policy Act

To comply with the National Environmental Policy Act of 1969 (NEPA; 42 U.S.C. 4321 *et seq*.) and NOAA Administrative Order (NAO) 216-6A, NMFS must review our proposed action (*i.e.*, promulgation of regulations and subsequent issuance of an LOA thereunder) with respect to potential impacts on the human environment. Accordingly, NMFS has prepared a draft Environmental Assessment (EA) to evaluate the environmental impacts associated with the proposed issuance of the regulations and LOA. NMFS' draft EA is available at *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-oil-and-gas*. NMFS will review all comments submitted in response to this notice prior to concluding our NEPA process or making a final decision on this request.

Summary of Request

On October 30, 2024, NMFS received an application from Hilcorp requesting authorization to take marine mammals incidental to oil and gas exploration, development, production, and decommissioning activities in Cook Inlet, Alaska. Specifically, Hilcorp plans to conduct necessary work, including use of tugs towing, holding, or positioning a jack-up rig, pile driving, and pipeline replacement/installation activities. NMFS requested additional information from Hilcorp regarding their request on November 19, 2024, which Hilcorp provided on January 2, 2025. A final request from NMFS for information was sent to Hilcorp on January 22, 2025. Hilcorp provided all necessary information on February 10, 2025, and NMFS deemed Hilcorp's application adequate and complete on February 18, 2025 (note that NMFS' Notice of Receipt of Hilcorp's application erroneously described this date as being February 10, 2025). On March 13, 2025, NMFS published a notice of receipt (NOR) of Hilcorp's adequate and complete application in the **Federal Register** (90 FR 11951), requesting comments and soliciting information related to Hilcorp's request during a 30-day public comment period. NMFS did not receive public comments. Subsequently, on March 14, 2025, Hilcorp submitted a revised application that corrected minor details but did not substantively modify the description of the specified activities or the type or amount of take requested incidental to those activities. This revised application is available at: *https://www.fisheries.noaa.gov/action/incidental-take-authorization-hilcorp-alaska-llcs-oil-and-gas-activities-cook-inlet-alaska*.

The requested regulations, if promulgated, would be valid for 5 years, from approximately September 23, 2025, through September 22, 2030. The exposure of marine mammals occurring in the vicinity to underwater noise generated by the activities could result in incidental take of marine mammals by Level A and/or Level B harassment. Therefore, Hilcorp requests authorization to incidentally take marine mammals.

Hilcorp's Incidental Take Authorization (ITA) History

NMFS previously issued multiple ITAs to Hilcorp. Initially, NMFS issued 5-year Incidental Take Regulations (ITR) to Hilcorp for a suite of oil and gas activities in Cook Inlet, Alaska (84 FR 37442, July 31, 2019) and three 1-year Letters of Authorization (LOAs) under the ITR. The 2019 ITR allowed for the take of marine mammals incidental to two-dimensional (2D) and three-dimensional (3D) geophysical surveys, vibratory sheet pile driving, and drilling of exploratory wells.

On September 17, 2019, Cook Inletkeeper and the Center for Biological Diversity filed suit in Federal district court in Alaska challenging the 2019 ITR and LOAs and supporting documents (the EA and Endangered Species Act (ESA) Biological Opinion). In a decision issued on March 30, 2021, the court ruled largely in NMFS' favor, but found a lack of adequate support in NMFS' record for the agency's determination that tug towing of drill rigs in connection with production activity would not cause take of CIBWs and remanded the rulemaking back to NMFS for further analysis of tug use under the MMPA, ESA, and NEPA. Hilcorp notified NMFS that all activities covered by the 2019 ITR had already been completed or would not be completed in the remaining effective period of the ITR. As a result, the only remaining activity was the use of tugs towing a jack-up rig. NMFS considered the specific circumstances relating to Hilcorp's request for take authorization for tug towing of a jack-up rig, which had not been covered under the 2019 ITR, and issued two sequential Incidental Harassment Authorizations (IHAs) (87 FR 62364, October 14, 2022). In 2024, NMFS issued an additional IHA to

Hilcorp, at its request and in consideration of the specific circumstances, for production drilling support in Cook Inlet, Alaska, which included the use of tugs towing, holding, and positioning a jack-up rig (89 FR 79529, September 30, 2024). Hilcorp complied with all the requirements (*e.g.*, mitigation, monitoring, and reporting) of the previous LOAs and IHAs, and information regarding their monitoring results may be found in the **Potential Effects of Specified Activities on Marine Mammals and their Habitat** section of this notice.

Description of Proposed Activity

Overview

Hilcorp plans to continue oil and gas exploration, development, production, and decommissioning activities in Cook Inlet, Alaska, for the reasonably foreseeable future. Over the course of the five years considered here, this work includes up to 54 days of tugs towing, holding, or positioning a jack-up rig in support of production drilling at existing platforms in middle Cook Inlet and Trading Bay; up to 70 days of pile driving in support of production well development at the Tyonek Platform in middle Cook Inlet; up to 6 days of tugs towing, holding, or positioning a jack-up rig and up to 18 days of pile driving in support of exploration drilling at two locations in the Middle Ground Shoal Unit in middle Cook Inlet and one location between the Anna and Bruce platforms on the northern border of Trading Bay; and up to 22 days of pipeline replacement/installation, involving either pipe pulling or anchor handling or a combination of both, at up to two locations in middle Cook Inlet and/or Trading Bay. Hilcorp requests authorization of take by Level B harassment for 12 marine mammal species (including CIBWs (*Delphinapterus leucas*)), and additionally by Level A harassment for a subset of 9 of these species.

Dates and Duration

The specified activities analyzed in this proposed rule are anticipated to begin in September 2025 and extend through December 2029. However, the proposed rule and LOA, if issued, would be effective through September 2030 (5 years) to allow for any delays in project activities. Table 1 provides a summary of Hilcorp's anticipated timings and durations for their planned activities; however, the schedule may shift such that actual activities occur in different years than specified below.

Table 1 -- Summary of Hilcorp's Planned Activities

Project Activity	Cook Inlet Region	Seasonal Timing	Year(s) Planned[1]	Anticipated Duration of Sound-producing Activity	Anticipated Sound Sources
Tugs under Load with a Jack-Up Rig in support of Production Drilling	Middle Cook Inlet	April – December	Years 1, 3, and 5 (2025, 2027, 2029)	12 days (2 days each: 1 mobilization, 4 location-location moves, 1 demobilization, up to 12 total pinning events)	3 to 4 tugs towing, holding, and positioning a jack-up rig
			Year 2 (2026)	10 days (2 days each: 1 mobilization, 3 location-location moves, 1 demobilization, up to 10 total pinning events)	
			Year 4 (2028)	8 days (2 days each: 1 mobilization, 2 location-location moves, 1 demobilization, up to 8 total pinning events)	
Pile Driving in Support of Production Well Development at the Tyonek Platform	Middle Cook Inlet	Mid-November – Mid-April	Year 1–Year 5 (2025–2029)	14 days (7 days per pile (intermittent); 8 hour (hr) per day; 2 piles per year)	Impact pile driving
Tugs under Load with a Jack-Up Rig and Pile Driving in Support of Exploratory Drilling[2]	Trading Bay (between Anna and Bruce platforms)	April – December	Year 2 (2026)	2 days tugs under load with a jack-up rig (1 location-location move, up to 2 total pinning events); 6 days intermittent pile driving (1 well, 1 pile each well)	Impact pile driving, 3 to 4 tugs towing, holding, and positioning a jack-up rig
	Middle Cook Inlet (MGS Unit)	April – December	Year 4 (2028)	4 days tugs under load with a jack-up rig (2 location-location moves, up to 4 total pinning events); 12 days intermittent pile driving (2 wells, 1 pile each well)	Impact pile driving, 3 to 4 tugs towing, holding, and positioning a jack-up rig

Pipeline Replacement/ Installation[3]	Middle Cook Inlet/Trading Bay	April – November	Year 2 (2026)	Scenario 1: 11 days using lay barge methods Scenario 2: 22 days using lay barge methods (11 days per project, 2 projects)	Scenario 1: Anchor handling Scenario 2: Anchor handling
		April – November	Year 4 (2028)	Scenario 1: 8 days using pipe pull methods Scenario 2: no pipeline replacement/installation	Scenario 1: 2 tugs engaged in pipe pulling, bottom impact sounds of pipe connecting with seafloor Scenario 2: none

[1] The specific years activities are planned to occur may or may not coincide with the actual year of execution.
[2] One exploratory well between Anna and Bruce is analyzed to occur in Year 2 and two exploratory wells in the Middle Ground Shoal Unit are analyzed to occur in Year 4; however, the exploratory wells may be developed in any separate years during the proposed authorization period.
[3] Two pipeline scenarios are analyzed to occur: Scenario 1 comprises one project using lay barge methods in Year 2 and one project using pipe pull methods in Year 4; Scenario 2 comprises two projects using lay barge methods in Year 2 and no additional projects thereafter. A maximum of two pipeline projects will occur during the proposed authorization period. Pipeline projects may occur simultaneously in any one year or in separate years during the proposed authorization period. However, only lay barge methodology can be utilized in the same year (*i.e.*, Scenario 2).

Specified Geographical Region

Hilcorp's planned activities would occur in Cook Inlet, Alaska, which is the specified geographical region. Specifically, activities would occur in middle Cook Inlet and Trading Bay, Alaska (figure 1) from a point on the eastern shoreline approximately 12 km (7.5 mi) south of the East Foreland to a point approximately 16 km (10 mi) south of Point Possession on the west side, to the northernmost production platform in middle Cook Inlet (Tyonek, located in the North Cook Inlet Unit) to a point that is 3.5 km (2.2 mi) north of the village of Tyonek near the mouth of the Chuitna River. From there the area extends south to a point along the western shoreline approximately 15 km (9.3 mi) south of the West Foreland, and across the inlet back to a point on the eastern shoreline approximately 12 km (7.5 mi) south of the East Foreland. The geographic area of all activity covers a total of approximately 1,865 square kilometers (km^2) (460,850 acres) (within Cook Inlet in State of Alaska waters). For the purpose of this proposed rule, middle Cook Inlet refers to waters north of the East and West Forelands and south of Threemile River in the west and Point Possession in the east, and Trading Bay refers to waters from approximately Granite Point in the north to the West Foreland in the south. Upper Cook Inlet refers to waters north and east of Beluga River in the west and Point Possession in the east.

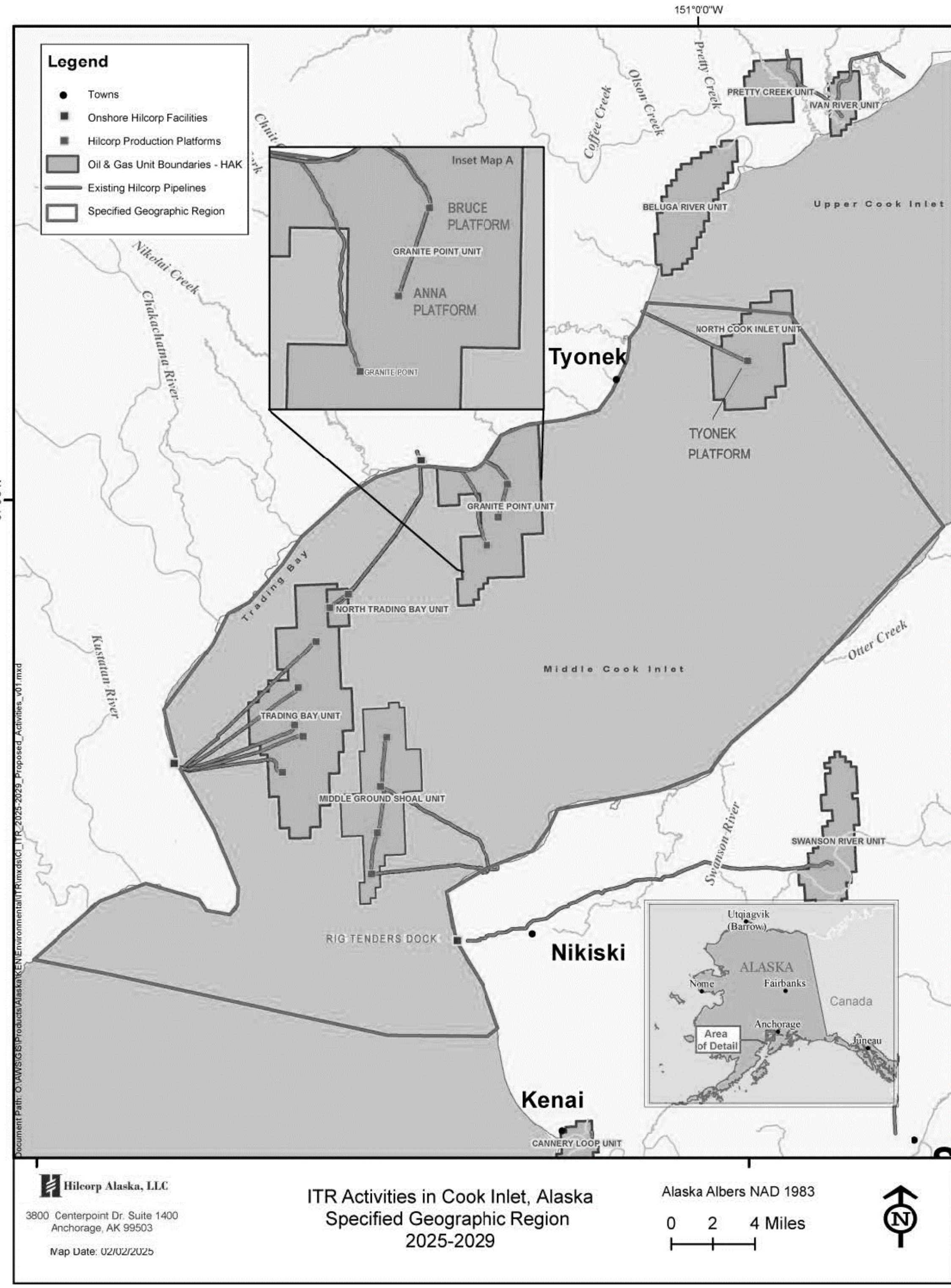

Figure 1 -- Hilcorp's Proposed Activity Location

Detailed Description of the Specified Activity

Hilcorp's ITR petition includes four stages of oil and gas activities: production, exploration, development, and decommissioning.

Production Drilling and Well Development – Hilcorp routinely conducts production drilling activities at offshore platforms to meet production needs; all Hilcorp platforms have the potential for production drilling activity. Drilling activities are accomplished using conventional drilling equipment from a variety of rig configurations and occur through existing well slots or wellbores located in legs of the existing platforms. Hilcorp plans to conduct production drilling in middle Cook Inlet and Trading Bay during the open water season, which generally runs from April to November but may extend into December depending on ice conditions. Drilling activities would span up to 240 days (table 1), with tugboats towing, holding, or positioning a jack-up rig for a total of up to 54 days across the 5-year proposed authorization period (table 1). In addition to production drilling activities, 10 drilling conductor pipes (piles) would be driven into the sediment to support future well slots for production well development on the Tyonek Platform at an installation rate not to exceed two per year (table 1). Pile driving would occur intermittently between mid-November and mid-April. Hilcorp has requested, and NMFS proposes to authorize, take associated with tug use (to tow, hold, and position a jack-up rig) and pile driving at the Tyonek Platform to support production drilling and well development.

Tugs under load with a jack-up rig in support of production drilling. Some platforms in Cook Inlet have permanent drilling rigs installed that operate using power provided by the platform power generation systems; other platforms do not have drill rigs or the platform drill rig is not sufficient for the work needing to be done, and the use of a mobile drill rig is required. Mobile offshore drill rigs may be powered by the platform power generation system (if compatible with the platform power generation system) or may self-generate power with the use of diesel-powered generators.

Hilcorp proposes to conduct production drilling using the Spartan 151 jack-up drill rig (or similar). A jack-up rig is a type of mobile offshore drill unit used in offshore oil and gas drilling activities. It is comprised of a buoyant mobile platform or hull with moveable legs that are adjusted to raise and lower the hull over the surface of the water. Spartan 151 is a 150 H class independent-leg, cantilevered jack-up drill rig with a drilling depth capability of 7,620 meters (m) (25,000 feet (ft)) that can operate in maximum water depths up to 46 m (151 ft). To maintain safety and work efficiency, the jack-up rig would be equipped with the following:

- Either a 5,000-, 10,000-, or 15,000-pound-per-square-inch (psi) blowout preventer (BOP) stack for drilling in higher pressure formations found at greater depths in Cook Inlet;
- Sufficient variable deck load to accommodate the increased drilling loads, tubular frame for deeper drilling;
- Reduced draft characteristics to enable the rig to easily access shallow water locations;
- Riser tensioning system to adequately deal with the extreme tides and currents in up to 46 m (151 ft) water depth;
- Steel hull designed according to United States Coast Guard (USCG) specifications (inspected by USCG prior to entering the water); and
- Ability to cantilever over existing platforms for working on development wells.

The jack-up rig would be stocked with most of the drilling supplies required to complete a full summer program each year, including both production and exploratory drilling. Deliveries of the remaining items, including crew transfers, would be performed by support vessels and helicopters. The majority of the oilfield support services contractors have offices, shops, and additional equipment located in Anchorage, Kenai, and Nikiski that would support their remote field operations. Tugs would be used to mobilize or move the jack-up rig and would be released once the rig is in place.

Jack-up rig equipment would use diesel fuel or electricity from generators. Personnel associated with fuel delivery, transfer, and handling would be knowledgeable of industry Best Management Practices (BMPs) related to fuel transfer and handling, drum labeling, secondary containment guidelines, and the use of liners/drip trays. The jack-up rig would take on a maximum fuel load prior to operations to reduce fuel transfers during production or exploratory drilling. T

The jack-up rig would have a diesel burn rate of approximately 9,464 liters (2,500 gallons) per day. The jack-up rig would need to be refueled on location one time per well via an International Organization for Standardization (ISO) tank or directly from a supply boat. Commercial tank farms in the Nikiski or Kenai area would supply fuel transported by workboats as needed. The Rig Barge Master would oversee re-fueling and fluid transfers between the rig and fuel workboats, and subsequent transfers between tanks on the rig.

Three ocean-going tugs would be used to safely pull the Spartan-151 (or similar jack-up rig) to drilling locations and to position the jack-up rig to appropriately secure it on the sea floor. The most common configuration while traveling with the jack-up rig during the proposed moves is two tugs positioned side by side (approximately 30 to 60 m apart [98 to 197 ft]), pulling from the front of the jack-up rig, and one tug approximately 200 m (656 ft) behind the front tugs positioned behind the jack-up rig, applying tension on the line as needed for steering and straightening. While positioning the jack-up rig on a platform, the tugs may be fanned out around the jack-up rig to provide the finer control of movement necessary to safely position the jack-up rig on the platform. A fourth tug would be available on standby in the event that mechanical issues occur with one of the tugs. Additionally, the fourth tug may be used minimally (for approximately 1 hr) to help with positioning the jack-up rig. The horsepower (hp) of each of the tugs may range between 4,000 and 8,000. Details of the proposed tugs, or similar, are provided in table 2.

Table 2 -- Description of Tugs (or Similar) Planned for Use for Towing, Holding, and Positioning the Jack-Up Rig

Vessel[1]	Activity	Length	Width	Gross Tonnage
Bering Wind (or similar)	Towing, holding, and positioning the jack-up rig	22 m	10 m	144
Stellar Wind (or similar)	Towing, holding, and positioning the jack-up rig	32 m	11 m	160
Glacial Wind (or similar)	Towing, holding, and positioning the jack-up rig	37 m	11 m	196
Dr. Hank Kaplan (or similar)	Standby tug used only for positioning the jack-up rig, if needed	23 m	11 m	196
[1]This is not intended to be a specific list of tugs. Rather, tugs would be the same or similar such that potential effects of their use would be equivalent to what is analyzed herein.				

The jack-up rig would be moved in a manner to minimize any potential safety risks as well as cultural or environmental impacts. While under tow to a well site, rig operations would be monitored by Hilcorp and the drilling contractor. Very high frequency (VHF) radio, satellite, and cellular phone communication systems would also be used while the jack-up rig is under tow. Helicopter transport would be available to move personnel to and from the rig and platforms.

The amount of time that tugs would be under load transiting and holding or positioning the jack-up rig in Cook Inlet would be tide-dependent. The amount of operational effort (*i.e.*, power output) the tugs use for transiting would depend on whether the tugs are towing with or against the tide and could vary across a tide cycle as the current increases or decreases in speed over time. Hilcorp would make every effort to maximize transit with the tide (which would require lower power output) and minimize transit against the tide (which would require higher power output). See the **Estimated Take of Marine Mammals** section of this proposed notice of issuance for more detail on assumptions related to power output.

To mobilize the jack-up rig each year, a high slack tide is necessary for the tugs to approach close enough to shore to attach and pull the jack-up rig off Rig Tenders Dock. The same conditions would be required for demobilization when the jack-up rig is returned to Rig Tenders Dock at the end of the open water season and to position the jack-up rig on existing platforms or well sites. The relatively slow current and calm conditions at a slack tide would enable the tugs to perform the fine movements necessary to safely position the jack-up rig within several feet of the platform. Additionally, positioning and securing the jack-up rig at high slack tide rather than low slack tide would allow for the legs to be pinned down (jack the legs down onto the sea floor) at an adequate height to ensure that the hull of the jack-up rig remains above the water level of the subsequent incoming high tide. Because 12 hrs elapse between each high slack tide, tugs are generally under load for those 12 hrs, even if the towed distance is small, as high slack tides are preferred to both attach and detach the jack-up rig from the tugs. Once the tugs are on location with the jack-up rig at high slack tide (12 hours from the previous departure), there is a 1 to 2-hour window when the tide is slow enough (*e.g.*, 1 to 2 knots [kt]) for the tugs to initiate positioning the jack-up rig and pin the legs to the seafloor on location. The tugs are estimated to be under load, generally at half-power conditions or less, for up to 14 hours from the time of departure through the initial positioning attempt of the jack-up rig. An additional fourth tug, may engage during positioning activities to assist with fine movements necessary to place the jack-up rig. The fourth tug would engage with the three tugs during a positioning attempt for up to approximately 1 hour at half power.

If the first positioning attempt takes longer than anticipated, the increasing current speed (approximately 3 to 4 kt) would prevent the tugs from safely positioning the jack-up rig on location. If the first positioning attempt is not successful, the jack-up rig would be pinned down at a nearby location and the tugs would be released from the jack-up rig and no longer be under load. The tugs would remain nearby, generally floating with the current. Approximately one hour before the next high slack tide, the tugs would re-attach to the jack-up rig and reattempt positioning over a period of 2 to 3 hours. Positioning activities would generally be performed at half power. If a second attempt is needed, the tugs would be under load holding or positioning the jack-up rig on a second day for up to 5 hours. Typically, the jack-up rig can be successfully positioned over the platform in one or two attempts.

During a location-to-location transport (*e.g.,* platform-to-platform), the tugs would transport the jack-up rig, traveling with the tide in nearly all circumstances except in situations that threaten the safety of humans and/or infrastructure integrity. In a north-to-south transit, the tugs would tow the jack-up rig with the outgoing tide and would typically arrive at their next location to position the jack-up rig on the low slack tide, requiring half power or a lower power output during the transport. In a south-to-north transit, Hilcorp would prefer to pull the jack-up rig from the platform on a low slack tide to begin transiting north following the incoming tide. This would maximize their control over the jack-up rig and would require half power or a lower power output. There may be a situation where the tugs pulling the jack-up rig begin transiting with the tide to their next location, miss the tide window to safely set the jack-up rig on the platform or pin it nearby, and so have to transport the jack-up rig against the tide to a safe harbor. Tugs may also need to transport the jack-up rig against the tide if large pieces of ice or extreme wind events threaten the stability of the jack-up rig on the platform. All tug towing, holding, or positioning would be done in a manner implementing best management practices to preserve water quality, and no work would occur around creek mouths or river systems where prey abundance could be affected.

Although the variability in power output from the tugs can range from an estimated 20 to 90 percent when they are under load with the jack-up rig, as described above, the majority of the hours (spent transiting, holding, and positioning) would occur at half power (*i.e.*, 50 percent) or less. Scenarios in which power output may be greater than 50 percent could include small periods of time (*i.e.*, minutes during positioning to counteract the tide (up to 90 percent power output); Durham, pers. comm. 2022).

Production Well Development at Tyonek Platform. Hilcorp plans to install ten 76.2-centimeter (cm; 30-inch [in]) diameter (or smaller) steel piles immediately adjacent to three of the four existing legs of the Tyonek Platform in middle Cook Inlet during the proposed 5-year authorization period. The piles would be delivered to the platform via a supply vessel from Nikiski and pile driving operations would be conducted using an existing crane on the Tyonek platform. Each pile would be arranged in a concentric configuration around the outside of legs 1, 2, and 3. Each leg would have up to four piles with a maximum of 10 piles total between all three legs. Pile driving would be intermittent to weld additional pile sections onto the driven pile approximately every 12.2 m (40 ft). Once installation is complete, each pile would extend approximately 53 m (175 ft) or 91 m (300 ft) below the mudline. The piles would be driven to target depth using an APE 20-5 hydraulic impact hammer with a ram weight of 18,144 kilograms (kg; 40,000 pounds [lb]) or an APE D80-42 single acting diesel impact hammer with a ram weight of 18,144 kg (40,000 lb) or a similar impact hammer. Impact hammering is anticipated to occur intermittently over weeks for 8 hours per day for up to seven days per pile, and a total of up to 14 days per season. Pile driving at the Tyonek Platform would occur between mid-November and mid-April.

Exploration Drilling – Hilcorp plans to drill one exploratory well between the Anna and Bruce platforms near the northern border of Trading Bay and two exploratory wells in the MGS Unit in middle Cook Inlet, based on mapping of subsurface structures from previously collected two-dimensional (2D) and three-dimensional (3D) seismic data and historical well information (table 1). For all three wells, drilling would begin after the jack-up rig has already mobilized to middle Cook Inlet and before it has demobilized back to Rig Tenders Dock. The exact start dates for drilling the wells are currently unknown and would be dependent upon availability of the jack-up rig. Hilcorp anticipates that each well would take approximately 40 to 60 days to drill and test with 2 days of tugs towing a jack-up rig, and 6 days of impact pile driving. After testing, the wells would undergo plug and abandonment (P&A) for the following 14 to 90 days.

Tugs under load with a jack-up rig in support of exploration drilling – Tugging activity in support of exploratory drilling is the same as described above for production drilling. In Year 2, tugs would tow, hold, or position the jack-up rig for up to 2 days at one exploratory well site between the Anna and Bruce platforms. In Year 4, tugs would tow, hold, or position the jack-up rig for up to 4 days at two exploratory well sites within the MGS Unit.

Drilling Program and Well Operations – 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 loose surface layer from collapsing and obstructing the wellbore. Drive pipes (piles) for each well would be installed using impact pile driving techniques. At each well site, Hilcorp proposes to drive a 76.2-cm (30-in) diameter pile to approximately 120 m (394 ft) using an APE Model 15-4 hydraulic impact hammer (or similar) with a ram weight of 13,608 kg (30,001 lb). Pile driving would be discontinuous and average 0.3 m (1 ft) per min with a 1-hour break for cooling and maintenance after approximately every 40 min. For each well, the assumed maximum impact hammering in one 24-hour period is 12 hours and is anticipated to last up to 6 days at each well site, although actual hammering of the pile would occur intermittently over the whole period.

Once piles are installed and ready for drilling, smaller diameter conductor pipes would be inserted into the 76.2-cm (30-in) diameter piles to transport drill cuttings to the surface. These small diameter pipes would be drilled and not hammered, and the drilling sounds would not be in direct contact with the water column. As a result, no take is expected to result from this activity.

The drilling program for one exploratory well between the Anna and Bruce platforms and for two wells in the MGS Unit would be described in detail in the request for a permit to drill submitted to the Alaska Oil and Gas Conservation Commission (AOGCC). When planned and permitted operations are completed, the wells would be suspended according to State of Alaska regulations. All drilling waste, wastewater, recyclables, hazardous waste, and municipal solid waste would be stored, transported, and disposed of in accordance with local, state, and Federal regulations. Drilling waste from each well including drilling fluids, mud, and rock cuttings would be circulated from downhole to the jack-up mud pit system. Non-hydrocarbon-based drilling wastes would be discharged to Cook Inlet under an approved Alaska Pollutant Discharge Elimination System general permit or sent to an approved waste disposal facility. Hydrocarbon-based drilling wastes which would be delivered to an onshore permitted location for disposal. Hilcorp would follow BMPs and all stipulations of the applicable permits for this activity. More information on oil production can be found in Hilcorp's application.

Pipeline Installation and/or Replacement. Hilcorp proposes to execute two pipeline replacement or installation projects in any year. The acoustic sources associated with pipeline replacement/installation activities for which Hilcorp has requested incidental take authorization include tugs engaged in anchor handling and/or pipe pulling activities (table 3). The project timelines are subject to weather conditions and equipment readiness. Each project's scope entails the installation or replacement of pipeline in either middle Cook Inlet or Trading Bay or a combination of both. The specific methodology of the pipeline replacement or installation is pending finalization, with both methods—pipe pulling and lay barge positioning—under consideration for implementation. Both methods include replacing or installing approximately 2,286 m (7,500 ft) of pipeline.

Pipeline replacement and installation is driven by the need to mitigate corrosion, pipeline fatigue, and abrasion leaks, ensuring alignment with requirements of the Pipeline and Hazardous Materials Safety Administration. Installation of new gas pipelines would also address the growing consumer demand for natural gas in Southcentral Alaska by allowing larger quantities of natural gas to be extracted for use.

Table 3 – Summary of Pipeline Activities, Purposes, Durations, and Anticipated Sound Sources

Activity	Purpose	Duration per Project	Anticipated Sound Sources
Lay Barge Method			
Anchor Setting	Set 8-point anchor system	2 days	2 AHTs*, 1 assist tug
Pipelay	Lay out 2,286 (7,500 ft) of pipeline	8 days	2 AHTs
Anchor Recovery	Recover 8 Anchors	1 day	2 AHTs
Pipe Pull Method			
Pipelay	Pull out 2,286 m (7,500 ft) of pipeline	8 days	1 installation tug, 1 assist tug, seafloor bottom impact sounds
*Note: AHT is an acronym for anchor handling tugs.			

Pipeline Replacement Activities Using Lay Barge Methodology. Hilcorp is considering employing lay barge methods for pipeline replacement/installation. This approach would involve the use of anchor handling tugs (AHTs) and anchor systems to maintain the optimal stability and alignment of a specialized vessel, referred to as a lay barge, while laying pipeline on the seafloor. Additional pre-mobilization needs for replacement/installation activities using lay barge methods include procurement and transport to the worksite of project materials and vessels. All activities involving sound generation in the day-to-day activities, such as anchor handling and pipelaying, would follow uniform procedures for both pipeline replacement and installation as detailed in the subsequent sections.

Subsea Pipeline Operations. Pipeline activities utilizing lay barge methods require support from two AHTs, a pipelay barge, and one assist tug (see table 4 for examples of anticipated vessel specifications). The pipelay barge would be towed by an

AHT to the initial anchor setting location. To anchor the barge, eight anchors would be set, one at a time using one AHT during slack tide. During anchor setting, a tug would handle each anchor, one at a time. Setting each anchor during slack tide may require 1 hour each, intermittently, over a 2-day period (*i.e.*, 4 hours per day for all eight anchors). During an incoming or outgoing tide, anchors would not be set, rather one AHT and one assist tug would hold the pipelay barge in a stationary position until the next slack tide (*i.e.*, 4 to 5 hours).

Table 4 – Example Types of Tugs and Barges Used in Lay Barge Operations

Vessel [1]	Operational Use	Length[2]	Beam[2]	hp
Barge				
Ninilchik	Lay barge to be positioned and anchored by tugs using up to eight anchors and serve as an above-water work platform	79 m	22 m	N/A
Assist Tug[3]				
Bering Wind	Assist tug used to assist the AHTs in holding the pipelay barge in place against an incoming or outgoing tide during initial barge positioning	22 m	10 m	5,080
Dr. Hank Kaplan		24 m	11 m	5,380
Anchor Handling Tugs[3]				
Denise Foss	AHTs used to hold the barge in place during incoming or outgoing tides when anchor setting or retrieving; re-position anchors along the pipeline route; and operate in tandem during pipelay	37 m	12 m	7,268
Resolve Pioneer		63 m	12 m	5,750

[1]This is not intended to be a specific list of tugs. Rather, tugs would be the same or similar such that potential effects of their use would be equivalent to what is analyzed herein.
[2] Vessel length and beam width are rounded to the nearest whole number.
[3] Tugs may range in power from 2,000 to 8,000 horsepower (hp).

Pipeline segments would be installed approximately every 305 m (1,000 ft) from the pipelay barge along the proposed routes. To lay the pipeline in place, the pipelay barge would be moved in a sequence along the pipeline route by moving the eight anchors one at a time to shift the position of the barge forward. To move anchors, two AHTs would operate one at a time in sequence and move a single anchor at a time (*i.e.*, a single tug would move an individual anchor).

Laying pipe from the lay barge would engage a U-shaped stinger roller assembly that would be affixed to the pipelay barge to guide the pipeline into the water. This assembly is specifically engineered to regulate the curvature of the pipeline during the laying process and safely lay pipe while preventing damage from excessive bending. On the deck of the pipelay barge, segments of pipeline would be inspected and hydrotested and coatings would be verified prior to installation in the water.

Anchor Setting. To secure the pipelay barge, each of the eight anchors would be set one at a time using one tug (C. Burvee, Blackfin, Pers. comm., March 13, 2023). Setting one anchor would take approximately 1 hour during slack tide. There are four slack tides per day; therefore, four anchors would be set in 1 day. Setting all eight anchors is expected to take 2 days (*i.e.*, during each of the four slack tides per day). There are approximately 4 to 5 hours between slack tides (*i.e.*, between low tide and high tide).

During an incoming or outgoing tide, an assist tug would work simultaneously with an AHT to hold the pipelay barge in place against the tide. During this 4-to-5-hour period, the two tugs would average 50 percent power output (C. Burvee, Blackfin, Pers. comm., March 13, 2023). During an incoming or outgoing tide, the other AHT would be idle. Therefore, during a 24-hour period of setting four anchors, a single AHT would operate at an average of 50 percent power for 4 hours (during each slack tide) to set anchors, followed by a 4-to-5-hour period when the assist tug and the second AHT would operate at an average of 50 percent power holding the barge between each slack tide. This pattern would continue until all eight anchors are set over 2 days. During anchor setting, only one tug would be anchor handling at a time, operating at 50 percent power. Once all eight anchors are set, the assist tug would depart the pipelay site, leaving only the two AHTs for pipelay. Setting an anchor requires the tug captain to aim for an X, Y coordinate on the seafloor. Due to the strong tides and currents in Cook Inlet and the need to aim for a specific location, setting anchors is more complex and requires more time than anchor retrieval.

Pipelaying. Once all eight anchors are set, the barge would be moved approximately every 305 m (1,000 ft) along the pipeline route. Each time that the barge needs to be repositioned, a single tug would be used at half power (50 percent) for anchor handling. Each of the eight anchors would be repositioned in the new location, one anchor at a time. Two bow anchors would typically be repositioned first (one at a time), then each set of port and starboard anchors (*i.e*., two on each side) would be repositioned one at a time, finishing with the two stern anchors one at a time to move the barge. The two tugs would work in sequence to relocate a single anchor at a time to "crawl" the barge into the new position approximately 305 m (1,000 ft) from the previous position. To execute this, the bow anchor cables of the pipelay barge would be tightened to slowly pull it to the new position as the stern anchors are slowly released. It is estimated it will take 8 days to complete the pipelaying portion of replacement/installation activity using the lay barge method.

Each anchor weighs 9,071 kg (20,000 lb) and has approximately 4.6 m (15 ft) of chain and 915 m (3,002 ft) of wire cable. All wire cables would be under tension when in the water. During pipelay, each anchor move would take about 15 minutes and would be an intermittent process as each anchor is moved individually.

Anchor Retrieval. Anchor retrieval is only possible during slack tides. The process would involve pulling eight anchors one by one using a single tug from a fixed, stationary position. While one tug is engaged in retrieving an anchor, the second tug would remain idle. Between slack tides, when the tide is either incoming or outgoing, both AHTs would hold the barge in place for approximately 4 to 5 hours, operating at an average power output of 50 percent. The process of retrieving anchors would be swifter compared to the initial anchoring procedure due to the relative ease of lifting the anchor from its fixed position on the seafloor as detailed in the previous section. Within one slack tide period, two anchors could be successfully retrieved. Consequently, all eight anchors could be pulled up within a 24-hr span.

Vessels for Pipeline Replacement/Installation Activities. Pipeline activities utilizing lay barge methods would require support from two AHTs, a pipelay barge, and one assist tug as shown in table 4. The two AHTs would be involved in replacement/installation operations, specifically during anchor handling. An assist tug from within Cook Inlet (*Bering Wind* or *Dr. Hank Kaplan*, or similar) would hold the barge between slack tides along with one of the AHTs. It is important to note their availability may not be guaranteed once project timelines are finalized. In such cases, a comparable vessel would be chosen for the intended activity.

Pipeline Replacement Activities Using Pipe Pull Methodology. Hilcorp is also considering implementing a pipe pull method for pipeline replacement/installation during the proposed ITR period. For this approach, the pipeline would be assembled on land in 305-m (1000-ft) sections and subsequently towed to sea one section at a time along the seafloor. This process would be executed by an installation tug with assistance from an assist tug. A large tug will tow the project spools into position.

During the initial phases of pipe-pulling, a pull wire would be connected to the winch on the installation tug; the tug would then pull the pipe towards its stern while remaining on anchor. As the towing of the pull wire begins, buoyancy assemblies would be installed from shore along the pull wire to lift the wire out of the mud. This added buoyancy would act to reduce drag and would also reduce the pull force required by the installation tug. Onshore, the pull wire would be attached to the buoyed pull head of the first pipeline spool and the first pipeline segment would be pulled into the water during high tide.

After the installation tug has pulled the pipeline, placing the tailhead about 91 m (300 ft) offshore, it would stop pulling and continue to release wire as it moves to a specified location farther offshore. Once it reached this new location, the tug would resume pulling the pipeline segment using the attached pull wire and remove the buoyancy assemblies as the pull wire is reeled in. Next, the pipeline segment would be guided into position within a predetermined 3 m by 3 m (10 ft by 10 ft) target area near the platform; the installation vessel would then detach the pull wire and attach a buoy to a 45.7-m (150-ft) pennant secured at the front of the pipeline.

Following positioning of the first pipeline spool, the process would be repeated by pulling the second spool within a 3 m by 3 m (10 ft by 10 ft) target area at the tailhead of the first spool, and then pull the third spool within a 3 m by 3 m (10 ft by 10 ft) target area at the tailhead of the second spool and so on until all spools are laid out 2,286 m (7,500 ft). The assist tug would help keep the installation tug on the correct bearing throughout each pull and will assist in final positioning of the spools. The estimated duration to position all the spools is approximately 8 days, with one spool being pulled per day. The total anticipated tug operation time, operating at 50 percent to 85 percent power, is expected to be 3 hours per day.

A separate tugboat would help the installation tug maintain the planned route during tidal changes. A shallow-water support vessel would ferry the messenger rope from the installation tug to the beach and assist in any onshore to offshore operations. The messenger rope is a wire used to transfer the larger pull wire from/to the floating asset to/from the beach. This is a light, usually floating line that can be messengered by a small craft. Messenger wire would only be needed if the weight, due to length or required diameter, of the actual pulling wire would be unmanageable by a small craft. Divers would remove the 45.7-m (150-ft) pennant wire and buoy from the pull head, flood each pipeline segment, and assist with post tie-in operations. See table 5 for examples of vessel sizes and function details for this activity.

Table 5 – Example Types of Tugs and Barges Used in Pipe Pull Operations

Vessel [1]	Operational Use	Length[2]	Beam[2]	Horsepower
Installation Tug[3]				
Resolve Pioneer	Main tug for installation and is responsible for pulling spools into position	63 m	12 m	5,750
Assist Tug[3]				
Steller Wind	Assist tug supports the Resolve Pioneer, or similar, in maneuvering the spool of pipe to its designated seabed position, particularly when contending with tidal currents	26 m	9 m	3,500

[1]This is not intended to be a specific list of tugs. Rather, tugs would be the same or similar such that potential effects of their use would be commensurate with what is analyzed herein.
[2] Vessel length and beam width are rounded to the nearest whole number.
[3]Tugs may range in power from 2,000 to 8,000 hp.

The risk of interaction or entanglement with gear or equipment during pipeline replacement/installation activities is avoided due to the small area occupied by the cables relative to the marine mammals' habitat in Cook Inlet, use of taut lines, and mitigation and monitoring measures described in the **Proposed Mitigation** and **Proposed Monitoring and Reporting** sections of this notice. Vessel strikes or other encounters are also not anticipated as a result of anchor handling activities. No other interactions are anticipated.

Proposed mitigation, monitoring, and reporting measures are described in detail later in this document (please see **Proposed Mitigation** and **Proposed Monitoring and Reporting**).

Description of Marine Mammals in the Area of Specified Activities

Sections 3 and 4 of the application summarize available information regarding status and trends, distribution and habitat preferences, and behavior and life history of the potentially affected species. NMFS fully considered all of this information, and we refer the reader to these descriptions, instead of reprinting the information. Additional information regarding population trends and threats may be found in NMFS' Stock Assessment Reports (SARs; *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments*) and more general information about these species (*e.g.*, physical and behavioral descriptions) may be found on NMFS' website (*https://www.fisheries.noaa.gov/find-species)*.

Table 6 lists all species or stocks for which take is expected and proposed to be authorized for this activity and summarizes information related to the population or stock, including regulatory status under the MMPA and ESA and potential biological removal (PBR), where known. PBR is defined by the MMPA as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population (as described in NMFS' SARs). While no mortality or serious injury (M/SI) is anticipated or proposed to be authorized here, PBR and M/SI rates from anthropogenic sources are included here as gross indicators of the status of the species or stocks and other threats.

Marine mammal abundance estimates presented in table 6 represent the total number of individuals that make up a given stock or the total number estimated within a particular study or survey area. NMFS' stock abundance estimates for most species represent the total estimate of individuals within the geographic area, if known, that comprises that stock. For some species, this geographic area may extend beyond U.S. waters. All values presented in table 6 are the most recent available at the time of publication (including from the draft 2024 SARs; 90 FR 13344, March 21, 2025) and are available online at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments*.

Table 6 -- Species with Estimated Take from the Specified Activities

Common name	Scientific name[1]	Stock	ESA/MMPA status; Strategic (Y/N)[2]	Stock abundance (CV, N_{min}, most recent abundance survey)[3]	PBR	Annual M/SI[4]
Order Artiodactyla – Cetacea – Mysticeti (baleen whales)						
Family Eschrichtiidae						
Gray Whale	*Eschrichtius robustus*	Eastern N Pacific	-, -, N	26,960 (0.05, 25,849, 2016)	801	131
Family Balaenidae						
Family Balaenopteridae (rorquals)						
Fin Whale	*Balaenoptera physalus*	Northeast Pacific	E, D, Y	3,168 (0.26, 2,554, 2013)[5]	UND	0.6
Humpback Whale	*Megaptera novaeangliae*	Hawai'i	-, -, N	11,278 (0.56, 7,265, 2020)	127	27.09
		Mexico-North Pacific	T, D, Y	N/A[6] (N/A, N/A, 2006)	UND	0.57
		Western North Pacific	E, D, Y	1,084 (0.088, 1,007, 2006)	3.4	5.82
Minke Whale	*Balaenoptera acutorostrata*	Alaska	-, -, N	N/A[7] (N/A, N/A, N/A)	UND	0
Odontoceti (toothed whales, dolphins, and porpoises)						
Family Delphinidae						
Killer Whale	*Orcinus orca*	Eastern North Pacific Alaska Resident	-, -, N	1,920 (N/A, 1,920, 2019)	19	1.3
		Eastern North Pacific Gulf of Alaska, Aleutian Islands and Bering Sea Transient	-, -, N	587 (N/A, 587, 2012)	5.9	0.8
Pacific White-Sided Dolphin	*Lagenorhynchus obliquidens*	North Pacific	-, -, N	26,880 (N/A, N/A, 1990)	UND	0
Family Monodontidae (white whales)						
Beluga Whale	*Delphinapterus leucas*	Cook Inlet	E, D, Y	331 (0.076, 311, 2022)	0.62	0
Family Phocoenidae (porpoises)						
Dall's Porpoise	*Phocoenoides dalli*	Alaska	-, -, N	UND[8] (UND, UND, 2015)	UND	37
Harbor Porpoise	*Phocoena*	Gulf of Alaska	-, -, Y	31,046 (0.21, N/A, 1998)	UND	72
Order Carnivora – Pinnipedia						
Family Otariidae (eared seals and sea lions)						
California Sea Lion	*Zalophus californianus*	U.S.	-, -, N	257,606 (N/A, 233,515, 2014)	14,011	>321
Steller Sea Lion	*Eumetopias jubatus*	Western	E, D, Y	49,837[9] (N/A, 49,837, 2020)	299	267
Family Phocidae (earless seals)						
Harbor Seal	*Phoca vitulina*	Cook Inlet/Shelikof Strait	-, -, N	28,411 (N/A, 26,907, 2018)	807	107

1 - Information on the classification of marine mammal species can be found on the web page for The Society for Marine Mammalogy's Committee on Taxonomy (*https://marinemammalscience.org/science-and-publications/list-marine-mammal-species-subspecies/*).

2 - Endangered Species Act (ESA) status: endangered (E), threatened (T)/MMPA status: depleted (D). A dash (-) indicates that the species is not listed under the ESA or designated as depleted under the MMPA.

Under the MMPA, a strategic stock is one for which the level of direct human-caused mortality exceeds PBR or which is determined to be declining and likely to be listed under the ESA within the foreseeable future. Any species or stock listed under the ESA is automatically designated under the MMPA as depleted and as a strategic stock.
3 - NMFS marine mammal stock assessment reports online at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region*. CV is coefficient of variation; N_{min} is the minimum estimate of stock abundance.
4 - These values, found in NMFS' SARs, represent annual levels of human-caused mortality plus serious injury from all sources combined (*e.g.*, commercial fisheries, ship strike). Annual M/SI often cannot be determined precisely and is in some cases presented as a minimum value or range. A CV associated with estimated mortality due to commercial fisheries is presented in some cases.
5 - The values presented here based on the 2020 SAR and are an underestimate for the entire stock because it is based on surveys which covered only a small portion of the stock's range.
6 - Abundance estimates are currently considered unknown.
7- Reliable population estimates are not available for this stock. Please see Friday *et al.*, (2013) and Zerbini *et al.*, (2006) for additional information on numbers of minke whales in Alaska.
8 - The best available abundance estimate is likely an underestimate for the entire stock because it is based upon a survey that covered only a small portion of the stock's range.
9 - Nest is best estimate of counts, which have not been corrected for animals at sea during abundance surveys.

As indicated above, all 12 species (with 15 managed stocks) in table 6 temporally and spatially co-occur with the activity to the degree that take is reasonably likely to occur. In addition, the northern sea otter may be found in Cook Inlet, Alaska. However, northern sea otters are managed by the U.S. Fish and Wildlife Service and are not considered further in this rulemaking.

Gray Whale

The stock structure for gray whales in the Pacific has been studied for a number of years and remains uncertain as of the most recent (2022) Pacific SARs (Carretta *et al.*, 2023). Gray whale population structure is not determined by simple geography and may be in flux due to evolving migratory dynamics (Carretta *et al.*, 2023). Currently, the SARs delineate a western North Pacific (WNP) gray whale stock and an eastern North Pacific (ENP) stock based on genetic differentiation (Carretta *et al.*, 2023). WNP gray whales are not known to feed in or travel to upper Cook Inlet (Conant and Lohe, 2023; Weller *et al.*, 2023). Therefore, we assume that gray whales near the project area are members of the ENP stock.

An Unusual Mortality Event (UME) for gray whales along the U.S. West Coast and in Alaska occurred from December 17, 2018, through November 9, 2023. During that time, 146 gray whales stranded off the coast of Alaska. The investigative team concluded that the preliminary cause of the UME was localized ecosystem changes in the whale's Subarctic and Arctic feeding areas that led to changes in food, malnutrition, decreased birth rates, and increased mortality (see *https://www.fisheries.noaa.gov/national/marine-life-distress/2019-2023-gray-whale-unusual-mortality-event-along-west-coast-and* for more information).

Gray whales are infrequent visitors to Cook Inlet, but may be seasonally present during spring and fall in the lower inlet (Bureau of Ocean Energy Management (BOEM), 2021). Migrating gray whales pass through the lower inlet during their spring and fall migrations to and from their primary summer feeding areas in the Bering, Chukchi, and Beaufort seas (Swartz, 2018; Silber *et al.*, 2021; BOEM, 2021). Several surveys and monitoring programs have sighted gray whales in lower Cook Inlet (Shelden *et al.*, 2013; Owl Ridge, 2014; Lomac-MacNair *et al.*, 2013, 2014; Kendall *et al.*, 2015, as cited in Weston and SLR, 2022). Gray whales are occasionally seen in mid- and upper Cook Inlet, Alaska, but they are not common. During NMFS aerial surveys conducted in June 1994, 2000, 2001, 2005, and 2009 gray whales were observed in Cook Inlet near Port Graham and Elizabeth Island as well as near Kamishak Bay, with one gray whale observed as far north as the Beluga River (Shelden *et al.*, 2013). Gray whales were also observed offshore of Cape Starichkof in 2013 by marine mammal observers monitoring Buccaneer's Cosmopolitan drilling project (Owl Ridge, 2014) and in middle Cook Inlet in 2014 during the 2014 Apache 2D seismic survey (Lomac-MacNair *et al.*, 2015). Several projects performed in Cook Inlet in recent years reported no observations of gray whales. These project activities included the SAExploration seismic survey in 2015 (Kendall and Cornick, 2015), the 2018 Cook Inlet Pipeline (CIPL) Extension Project (Sitkiewicz *et al.*, 2018), the 2019 Hilcorp seismic survey in lower Cook Inlet

(Fairweather Science, 2020), Hilcorp's 2022, 2023, and 2024 aerial and rig-based monitoring efforts (Horsley and Larson, 2023, 2024).

In 2020, a young male gray whale was stranded in the Twentymile River near Girdwood for over a week before swimming back into Turnagain Arm. The whale did not survive and was found dead in west Cook Inlet later that month (NMFS, 2020). One gray whale was sighted in Knik Arm near the Don Young Port of Alaska (POA) in Anchorage in upper Cook Inlet in May of 2020 during observations conducted during construction of the Petroleum and Cement Terminal project (61N Environmental, 2021). The sighting occurred less than a week before the reports of the gray whale stranding in the Twentymile River and was likely the same animal. In 2021, one small gray whale was sighted in Knik Arm near Ship Creek, south of the POA (61N Environmental, 2022a). Although some sightings have been documented in the middle and upper Inlet, the gray whale range typically only extends into the lower Cook Inlet region.

Humpback Whale

The 2022 NMFS Alaska and Pacific SARs described a revised stock structure for humpback whales which modifies the previous designated stocks to align more closely with the ESA-designated Distinct Population Segments (DPSs) (Carretta *et al.*, 2023; Young *et al.*, 2023). Specifically, the three previous North Pacific humpback whale stocks (Central and Western North Pacific stocks and a CA/OR/WA stock) were replaced by five stocks, largely corresponding with the ESA-designated DPSs. These include Western North Pacific and Hawaii stocks and a Central America/Southern Mexico-California (CA)/Oregon (OR)/Washington (WA) stock (which corresponds with the Central America DPS). The remaining two stocks, corresponding with the Mexico DPS, are the Mainland Mexico-CA/OR/WA and Mexico-North Pacific stocks (Carretta *et al.*, 2023; Young *et al.*, 2023). The former stock is expected to occur along the west coast from California to southern British Columbia, while the latter stock may occur across the

Pacific, from northern British Columbia through the Gulf of Alaska and Aleutian Islands/Bering Sea region to Russia.

The Hawaii stock consists of one demographically independent population (DIP) (Hawaii - Southeast Alaska/Northern British Columbia DIP) and the Hawaii - North Pacific unit, which may or may not be composed of multiple DIPs (Wade *et al.*, 2021). The DIP and unit are managed as a single stock at this time, due to the lack of data available to separately assess them and lack of compelling conservation benefit to managing them separately (Martien et al., 2021, NMFS 2019, 2023a). The DIP is delineated based on two strong lines of evidence: genetics and movement data (Wade *et al.*, 2021). Whales in the Hawaii - Southeast Alaska/Northern British Columbia DIP winter off Hawaii and largely summer in Southeast Alaska and Northern British Columbia (Wade *et al.*, 2021). The group of whales that migrate from Russia, western Alaska (Bering Sea and Aleutian Islands), and central Alaska (Gulf of Alaska excluding Southeast Alaska) to Hawaii have been delineated as the Hawaii-North Pacific unit (Wade *et al.*, 2021). There are a small number of whales that migrate between Hawaii and southern British Columbia/Washington, but current data and analyses do not provide a clear understanding of which unit these whales belong to (Wade *et al.*, 2021; Carretta *et al.*, 2023; Young *et al.*, 2023).

The Mexico-North Pacific stock is likely composed of multiple DIPs, based on movement data (Martien *et al.*, 2021, Wade 2021, Wade *et al.*, 2021). However, because currently available data and analyses are not sufficient to delineate or assess DIPs within the unit, it was designated as a single stock (NMFS 2019, 2022d, 2023a). Whales in this stock winter off Mexico and the Revillagigedo Archipelago and summer primarily in Alaska waters (Martien *et al.*, 2021; Carretta *et al.*, 2023; Young *et al.*, 2023).

The Western North Pacific stock consists of two units- the Philippines/Okinawa - North Pacific unit and the Marianas/Ogasawara - North Pacific unit. The units are managed as a single stock at this time, due to a lack of data available to separately assess them (NMFS 2019, 2022d, 2023a). Recognition of these units is based on movements and genetic data (Oleson *et al.*, 2022). Whales in the Philippines/Okinawa - North Pacific unit winter near the Philippines and in the Ryukyu Archipelago and migrate to summer feeding areas primarily off the Russian mainland (Oleson *et al.*, 2022). Whales that winter off the Mariana Archipelago, Ogasawara, and other areas not yet identified and then migrate to summer feeding areas off the Commander Islands, and to the Bering Sea and Aleutian Islands comprise the Marianas/Ogasawara - North Pacific unit.

The most comprehensive photo-identification data available suggest that approximately 89 percent of all humpback whales in the Gulf of Alaska are from the Hawaii stock, 11 percent are from the Mexico stock, and less than 1 percent are from the Western North Pacific stock (Wade, 2021). Individuals from different stocks are known to intermix in feeding grounds. There is no designated critical habitat for humpback whales in or near the project area (86 FR 21082, April 21, 2021), nor does the project overlap with any known biologically important areas.

Humpback whales are encountered regularly in lower Cook Inlet and occasionally in mid-Cook Inlet; sightings are rare in upper Cook Inlet. Eighty-three groups containing an estimated 187 humpbacks were sighted during the CIBW aerial surveys conducted by NMFS from 1994 to 2012 (Shelden *et al.*, 2013). Surveys conducted north of the forelands have documented small numbers in middle Cook Inlet. During the 2014 Apache seismic surveys in Cook Inlet, five groups (six individuals) were reported, with three groups north of the forelands on the east side of the inlet (Lomac-MacNair *et al.*, 2014). In 2015, during the construction of the Furie Operating Alaska, LLC (Furie) platform and pipeline, four groups of humpback whales were documented. Another group of 6 to 10 unidentified whales, thought to be either humpback or gray whales, was sighted approximately 15 km (9 mi) northeast of the Julius R. Platform. Large cetaceans were visible near the project (*i.e.*, whales or blows were visible) for 2 hours out of the 1,275 hours of observation conducted (Jacobs, 2015). During SAExploration's 2015 seismic program, three humpback whales were observed in Cook Inlet, including two near the Forelands and one in lower Cook Inlet (Kendall *et al.*, 2015 as cited in Weston and SLR, 2022). Hilcorp did not record any sightings of humpback whales in middle Cook Inlet from their aerial or rig-based monitoring efforts in 2022, 2023, or 2024 (Horsley and Larson, 2023, 2024). The POA has observed humpbacks in Knik Arm (2 sightings of likely the same individual near Ship Creek in 2017 (ABR 2017) and 1 at the POA in 2022 (61N Environmental 2022b). Based on these observations, humpback whales may be infrequent visitors to middle Cook Inlet.

Minke Whale

Two stocks of minke whales occur within U.S. waters: Alaska and California/Oregon/Washington (Muto *et al.*, 2022). The Alaskan stock of minke whales is considered migratory, as they are speculated to migrate seasonally from the Bering and Chukchi Seas in fall to areas of the central North Pacific Ocean (Delarue *et al.*, 2013). Although they are likely migratory in Alaska, minke whales have been observed off Cape Starichkof and Anchor Point year-round (Muto *et al.*, 2017)

Minke whales are most abundant in the Gulf of Alaska during summer and occupy localized feeding areas (Zerbini *et al.*, 2006). During the NMFS annual and semiannual surveys of Cook Inlet, minke whales were observed near Anchor Point in 1998, 1999, 2006, and 2021 (Shelden *et al.*, 2013, 2015b, 2017, 2022; Shelden and Wade, 2019) and near Ninilchik and the middle of lower Cook Inlet in 2021 (Shelden *et al.*, 2022). Minkes were sighted southeast of Kalgin Island and near Homer during Apache's 2014 survey (Lomac-MacNair *et al.*, 2014), and one was observed near Tuxedni Bay in 2015 (Kendall *et al.*, 2015, as cited in Weston and SLR, 2022). During Hilcorp's seismic survey in lower Cook Inlet in the fall of 2019, eight minke whales were observed (Fairweather Science, 2020). In 2018, no minke whales were observed during observations conducted for the CIPL project near Tyonek (Sitkiewicz *et al.*, 2018). Minke whales were also not recorded during Hilcorp's aerial or rig-based monitoring efforts in 2022, 2023, or 2024 (Horsley and Larson, 2023, 2024), however, one sighting of one minke whale was recorded during Hilcorp's spring marine vibroseis seismic survey offshore from Anchor Point in April 2024 (Hanks *et al.*, 2024).

Fin Whale

In U.S. Pacific waters, fin whales are seasonally found in the Gulf of Alaska, and Bering Sea and as far north as the northern Chukchi Sea (Muto *et al.*, 2021). Several surveys have been conducted to assess the distribution and habitat preferences of fin whales within parts of their range in the North Pacific. In coastal waters of the Aleutians and the Alaska Peninsula, they were found primarily from the Kenai Peninsula to the Shumagin Islands, with a higher abundance near the Semidi Islands and Kodiak Island (Zerbini *et al.*, 2006). An opportunistic survey in the Gulf of Alaska revealed that fin whales were concentrated west of Kodiak Island, in Shelikof Strait, and in the southern Cook Inlet region, with smaller numbers observed over the shelf east of Kodiak to Prince William Sound (Alaska Fisheries Science Center [AFSC], 2003). Muto *et al.* (2021) reported visual sightings and acoustic detections in the northeastern Chukchi Sea have been increasing, suggesting that the stock may be re-occupying habitat used prior to large-scale commercial whaling. Delarue *et al.* (2013) also detected fin whale calls in the northeastern Chukchi Sea from July through October in a 3-year acoustic study.

Fin whales' range extends into lower Cook Inlet; however, their sightings are infrequent, and they are mostly spotted near the inlet's entrance. Fin whales are usually observed as individuals traveling alone, although they are sometimes observed in small groups. Rarely, large groups of 50 to 300 fin whales can travel together during migrations (NMFS, 2010). Fin whales in Cook Inlet have only been observed as individuals or in small groups. From 2000 to 2022, 10 sightings of 26 estimated individual fin whales in lower Cook Inlet were observed during NMFS aerial surveys (Shelden *et al.*, 2013, 2015b, 2017, 2022; Shelden and Wade, 2019). No fin whales were observed during the 2018 Harvest's CIPL Extension Project Acoustic Monitoring Program in middle Cook Inlet (Sitkiewicz *et al.*, 2018). In September and October 2019, Castellote *et al.* (2020) detected fin whales acoustically in lower Cook Inlet during three-dimensional (3D) seismic surveys, which coincided with the Hilcorp lower Cook Inlet seismic survey. During this period, 8 sightings of 23 individual fin whales were reported, indicating the offshore waters of lower Cook Inlet may be more heavily used than previously believed, especially during the fall season (Fairweather Science, 2020). Hilcorp did not record any sightings of fin whales from their aerial or rig-based monitoring efforts in 2022, 2023, or 2024 (Horsley and Larson, 2023, 2024)

Beluga Whale

Five stocks of beluga whales are recognized in Alaska: the Beaufort Sea stock, eastern Chukchi Sea stock, eastern Bering Sea stock, Bristol Bay stock, and Cook Inlet stock (Young *et al.*, 2023). The Cook Inlet stock is geographically and genetically isolated from the other stocks (O'Corry-Crowe *et al.*, 1997; Laidre *et al.*, 2000) and resides year-round in Cook Inlet (Laidre *et al.*, 2000; Castellote *et al.*, 2020). Only the Cook Inlet stock inhabits the area where Hilcorp would conduct activities. CIBWs were designated as depleted under the MMPA in 2000 (65 FR 34950, May 31, 2000), and as a DPS and listed as endangered under the ESA in October 2008 (73 FR 62919, October 10, 2008) when the species failed to recover following a moratorium on subsistence harvest. Between 2008 and 2018, CIBWs experienced a decline of about 2.3 percent per year (Wade *et al.*, 2019). The decline partially overlapped with the northeast Pacific marine heatwave that occurred from 2014 to 2016 in the Gulf of Alaska, significantly impacting the marine ecosystem (Suryan *et al.*, 2021, as cited in Goetz *et al.*, 2023).

In June 2023, NMFS released an updated abundance estimate for CIBWs in Alaska that incorporates aerial survey data from June 2021 and 2022 and accounted for visibility bias (Goetz *et al.*, 2023). This report estimated that CIBW abundance is between 290 and 386, with a median best estimate of 331. Goetz *et al.* (2023) also present an analysis of population trends for the most recent 10-year period (2012–2022). The addition of data from the 2021 and 2022 survey years in the analysis resulted in a 65.1 percent probability that the CIBW population is now increasing at 0.9 percent per year (95 percent prediction interval of −3 to 5.7 percent). This increase drops slightly to 0.2 percent per year (95 percent prediction interval of −1.8 to 2.6 percent) with a 60 percent probability that the CIBW population is increasing more than 1 percent per year when data from 2021, which had limited survey coverage due to poor weather, are excluded from the analysis.For management purposes, NMFS has determined that the carrying capacity of Cook Inlet is 1,300 CIBWs (65 FR 34590, May 31, 2000) based on historical CIBW abundance estimated by Calkins (1989).

Threats that have the potential to impact this stock and its habitat include the following: catastrophic events (*e.g.*, natural disasters, spills, mass strandings); disease agents (*e.g.*, pathogens, parasites, and harmful algal blooms), habitat loss or degradation, reduction in prey, changes in prey availability due to natural environmental variability, ocean acidification, and commercial fisheries; climatic changes affecting habitat; predation by killer whales; contaminants; noise; ship strikes; waste management; urban runoff; construction projects; and physical habitat modifications that may occur as Cook Inlet becomes increasingly urbanized (Moore *et al.*, 2000; Hobbs *et al.*, 2015; NMFS, 2016b). Another source of CIBW mortality in Cook Inlet is predation by transient-type (mammal-eating) killer whales (NMFS, 2016b; Shelden *et al.*, 2003). No human-caused mortality or serious injury of CIBWs through interactions with commercial, recreational, and subsistence fisheries, takes by subsistence hunters, and or human-caused events (*e.g.*, entanglement in marine debris, ship strikes) has been recently documented, and harvesting of CIBWs has not occurred since 2008 (NMFS, 2008b).

Critical Habitat. On April 11, 2011, NMFS designated two areas of critical habitat for CIBW (76 FR 20179). The designation includes 7,800 km^2 (3012 square mi, mi^2) of marine and estuarine habitat within Cook Inlet, encompassing approximately 1,909 km^2 (737 mi^2) in Area 1 and 5,891 km^2 (2275 mi^2) in Area 2 (see figure 1 in 76 FR 20179). Area 1 of the CIBW critical habitat encompasses all marine waters of Cook Inlet north of a line connecting Point Possession and the mouth of Three Mile Creek, including waters of the Susitna, Little Susitna, and Chickaloon Rivers below Mean Higher High Water (MHHW). From spring through fall, Area 1 critical habitat has the highest concentration of CIBWs due to its important foraging and calving habitat. Critical Habitat Area 2 encompasses some of the fall and winter feeding grounds in middle Cook Inlet. This area has a lower concentration of CIBWs in spring and summer but is used by CIBWs in fall and winter. More information on CIBW critical habitat can be found at *https://www.fisheries.noaa.gov/action/critical-habitat-cook-inlet-beluga-whale*.

The designation identified the following Primary Constituent Elements, essential features important to the conservation of the CIBW:

(1) Intertidal and subtidal waters of Cook Inlet with depths of less than 9 m (30 ft) Mean Lower-Low Water (MLLW) and within 8 km (5 mi) of high- and medium-flow anadromous fish streams;

(2) Primary prey species, including four of the five species of Pacific salmon (chum (*Oncorhynchus keta*), sockeye (*Oncorhynchus nerka*), Chinook (*Oncorhynchus tshawytscha*), and coho (*Oncorhynchus kisutch*)), Pacific eulachon (*Thaleichthys pacificus*), Pacific cod (*Gadus macrocephalus*), walleye Pollock (*Gadus chalcogrammus*), saffron cod (*Eleginus gracilis*), and yellowfin sole (*Limanda aspera*);

(3) The absence of toxins or other agents of a type or amount harmful to CIBWs;

(4) Unrestricted passage within or between the critical habitat areas; and

(5) The absence of in-water noise at levels resulting in the abandonment of habitat by CIBWs.

Biologically Important Areas. Wild *et al.* (2023) delineated a Small and Resident Population Biologically Important Area (BIA) in Cook Inlet that is active year-round and overlaps where Hilcorp would conduct the specified activities. The authors assigned the BIA an importance score of 2, an intensity score of 2, a data support score of 3, and a boundary certainty score of 2 (scores range from 1 to 3, with a higher score representing an area of more concentrated or focused use and higher confidence in the data supporting the BIA; Harrison *et al.*, 2023). These scores indicate that the BIA is of moderate importance and intensity, the authors have high confidence that the population is small and resident and in the abundance and range estimates of the population, and the boundary certainty is medium (see Harrison *et al.* (2023) for additional information about the scoring process used to identify BIAs). The boundary of the CIBW BIA is consistent with NMFS' critical habitat designation (Wild *et al.*, 2023).

Foraging ecology

CIBWs feed on a wide variety of prey species, particularly those that are seasonally abundant. From late spring through summer, most CIBW stomachs sampled contained salmon, which corresponded to the timing of fish runs in the area. Anadromous smolt and adult fish aggregate at river mouths and adjacent intertidal mudflats (Calkins, 1989). All five Pacific salmon species (*i.e.*, Chinook, pink (*Oncorhynchus gorbuscha*), coho, sockeye, and chum) spawn in rivers throughout Cook Inlet (Moulton, 1997; Moore *et al.*, 2000). Overall, Pacific salmon represent the highest percent frequency of occurrence of prey species in CIBW stomachs. This suggests that their spring feeding in upper Cook Inlet, principally on fat-rich fish such as salmon and eulachon, is important to the energetics of these animals (NMFS, 2016b).

The nutritional quality of Chinook salmon in particular is unparalleled, with an energy content four times greater than that of a Coho salmon. It is suggested the decline of the Chinook salmon population has left a nutritional void in the diet of the CIBWs that no other prey species can fill in terms of quality or quantity (Norman *et al.*, 2020, 2022).

In fall, as anadromous fish runs begin to decline, CIBWs return to consume fish species (cod and bottom fish) found in nearshore bays and estuaries. Stomach samples from CIBWs are not available for winter (December through March), although dive data from CIBWs tagged with satellite transmitters suggest that they feed in deeper waters during winter (Hobbs *et al.*, 2005), possibly on such prey species as flatfish, cod, sculpin, and pollock.

Habitat Use

The CIBW stock remains within Cook Inlet throughout the year, showing only small seasonal shifts in distribution (Goetz *et al.*, 2012a; Lammers *et al.*, 2013; Castellotte *et al.*, 2015; Shelden *et al.*, 2015a, 2018; Lowry *et al.*, 2019). The ecological range of CIBWs has contracted significantly since the 1970s. From late spring to fall, nearly the entire population is now found in the upper inlet north of the forelands, with a range reduced to approximately 39 percent of the size documented in the late 1970s (Goetz *et al.*, 2023). The recent annual and semiannual aerial surveys (since 2008) found that approximately 83 percent of the population inhabits the area between the Beluga River and Little Susitna River during the survey period, typically conducted in early June. Some aerial survey counts were performed in August, September, and October, finding minor differences in the numbers of belugas in the upper inlet compared to June, reinforcing the importance of the upper inlet habitat area (Young *et al.*, 2023).

During spring and summer, CIBWs generally aggregate near the warmer waters of river mouths along the northern shores of middle and upper Cook Inlet where prey availability is high and predator occurrence is low (Moore *et al.*, 2000; Shelden and Wade, 2019; McGuire *et al.*, 2020). In particular, CIBW groups are seen in the Susitna River Delta, the Beluga River and along the shore to the Little Susitna River, Knik Arm, and along the shores of Chickaloon Bay. Large groups of CIBWs have been observed in the Susitna River Delta, with sizes ranging from 200 to 300 individuals and including a mix of adults, juveniles, and neonates (McGuire *et al*., 2014, 2020). Small groups have been recorded farther south in Kachemak Bay, Redoubt Bay (Big River), and Trading Bay (McArthur River) prior to 1996, but rarely thereafter. Since the mid-1990s, most CIBWs (96 to 100 percent) aggregate in shallow areas near river mouths in upper Cook Inlet, and they are only occasionally sighted in the central or southern portions of Cook Inlet during summer (Hobbs *et al.*, 2008). Almost the entire population can be found in northern Cook Inlet from late spring through the summer and into the fall (Muto *et al.*, 2020), shifting into deeper waters in middle Cook Inlet in winter (Hobbs *et al.*, 2008).

Data from tagged whales (14 tags deployed July 2000 through March 2003) show that CIBWs use upper Cook Inlet intensively between summer and late autumn (Hobbs *et al.*, 2005). CIBWs tagged with satellite transmitters continue to use Knik Arm, Turnagain Arm, and Chickaloon Bay as late as October, but some range into lower Cook Inlet to Chinitna Bay, Tuxedni Bay, and Trading Bay (McArthur River) in fall (Hobbs *et al.*, 2005, 2012). From September through November, CIBWs move between Knik Arm, Turnagain Arm, and Chickaloon Bay (Hobbs *et al.*, 2005; Goetz *et al.*, 2012b). By December, CIBWs are distributed throughout the upper to mid-inlet. Data from recent monitoring suggests lower Cook Inlet (*e.g.*, Tuxedni Bay and Kenai and Kasilof waters) may also be important spring, fall, and/or winter habitat (Castellote *et al.*, 2023, 2024; Kumar, 2024). From January into March, they move as far south as Kalgin Island and slightly beyond in central offshore waters. However, CIBWs make occasional excursions into Knik Arm and Turnagain Arm in February and March in spite of ice cover (Hobbs *et al.*, 2005). Although tagged CIBWs move widely around Cook Inlet throughout the year, there is no indication of seasonal migration in and out of Cook Inlet (Hobbs *et al.*, 2005). Data from NMFS aerial surveys, opportunistic sighting reports, and corrected satellite-tagged CIBWs confirm that they are more widely dispersed throughout Cook Inlet during winter (November–April), with animals found between Kalgin Island and Point Possession. Generally fewer observations of CIBWs are reported from the Anchorage and Knik Arm area from November through April (76 FR 20179, April 11, 2011; Rugh *et al.*, 2000, 2004). Later in winter (January into March), belugas were sighted near Kalgin Island and in deeper waters offshore. However, even when ice cover exceeds 90 percent in February and March, belugas travel into Knik Arm and Turnagain Arm (Hobbs *et al.*, 2005).

The NMFS AFSC has conducted long-term passive acoustic monitoring demonstrating seasonal shifts in CIBW concentrations throughout Cook Inlet. Castellote *et al.* (2015) conducted long-term acoustic monitoring at 13 locations throughout Cook Inlet between 2008 and 2015: North Eagle Bay, Eagle River Mouth, South Eagle Bay, Six Mile, Point MacKenzie, Cairn Point, Fire Island, Little Susitna, Beluga River, Trading Bay, Kenai River, Tuxedni Bay, and Homer Spit; the former 6 stations being located within Knik Arm. In general, the observed seasonal distribution is in accordance with descriptions based on aerial surveys and satellite telemetry: CIBW detections are higher in the upper inlet during summer, peaking at Little Susitna, Beluga River, and Eagle Bay, followed by fewer detections at those locations during winter. Higher detections in winter at Trading Bay, Kenai River, and Tuxedni Bay suggest a broader CIBW distribution in the lower inlet during winter. That is, CIBWs spend a considerable amount of time outside of middle Cook Inlet where Hilcorp project activities would occur

(Castellote *et al.*, 2024). Acoustic studies also provide evidence that the Susitna Delta is a crucial habitat for CIBWs, especially during the summer and fall months. An acoustic recorder in the Little Susitna River detected peak CIBW activity from late May to early June and again from July through August (Castellote *et al.*, 2016). In the Beluga River, three peaks in activity were recorded: the first from mid-February to early April, the strongest peak from June to mid-July, and a third peak from mid-November to mid-December. The bimodal distribution of these detections is thought to be related to the known availability of the two main anadromous summer prey species for CIBWs, eulachon and Pacific salmon.

Goetz *et al.* (2012b) modeled habitat preferences using NMFS' 1994-2008 June abundance survey data. In large areas, such as the Susitna Delta (Beluga to Little Susitna Rivers) and Knik Arm, there was a high probability that CIBWs were in larger groups. CIBW presence and acoustic foraging behavior also increased closer to rivers with Chinook salmon runs, such as the Susitna River (*e.g.*, Castellote *et al.*, 2021). Movement has been correlated with the peak discharge of seven major rivers emptying into Cook Inlet. Boat-based surveys (McGuire and Stephens, 2017) and results from passive acoustic monitoring across the entire inlet (Castellote *et al.*, 2015) also support seasonal patterns observed with other methods. Based on long-term passive acoustic monitoring, foraging behavior was more prevalent during summer, particularly at upper inlet rivers, than during winter. The foraging index was highest at Little Susitna, with a peak in July-August and a secondary peak in May, followed by Beluga River and then Eagle Bay; monthly variation in the foraging index indicates CIBWs shift their foraging behavior among these three locations from April through September. The location of the towing routes are areas of predicted low density in the summer months.

CIBWs are believed to mostly calve in the summer, and breed between late spring and early summer (NMFS, 2016b), primarily in upper Cook Inlet. The only known observed occurrence of calving occurred on July 20, 2015, in the Susitna Delta area (T. McGuire, pers. comm., March 27, 2017). The first neonates encountered during each field season from 2005 through 2015 were always seen in the Susitna River Delta in July. The photographic identification team's documentation of the dates of the first neonate of each year indicate that calving begins in mid-late July/early August, generally coinciding with the observed timing of annual maximum group size. Probable mating behavior of CIBWs was observed in April and May of 2014, in Trading Bay. Young CIBWs are nursed for 2 years and may continue to associate with their mothers for a considerable time thereafter (Colbeck *et al.*, 2013). Important calving grounds are thought to be located near the river mouths of upper Cook Inlet.

CIBWs have been observed during marine mammal monitoring efforts in support of industry and research projects. During Apache's seismic test program in 2011 along the west coast of Redoubt Bay, lower Cook Inlet, a total of 33 CIBWs were sighted during the survey (Lomac-MacNair *et al.*, 2013). During Apache's 2012 seismic program in mid-inlet, a total of 151 groups consisting of an estimated 1,463 CIBWs were observed (note individuals were likely observed more than once) (Lomac-MacNair *et al.*, 2014). During SAExploration's 2015 seismic program, a total of eight groups of 33 estimated individual CIBWs were visually observed during this time period and there were two acoustic detections of CIBWs in upper Cook Inlet (Kendall *et al.*, 2015). During Harvest Alaska's CIPL project on the west side of Cook Inlet in between Ladd Landing and Tyonek Platform, a total of 143 CIBW groups (814 individuals) were observed almost daily from May 31 to July 11, even though observations spanned from May 9 through September 15 (Sitkiewicz *et al.*, 2018). There were two CIBW carcasses observed by the project vessels in the 2019 Hilcorp lower Cook Inlet seismic survey in the fall which were reported to the NMFS Marine Mammal Stranding Network (Fairweather Science, 2020). Both carcasses were moderately decomposed when they were sighted by the

PSOs. Daily aerial surveys specifically for CIBWs were flown over the lower Cook Inlet region, but no CIBWs were observed. Aerial surveys during Hilcorp rig moves in June 2021, and June and September 2022 reported sightings of 11, more than 25, and 20 individual CIBWs, respectively; some were within the aerial survey area and some outside. Rig moves also occurred in June and July of 2023; aerial observers reported 37 sightings of 281 individuals observed both in and out of the survey area (Horsley and Larson, 2023). No CIBWs were sighted from vessel-based PSOs during these rig moves. In May 2024 during Hilcorp's jack-up rig move, two opportunistic sightings of approximately 25 CIBWs were recorded outside of the designated aerial survey area. No additional observations were recorded by aerial or vessel-based PSOs (Horsley and Larson, 2024). Furthermore, three additional CIBWs were observed near the Tyonek Platform by vessel-based PSOs during the pre-clearance monitoring period for Hilcorp's October 2024 jack-up rig move (Horsley et al,. 2024). In November 2024, no sightings of CIBWs were reported during the rig move conducted under the operatorship of Furie Operating Alaska, LLC (S. Vercelline, pers. comm., December 9, 2024).

Killer Whale

Along the west coast of North America, seasonal and year-round occurrence of killer whales has been noted along the entire Alaska coast (Braham and Dahlheim, 1982), in British Columbia and Washington inland waterways (Bigg *et al.*, 1990), and along the outer coasts of Washington, Oregon, and California (Green *et al.*, 1992; Barlow 1995, 1997; Forney *et al.*, 1995). Killer whales from these areas have been labeled as "resident," "transient," and "offshore" type killer whales (Bigg *et al.*, 1990; Ford *et al.*, 2000; Dahlheim *et al.*, 2008) based on aspects of morphology, ecology, genetics, and behavior (Ford and Fisher, 1982; Baird and Stacey, 1988; Baird *et al.*, 1992; Hoelzel *et al.*, 1998, 2002; Barrett-Lennard, 2000; Dahlheim *et al.*, 2008). Based on data regarding association patterns, acoustics, movements, and genetic differences, eight killer whale stocks are now recognized within the U.S. Pacific, two of which have the potential to be found in Cook Inlet: the Eastern North Pacific Alaska Resident stock and the Gulf of Alaska, Aleutian Islands, and the Bering Sea Transient stock. Both stocks occur in lower Cook Inlet, but rarely in middle and upper Cook Inlet (Shelden *et al.*, 2013). While stocks overlap the same geographic area, they maintain social and reproductive isolation and feed on different prey species. Resident killer whales are primarily fish-eaters, while transients primarily hunt and consume marine mammals, such as harbor seals, Dall's porpoises, harbor porpoises, CIBWs and sea lions. Killer whales are not harvested for subsistence in Alaska. Potential threats most likely to result in direct human-caused mortality or serious injury of killer whales in this region include oil spills, vessel strikes, and interactions with fisheries.

Killer whales have been sighted near Homer and Port Graham in lower Cook Inlet (Shelden *et al.*, 2003, 2022; Rugh *et al.*, 2005). Resident killer whales from pods often sighted near Kenai Fjords and Prince William Sound have been occasionally photographed in lower Cook Inlet (Shelden *et al.*, 2003). The availability of salmon influences when resident killer whales are more likely to be sighted in Cook Inlet. Killer whales were observed in the Kachemak and English Bay three times during aerial surveys conducted between 1993 and 2004 (Rugh *et al.*, 2005). Passive acoustic monitoring efforts throughout Cook Inlet documented killer whales at the Beluga River, Kenai River, and Homer Spit, although they were not encountered within Knik Arm (Castellote *et al.*, 2016). These detections were likely resident killer whales. Transient killer whales likely have not been acoustically detected due to their propensity to move quietly through waters to track prey (Small, 2010; Lammers *et al.*, 2013). Transient killer whales were increasingly reported to feed on belugas in the middle and upper Cook Inlet in the 1990s.

During the 2015 SAExploration seismic program near the North Foreland, two killer whales were observed (Kendall *et al.*, 2015, as cited in Weston and SLR, 2022). Killer whales were observed in lower Cook Inlet in 1994, 1997, 2001, 2005, 2010, 2012, and 2022 during the NMFS aerial surveys (Shelden *et al.*, 2013, 2022). Eleven killer whale strandings have been reported in Turnagain Arm: 6 in May 1991 and 5 in August 1993. During the Hilcorp lower Cook Inlet seismic survey in the fall of 2019, 21 killer whales were documented (Fairweather Science, 2020). Throughout 4 months of observation in 2018 during the CIPL project in middle Cook Inlet, no killer whales were observed (Sitkiewicz *et al.*, 2018). In September 2021, two killer whales were documented in Knik Arm in upper Cook Inlet, near the POA (61N Environmental, 2022a). One killer whale was observed during Hilcorp's pilot marine vibroseis seismic survey in lower Cook Inlet in October of 2023. During the 2024 marine vibroseis seismic survey, a group of four individuals was recorded nearshore Clam Gulch (Hanks *et al*., 2024). Hilcorp did not record any sightings of killer whales from their aerial or rig-based monitoring efforts in 2022, 2023, or 2024 (Horsley and Larson, 2023, 2024).

Pacific White-Sided Dolphin

The Pacific white-sided dolphin is divided into three stocks within U.S. waters. The North Pacific stock includes the coast of Alaska, including the project area. Pacific white-sided dolphins are common in the Gulf of Alaska's pelagic waters and Alaska's nearshore areas, British Columbia, and Washington (Ferrero and Walker, 1996, as cited in Muto *et al.*, 2022). They do not typically occur in Cook Inlet, but in 2019, Castellote *et al.* (2020) documented short durations of Pacific white-sided dolphin presence using passive acoustic recorders near Iniskin Bay (6 minutes) and at an offshore mooring located approximately midway between Port Graham and Iniskin Bay (51 minutes). Detections of vocalizations typically lasted on the order of minutes, suggesting the animals did not remain in the area and/or continue vocalizing for extended durations.

Visual monitoring conducted during the same period by marine mammal observers on seismic vessels near the offshore recorder did not detect any Pacific white-sided dolphins (Fairweather Science, 2020). These observational data, combined with anecdotal information, indicate that there is a small potential for Pacific white-sided dolphins to occur in the Project area. On May 7, 2014, Apache Alaska observed three Pacific white-sided dolphins during an aerial survey near Kenai. This is one of the only recorded visual observations of Pacific white-sided dolphins in Cook Inlet; they have not been reported in groups as large as those estimated in other parts of Alaska (Muto *et al*., 2022).

Harbor Porpoise

In the eastern North Pacific Ocean, harbor porpoise range from Point Barrow, along the Alaska coast, and down the west coast of North America to Point Conception, California. The 2022 Alaska SARs describe a revised stock structure for harbor porpoises (Young *et al.*, 2023). Previously, NMFS had designated three stocks of harbor porpoises: the Bering Sea stock, the Gulf of Alaska stock, and the Southeast Alaska stock (Muto *et al.*, 2022; Zerbini *et al.*, 2022). The 2022 Alaska SARs splits the Southeast Alaska stock into three separate stocks, resulting in five separate stocks in Alaskan waters for this species. This update better aligns harbor porpoise stock structure with genetics, trends in abundance, and information regarding discontinuous distribution trends (Young *et al.*, 2023). Harbor porpoises found in Cook Inlet are likely to be members of the Gulf of Alaska stock (Young *et al.*, 2023).

Harbor porpoises occur most frequently in waters less than 100 m deep (Hobbs and Waite, 2010) and are common in nearshore areas of the Gulf of Alaska, Shelikof Strait, and lower Cook Inlet (Dahlheim *et al.*, 2000). Harbor porpoises are often observed in lower Cook Inlet in Kachemak Bay and from Cape Douglas to the West Foreland (Rugh *et al.*, 2005). They can be opportunistic foragers but consume primarily schooling forage fish (Bowen and Siniff, 1999). Given their shallow water distribution, harbor porpoise are vulnerable to physical modifications of nearshore habitats resulting from urban and industrial development (including waste management and nonpoint source runoff) and activities such as construction of docks and other over-water structures, filling of shallow areas, dredging, and noise (Linnenschmidt *et al.*, 2013). Subsistence users have not reported any harvest from the Gulf of Alaska harbor porpoise stock since the early 1900s (Shelden *et al.*, 2014). Calving occurs from May to August; however, this can vary by region. Harbor porpoises are often found traveling alone, or in small groups of less than 10 individuals (Schmale, 2008).

Harbor porpoises occur throughout Cook Inlet, with passive acoustic detections being more prevalent in lower Cook Inlet. Although harbor porpoises have been frequently observed during aerial surveys in Cook Inlet (Shelden *et al.*, 2014), most sightings are of single animals and are concentrated at Chinitna and Tuxedni bays on the west side of lower Cook Inlet (Rugh *et al.*, 2005), with smaller numbers observed in upper Cook Inlet between April and October. The occurrence of larger numbers of porpoise in the lower Cook Inlet may be driven by greater availability of preferred prey and possibly less competition with CIBWs, as CIBWs move into upper inlet waters to forage on Pacific salmon during the summer months (Shelden *et al.*, 2014).

An increase in harbor porpoise sightings in upper Cook Inlet was observed over recent decades (*e.g.*, 61N Environmental, 2021, 2022a; Shelden *et al.*, 2014). Small numbers of harbor porpoises have been consistently reported in upper Cook Inlet between April and October (Prevel-Ramos *et al.*, 2008). The overall increase in the number of harbor porpoise sightings in upper Cook Inlet is unknown, although it may be an artifact of increased studies and marine mammal monitoring programs in upper Cook Inlet. It is also possible that the contraction in the CIBW's range has opened up previously occupied CIBW range to harbor porpoises (Shelden *et al.*, 2014).

During Apache's 2012 seismic program in middle Cook Inlet, 137 groups of harbor porpoises comprising 190 individuals were documented between May and August (Lomac-MacNair *et al.*, 2013). Lomac-MacNair *et al.* (2014) identified 13 groups of harbor porpoises totaling 77 individuals during Apache's 2014 Cook Inlet seismic survey, both from vessels and aircraft, in May. In June 2012, Shelden *et al.* (2015b) documented 65 groups of 129 individual harbor porpoises during an aerial survey, none of which were in upper Cook Inlet. Kendall *et al.* (2015, as cited in Weston and SLR, 2022) documented 52 groups comprising 65 individuals north of the Forelands during SAExploration's 2015 seismic survey. Shelden *et al.* (2017, 2019, and 2022) also conducted aerial surveys in June and July over Cook Inlet in 2016, 2018, 2021, and 2022 and recorded 65 individuals. Observations occurred in middle and lower Cook Inlet with a majority in Kachemak Bay. A total of 29 groups (44 individuals) were observed north of the Forelands from May to September during the CIPL Extension Project (Sitkiewicz *et al.*, 2018). There were two sightings of three harbor porpoises observed during the 2019 Hilcorp lower Cook Inlet seismic survey in the fall (Fairweather Science, 2020). Four monitoring events were conducted at the POA in Anchorage between April 2020 and August 2022, during which 42 groups of harbor porpoises comprising 50 individual porpoises were documented over 285 days of observation (61N Environmental 2021, 2022a, 2022b, and 2022c). An additional 16 harbor porpoises were observed near the POA during their North Extension Stabilization – Step 1 (NES1) project (61N Environmental 2025). During jack-up rig moves in 2021, a PSO observed an individual harbor porpoise in middle Cook Inlet in July and another in October (Horsley and Larson 2023). During a jack-up rig move in June 2023, a PSO also observed an individual harbor porpoise in middle Cook Inlet (Horsley and Larson 2023). In 2023 Hilcorp conducted a pilot marine vibroseis seismic survey in October where two sightings of two harbor porpoises were recorded offshore from Clam Gulch. In April, the survey was conducted once again and one harbor seal sighting of one individual was reported in the same area (Hanks *et al.*, 2024). Recent passive acoustic research in Cook Inlet by Alaska Department of Fish and Game (ADF&G) and AFSC have indicated harbor porpoises occur more frequently than expected, particularly in the West Foreland area in spring, although overall numbers are unknown at this time (Castellote *et al.*, 2016).

Dall's Porpoise

Dall's porpoises are found throughout the North Pacific, from southern Japan to southern California north to the Bering Sea. All Dall's porpoises in Alaska are of the Alaska stock. This species can be found in offshore, inshore, and nearshore habitat. The Dall’s porpoise range in Alaska includes lower Cook Inlet, but very few sightings have been reported in upper Cook Inlet. Observations have been documented near Kachemak Bay and Anchor Point (Owl Ridge, 2014; BOEM, 2015). Shelden *et al.* (2013) and Rugh *et al.* (2005) collated data from aerial surveys conducted between 1994 and 2012 and documented 9 sightings of 25 individuals in the lower Cook Inlet during June and/or July 1997, 1999, and 2000. No Dall’s porpoise were observed on subsequent surveys in June and/or July 2014, 2016, 2018, 2021, and 2022 (Shelden *et al.*, 2015b, 2017, and 2022; Shelden and Wade, 2019). During Apache’s 2014 seismic survey, two groups of three Dall’s porpoises were observed in Upper and middle Cook Inlet (Lomac-MacNair *et al.*, 2014). In August 2015, one Dall’s porpoise was reported in the mid-inlet north of Nikiski in middle Cook Inlet during SAExploration’s seismic program (Kendall *et al.*, 2015). During aerial surveys in Cook Inlet, they were observed in Iniskin Bay, Barren Island, Elizabeth Island, and Kamishak Bay (Shelden *et al.*, 2013). No Dall’s porpoises were observed during the 2018 CIPL Extension Project Acoustic Monitoring Program in middle Cook Inlet (Sitkiewicz *et al.*, 2018); however, 30 individuals in 10 groups were sighted during a lower Cook Inlet seismic project in the fall 2019 (Fairweather Science, 2020). Hilcorp recorded three sightings of Dall’s porpoises in 2021 and one sighting of a

Dall's porpoise in 2023 from their rig-based monitoring efforts in the project area (Korsmo *et al.*, 2022; Horsley and Larson, 2023). One Dall's porpoise was observed near the POA during the NES1 project, but it is possible this was misidentified (61N Environmental 2025). This higher number of sightings suggests Dall's porpoise may use portions of middle Cook Inlet in greater numbers than previously expected but would still be considered infrequent in middle and upper Cook Inlet.

Steller Sea Lion

Two DPSs of Steller sea lion occur in Alaska: the western DPS and the eastern DPS. The western DPS includes animals that occur west of Cape Suckling, Alaska, and therefore includes individuals within the project area. The western DPS was listed under the ESA as threatened in 1990 (55 FR 49204, November 26, 1990), and its continued population decline resulted in a change in listing status to endangered in 1997 (62 FR 24345, May 5, 1997). Since 2000, studies indicate that the population east of Samalga Pass (*i.e.*, east of the Aleutian Islands) has increased and is potentially stable (Young *et al.*, 2023).

There is uncertainty regarding threats currently impeding the recovery of Steller sea lions, particularly in the Aleutian Islands. Many factors have been suggested as causes of the steep decline in abundance of western Steller sea lions observed in the 1980s, including competitive effects of fishing, environmental change, disease, contaminants, killer whale predation, incidental take, and illegal and legal shooting (Atkinson *et al.*, 2008; NMFS, 2008a). A number of management actions have been implemented since 1990 to promote the recovery of the Western U.S. stock of Steller sea lions, including 5.6-km (3-nautical mile) no-entry zones around rookeries, prohibition of shooting at or near sea lions, and regulation of fisheries for sea lion prey species (*e.g.*, walleye pollock, Pacific cod, and Atka mackerel (*Pleurogrammus monopterygius*)) (Sinclair *et al.*, 2013; Tollit *et al.*, 2017). Additionally, potentially deleterious events, such as harmful algal blooms (Lefebvre *et al.*, 2016) and disease transmission across the Arctic (VanWormer *et al.*, 2019) that have been associated with warming waters, could lead to potentially negative population-level impacts on Steller sea lions.

NMFS designated critical habitat for Steller sea lions on August 27, 1993 (58 FR 45269), including portions of the southern reaches of lower Cook Inlet. The critical habitat designation for the Western DPS of was determined to include a 37-km (20-nautical mile) buffer around all major haul-outs and rookeries, and associated terrestrial, atmospheric, and aquatic zones, plus three large offshore foraging areas, none of which occurs in the project area. There is no designated critical habitat for Steller sea lions in the mid- or upper inlet, nor are there any known BIAs for Steller sea lions within the project area. Rookeries and haul out sites in lower Cook Inlet include those near the mouth of the inlet, which are approximately 56 km or more south of the closest action area.

Steller sea lions are opportunistic predators, feeding primarily on a wide variety of seasonally abundant fishes and cephalopods, including Pacific herring (*Clupea pallasi*), walleye pollock, capelin (*Mallotus villosus*), Pacific sand lance (*Ammodytes hexapterus*), Pacific cod, salmon (*Oncorhynchus spp.*), and squid (*Teuthida spp*.); (Jefferson *et al.*, 2008; Wynne *et al.*, 2011). Steller sea lions do not generally eat every day, but tend to forage every 1–2 days and return to haulouts to rest between foraging trips (Merrick and Loughlin, 1997; Rehberg *et al.*, 2009). Steller sea lions feed largely on walleye pollock, salmon, and arrowtooth flounder during the summer, and walleye pollock and Pacific cod during the winter (Sinclair and Zeppelin, 2002).

Most Steller sea lions in Cook Inlet occur south of Anchor Point on the east side of lower Cook Inlet, with concentrations near haulout sites at Shaw Island and Elizabeth Island and by Chinitna Bay and Iniskin Bay on the west side (Rugh *et al.*, 2005). Steller sea lions are rarely seen in upper Cook Inlet (Nemeth *et al.*, 2007). About 3,600 sea lions use haulout sites in the lower Cook Inlet area (Sweeney *et al.*, 2017), with additional individuals venturing into the area to forage.

Several surveys and monitoring programs have documented Steller sea lions throughout Cook Inlet, including in upper Cook Inlet in 2012 (Lomac-MacNair *et al.*, 2013), near Cape Starichkof in 2013 (Owl Ridge, 2014), in middle and lower Cook Inlet in 2015 (Kendall *et al.*, 2015, as cited in Weston and SLR, 2022), in middle Cook Inlet in 2018 (Sitkiewicz *et al.*, 2018), in lower Cook Inlet in 2019 (Fairweather Science, 2020), and near the POA in Anchorage in 2020, 2021, 2022, and 2025 (61N Environmental, 2021, 2022a, 2022b, and 2022c, 2025). During NMFS CIBW aerial surveys from 2000 to 2016, 39 sightings of 769 estimated individual Steller sea lions in lower Cook Inlet were recorded (Shelden *et al.*, 2017). Sightings of large congregations of Steller sea lions during NMFS aerial surveys occurred outside the specific geographic region, on land in the mouth of Cook Inlet (*e.g.*, Elizabeth and Shaw Islands). In 2012, during Apache's 3D seismic surveys, three sightings of approximately four individuals in upper Cook Inlet were recorded (Lomac-MacNair *et al.*, 2013). PSOs associated with Buccaneer's drilling project off Cape Starichkof observed seven Steller sea lions in summer 2013 (Owl Ridge, 2014), and another four Steller sea lions were observed in 2015 in Cook Inlet during SAExploration's 3D Seismic Program. Of the three 2015 sightings, one sighting occurred between the West and East Forelands, one occurred near Nikiski, and one occurred northeast of the North Foreland in the center of Cook Inlet (Kendall and Cornick, 2015). One sighting of two individuals occurred during the CIPL Extension Project in 2018 in middle Cook Inlet (Sitkiewicz *et al.*, 2018). Additionally, five sightings of five Steller sea lions were recorded during Hilcorp's lower Cook Inlet seismic survey in the fall of 2019 (Fairweather Science, 2020). At the end of July 2022, while conducting a waterfowl survey an estimated 25 Steller sea lions were observed hauled-out at low tide in the Lewis River, on the west side of Cook Inlet. (K. Lindberg, pers. comm. , August 15, 2022). Hilcorp did not record any sightings of Steller sea lions from their aerial or rig-based monitoring efforts in 2022, 2023, or 2024 (Horsley and Larson, 2023, 2024).

Harbor Seal

Harbor seals inhabit waters all along the western coast of the United States, British Columbia, and north through Alaska waters to the Pribilof Islands and Cape Newenham. NMFS currently identifies 12 stocks of harbor seals in Alaska based largely on genetic structure (Young *et al.*, 2023). Harbor seals potentially affected by Hilcorp's specified activities are members of the Cook Inlet/Shelikof stock, which ranges from the southwest tip of Unimak Island east along the southern coast of the Alaska Peninsula to Elizabeth Island off the southwest tip of the Kenai Peninsula, including Cook Inlet, Knik Arm, and Turnagain Arm. Distribution of the Cook Inlet/Shelikof stock extends from Unimak Island, in the Aleutian Islands archipelago, north through all of upper and lower Cook Inlet (Young *et al.*, 2023).

Harbor seals inhabit the coastal and estuarine waters of Cook Inlet and are observed in both upper and lower Cook Inlet throughout most of the year (Boveng *et al.*, 2012; Shelden *et al.*, 2013). High-density areas include Kachemak Bay, Iniskin Bay, Iliamna Bay, Kamishak Bay, Cape Douglas, and Shelikof Strait. Up to a few hundred seals seasonally occur in middle and upper Cook Inlet (Rugh *et al.* 2005), with the highest concentrations found near the Susitna River and other tributaries within upper Cook Inlet during eulachon and salmon runs (Nemeth *et al.*, 2007; Boveng *et al.*, 2012), but most remain south of the forelands (Boveng *et al.*, 2012).

Harbor seals haul out on rocks, reefs, beaches, and drifting glacial ice (Young *et al.*, 2023). Their movements are influenced by tides, weather, season, food availability, and reproduction, as well as individual sex and age class (Lowry *et al.*, 2001; Small *et al.*, 2003; Boveng *et al.*, 2012). The results of past and recent satellite tagging studies in Southeast Alaska, Prince William Sound, Kodiak Island, and Cook Inlet are also consistent with the conclusion that harbor seals are non-migratory (Lowry *et al.*, 2001; Small *et al.*, 2003; Boveng *et al.*, 2012). However, some long-distance movements of tagged animals in Alaska have been recorded (Pitcher and McAllister, 1981; Lowry *et al.*, 2001; Small *et al.*, 2003; Womble, 2012; Womble and Gende, 2013). Strong fidelity of individuals for haulout sites during the breeding season has been documented in several populations (Härkönen and Harding, 2001), including in Cook Inlet (Pitcher and McAllister, 1981; Small *et al.*, 2005; Boveng *et al.*, 2012; Womble, 2012; Womble and Gende, 2013). Harbor seals usually give birth to a single pup between May and mid-July; birthing locations are dispersed over several haulout sites and not confined to major rookeries (Klinkhart *et al.*, 2008). More than 200 haulout sites are documented in lower Cook Inlet (Montgomery *et al.*, 2007) and 18 in middle and upper Cook Inlet (London *et al.*, 2015). Of the 18 in middle and upper Cook Inlet, nine are considered "key haulout" locations where aggregations of 50 or more harbor seals have been documented. Seven key haulouts are in the Susitna River delta, and two are near the Chickaloon River.

Recent research on satellite-tagged harbor seals observed several movement patterns within Cook Inlet (Boveng *et al.*, 2012), including a strong seasonal pattern of more coastal and restricted spatial use during the spring and summer (breeding, pupping, molting) and more wide-ranging movements within and outside of Cook Inlet during the winter months, with some seals ranging as far as Shumagin Islands. During summer months, movements and distribution were mostly confined to the west side of Cook Inlet and Kachemak Bay, and seals captured in lower Cook Inlet generally exhibited site fidelity by remaining south of the Forelands in lower Cook Inlet after release (Boveng *et al.*, 2012). In the fall, a portion of the harbor seals appeared to move out of Cook Inlet and into Shelikof Strait, northern Kodiak Island, and coastal habitats of the Alaska Peninsula. The western coast of Cook Inlet had higher usage by harbor seals than eastern coast habitats, and seals captured in lower Cook Inlet generally exhibited site fidelity by remaining south of the Forelands in lower Cook Inlet after release (south of Nikiski; Boveng *et al.*, 2012).

Harbor seals have been sighted in Cook Inlet during every year of the aerial surveys conducted by NMFS and during all recent mitigation and monitoring programs in lower, middle, and upper Cook Inlet (61N Environmental, 2021, 2022a, 2022b, 2022c, 2025; Fairweather Science, 2020; Kendall *et al.*, 2015 as cited in Weston and SLR, 2022; Lomac-MacNair *et al.*, 2013, 2014; Sitkiewicz *et al.*, 2018). In 2018 Harvest Alaska conducted marine mammal monitoring in middle Cook Inlet within the same geographic area as Hilcorp's proposed action area and reported 313 sightings comprised of 316 harbor seal individuals (Sitkiewicz *et al.*, 2018). During Hilcorp's June 2023 jack-up rig move, PSOs observed two separate sightings of harbor seals in middle Cook Inlet: one just north of Nikiski, and the other closer to the Tyonek Platform (Horsley and Larson, 2023). Two separate sightings of harbor seals in middle Cook Inlet also occurred during Hilcorp's May 2024 jack-up rig move, one occurring near the Tyonek Platform and the other approximately halfway between the Tyonek Platform and OSK Dock (Horsley and Larson, 2024).

California Sea Lion

California sea lions live along the Pacific coastline spanning an area from central Mexico to Southeast Alaska and typically breed on islands located in southern California, western Baja California, and the Gulf of California (Carretta *et al.*, 2020). Five genetically distinct geographic populations are known to exist: Pacific Temperate, Pacific Subtropical, Southern Gulf of California, Central Gulf of California, and Northern Gulf of California (Schramm *et al.*, 2009).

Few observations of California sea lions have been reported in Alaska and most observations have been limited to solitary individuals, typically males that are known to migrate long distances. Occasionally, California sea lions can be found in small groups of two or more and are usually associated with Steller sea lions at their haul outs and rookeries (Maniscalco *et al.*, 2004). The few California sea lions observed in Alaska typically do not travel further north than Southeast Alaska. They are often associated with Steller sea lion haulouts and rookeries (Maniscalco *et al.*, 2004). Sightings in Cook Inlet are rare, with two documented during the Apache 2012 seismic survey (Lomac-MacNair *et al.*, 2013) and anecdotal sightings in Kachemak Bay. No California sea lions were sighted during the 2019 Hilcorp lower Cook Inlet seismic survey (Fairweather Science, 2020), the CIPL project in 2018 (Sitkiewicz *et al.*, 2018), or the 2022, 2023, or 2024 Hilcorp aerial or rig-based monitoring efforts (Horsley and Larson, 2023, 2024).

Marine Mammal Hearing

Hearing is the most important sensory modality for marine mammals underwater, and exposure to anthropogenic sound can have deleterious effects. To appropriately assess the potential effects of exposure to sound, it is necessary to understand the frequency ranges marine mammals are able to hear. Not all marine mammal species have equal hearing capabilities (*e.g.*, Richardson *et al.*, 1995; Wartzok and Ketten, 1999; Au and Hastings, 2008). To reflect this, Southall *et al.* (2007, 2019) recommended that marine mammals be divided into hearing groups based on directly measured (behavioral or auditory evoked potential techniques) or estimated hearing ranges (behavioral response data, anatomical modeling, *etc.*). Subsequently, NMFS (2018, 2024) described generalized hearing ranges for these marine mammal hearing groups. Generalized hearing ranges were chosen based on the ~65-decibel (dB) threshold from composite audiograms, with the exception for lower limits for low-frequency cetaceans where the lower bound was deemed to be biologically implausible and the lower bound from Southall *et al*. (2007) retained. Frequency is expressed in hertz (Hz) or kilohertz (kHz). We note that the names of two hearing groups and the generalized hearing ranges of all marine mammal hearing groups were recently updated (NMFS 2024) as reflected below in table 7. Of the species potentially present in the action area, gray whales, fin whales, minke whales, and humpback whales are considered low-frequency (LF) cetaceans, CIBWs, pacific white-sided dolphins, and killer whales are considered mid-frequency (MF) cetaceans, harbor porpoises and Dall's porpoises are considered high-frequency (HF) cetaceans, Steller sea lions and California sea lions are otariid pinnipeds (OW), and harbor seals are phocid pinnipeds (PW).

Table 7 – Marine Mammal Hearing Groups (NMFS, 2024)

Hearing Group	Generalized Hearing Range*
Low-frequency (LF) cetaceans (baleen whales)	7 Hz to 36 kHz
High-frequency (HF) cetaceans (dolphins, toothed whales, beaked whales, bottlenose whales)	150 Hz to 160 kHz
Very high-frequency (VHF) cetaceans (true porpoises, *Kogia*, river dolphins, Cephalorhynchid, *Lagenorhynchus cruciger* & *L. australis*)	200 Hz to 165 kHz
Phocid pinnipeds (PW) (underwater) (true seals)	40 Hz to 90 kHz
Otariid pinnipeds (OW) (underwater) (sea lions and fur seals)	60 Hz to 68 kHz
* Represents the generalized hearing range for the entire group as a composite (*i.e.*, all species within the group), where individual species' hearing ranges may not be as broad. Generalized hearing range chosen based on ~65 dB threshold from composite audiogram, previous analysis in NMFS 2018, and/or data from Southall *et al.*, 2007; Southall *et al.*, 2019. Additionally, animals are able to detect very loud sounds above and below that "generalized" hearing range.	

For more detail concerning these groups and associated frequency ranges, please see NMFS (2024) for a review of available information.

Potential Effects of Specified Activities on Marine Mammals and Their Habitat

This section provides a discussion of the ways in which components of the specified activity may impact marine mammals and their habitat. The **Estimated Take of Marine Mammals** section later in this document includes a quantitative analysis of the number of individuals that are expected to be taken by this activity. The **Negligible Impact Analysis and Determination** section considers the content of this section, the **Estimated Take of Marine Mammals** section, and the **Proposed Mitigation** section, to draw conclusions regarding the likely impacts of these activities on the reproductive success or survivorship of individuals and whether those impacts are reasonably expected to, or reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival.

There are a variety of types and degrees of effects to marine mammals, prey species, and habitat that could occur as a result of Hilcorp's specified activities. In this section, NMFS provides a brief description of the types of sound sources that would be generated by the specified activities of the project, and a description of the ways marine mammals may be generally affected by these activities including in the form of mortality, physical injury, sensory impairment (permanent threshold shifts (PTS), TTS, acoustic masking), physiological responses (particular stress responses), behavioral disturbance, and habitat effects. The **Estimated Take of Marine Mammals** section also discusses how the potential effects on marine mammals from non-impulsive and impulsive sources relate to the MMPA definitions of Level A harassment and Level B harassment, and quantifies those effects that rise to the level of a take. The **Preliminary Analysis and Negligible Impact Determination** section assesses whether the proposed authorized take would have a negligible impact on the affected species and stocks.

Background on Sound

This section contains a brief technical background on sound, on the characteristics of certain sound types, on metrics used relevant to the specified activity, and to a discussion of the potential effects of the specified activity on marine mammals found later in this document. For general information on sound and its interaction with the marine environment, please see: Erbe and Thomas (2022); Au and Hastings (2008); Richardson *et al.* (1995); Urick (1983); as well as the Discovery of Sound in the Sea website at *https://dosits.org/.*

Sound is a vibration that travels as an acoustic wave through a medium such as a gas, liquid, or solid. Sound waves alternately compress and decompress the medium as the wave travels. In water, sound waves radiate in a manner similar to ripples on the surface of a pond and may be either directed in a beam (narrow beam or directional sources) or sound may radiate in all directions (omnidirectional sources), as is the case for sound produced by tugs under load with a jack-up rig considered here. The compressions and decompressions associated with sound waves are detected as changes in pressure by marine mammals and human-made sound receptors such as hydrophones.

Sound travels more efficiently in water than almost any other form of energy, making the use of sound as a primary sensory modality ideal for inhabitants of the aquatic environment. In seawater, sound travels at roughly 1,500 meters per second (m/s). In air, sound waves travel much more slowly at about 340 m/s. However, the speed of sound in water can vary by a small amount based on characteristics of the transmission medium such as temperature and salinity.

The basic characteristics of a sound wave are frequency, wavelength, velocity, and amplitude. Frequency is the number of pressure waves that pass by a reference point per unit of time and is measured in Hz or cycles per second. Wavelength is the distance between two peaks or corresponding points of a sound wave (length of one cycle). Higher frequency sounds have shorter wavelengths than lower frequency sounds, and typically attenuate (decrease) more rapidly with distance, except in certain cases in shallower water. The amplitude of a sound pressure wave is related to the subjective "loudness" of a sound and is typically expressed in dB, which are a relative unit of measurement that is used to express the ratio of one value of a power or pressure to another. A sound pressure level (SPL) in dB is described as the ratio between a measured pressure and a reference pressure, and is a logarithmic unit that accounts for large variations in amplitude; therefore, a relatively small change in dB corresponds to large changes in sound pressure.

For example, a 10-dB increase is a 10-fold increase in acoustic power. A 20-dB increase is then a 100-fold increase in power and a 30-dB increase is a 1,000-fold increase in power. However, a 10-fold increase in acoustic power does not mean that the sound is perceived as being 10 times louder. The dB is a relative unit comparing two pressures; therefore, a reference pressure must always be indicated. For underwater sound, this is 1 microPascal (μPa). For in-air sound, the reference pressure is 20 μPa. The amplitude of a sound can be presented in various ways; however, NMFS typically considers three metrics: sound exposure level (SEL), root-mean-square (RMS) SPL, and peak SPL (defined below). The source level represents the SPL referenced at a standard distance from the source, typically 1 m (Richardson *et al.*, 1995; American National Standards Institute (ANSI), 2013), while the received level is the SPL at the receiver's position. For tugging activities, the SPL is typically referenced at 1 m.

SEL (represented as dB referenced to 1 micropascal squared second (re 1 μPa^2-s)) represents the total energy in a stated frequency band over a stated time interval or event, and considers both intensity and duration of exposure. SEL can also be a cumulative metric; it can be accumulated over a single pulse (*i.e.*, during activities such as impact pile driving) or calculated over periods containing multiple pulses. Cumulative SEL (SEL_{cum}) represents the total energy accumulated by a receiver over a defined time window or during an event. The SEL metric is useful because it allows sound exposures of different durations to be related to one another in terms of total acoustic energy. The duration of a sound event and the number of pulses, however, should be specified as there is no accepted standard duration over which the summation of energy is measured.

RMS SPL is equal to 10 times the logarithm (base 10) of the ratio of the mean-square sound pressure to the specified reference value, and given in units of dB (International Organization for Standardization (ISO), 2017). RMS is calculated by squaring all of the sound amplitudes, averaging the squares, and then taking the square root of the average (Urick, 1983). RMS accounts for both positive and negative values; squaring the pressures makes all values positive so that they may be accounted for in the summation of pressure levels (Hastings and Popper, 2005). This measurement is often used in the context of discussing behavioral effects, in part because behavioral effects, which often result from auditory cues, may be better expressed through averaged units than by peak SPL. For impulsive sounds, RMS is calculated by the portion of the waveform containing 90 percent of the sound energy from the impulsive event (Madsen, 2005).

Peak SPL (also referred to as zero-to-peak sound pressure or 0-pk) is the maximum instantaneous sound pressure measurable in the water, which can arise from a positive or negative sound pressure, during a specified time, for a specific frequency range at a specified distance from the source, and is represented in the same units as the RMS sound pressure (ISO, 2017). Along with SEL, this metric is used in evaluating the potential for permanent threshold shift (PTS) and temporary threshold shift (TTS) associated with impulsive sound sources.

Sounds are also characterized by their temporal components. Continuous sounds are those whose sound pressure level remains above that of the ambient or background sound with negligibly small fluctuations in level (ANSI, 2005) while intermittent sounds are defined as sounds with interrupted levels of low or no sound (National Institute for Occupational Safety and Health (NIOSH), 1998). A key distinction between continuous and intermittent sound sources is that intermittent sounds have a more regular (predictable) pattern of bursts of sounds and silent periods (*i.e.*, duty cycle), which continuous sounds do not. Tugs under load are considered sources of continuous sound.

Sounds may be either impulsive or non-impulsive (defined below). The distinction between these two sound types is important because they have differing potential to cause physical effects, particularly with regard to noise-induced hearing loss (*e.g.*, Ward, 1997 in Southall *et al.*, 2007). Please see NMFS (2018) and Southall *et al.* (2007, 2019) for an in-depth discussion of these concepts.

Impulsive sound sources (*e.g.*, explosions, gunshots, sonic booms, seismic airgun shots, impact pile driving) produce signals that are brief (typically considered to be less than 1 second), broadband, atonal transients (ANSI, 1986, 2005; NIOSH, 1998) and occur either as isolated events or repeated in some succession. Impulsive sounds are all characterized by a relatively rapid rise from ambient pressure to a maximal pressure value followed by a rapid decay period that may include a period of diminishing, oscillating maximal and minimal pressures, and generally have an increased capacity to induce physical injury as compared with sounds that lack these features. Impulsive sounds are intermittent in nature. The duration of such sounds, as received at a distance, can be greatly extended in a highly reverberant environment.

Non-impulsive sounds can be tonal, narrowband, or broadband, brief or prolonged, and may be either continuous or non-continuous (ANSI, 1995; NIOSH, 1998). Some of these non-impulsive sounds can be transient signals of short duration but without the essential properties of impulses (*e.g.*, rapid rise time). Examples of non-impulsive sounds include those produced by vessels (including tugs under load), aircraft, machinery operations, such as drilling or dredging, and vibratory pile driving, and active sonar systems.

Even in the absence of sound from the specified activity, the underwater environment is characterized by sounds from both natural and anthropogenic sound sources. Ambient sound is defined as a composite of naturally-occurring (*i.e.*, non-anthropogenic) sound from many sources both near and far (ANSI, 1995). Background sound is similar, but includes all sounds, including anthropogenic sounds, minus the sound produced by the proposed activities (NMFS, 2012, 2016a). The sound level of a region is defined by the total acoustical energy being generated by known and unknown sources. These sources may include physical (*e.g.,* wind and waves, earthquakes, ice, atmospheric sound), biological (*e.g.,* sounds produced by marine mammals, fish, and invertebrates), and anthropogenic (*e.g.,* vessels, dredging, construction) sound.

A number of sources contribute to background and ambient sound, including wind and waves, which are a main source of naturally occurring ambient sound for frequencies between 200 Hz and 50 kHz (Mitson, 1995). In general, background and ambient sound levels tend to increase with increasing wind speed and wave height. Precipitation can become an important component of total sound at frequencies above 500 Hz, and possibly down to 100 Hz during quiet times. Marine mammals can contribute significantly to background and ambient sound levels, as can some fish and snapping shrimp. The frequency band for biological contributions is from approximately 12 Hz to over 100 kHz. Sources of background sound related to human activity include transportation (surface vessels), dredging and construction, oil and gas drilling and production, geophysical surveys, sonar, and explosions. Vessel noise typically dominates the total background sound for frequencies between 20 and 300 Hz. In general, the frequencies of many anthropogenic sounds, particularly those produced by construction activities, are below 1 kHz (Richardson *et al.*, 1995). When sounds at frequencies greater than 1 kHz are produced, they generally attenuate relatively rapidly (Richardson *et al.*, 1995), particularly above 20 kHz due to propagation losses and absorption (Urick, 1983).

Transmission loss (TL) defines the degree to which underwater sound has spread in space and lost energy after having moved through the environment and reached a receiver. It is defined as the reduction in a specified level between two specified points that are within an underwater acoustic field (ISO, 2017). Careful consideration of TL and appropriate propagation modeling is a crucial step in determining the impacts of underwater sound, as it helps to define the ranges (isopleths) to which impacts are expected and depends significantly on local environmental parameters such as seabed type, water depth (bathymetry), and the local speed of sound. Geometric spreading laws are powerful tools, which provide a simple means of estimating TL, based on the shape of the sound wave front in the water column. For a sound source that is equally loud in all directions and in deep water, the sound field takes the form of a sphere, as the sound extends in every direction uniformly. In this case, the intensity of the sound is spread across the surface of the sphere, and thus we can relate intensity loss to the square of the range (as area = $4*pi*r^2$). When TL = $20*Log_{10}$(range), this situation is known as spherical spreading. In shallow water, the sea surface and seafloor will bound the shape of the sound, leading to a more cylindrical shape, as the top and bottom of the sphere is truncated by the largely reflective boundaries. This situation is termed cylindrical spreading, and is given by TL = $10*Log_{10}$(range) (Urick, 1983). An intermediate scenario may be defined by the equation TL = $15*Log_{10}$(range), and is referred to as practical spreading. Though these geometric spreading laws do not capture many often important details (scattering, absorption, *etc.*), they offer a reasonable and simple approximation of how sound decreases in intensity as it is transmitted. Cook Inlet is a particularly complex acoustic environment with strong currents, large tides, variable sea floor and generally changing conditions.

The sum of the various natural and anthropogenic sound sources at any given location and time depends not only on the source levels, but also on the propagation of sound through the environment. Sound propagation is dependent on the spatially and temporally varying properties of the water column and sea floor, and is frequency-dependent. As a result of the dependence on a large number of varying factors, background and ambient sound levels can be expected to vary widely over both coarse and fine spatial and temporal scales. Sound levels at a given frequency and location can vary by 10 to 20 dB from day to day (Richardson *et al.*, 1995). The result is that, depending on the source type and its intensity, sound from a specified activity may be a negligible addition to the local environment or could form a distinctive signal that may affect marine mammals.

Description of Sound Sources for the Specified Activities

In-water activities associated with the project that have the potential to incidentally take marine mammals through exposure to sound include impact pile driving, tugs under load with a jack-up rig, and tugs involved in anchor handling and pipe pulling. Impact hammers typically operate by repeatedly dropping and/or pushing a heavy piston onto a pile to drive the pile into the substrate. Sound generated by impact hammers is impulsive, characterized by rapid rise times and high peak levels, a potentially injurious combination (Hastings and Popper, 2005). Sound energy associated with tug use is produced by vessel propeller cavitation, a non-impulsive sound source. Bow thrusters, also a non-impulsive sound source, would be occasionally used for a short duration (20 to 30 seconds) to either push or pull a vessel in or away from a dock or platform. Other sound sources include onboard diesel generators and sound from the main engine, but both are subordinate to the thruster and main propeller blade rate harmonics (Gray and Greeley, 1980). The various tug scenarios that may occur during this project include tugs in a stationary mode positioning the drill rig and pulling the jack-up rig at nearly full power against strong tides, and tugs engaged in anchor handling and pipe pulling activities. Our assessments of the likelihood for harassment of marine mammals incidental to Hilcorp's tug activities specified here and in its take authorization request are conservative in light of the general Level B harassment exposure thresholds, the fact that NMFS is still in the process of developing analyses of the impact that non-quantitative contextual factors have on the likelihood of Level B harassment occurring, and the nature and duration of the particular tug activities analyzed here. Potential non-acoustic stressors could result from the physical presence of the equipment and personnel; however, given there are no known pinniped haul-out sites in the vicinity of the specified activity, visual and other non-acoustic stressors would be limited, and any impacts to marine mammals are expected to primarily be acoustic in nature.

Potential Effects of Underwater Sound on Marine Mammals

The introduction of underwater anthropogenic noise into the aquatic environment from impact pile driving and tugs towing, holding, and positioning a jack-up rig or engaging in pipe pulling or anchor handling is the primary means by which marine mammals may be disturbed from Hilcorp's specified activity. In general, animals exposed to natural or anthropogenic sound may experience physical and psychological effects, ranging in magnitude from none to severe (Southall *et al.*, 2007, 2019). Exposure to anthropogenic noise has the potential to result in auditory threshold shifts and behavioral reactions (*e.g.,* avoidance, temporary cessation of foraging and vocalizing, changes in dive behavior). In addition to auditory implications, there exists the potential for non-auditory physical effects. Prolonged exposure to intense underwater sound associated with industrial activities may trigger physiological responses in marine mammals that are not observable to the eye, including stress, neurological effects, bubble formation, resonance effects, and various forms of organ or tissue damage (Richardson *et al.*, 1995). Additional noise in a marine mammal's habitat can mask acoustic cues used to carry out daily functions, such as communication and predator and prey detection. The effects of noise on marine mammals are dependent on several factors, including but not limited to sound type (*e.g.,* impulsive vs. non-impulsive), the species, age and sex class (*e.g.,* adult male vs. mother with calf), duration of exposure, the distance between the vessel and the animal, received levels, behavior at time of exposure, and previous history with exposure (Wartzok *et al.*, 2004; Southall *et al.*, 2007). Here we provide additional detail regarding potential impacts on marine mammals and their habitat from noise in general, starting with hearing impairment, as well as from Hilcorp's specified activities, to the degree available.

Hearing Threshold Shifts

Marine mammals, like all mammals, develop increased hearing thresholds over time due to age-related degeneration of auditory pathways and sensory cells of the inner ear. This natural, age-related hearing loss is contrasted with noise-induced hearing loss (Møller, 2013). Marine mammals exposed to high-intensity sound or to lower-intensity sound for prolonged periods can experience a noise-induced hearing threshold shift (TS), which NMFS defines as a change, usually an increase, in the threshold of audibility at a specified frequency or portion of an individual's hearing range above a previously established reference level as a result of noise exposure (NMFS, 2018, 2024). The amount of threshold shift is customarily expressed in dB. Noise-induced hearing TS can be temporary (TTS) or permanent (PTS), with higher-energy sound exposures (which considers both intensity and duration) are more likely to cause PTS or other auditory injury. As described in NMFS (2018, 2024) there are numerous factors to consider when examining the consequence of TS, including but not limited to the signal temporal pattern (*e.g*., impulsive or non-impulsive), likelihood an individual would be exposed for a long enough duration or to a high enough level to induce a TS, the magnitude of the TS, time to recovery (seconds to minutes or hours to days), the frequency range of the exposure (*i.e.*, spectral content), the hearing frequency range of the exposed species relative to the signal's frequency spectrum (*i.e.*, how animal uses sound within the frequency band of the signal; *e.g.*, Kastelein *et al*., 2014), and the overlap between the animal and the source (*e.g*., spatial, temporal, and spectral).

Auditory Injury (AUD INJ). NMFS (2024) defines AUD INJ as damage to the inner ear that can result in destruction of tissue, such as the loss of cochlear neuron synapses or auditory neuropathy (Houser, 2021; Finneran, 2024). AUD INJ may or may not result in a PTS. PTS is defined as a permanent, irreversible increase in the threshold of audibility at a specified frequency or portion of an individual's hearing range above a previously established reference level (NMFS, 2024). PTS does not generally affect more than a limited frequency range, and an animal that has incurred PTS has some level of hearing loss at the relevant frequencies; thus typically animals with PTS or other AUD INJ are not functionally deaf (Au and Hastings, 2008; Finneran, 2016). For marine mammals, AUD INJ is considered possible when sound exposures are sufficient to produce 40 dB of TTS measured after exposure (Southall *et al.*, 2007, 1019). AUD INJ levels for marine mammals are estimates, as with the exception of a single study unintentionally inducing PTS in a harbor seal (Kastak *et al.*, 2008; Reichmuth *et al.*, 2019), there are no empirical data measuring AUD INJ in marine mammals largely due to the fact that, for various ethical reasons, experiments involving anthropogenic noise exposure at levels inducing AUD INJ are not typically pursued or authorized (NMFS, 2024).

Temporary Threshold Shift (TTS). TTS is the mildest form of hearing impairment that can occur during exposure to sound. TTS is a temporary, reversible increase in the threshold of audibility at a specified frequency or portion of an individual's hearing range above a previously established reference level (NMFS, 2024) that represents primarily tissue fatigue (Henderson *et al*., 2008), and is not considered an AUD INJ. Based on data from marine mammal TTS measurements (see Southall *et al*., 2007, 2019), a TTS of 6 dB is considered the minimum threshold shift clearly larger than any day-to-day or session-to-session variation in a subject's normal hearing ability (Finneran *et al*., 2000, 2002; Schlundt *et al.*, 2000). While experiencing TTS, the hearing threshold rises, meaning that a sound must be at a higher level in order to be heard. As described in Finneran (2015), marine mammal studies have shown the amount of TTS increases with SEL_{cum} in an accelerating fashion: at low exposures with lower SEL_{cum}, the amount of TTS is typically small and the growth curves have shallow slopes. At exposures with higher SEL_{cum}, the growth curves become steeper and approach linear relationships with the noise SEL.

In terrestrial and marine mammals, TTS can last from minutes or hours to days (*i.e.*, there is recovery back to baseline/pre-exposure levels), can occur within a specific frequency range (*i.e.*, an animal might only have a temporary loss of hearing sensitivity within a limited frequency band of its auditory range), and can be of varying amounts (*e.g.*, an animal's hearing sensitivity might be reduced by only 6 dB or reduced by 30 dB). In many cases, hearing sensitivity recovers rapidly after exposure to the sound ends. While there are data on sound levels and durations necessary to elicit mild TTS for marine mammals, recovery is complicated to predict and dependent on multiple factors.

Depending on the degree (elevation of threshold in dB), duration (*i.e.,* recovery time), and frequency range of TTS, and the context in which it is experienced, TTS can have effects on marine mammals ranging from discountable to serious (similar to those discussed in auditory masking, below). For example, a marine mammal may be able to readily compensate for a brief, relatively small amount of TTS in a non-critical frequency range that takes place during a time when the animal is traveling through the open ocean, where ambient noise is lower and there are not as many competing sounds present. Alternatively, a larger amount and longer duration of TTS sustained during time when communication is critical for successful mother/calf interactions could have more serious impacts. We note that reduced hearing sensitivity as a simple function of aging has been observed in marine mammals, as well as humans and other taxa (Southall *et al.*, 2007), so we can infer that strategies exist for coping with this condition to some degree, though likely not without cost.

Many studies have examined noise-induced hearing loss in marine mammals (see Finneran (2015) and Southall *et al.* (2019) for summaries). TTS is the mildest form of hearing impairment that can occur during exposure to sound (Kryter, 2013). While experiencing TTS, the hearing threshold rises, and a sound must be at a higher level in order to be heard. In terrestrial and marine mammals, TTS can last from minutes or hours to days (in cases of strong TTS). In many cases, hearing sensitivity recovers rapidly after exposure to the sound ends. For cetaceans, published data on the onset of TTS are limited to captive bottlenose dolphin (*Tursiops truncatus*), beluga whale, harbor porpoise, and Yangtze finless porpoise (*Neophocoena asiaeorientalis*) (Southall *et al.*, 2019). For pinnipeds in water, measurements of TTS are limited to harbor seals, elephant seals (*Mirounga angustirostris*), bearded seals (*Erignathus barbatus*), and California sea lions (Kastak *et al.*, 1999, 2007; Kastelein *et al.*, 2019b, 2019c, 2021, 2022a, 2022b; Reichmuth *et al.*, 2019; Sills *et al.*, 2020). TTS was not observed in spotted (*Phoca largha*) and ringed (*Pusa hispida*) seals exposed to single airgun impulse sounds at levels matching previous predictions of TTS onset (Reichmuth *et al.*, 2016). These studies examine hearing thresholds measured in marine mammals before and after exposure to intense or long-duration sound exposures. The difference between the pre-exposure and post-exposure thresholds can be used to determine the amount of threshold shift at various post-exposure times.

The amount and onset of TTS depends on the exposure frequency. Sounds below the region of best sensitivity for a species or hearing group are less hazardous than those near the region of best sensitivity (Finneran and Schlundt, 2013). At low frequencies, onset-TTS exposure levels are higher compared to those in the region of best sensitivity (*i.e.,* a low frequency noise would need to be louder to cause TTS onset when TTS exposure level is higher), as shown for harbor porpoises and harbor seals (Kastelein *et al.*, 2019a, 2019c). Note that in general, harbor seals and harbor porpoises have a lower TTS onset than other measured pinniped and cetacean species (Finneran, 2015). In addition, TTS can accumulate across multiple exposures, but the resulting TTS will be less than the TTS from a single, continuous exposure with the same SEL (Mooney *et al.*, 2009; Finneran *et al.*, 2010; Kastelein *et al.*, 2014, 2015). This means that TTS predictions based on the total, cumulative SEL will overestimate the amount of TTS from intermittent exposures, such as sonars and impulsive sources. Nachtigall *et al.* (2018) describe measurements of hearing sensitivity of multiple odontocete species (bottlenose dolphin, harbor porpoise, beluga, and false killer whale (*Pseudorca crassidens*)) when a relatively loud sound was preceded by a warning sound. These captive animals were shown to reduce hearing sensitivity when warned of an impending intense sound. Based on these experimental observations of captive animals, the authors suggest that wild animals may dampen their hearing during prolonged exposures or if conditioned to anticipate intense sounds. Another study showed that echolocating animals (including odontocetes) might have anatomical specializations that might allow for conditioned hearing reduction and filtering of low-frequency ambient noise, including increased stiffness and control of middle ear structures and placement of inner ear structures (Ketten *et al.*, 2021). Data available on noise-induced hearing loss for mysticetes are currently lacking (NMFS, 2018). Additionally, the existing marine mammal TTS data come from a limited number of individuals within these species.

Relationships between TTS and PTS thresholds have not been studied in marine mammals, and there is no PTS data for cetaceans, but such relationships are assumed to be similar to those in humans and other terrestrial mammals. PTS typically occurs at exposure levels at least several decibels above that inducing mild TTS (*e.g.,* a 40-dB threshold shift approximates PTS onset (Kryter *et al.*, 1966; Miller, 1974), while a 6-dB threshold shift approximates TTS onset (Southall *et al.*, 2007, 2019). Based on data from terrestrial mammals, a precautionary assumption is that the PTS thresholds for impulsive sounds are at least 6 dB higher than the TTS threshold on a peak-pressure basis and PTS cumulative sound exposure level thresholds are 15 to 20 dB higher than TTS cumulative sound exposure level thresholds (Southall *et al.*, 2007, 2019). Given the higher level of sound or longer exposure duration necessary to cause PTS as compared with TTS, it is considerably less likely that PTS could occur.

Non-acoustic Stressors. Hilcorp's specified activities could also involve non-acoustic stressors. Potential non-acoustic stressors could result from the physical presence of the equipment (*e.g.*, tug and vessel configuration, pile driving equipment) and personnel; however, given there are no known pinniped haul-out sites in the vicinity of the project site, visual and other non-acoustic stressors would be limited, and any impacts to marine mammals are expected to primarily be acoustic in nature.

Behavioral Disturbance. Exposure to noise also has the potential to behaviorally disturb marine mammals to a level that rises to the definition of Level B harassment under the MMPA. Behavioral disturbance may include a variety of effects, including subtle changes in behavior (*e.g.,* minor or brief avoidance of an area or changes in vocalizations), more conspicuous changes in similar behavioral activities, and more sustained and/or potentially severe reactions, such as displacement from or abandonment of high-quality habitat. Behavioral responses may include changing durations of surfacing and dives, changing direction and/or speed; reducing/increasing vocal activities; changing/cessation of certain behavioral activities (such as socializing or feeding); eliciting a visible startle response or aggressive behavior (such as tail/fin slapping or jaw clapping); and avoidance of areas where sound sources are located (Erbe *et al.*, 2019). In addition, pinnipeds may increase their haul out time, possibly to avoid in-water disturbance (Thorson and Reyff, 2006).

Behavioral responses to sound are highly variable and context-specific and any reactions depend on numerous intrinsic and extrinsic factors (*e.g.*, species, state of maturity, experience, current activity, reproductive state, auditory sensitivity, time of day), as well as the interplay between factors (*e.g.*, Richardson *et al.*, 1995; Wartzok *et al.*, 2004; Southall *et al.*, 2007, 2019; Weilgart, 2007; Archer *et al.*, 2010; Erbe *et al.*, 2019). Behavioral reactions can vary not only among individuals but also within an individual, depending on previous experience with a sound source, context, and numerous other factors (Ellison *et al.*, 2012), and can vary depending on characteristics associated with the sound source (*e.g.,* whether it is moving or stationary, number of sources, distance from the source). For example, animals that are resting may show greater behavioral change in response to disturbing sound levels than animals that are highly motivated to remain in an area for feeding (Richardson *et al.*, 1995; Wartzok *et al.*, 2004; National Research Council (NRC), 2005). In general, pinnipeds seem more tolerant of, or at least habituate more quickly to, potentially disturbing underwater sound than do cetaceans, and generally seem to be less responsive to exposure to industrial sound than most cetaceans. The biological significance of many of behavioral disturbances is difficult to predict, especially if the detected disturbances appear minor. However, the consequences of behavioral modification could be biologically significant if the change affects growth, survival, and/or reproduction, which depends on the severity, duration, and context of the effects. Please see appendices B and C of Southall *et al.* (2007) and Gomez *et al.* (2016) for reviews of studies involving marine mammal behavioral responses to sound.

Habituation can occur when an animal's response to a stimulus wanes with repeated exposure, usually in the absence of unpleasant associated events (Wartzok *et al.*, 2004). Animals are most likely to habituate to sounds that are predictable and unvarying. It is important to note that habituation is appropriately considered as a "progressive reduction in response to stimuli that are perceived as neither aversive nor beneficial," rather than as, more generally, moderation in response to human disturbance (Bejder *et al.*, 2009). The opposite process is sensitization, when an unpleasant experience leads to subsequent responses, often in the form of avoidance, at a lower level of exposure.

Available studies show wide variation in response to underwater sound; therefore, it is difficult to predict specifically how any given sound in a particular instance might affect marine mammals perceiving the signal (*e.g.*, Erbe *et al.*, 2019). If a marine mammal does react briefly to an underwater sound by changing its behavior or moving a small distance, the impacts of the change are unlikely to be significant to the individual, let alone the stock or population. If a sound source displaces marine mammals from an important feeding or breeding area for a prolonged period, impacts on individuals and populations could be significant (*e.g.,* Lusseau and Bejder, 2007; Weilgart, 2007; NRC, 2005). However, there are broad categories of potential response, which we describe in greater detail here, that include alteration of dive behavior, alteration of foraging behavior, effects to breathing, interference with or alteration of vocalization, avoidance, and flight.

Changes in dive behavior can vary widely and may consist of increased or decreased dive times and surface intervals as well as changes in the rates of ascent and descent during a dive (*e.g.,* Frankel and Clark, 2000; Costa *et al.*, 2003; Ng and Leung, 2003; Nowacek *et al.*, 2004; Goldbogen *et al.*, 2013a, 2013b, Blair *et al.*, 2016). Variations in dive behavior may reflect interruptions in biologically significant activities (*e.g.,* foraging) or they may be of little biological significance. The impact of an alteration to dive behavior resulting from an acoustic exposure depends on what the animal is doing at the time of the exposure and the type and magnitude of the response.

Disruption of feeding behavior from anthropogenic sound exposure is usually inferred by observed displacement from known foraging areas, the appearance of secondary indicators (*e.g.,* bubble nets or sediment plumes), or changes in dive behavior. Acoustic and movement bio-logging tools also have been used in some cases to infer responses to anthropogenic noise. For example, Blair *et al.* (2016) reported significant effects on humpback whale foraging behavior in Stellwagen Bank in response to ship noise including slower descent rates, and fewer side-rolling events per dive with increasing ship nose. In addition, Wisniewska *et al.* (2018) reported that tagged harbor porpoises demonstrated fewer prey capture attempts when encountering occasional high-noise levels resulting from vessel noise as well as more vigorous fluking, interrupted foraging, and cessation of echolocation signals observed in response to some high-noise vessel passes. In addition, harbor porpoises trained to collect fish during playback of impact pile driving sounds also showed potential changes in behavior and task success, though individual differences were prevalent (Kastelein *et al.*, 2019d). As for other types of behavioral response, the frequency, duration, and temporal pattern of signal presentation, as well as differences in species sensitivity, are likely contributing factors to differences in response in any given circumstance (*e.g.,* Croll *et al.*, 2001; Nowacek *et al.*, 2004; Madsen *et al.*, 2006; Yazvenko *et al.*, 2007). A determination of whether foraging disruptions incur fitness consequences would require information on or estimates of the energetic requirements of the affected individuals and the relationships among prey availability, foraging effort and success, and the life history stage(s) of the animal.

Variations in respiration naturally vary with different behaviors and alterations to breathing rate as a function of acoustic exposure can be expected to co-occur with other behavioral reactions, such as a flight response or an alteration in diving. However, respiration rates in and of themselves may be representative of annoyance or an acute stress response. Various studies have shown that respiration rates may either be unaffected or could increase, depending on the species and signal characteristics, again highlighting the importance in understanding species differences in the tolerance of underwater noise when determining the potential for impacts resulting from anthropogenic sound exposure (*e.g.,* Kastelein *et al.*, 2001, 2005, 2006; Gailey *et al.*, 2007). For example, harbor porpoise respiration rate increased in response to pile driving sounds at and above a received broadband SPL of 136 dB (zero-peak SPL: 151 dB re 1 μPa; SEL of a single strike: 127 dB re 1 μPa^2 -s) (Kastelein *et al.,* 2013).

Avoidance is the displacement of an individual from an area or migration path as a result of the presence of a sound or other stressors, and is one of the most obvious manifestations of disturbance in marine mammals (Richardson *et al.*, 1995). For example, gray whales are known to change direction – deflecting from customary migratory paths – in order to avoid noise from seismic surveys (Malme *et al.*, 1984). Harbor porpoises, Atlantic white-sided dolphins (*Lagenorhynchus actusus*), and minke whales have demonstrated avoidance in response to vessels during line transect surveys (Palka and Hammond, 2001). In addition, beluga whales in the St. Lawrence Estuary in Canada have been reported to increase levels of avoidance with increased boat presence by way of increased dive durations and swim speeds, decreased surfacing intervals, and by bunching together into groups (Blane and Jaakson, 1994). Possible avoidance of pile driving activities has also been documented in species such as harbor porpoises (*e.g.*, Dähne *et al.*, 2013, Kastelein *et al*., 2013, Degraer *et al.*, 2022) and harbor seals (*e.g.*, Russel *et al.*, 2016). Avoidance may be short-term, with animals returning to the area once the noise has ceased (*e.g.,* Bowles *et al.*, 1994; Goold, 1996; Stone *et al.*, 2000; Morton and Symonds, 2002; Gailey *et al.*, 2007). Longer-term displacement is possible, however, which may lead to changes in abundance or distribution patterns of the affected species in the affected region if habituation to the presence of the sound does not occur (*e.g.,* Blackwell *et al.*, 2004; Bejder *et al.*, 2006; Teilmann *et al.*, 2006).

A flight response is a dramatic change in normal movement to a directed and rapid movement away from the perceived location of a sound source. The flight response differs from other avoidance responses in the intensity of the response (*e.g.,* directed movement, rate of travel). Relatively little information on flight responses of marine mammals to anthropogenic signals exists, although observations of flight responses to the presence of predators have occurred (Connor and Heithaus, 1996; Bowers *et al.*, 2018). The result of a flight response could range from brief, temporary exertion and displacement from the area where the signal provokes flight to, in extreme cases, marine mammal strandings (England *et al.*, 2001). However, it should be noted that response to a perceived predator does not necessarily invoke flight (Ford and Reeves, 2008), and whether individuals are solitary or in groups may influence the response.

Behavioral disturbance can also impact marine mammals in more subtle ways. Increased vigilance may result in costs related to diversion of focus and attention (*i.e.,* when a response consists of increased vigilance, it may come at the cost of decreased attention to other critical behaviors such as foraging or resting). Studies involving fishes and terrestrial animals have shown that increased vigilance may substantially reduce feeding rates (*e.g.,* Beauchamp and Livoreil, 1997; Fritz *et al.*, 2002; Purser and Radford, 2011). Ridgway *et al.* (2006) reported that increased vigilance in bottlenose dolphins exposed to sound over a 5-day period did not cause any sleep deprivation or stress effects.

Many animals perform vital functions, such as feeding, resting, traveling, and socializing, on a diel cycle (24-hour cycle). Disruption of such functions resulting from reactions to stressors such as sound exposure are more likely to be significant if they last more than one diel cycle or recur on subsequent days (Southall *et al.*, 2007). That is, chronic disturbance can cause population declines through reduction of fitness (*e.g.,* decline in body condition) and subsequent reduction in reproductive success, survival, or both (*e.g.,* Harrington and Veitch, 1992; Daan *et al.*, 1996; Bradshaw *et al.*, 1998). Consequently, a behavioral response lasting less than 1 day and not recurring on subsequent days is not considered particularly severe unless it could directly affect reproduction or survival (Southall *et al.*, 2007). Note that there is a difference between multi-day substantive (*i.e.,* meaningful) behavioral reactions and multi-day anthropogenic activities. For example, just because an activity lasts for multiple days does not necessarily mean that individual animals are either exposed to activity-related stressors for multiple days or, further, exposed in a manner resulting in sustained multi-day substantive behavioral responses.

Stress Responses. An animal's perception of a threat may be sufficient to trigger stress responses consisting of some combination of behavioral responses, autonomic nervous system responses, neuroendocrine responses, or immune responses (*e.g.,* Selye, 1950; Moberg, 2000). In many cases, an animal's first and sometimes most economical (in terms of energetic costs) response is behavioral avoidance of the potential stressor. Autonomic nervous system responses to stress typically involve changes in heart rate, blood pressure, and gastrointestinal activity. These responses have a relatively short duration and may or may not have a significant long-term effect on an animal's fitness.

Neuroendocrine stress responses often involve the hypothalamus-pituitary-adrenal system. Virtually all neuroendocrine functions that are affected by stress—including immune competence, reproduction, metabolism, and behavior—are regulated by pituitary hormones. Stress-induced changes in the secretion of pituitary hormones have been implicated in failed reproduction, altered metabolism, reduced immune competence, and behavioral disturbance (*e.g.,* Moberg, 1987; Blecha, 2000). Increases in the circulation of glucocorticoids are also equated with stress (Romano *et al.*, 2004).

The primary distinction between stress (which is adaptive and does not normally place an animal at risk) and "distress" is the cost of the response. During a stress response, an animal uses glycogen stores that can be quickly replenished once the stress is alleviated. In such circumstances, the cost of the stress response would not pose serious fitness consequences. However, when an animal does not have sufficient energy reserves to satisfy the energetic costs of a stress response, energy resources must be diverted from other functions. This state of distress will last until the animal replenishes its energetic reserves sufficient to restore normal function.

Relationships between these physiological mechanisms, animal behavior, and the costs of stress responses are well-studied through controlled experiments and for both laboratory and free-ranging animals (*e.g.,* Holberton *et al.*, 1996; Hood *et al.*, 1998; Jessop *et al.*, 2003; Krausman *et al.*, 2004; Lankford *et al.*, 2005). Stress responses due to exposure to anthropogenic sounds or other stressors and their effects on marine mammals have also been reviewed (Fair and Becker, 2000; Romano *et al.*, 2002b) and, more rarely, studied in wild populations (*e.g.,* Romano *et al.*, 2002a). For example, Rolland *et al.* (2012) found that noise reduction from reduced ship traffic in the Bay of Fundy was associated with decreased stress in North Atlantic right whales. In addition, Lemos *et al.* (2022) observed a correlation between higher levels of fecal glucocorticoid metabolite concentrations (indicative of a stress response) and vessel traffic in gray whales. These and other studies lead to a reasonable expectation that some marine mammals will experience physiological stress responses upon exposure to acoustic stressors and that it is possible that some of these would be classified as "distress." In addition, any animal experiencing TTS would likely also experience stress responses (NRC, 2005). Based on marine mammal behavior observed during pile driving projects in Cook Inlet and previous monitoring by Hilcorp and other ITA holders, marine mammals exposed to noise from Hilcorp's activities are unlikely to experience a high degree of stress.

Norman (2011) reviewed environmental and anthropogenic stressors for CIBWs. Lyamin *et al.* (2011) determined that the heart rate of a beluga whale increases in response to noise, depending on the frequency and intensity. Acceleration of heart rate in the beluga whale is the first component of the "acoustic startle response." Romano *et al.* (2004) demonstrated that captive beluga whales exposed to high-level impulsive sounds (*i.e.,* seismic airgun and/or single pure tones up to 201 dB RMS) resembling sonar pings showed increased stress hormone levels of norepinephrine, epinephrine, and dopamine when TTS was reached. Thomas *et al.* (1990) exposed beluga whales to playbacks of an oil-drilling platform in operation ("Sedco 708," 40 Hz–20 kHz; source level 153 dB). Ambient SPL at ambient conditions in the pool before playbacks was 106 dB and 134 to 137 dB RMS during playbacks at the monitoring hydrophone across the pool. All cell and platelet counts and 21 different blood chemicals, including epinephrine and norepinephrine, were within normal limits throughout baseline and playback periods, and stress response hormone levels did not increase immediately after playbacks. The difference between the Romano *et al.* (2004) and Thomas *et al.* (1990) studies could be the differences in the type of sound (seismic airgun and/or tone versus oil drilling), the intensity and duration of the sound, the individual's response, and the surrounding circumstances of the individual's environment. The sounds in the Thomas *et al.* (1990) study would be more similar to those anticipated by Hilcorp's tugs under load with a jack-up rig; therefore, no more than short-term, low-hormone stress responses, if any, of CIBWs or other marine mammals are expected as a result of exposure to noise during tugs under load with a jack-up rig during Hilcorp's planned activities.

Auditory Masking. Acoustic masking is when other noises such as from human sources interfere with an animal's ability to detect, recognize, or discriminate between acoustic signals of interest (*e.g.,* those used for intraspecific communication and social interactions, prey detection, predator avoidance, navigation) (Richardson *et al.*, 1995; Erbe *et al.*, 2016). Since many marine mammals rely on sound to find prey, moderate social interactions, and facilitate mating (Tyack, 2008), noise from anthropogenic sound sources can interfere with these functions, but only if the noise spectrum overlaps with the hearing sensitivity of the receiving marine mammal (Southall *et al.*, 2007; Clark *et al.*, 2009; Hatch *et al.*, 2012). For example, Brewer *et al.* (2023) investigated masking of CIBW calls in the 0-12 kHz range by commercial ship noise and found that all seven of the most common call types in the CIBW repertoire were partially masked by distant commercial ship noise and completely masked by close commercial ship noise in the 0-

12 kHz range. Chronic exposure to excessive, though not high-intensity, noise could cause masking at particular frequencies for marine mammals that utilize sound for vital biological functions (Clark *et al.*, 2009). Therefore, under certain circumstances, marine mammals whose acoustical sensors or environment are being severely masked could also be impaired from maximizing their performance fitness for survival and reproduction. The ability of a noise source to mask biologically important sounds depends on the characteristics of both the noise source and the signal of interest (*e.g.,* signal-to-noise ratio, temporal variability, direction), in relation to each other and to an animal's hearing abilities (*e.g.,* sensitivity, frequency range, critical ratios, frequency discrimination, directional discrimination, age or TTS hearing loss), and existing ambient noise and propagation conditions (Hotchkin and Parks, 2013).

Marine mammals vocalize for different purposes and across multiple modes, such as whistling, echolocation click production, calling, and singing. Changes in vocalization behavior in response to anthropogenic noise can occur for any of these modes and may result from a need to compete with an increase in background noise or may reflect increased vigilance or a startle response. For example, in the presence of potentially masking signals, humpback whales and killer whales have been observed to increase the length of their songs (Miller *et al.*, 2000; Fristrup *et al.*, 2003) or vocalizations (Foote *et al.*, 2004), respectively, while North Atlantic right whales (*Eubalaena glacialis*) have been observed to shift the frequency content of their calls upward while reducing the rate of calling in areas of increased anthropogenic noise (Parks *et al.*, 2007). Blue whales in California have been observed to shift their call frequencies downward by 31 percent since the 1960s to effectively communicate below the sound frequency generated by propeller cavitation from ships (McDonald *et al*., 1995). Fin whales have also been documented lowering the bandwidth, peak frequency, and center frequency of their vocalizations under increased levels of background noise from large vessels (Castellote *et* *al.*, 2012) and reducing their calling rate in response to sound from boats (Watkins, 1986). Other alterations to communication signals have also been observed. For example, gray whales, in response to playback experiments exposing them to vessel noise, have been observed increasing their vocalization rate and producing louder signals at times of increased outboard engine noise (Dahlheim and Castellote, 2016). Alternatively, in some cases, animals may cease sound production during production of aversive signals (Bowles *et al.*, 1994; Wisniewska *et al.*, 2018).

Under certain circumstances, marine mammals experiencing significant masking could also be impaired from maximizing their performance fitness in survival and reproduction. Therefore, when the coincident (masking) sound is human-made, it may be considered harassment when disrupting or altering critical behaviors. It is important to distinguish TTS and PTS, which persist after the sound exposure, from masking, which occurs only during the sound exposure. Because masking (without resulting in TS) is not associated with abnormal physiological function, it is not considered a physiological effect, but rather a potential behavioral effect (though not necessarily one that would be considered harassment).

The frequency range of the potentially masking sound is important in determining any potential behavioral impacts. For example, low-frequency signals have less potential to interfere with the detection of high-frequency echolocation sounds produced by odontocetes than detection of mysticete communication calls and other potentially important natural sounds such as those produced by surf and some prey species. The masking of communication signals by anthropogenic noise may be considered as a reduction in the communication space of animals (*e.g.,* Clark *et al.*, 2009) and may result in energetic or other costs as animals change their vocalization behavior (*e.g.,* Miller *et al.*, 2000; Foote *et al.*, 2004; Parks *et al.*, 2007; Di Iorio and Clark, 2010; Holt *et al.*, 2009). Masking can be reduced in situations where the signal and noise come from different directions (Richardson *et al.*, 1995), through amplitude modulation of the signal, or through other compensatory behaviors (Hotchkin and Parks, 2013).

Marine mammals at or near where Hilcorp would conduct activities may be exposed to anthropogenic noise, which may be a source of masking. Vocalization changes may result from a need to compete with an increase in background noise and include increasing the source level, modifying the frequency, increasing the call repetition rate of vocalizations, or ceasing to vocalize in the presence of increased noise (Hotchkin and Parks, 2013). For example, in response to vessel noise, CIBWs may shift the frequency of their echolocation clicks and communication signals, reduce their overall calling rates, and or increase the emission of certain call signals to prevent masking by anthropogenic noise (Lesage *et al.*, 1999; Tyack, 2000; Eickmeier and Vallarta, 2022).

Masking occurs in the frequency band that the animals utilize, and is more likely to occur in the presence of broadband, relatively continuous noise sources such as tugging. Since noises generated from tugs towing and positioning are mostly concentrated at low frequency ranges, with a small concentration in high frequencies as well, these activities likely have less effect on mid-frequency echolocation sounds by odontocetes (toothed whales) such as CIBWs. However, lower frequency noises are more likely to affect detection of communication calls and other potentially important natural sounds such as surf and prey noise. Low-frequency noise may also affect communication signals when they occur near the frequency band for noise and thus reduce the communication space of animals (*e.g.,* Clark *et al.*, 2009) and cause increased stress levels (*e.g.,* Holt *et al.*, 2009). Unlike TS, masking, which can occur over large temporal and spatial scales, can potentially affect the species at population, community, or even ecosystem levels, in addition to individual levels. Masking affects both senders and receivers of the signals, and at higher levels for longer durations could have long-term chronic effects on marine mammal species and populations. However, the noise generated by the tugs will not be concentrated in one location or for more than 5 hours per positioning attempt, and up to two positioning attempts at the same site. Thus, while Hilcorp's activities may mask some acoustic signals that are relevant to the daily behavior of marine mammals, the short-term duration and limited areas affected make it very unlikely that the fitness of individual marine mammals would be impacted.

In consideration of the range of potential effects (AUD INJ to behavioral disturbance), we consider the potential exposure scenarios and context in which species would be exposed to noise from tug-related activities and pile driving. Tugs engaged in towing, holding, and positioning a jack-up rig, anchor handling, or pipe pulling are slow-moving as compared to typical recreational and commercial vessel traffic. Slow-moving vessels may be tolerated by some whales while other individuals may deflect around vessels and continue on their migratory path. Marine mammal responses to mobile non-impulsive sound from vessel traffic are typically associated with sound that is generated by changes in the engine and propeller speed (Wartzok *et al*., 1989; Richardson *et al*., 1995). Whales have been known to tolerate slow-moving vessels within several hundred meters, especially when the vessel is not directed toward the animal and when there are no sudden changes in direction or engine speed (Wartzok *et al*., 1989, Richardson *et al*., 1995, Heide-Jørgensen *et al*., 2003). Additionally, visual cues may also contribute to responses from marine mammals to vessel traffic (Richardson *et al*., 1995). Assuming an animal was stationary, exposure from the moving tug configuration (which comprises most of the tug activity being considered) would be in the order of minutes in any particular location. The slow, predictable, and generally straight path of these activities are expected to further lessen the likelihood that sound exposures at the expected levels would result in the harassment of marine mammals. Also, this slow transit along a predictable path is also planned in an area of routine vessel traffic where many large vessels move in slow straight-line paths, and some individuals are expected to be habituated to these sorts of sounds. Based on these characteristics of the sound source and the other activities regularly encountered in the area, it is unlikely an animal will exhibit a disruption of behavioral patterns.

In response to pile driving, marine mammals may alter their use of the area (*e.g.*, faster passage through, erratic behavior within, or avoidance of the area all together), and/or demonstrate changes in vocal behavior, hunting, feeding, breeding, calving, and other social interactions. However, severe responses to Hilcorp's pile driving activity are not anticipated. In upper Cook Inlet, the POA has recently completed several years of marine mammal monitoring efforts during impact and vibratory pile driving activities related to the POA Modernization Program (PAMP) (61N Environmental, 2021, 2022a, 2022b, 2022c, 2025). Behavioral reactions to pile driving have not been reported in non-CIBW species during the POA monitoring efforts. During POA's Petroleum and Cement Terminal (PCT) construction, 81 harbor seals were observed within estimated Level B harassment zones associated with vibratory and impact installation and removal of 36-in (61-cm) and 144-in (366-cm) piles, and 5 harbor seals were observed within estimated Level A harassment zones during the installation of 144-in (366-cm) piles. No observable behavioral reactions were observed in any of these seals (61N Environmental, 2021, 2022a). One harbor porpoise was observed within the estimated Level B harassment zone during vibratory driving of a 36-in (61-cm) pile in May 2021. The animal was traveling at a moderate pace. No observable reactions to pile driving were noted by the PSOs. Another harbor porpoise near the border of (and may have been within) the estimated Level B harassment zone during the impact installation of 36-in (61-cm) piles in June 2021, but PSOs did not record any behavioral responses of this individual to the pile driving activities. Similarly 13 harbor seals observed within estimated Level B harassment zones associated with pile driving 36-in (61-cm) piles during POA's South

Floating Dock (SFD) construction did not exhibit observable behavioral reactions (61N Environmental, 2022b).During vibratory pile installation and removal in 2024, the predominant behaviors for harbor seals were “looking” and “sinking,” accounting for 64.6 percent and 44.4 percent of the primary and secondary behaviors recorded. No behavioral reactions in response to vibratory noise were recorded (61N Environmental, 2025).

Specific to CIBWs, several years of marine mammal monitoring data demonstrate behavioral responses to pile driving at the POA. Previous pile driving activities at the POA include the installation and removal of sheet piles, the vibratory and impact installation of 24-in (61-cm), 36-in (91-cm), 48-in (122-cm), and 144-in (366-cm) pipe piles, and the vibratory installation of 72-in (182-cm) air bubble casings.

Kendall and Cornick (2015) provide a comprehensive overview of 4 years of scientific marine mammal monitoring conducted before (2005-2006) and during the POA's Marine Terminal Redevelopment Project (MTRP; 2008-2009). These were observations made by biologists at Alaska Pacific University, funded by the POA and other groups but independent of the POA's required monitoring for pile driving activities (*i.e.,* not construction based PSOs). The authors investigated CIBW behavior before and during pile driving activity at the POA. Sighting rates, mean sighting duration, behavior, mean group size, group composition, and group formation were compared between the two periods. A total of about 2,329 hours of sampling effort was completed across 349 days from 2005 to 2009. Overall, 687 whales in 177 groups were documented during the 69 days that whales were sighted. A total of 353 and 1,663 hours of pile driving took place in 2008 and 2009, respectively. There was no relationship between monthly CIBW sighting rates and monthly pile driving rates ($r = 0.19$, $p = 0.37$). Sighting rates before (n = 12; 0.06 ± 0.01) and during (n = 13; 0.01 ± 0.03) pile driving were not significantly different. However, sighting duration of CIBWs decreased significantly during pile driving (39 ± 6 minutes before and 18 ± 3 minutes during). There were also significant differences in behavior before versus during pile driving. CIBWs primarily traveled through the study area both before and during pile driving; however, traveling increased relative to other behaviors during pile driving. Documentation of milling was observed on 21 occasions during pile driving. Mean group size decreased during pile driving; however, this difference was not statistically significant. In addition, group composition was significantly different before and during pile driving, with more white (*i.e.,* likely older) animals being present during pile driving (Kendall and Cornick, 2015). CIBWs were primarily observed densely packed before and during pile driving; however, the number of densely packed groups increased by approximately 67 percent during pile driving. There were also significant increases in the number of dispersed groups (approximately 81 percent) and lone whales (approximately 60 percent) present during pile driving than before pile driving (Kendall and Cornick, 2015).

During PCT and SFD construction monitoring, behaviors of CIBWs groups were compared by month and by construction activity (61N Environmental, 2021, 2022a, 2022b). Little variability was evident in the behaviors recorded from month to month or among sightings that coincided with in-water pile installation and removal and those that did not (61N Environmental, 2021, 2022a). Definitive behavioral reactions to in-water pile driving or avoidance behaviors were not documented; however, potential reactions (where a group reversed its trajectory shortly after the start of in-water pile driving occurred; a group reversed its trajectory as it got closer to the sound source during active in-water pile driving; or upon an initial sighting, a group was already moving away from in-water pile driving, raising the possibility that it had been moving towards, but was only sighted after they turned away) and instances where CIBWs moved toward active in-water pile driving were recorded. During these instances, impact driving appeared to cause potential behavioral reactions more readily than vibratory hammering (61N

Environmental, 2021, 2022a, 2022b). One minor difference documented during PCT construction was a slightly higher incidence of milling behavior and diving during the periods of no pile driving and slightly higher rates of traveling behavior during periods when potential CIBW behavioral reactions to pile driving, as described above, were recorded (61N Environmental, 2021, 2022a). Note, narratives of each CIBW reaction can be found in the appendices of the POA's final monitoring reports (61N Environmental, 2021, 2022a, 2022b). During vibratory pile installation and removal in 2024, PSOs observed 433 CIBW groups during monitoring, 205 of which were observed during pile driving or removal or within 10 minutes of the activity concluding. No visible or overt avoidance behaviors or reactions to the project activities were recorded although 33 groups were categorized as potential reactions because they moved away (or were first sighted moving away) from the site during vibratory, 63 had no discernable reaction, and 109 moved toward activities during a portion of the sighting.

Saxon-Kendall *et al.* (2013) recorded echolocation clicks (which can be indicative of feeding behavior) during the MTRP at the POA both while pile driving was occurring and when it was not. This indicates that while feeding is not a predominant behavior that PSOs visually observed in CIBWs sighted near the POA (61N Environmental, 2021, 2022a, 2022b, 2022c, 2025; Easley-Appleyard and Leonard, 2022), CIBWs can and still exhibit feeding behaviors during pile driving activities. In addition, Castellote *et al.* (2020) found low echolocation detection rates in lower Knik Arm (*i.e.,* Six Mile, Port MacKenzie, and Cairn Point) and suggested that CIBWs moved through that area relatively quickly when entering or exiting Knik Arm. No whistles or noisy vocalizations were recorded during the MTRP construction activities; however, it is possible that persistent noise associated with construction activity at the MTR project masked beluga vocalizations and or that CIBWs did not use these communicative signals when they were near the MTRP (Saxon-Kendall *et al.*, 2013).

Recently, McHuron *et al.* (2023) developed a model to predict general patterns related to the movement and foraging decisions of pregnant CIBWs in Cook Inlet. They found that the effects of disturbance from human activities, such as pile driving activities occurring at the POA assuming no mitigation measures, are inextricably linked with prey availability. If prey are abundant during the summer and early fall and prey during winter is above some critical threshold, pregnant CIBWs can likely cope with intermittent disruptions such as those produced by pile driving at the POA (McHuron *et al.*, 2023). However, they stress that more information needs to be acquired regarding CIBW prey and CIBW body condition, specifically in their critical habitat, to better understand possible behavioral responses to disturbance.

Blackwell and Greene (2003) observed CIBWs swimming in close proximity to a Northern Lights freighter ship that was docked with the motors running (126 dB re 1μPa) at the POA, indicating that sound from the ship did not significantly affect the whales, who may have become accustomed to high background sound levels in Cook Inlet.

In relation to Hilcorp's planned activities, CIBWs may be present (in low numbers) during the work; therefore, some individuals may be reasonably expected to be exposed to elevated sound levels, including briefly those that exceed the Level B harassment thresholds for continuous or impulsive noise. However, CIBWs are expected to be transiting through the area, given this work is proposed primarily in middle Cook Inlet (as described in the **Description of Marine Mammals in the Area of Specified Activities** section), thereby limiting exposure duration or exposure during critical behaviors, as CIBWs in the area are expected to be headed to or from the concentrated foraging areas farther north near the Beluga River, Susitna Delta, and Knik and Turnigan Arms. Similarly, humpback whales, fin whales, minke whales, gray whales, killer whales, California sea lion, and Steller sea lions are not expected to remain in the work area. Dall's porpoise, harbor porpoise, and harbor seal have been sighted with more regularity than many other species during oil and gas activities in Cook Inlet but due to the transitory nature of these species, they are unlikely to remain close to the planned activities for the full duration of the noise-producing activity. For example, during Hilcorp's jack-up rig-based monitoring efforts in 2023, only one Dall's porpoise, two harbor seals, and one harbor porpoise were observed across four different sightings, and observations only lasted 1 to 5 minutes (Horsley and Larson, 2023).

Given most marine mammals are likely transiting through the area, exposure is expected to be brief but the combination of the actual presence and configuration of the tugs and rig configuration as well as the presence of impact pile driving may result in animals shifting pathways around the work site (*e.g.,* avoidance), increasing speed or dive times, changing their group formations, or altering their acoustic signals. The likelihood of no more than short-term, localized disturbance responses is supported by data from Hilcorp's previous jack-up rig-based monitoring efforts in 2023, which reported no observable reactions to the towing activities outside of two harbor seals diving. Further, other data indicate CIBWs and other marine mammals regularly pass by industrialized areas such as the POA, including during periods of active impact and vibratory pile driving (61N Environmental, 2021, 2022a, 2022b, 2022c, 2025; Easley-Appleyard and Leonard, 2022); therefore, we do not expect abandonment of their transiting route or other disruptions of their behavioral patterns. We also anticipate some animals may respond with such mild reactions to the project that the response would not be detectable. For example, during low levels of tug power output (*e.g.,* while tugs may be operating at low power because of favorable conditions), the animals may be able to hear the work but any resulting reactions, if any, are not expected to rise to the level of take.

Potential Effects on Marine Mammal Habitat

Hilcorp's proposed activities could have localized, temporary impacts on marine mammal habitat, including prey, by increasing in-water sound pressure levels, and for pile driving, slightly decreasing water quality and disturbing the sea floor. All production drilling would be accomplished through existing well structures. The production well development would involve driving ten 76.2-cm (30-in) diameter (or smaller) steel piles into sediment surrounding the existing platform legs. The total area of soft substrate loss as a result of production well development at the Tyonek Platform is estimated to be 3.04 m^2 (32.71 ft^2). The Spartan-151 jack-up rig has three spudcans (legs) that would make contact with the seafloor. Each spudcan has a diameter measuring 10.6 m (34 ft 8-3/4 in). The spudcans, anchors, and pipe connecting with the seafloor may result in compaction of the sediments. Additionally, some burial and smothering of benthic species may occur temporarily within a radius of approximately 500 m (0.78 km^2) around the production well development site. The strong tidal actions and currents within Cook Inlet, however, would likely resuspend and disperse sediment plumes.

During jack-up rig operations, the Spartan 151 drill rig is estimated to disturb approximately 0.01 km^2 (2.5 acres) of seafloor during rig placement and removal activities at a given site (BOEM 2017). During exploratory drilling one 76.2-cm (30-in) diameter steel pile will be driven at each well site: 2-at the MGS Unit and 1-between the Anna and Bruce platforms. Seafloor disturbance from jack-up rig legs and pile driving would have a relatively small footprint in comparison to the entire seafloor of the action area. Some burials and smothering of benthic species may occur within close proximity to the well sites. Sediment resuspension may also occur, although the tidal complexities within Cook Inlet would negate any potential long-term resuspension effects. Local tides and currents disperse suspended sediments at a moderate to rapid rate depending on tidal stage. The total area likely impacted by Hilcorp’s activities is relatively small compared to the available habitat in Cook Inlet, and no habitat known to be of particular importance would be impacted.

Increased noise levels may affect acoustic habitat and adversely affect marine mammal prey in the vicinity of Hilcorp's specified activities (see discussion below). Elevated levels of underwater noise would ensonify where both fishes and mammals occur and could affect foraging success. Avoidance by potential prey (*i.e.,* fish) or marine mammals of the immediate area due to increased noise is possible. The duration of fish and marine mammal avoidance of this area after Hilcorp's activities stop is unknown, but a rapid return to normal recruitment, distribution, and behavior is anticipated. Any behavioral avoidance by fish or marine mammals of the disturbed area is expected to be temporary, would still leave significantly large areas of fish and marine mammal foraging habitat in the nearby vicinity, and is not expected to result in long-term effects to the individuals or populations.

Potential Effects on Prey. Sound may affect marine mammals through impacts on the abundance, behavior, or distribution of prey species (*e.g.,* crustaceans, cephalopods, fishes, zooplankton). Marine mammal prey varies by species, season, and location and, for some, is not well documented. Studies regarding the effects of noise on known marine mammal prey are described here. Key impacts to fishes may include behavioral responses, hearing damage, barotrauma (pressure-related injuries), and mortality.

Fishes utilize the soundscape and components of sound in their environment to perform important functions such as foraging, predator avoidance, mating, and spawning (*e.g.,* Zelick *et al.*, 1999; Fay, 2009). Depending on their hearing anatomy and peripheral sensory structures, which vary among species, fishes hear sounds using pressure and particle motion sensitivity capabilities and detect the motion of surrounding water (Fay *et al.*, 2008). The potential effects of noise on fishes depends on the overlapping frequency range, distance from the sound source, water depth of exposure, and species-specific hearing sensitivity, anatomy, and physiology. Reactions also depend on the physiological state of the fish, past exposures, motivation (*e.g.,* feeding, spawning, migration), and other environmental factors.

Fish react to sounds that are especially strong and/or intermittent low-frequency sounds, and behavioral responses such as flight or avoidance are the most likely effects. Short duration, sharp sounds can cause overt or subtle changes in fish behavior and local distribution. The reaction of fish to noise depends on the physiological state of the fish, past exposures, motivation (*e.g.,* feeding, spawning, migration), and other environmental factors. Hastings and Popper (2005) identified several studies that suggest fish may relocate to avoid certain areas of sound energy. Additional studies have documented effects of pile driving on fish; several are based on studies in support of large, multiyear bridge construction projects (*e.g.,* Scholik and Yan 2001, 2002; Popper and Hastings 2009). Several studies have demonstrated that impulse sounds might affect the distribution and behavior of some fishes, potentially impacting foraging opportunities or increasing energetic costs (*e.g.*, Fewtrell and McCauley 2012; Pearson *et al.*, 1992; Skalski *et al.*, 1992; Santulli *et al.*, 1999; Paxton *et al.*, 2017). However, some studies have shown no or slight reaction to impulse sounds (*e.g.*, Pena *et al.*, 2013; Wardle *et al.*, 2001; Jorgenson and Gyselman 2009).

SPLs of sufficient strength have been known to cause injury to fishes and fish mortality (summarized in Popper *et al.*, 2014). However, in most fish species, hair cells in the ear continuously regenerate and loss of auditory function likely is restored when damaged cells are replaced with new cells. Halvorsen *et al.* (2012) showed that a TTS of 4 to 6 dB was recoverable within 24 hours for one species. Impacts would be most severe when the individual fish is close to the source and when the duration of exposure is long. Injury caused by barotrauma can range from slight to severe and can cause death, and is most likely for fish with swim bladders. Barotrauma injuries have been documented during controlled exposure to impact pile driving (Halvorsen *et al.*, 2012; Casper *et al.*, 2013).

For pile driving, the most likely impact to fishes at the project site would be temporary avoidance of the area, although alarm responses, including an increase in swimming speed and changes in ventilation and hear rate, could occur (Popper *et al.*, 2019). The duration of fish avoidance of this area or an alarm response after pile driving stops is unknown, but a rapid return to normal recruitment, distribution, and behavior is anticipated, and are unlikely to result in adverse impacts to fish. In relation to tugging activities, fish have been observed to react when engine and propeller sounds exceed a certain level (Olsen *et al.*, 1983; Ona, 1988; Ona and Godo, 1990). Avoidance reactions have been observed in fish, including cod and herring, when vessel sound levels were 110 to 130 dB re 1 μPa rms (Nakken, 1992; Olsen, 1979; Ona and Godo, 1990; Ona and Toresen, 1988). Vessel sound source levels in the audible range for fish are typically 150 to 170 dB re 1 μPa per Hz (Richardson *et al.*, 1995). The tugs used during the specified activity could be expected to produce levels in this range when in transit. However, much of the tugging would be mobile during transport of the rig, and the tugging noise that occurs during rig positioning would be temporary, similar to pile driving. Therefore, based upon the reports in the literature and the predicted sound levels from these vessels, some temporary avoidance by fish in the immediate area may occur. Overall, no more than negligible impacts on fish are expected as a result of the specified activity.

Zooplankton is a food source for several marine mammal species, as well as a food source for fish that are then preyed upon by marine mammals. Population effects on zooplankton could have indirect effects on marine mammals. Data are limited on the effects of underwater sound on zooplankton species, particularly sound from ship traffic and construction (Erbe *et al.*, 2019). Sound energy associated with project activities includes sources such as pile driving. Popper and Hastings (2009) reviewed information on the effects of human-generated sound and concluded that no substantive data are available on whether the sound levels from pile driving, seismic activity, or any human-made sound would have physiological effects on invertebrates. Any such effects would be limited to the area very near (1 to 5 m [3.2 to 16.4 ft]) the sound source and would result in no population effects because of the relatively small area affected at any one time and the reproductive strategy of most zooplankton species (short generation, high fecundity, and very high natural mortality). No adverse impact on zooplankton populations is expected to occur from the specified activity due in part to large reproductive capacities and naturally high levels of predation and mortality of these populations. Any mortalities or impacts that might occur would be negligible.

Jack-up legs, anchors or pipe contact with seafloor may result in the death or displacement of some benthic organisms due to direct impact from activity equipment (*i.e.*, jack-up legs, anchors, pipelines, and piles); however, any potential effects on benthic organisms are anticipated to be temporary and of low impact due to the short duration and small total area of activities. Each of the three legs of the jack-up-rig would have a footprint diameter of 10.6 m (34 ft 8-2/4 in). All production drilling would be accomplished through existing well structures. Pipe driving and exploratory drilling would have very minimal impact on the seafloor given the small pipe diameter (76.2 cm [30 in]). Benthic organisms have large reproductive capacities and naturally high levels of predation and mortality, and, as a result, mortalities or impacts that might occur in disturbed areas are likely to be recolonized quickly following benthic disturbance. Amphipods, copepods, nematodes, polychaetes, and shrimp species are often among the first animals to recolonize, usually in less than a year (BOEM 2015; Trannum *et al.*, 2011). Based on benthic organisms naturally occurring rates of reproduction and mortality, benthic impacts from Hilcorp's operations are considered negligible.

In summary, given the relatively small areas being affected, as well as the short duration of sound associated with individual pile driving events and the temporary and mostly transitory nature of the tugging activities (including those planned for anchor handling, pipe-pulling, and jack-up rig moves), any adverse effects from Hilcorp's activities on any prey habitat or prey populations are expected to be minor and temporary. The most likely impact to fishes at the project site would be temporary avoidance of the area. Any behavioral avoidance by fish of the disturbed area would still leave significantly large areas of fish and marine mammal foraging habitat in the nearby vicinity. Thus, we conclude that impacts of the specified activities are not likely to have more than short-term adverse effects on any prey habitat or populations of prey species. Further, any impacts to marine mammal habitat are not expected to result in significant or long-term consequences for individual marine mammals, or to contribute to adverse impacts on their populations.

Estimated Take of Marine Mammals

This section provides an estimate of the number of incidental takes proposed for authorization under the rule, which will inform NMFS' consideration of "small numbers," the negligible impact determinations, and impacts on subsistence uses.

Harassment is the only type of take expected to result from these activities. Except with respect to certain activities not pertinent here, section 3(18) of the MMPA defines "harassment" as any act of pursuit, torment, or annoyance, which (i) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B harassment).

Authorized takes would primarily be by Level B harassment, as use of the acoustic sources (*i.e.*, pile driving and tugging activities, including those planned for anchor handling, pipe-pulling, and jack-up rig moves) have the potential to result in disruption of behavioral patterns for individual marine mammals. We note here that given the slow, predictable, and generally straight path (or stationary nature) of tugs towing, holding, and positioning the jack-up rig or engaged in anchor handling or pipe pulling activities, the likelihood of disrupting marine mammal behavioral patterns from tug use that would qualify as harassment under the MMPA is considered relatively low. However, at the request of the applicant, we have quantified the potential exposures from this activity to our generalized harassment thresholds, assumed that these exposures would equate to take, and analyzed the impacts of the assumed takes, which we propose for authorization. The required mitigation and monitoring measures are expected to minimize the potential for take and, if take were to occur, the severity of the taking to the extent practicable. As described previously, no serious injury or mortality is anticipated or proposed to be authorized for this activity.

For acoustic impacts, generally speaking, we estimate take by considering: (1) acoustic criteria above which NMFS believes there is reasonable potential for marine mammals to be behaviorally harassed or incur some degree of AUD INJ; (2) the area or volume 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) the number of days of activities. We note that while these factors can contribute to a basic calculation to provide an initial prediction of potential takes, additional information that can qualitatively inform take estimates is also sometimes available (*e.g.,* previous monitoring results or average group size). Below, we describe the factors considered here in more detail and present the proposed take estimates.

Acoustic Criteria

NMFS recommends the use of acoustic criteria 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 AUD INJ of some degree (equated to Level A harassment). We note that the criteria for AUD INJ, as well as the names of two hearing groups, have been recently updated (NMFS 2024) as reflected below in the Level A harassment section.

Level B Harassment – Though significantly driven by received level, the onset of behavioral disturbance from anthropogenic noise exposure is also informed to varying degrees by other factors related to the source or exposure context (*e.g.*, frequency, predictability, duty cycle, duration of the exposure, signal-to-noise ratio, distance to the source), the environment (*e.g.*, bathymetry, other noises in the area, predators in the area), and the receiving animals (hearing, motivation, experience, demography, life stage, depth) and can be difficult to predict (*e.g.*, Southall *et al.,* 2007, 2021, Ellison *et al.*, 2012). Based on what the available science indicates and the practical need to use a threshold based on a metric that is both predictable and measurable for most activities, NMFS typically uses a generalized acoustic threshold based on received level to estimate the onset of behavioral harassment. NMFS generally predicts that marine mammals are likely to be behaviorally harassed in a manner considered to be Level B harassment when exposed to underwater anthropogenic noise above root-mean-squared pressure received levels (RMS SPL) of 120 dB (referenced to 1 re 1 μPa) for continuous (*e.g.,* vibratory pile driving, drilling) and above RMS SPL 160 dB re 1 μPa for non-explosive impulsive (*e.g.*, seismic airguns, impact pile driving) or intermittent (*e.g.*, scientific sonar) sources. Generally speaking, Level B harassment take estimates based on these behavioral harassment thresholds are expected to include any likely takes by TTS as, in most cases, the likelihood of TTS occurs at distances from the source less than those at which behavioral harassment is likely. TTS of a sufficient degree can manifest as behavioral harassment, as reduced hearing sensitivity and the potential reduced opportunities to detect important signals (conspecific communication, predators, prey) may result in changes in behavior patterns that would not otherwise occur.

Hilcorp's proposed activity includes the use of continuous (tugging activities, including those planned for anchor handling, pipe-pulling, and jack-up rig moves) and impulsive (impact pile driving) sources, and therefore the RMS SPL thresholds of 120 and 160 dB re 1 μPa are applicable.

Level A harassment – NMFS' Updated Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 3.0) (Updated Technical Guidance, 2024) identifies dual criteria to assess AUD INJ (Level A harassment) to five different underwater marine mammal groups (based on hearing sensitivity) as a result of exposure to noise from two different types of sources (impulsive or non-impulsive). Hilcorp's proposed activity includes the use of impulsive (impact pile driving) and non-impulsive (tugging activities) sources.

The 2024 Updated Technical Guidance criteria include both updated thresholds and updated weighting functions for each hearing group. The thresholds are provided in the table 8 below. The references, analysis, and methodology used in the development of the criteria are described in NMFS' 2024 Updated Technical Guidance, which may be accessed at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance-other-acoustic-tools*.

Table 8 – Thresholds Identifying the Onset of Auditory Injury

	AUD INJ Onset Acoustic Thresholds* (Received Level)	
Hearing Group	Impulsive	Non-impulsive
Low-Frequency (LF) Cetaceans	*Cell 1* $L_{pk,flat}$: 222 dB $L_{E,LF,24h}$: 183 dB	*Cell 2* $L_{E,LF,24h}$: 197 dB
High-Frequency (HF) Cetaceans	*Cell 3* $L_{pk,flat}$: 230 dB $L_{E,HF,24h}$: 193 dB	*Cell 4* $L_{E,HF,24h}$: 201 dB
Very High-Frequency (VHF) Cetaceans	*Cell 5* $L_{pk,flat}$: 202 dB	*Cell 6* $L_{E,VHF,24h}$: 181 dB

	$L_{E,VHF,24h}$: 159 dB	
Phocid Pinnipeds (PW) (Underwater)	*Cell 7* $L_{pk,flat}$: 223 dB $L_{E,PW,24h}$: 183 dB	*Cell 8* $L_{E,PW,24h}$: 195 dB
Otariid Pinnipeds (OW) (Underwater)	*Cell 9* $L_{pk,flat}$: 230 dB $L_{E,OW,24h}$: 185 dB	*Cell 10* $L_{E,OW,24h}$: 199 dB
*Dual metric criteria for impulsive sounds: Use whichever criteria results in the larger isopleth for calculating AUD INJ onset. If a non-impulsive sound has the potential of exceeding the peak sound pressure level criteria associated with impulsive sounds, the PK SPL criteria are recommended for consideration for non-impulsive sources. **Note:** Peak sound pressure level ($L_{p,0\text{-}pk}$) has a reference value of 1 μPa, and weighted cumulative sound exposure level ($L_{E,p}$) has a reference value of 1 $\mu Pa^2 s$. In this table, criteria are abbreviated to be more reflective of International Organization for Standardization standards (ISO 2017; ISO 2020). The subscript "flat" is being included to indicate peak sound pressure are flat weighted or unweighted within the generalized hearing range of marine mammals underwater (*i.e.,* 7 Hz to 165 kHz). The subscript associated with cumulative sound exposure level criteria indicates the designated marine mammal auditory weighting function (LF, HF, and VHF cetaceans, and PW and OW pinnipeds) and that the recommended accumulation period is 24 hours. The weighted cumulative sound exposure level criteria could be exceeded in a multitude of ways (*i.e.*, varying exposure levels and durations, duty cycle). When possible, it is valuable for action proponents to indicate the conditions under which these criteria will be exceeded.		

Ensonified Area

Here, we describe operational and environmental parameters of the activity that are used in estimating the area ensonified above the acoustic thresholds, including source levels and TL coefficient.

The sound fields includes existing background noise plus additional noise resulting from pile driving and tugs towing, holding, and positioning a jack-up rig or engaging in pipe pulling or anchor handling. Marine mammals are expected to be affected via sound generated by the primary components of the project (*i.e.,* pile driving and tugging activities). Calculation of the area ensonified by the proposed action is dependent on the background sound levels at the project site, the source levels of the proposed activities, and the estimated TL coefficients for the proposed activities at the site. These factors are addressed below.

Calculations for Pile Driving Activities. Hilcorp's specified activity includes impact installation of up to ten 76.2-cm (30-in) steel pipe piles at Tyonek Platform in support of production well development (two piles per year) and one 76.2-cm (30-in) steel pipe pile at each well location in support of exploratory drilling. Hilcorp proposed associated sound source level proxy values (at 10 m) of 177 dB single strike SEL (SELss), 210 dB Peak, and 190 dB RMS and a TL coefficient of $15*Log_{10}$ (*i.e.*, they assumed practical spreading). NMFS concurs that these values are appropriate proxies for calculating Level A and Level B harassment isopleths for this activity.

The distance to threshold and ensonified area associated with Level B harassment for pile driving activities was calculated as the area ensonified above 160 dB RMS assuming a source level of 190 dB RMS and a TL coefficient of $15*Log_{10}$ (see table 9). The distance to threshold and ensonified area associated with Level A harassment is more technically challenging to predict due to the need to account for a duration component. Therefore, NMFS developed an optional User Spreadsheet tool to accompany the 2024 Updated Technical Guidance that can be used to simply predict an isopleth distance for use in conjunction with marine mammal density or occurrence to help predict potential takes. This optional tool offers the best way to estimate isopleth distances when more sophisticated modeling methods are not available or practical. For stationary sources such as pile driving, the optional User Spreadsheet tool predicts the distance at which, if a marine mammal remained at that distance for the duration of the activity, it would be expected to incur AUD INJ. In this case, because of the extended duration of pile driving per day (8 hours), the resulting take estimates are typically going to be overestimates of Level A harassment because it is unlikely animals would remain at the distance for that length of time or closer than the distances produced by the User Spreadsheet for a long enough subset of time. For impact pile driving at the Tyonek Platform, Hilcorp assumed a source level of 177 dB SELss and that each pile would take 7 days to install at a rate of 50 blows per minute with approximately 8 hours of pile driving occurring each day (24,000 strikes per day). Level A harassment isopleths for impact pile driving at each well site were calculated using the optional User Spreadsheet assuming a source level of 177 dB SELss, a strike rate of 65 blows per foot by 393.70 ft (120 m), and that it would take 6 days to install a single pile.

Table 9 – Calculated Distances and Areas to the Estimated Level A and Level B Harassment Thresholds for Pile Driving Activities

Activity	Level A harassment (SEL) distance (m) / area (km^2)					Level B harassment distance (m) / area (km^2)
	LF	HF	VHF	PW	OW	
Winter production impact pile driving	3,295.85 / 34.13	420.51 / 0.56	5,100.30 / 81.72	2,927.89 / 26.93	1,091.31 / 3.74	1,000.00 / 3.14
Exploratory impact pile driving	1,041.78 / 3.41	132.92 / 0.06	1,612.16 / 8.17	925.48 / 2.69	344.98 / 0.37	1,000.00 / 3.14

Calculations for Tugs under Load with a Jack-Up Rig. The project includes three to four tugs under load with a jack-up rig in support of production and exploration drilling. Hilcorp conducted a literature review of underwater sound emissions of tugs under various loading efforts. The sound source levels for tugs of various horsepower (2,000 to 8,200) under load can range from approximately 164 dB RMS to 202 dB RMS (see tables 9 and 10 in Hilcorp's ITR application). This range largely relates to the level of operational effort, with full power output and higher speeds generating more propeller cavitation and hence greater sound source levels than lower power output and lower speeds. Tugs under tow produce higher source levels than tugs transiting with no load because of the higher power output necessary to pull the load. The amount of power the tugs expend while operating is the best predictor of relative sound source level. Several factors would determine the duration that the tugboats are towing the jack-up rig, including the origin and destination of the towing route (*e.g.*, Rig Tenders Dock, an existing platform) and the tidal conditions. The power output would be variable and influenced by the prevailing wind direction and velocity, the current velocity, and the tidal stage. To the extent feasible, transport would be timed with the tide to minimize towing duration and power output.

Hilcorp's literature review identified no existing data on sound source levels of tugs towing jack-up rigs specifically nor does NMFS have such information. Accordingly, for this analysis, Hilcorp considered data from tug-under-load activities, including berthing and towing activities. Austin and Warner (2013) measured 167 dB RMS for tug towing barge activity in Cook Inlet. Blackwell and Greene (2002) reported berthing activities in the POA with a source level of 179 dB RMS. Laurinolli *et al.* (2005) measured a source level of 200 dB RMS for anchor towing activities by a tugboat in the Strait of Juan de Fuca, Washington. The Roberts Bank Terminal 2 study (2014) repeated measurements of the same tug operating under different speeds and loading conditions. Broadband measurements from this study ranged from approximately 162 dB RMS up to 200 dB RMS.

The rig manager for Hilcorp, who is experienced with towing jack-up rigs in Cook Inlet, described operational conditions wherein the tugs generally operate at half power or less for the majority of the time they are under load (pers. Comm., Durham, 2021). Transits with the tide (lower power output) are preferred for safety reasons, and effort is made to reduce or eliminate traveling against the tide (higher power output). The Roberts Bank Terminal 2 study (2014) allowed for a comparison of source levels from the same vessel (Seaspan Resolution tug) at half power versus full power. Seaspan Resolution's half-power (*i.e.,* 50 percent) berthing scenario had a sound source level of 180 dB RMS at 1 m. In addition, the Roberts Bank Terminal 2 Study (2014) reported a mean tug source level of 179.3 dB RMS at 1 m from 650 tug transits under varying load and speed conditions.

The 50 percent (or less) power output scenario occurs during the vast majority of tug towing jack-up rig activity, as described in the *Detailed Description of the Specific Activity* section of Hilcorp's application. Therefore, based on Hilcorp's literature review, a source level of 180 dB RMS was found to be an appropriate proxy source level for a single tug under load based on the Roberts Bank Terminal 2 study. If all three tugs were operating simultaneously at 180 dB RMS, the overall source emission levels would be expected to increase by approximately 5 dB when logarithmically adding the sources (*i.e.,* to 185 dB RMS). To further support this level as an appropriate proxy, a sound source verification (SSV) study performed by JASCO Applied Sciences (JASCO) in Cook Inlet in October 2021 (Lawrence *et al.*, 2022) measured the sound source level from three tugs pulling a jack-up rig in Cook Inlet at various power outputs. Lawrence *et al.* (2022) reported a source level of 167.3 dB RMS for the 20 percent-power scenario and a source level of 205.9 dB RMS for the 85 percent-power scenario. Assuming a linear scaling of tug power, a source level of 185 dB RMS was calculated as a single point source level for three tugs operating at 50 percent power output. Because the 2021 Cook Inlet SSV measurements by JASCO represent the most recent best available data, and because multiple tugs may be operating simultaneously, the analyses presented below use a mean tug sound source level scenario of 185 dB RMS to calculate the Level B harassment estimates for three tugs operating at 50 percent power output. In practice, the load condition of the three tugs is unlikely to be identical at all times, so sound emissions would be dominated by the single tug in the group that is working hardest at any point in time.

Further modeling was done to account for one additional tug working for one hour at 50 percent power during jack-up rig positioning, a stationary activity. This is equivalent in terms of acoustic energy to three tugs operating at 180.0 dB RMS (each of them) for 4 hours, joined by a fourth tug for 1 hour, increasing the source level to 186.0

dB RMS only during the 1-hour period (the logarithmic sum of four tugs working together at 180.0 dB RMS). An SEL of 185.1 dB was used to account for the cumulative sound exposure when calculating Level A harassment by adding a 4th tug operating at 50 percent power for 20 percent of the 5-hour period. This is equivalent in terms of acoustic energy to 3 tugs operating at 185.0 dB for 4 hours, joined by a fourth tug for 1 hour, increasing the source level to 186.0 dB only during the 1-hour period. The use of the 20 percent duty cycle was a computational requirement and, although equal in terms of overall energy and determination of impacts, should not be confused with the actual instantaneous SPL (see section 6.2.1.1.1 of Hilcorp's application for additional computational details).

In summary, Hilcorp has proposed to use a source level of 185.0 dB RMS to calculate the stationary Level B harassment isopleth where three tugs were under load for 4 hours with a 50 percent power output and a source level of 186.0 dB RMS to calculate the stationary Level B harassment isopleth where four tugs were under load for 1 hour with a 50 percent power output. Further, Hilcorp has proposed to use a source level of 185.1 dB SEL to calculate the stationary Level A harassment isopleths where three tugs were under load for 4 hours and then one tug joined for 1 additional hour. Lastly, Hilcorp proposed to use the 185.0 dB RMS level to model the mobile Level A harassment isopleths for three tugs under load with a 50 percent power output. NMFS concurs that Hilcorp's proposed source levels are appropriate.

Underwater Sound Propagation Modeling. Hilcorp contracted SLR Consulting to model the extent of the Level A and Level B harassment isopleths for tugs under load with a jack-up rig during their proposed activities. Cook Inlet is a particularly complex acoustic environment with strong currents, large tides, variable sea floor and generally changing conditions. Accordingly, Hilcorp applied a more detailed propagation model than the practical spreading loss approach that uses a factor of 15. The objective of a more detailed propagation calculation is to improve the representation of the influence of some environmental variables, in particular by accounting for bathymetry and specific sound source locations and frequency-dependent propagation effects.

Modeling was conducted using the dBSea software package. The fluid parabolic equation modeling algorithm was used with 5 Padé terms to calculate the TL between the source and the receiver at low frequencies (1/3-octave bands, 31.5 Hz up to 1 kHz). For higher frequencies (1 kHz up to 8 kHz) the ray tracing model was used with 1,000 reflections for each ray. Sound sources were assumed to be omnidirectional and modeled as points. The received sound levels for the project were calculated as follows: (1) One-third octave source spectral levels were obtained via reference spectral curves with subsequent corrections based on their corresponding overall source levels; (2) TL was modeled at one-third octave band central frequencies along 100 radial paths at regular increments around each source location, out to the maximum range of the bathymetry data set or until constrained by land; (3) The bathymetry variation of the vertical plane along each modeling path was obtained via interpolation of the bathymetry dataset which has 83 m grid resolution; (4) The one-third octave source levels and transmission loss were combined to obtain the received levels as a function of range, depth, and frequency; and (5) The overall received levels were calculated at a 1-m (3.3 ft) depth resolution along each propagation path by summing all frequency band spectral levels.

Model Inputs. Bathymetry data used in the model was collected from the NOAA National Centers for Environmental Information (AFSC, 2019). Using NOAA's temperature and salinity data, sound speed profiles were computed for depths from 0 to 100 m (0 to 328 ft) for May, July, and October to capture the range of possible sound speed depending on the time of year Hilcorp's work could be conducted. These sound speed profiles were compiled using the Mackenzie Equation (Mackenzie 1981) and are presented in table 11 of Hilcorp's application (available at *https://www.fisheries.noaa.gov/action/incidental-take-authorization-hilcorp-alaska-llc-oil-and-gas-activities-cook-inlet-alaska-0*). Geoacoustic parameters were also incorporated into the model. The parameters were based on substrate type and their relation to depth. These parameters are presented in table 12 of Hilcorp's application (available at *https://www.fisheries.noaa.gov/action/incidental-take-authorization-hilcorp-alaska-llc-oil-and-gas-activities-cook-inlet-alaska-0*).

Detailed broadband sound transmission loss modeling in dBSea used the source level of 185 dB RMS calculated in one-third octave band levels (31.5 Hz to 64,000 Hz) for frequency dependent solutions. The frequencies associated with tug sound sources occur within the hearing range of marine mammals in Cook Inlet. Received levels for each hearing marine mammal group based on one-third octave auditory weighting functions were also calculated and integrated into the modeling scenarios of dBSea. For modeling the distances to relevant AUD INJ thresholds, a weighting factor adjustment was not used; instead, the data on the spectrum associated with their source was used and incorporated the full auditory weighting function for each marine mammal hearing group.

The tugs towing the jack-up rig represent a mobile sound source, and tugs holding and positioning the jack-up rig on a platform are more akin to a stationary sound source. Three tugs would be used for towing (mobile) and holding and positioning (stationary) and up to four tugs could be used for positioning (stationary). Consequently, sound TL modeling was undertaken for the various stationary and mobile scenarios for three and four tugs to generate Level A and Level B harassment threshold distances.

For acoustic modeling purposes of the stationary Level A harassment thresholds, two locations representative of where tugs will be stationary while they position the jack-up rig were selected in middle Cook Inlet near the Tyonek Platform and in lower Trading Bay where the production platforms are located. To account for the mobile scenarios, the acoustic model generated Level A and Level B harassment distances along a representative route from the Rig Tenders Dock in Nikiski to the Tyonek platform, the northernmost platform in Cook Inlet (representing middle Cook Inlet), as well as from the Tyonek Platform to the Dolly Varden platform in lower Trading Bay, then from the Dolly Varden platform back to the Rig Tenders Dock in Nikiski. Note that this route is representative of a typical route the tugs may take; the specific route is not yet known, as the order in which platforms will be drilled with the jack-up rig is not yet known. These results were used to calculate Level A and Level B harassment exposure estimates from three mobile tugs towing a jack-up rig. The Level B harassment results were also used to calculate Level B harassment exposure estimates from stationary tugs holding or positioning a jack-up rig, as the mobile route encompassed the stationary modeling points. The locations represent a range of water depths from 18 to 77 m (59 to 253 ft) found throughout the area where Hilcorp would conduct the specified activities.

To identify distances to the 120 dB RMS Level B harassment threshold for both mobile and stationary sources, 100 radials at 25 locations across seasons (represented by May, July, and October) were calculated (table 10) with all three months averaged for that location. Results for each location ranged from 2,866 to 4,694 m. Across all locations, the average stationary and mobile distance to the Level B harassment threshold when three tugs are used is 3,850 m (table 10). Similarly, for four stationary tugs, the distance to the 120 dB RMS threshold was calculated based on an average of 100 radials at two locations, one in Trading Bay and one in middle Cook Inlet, across three seasons (May, July, and October). The average distance to the Level B harassment threshold across those two locations and all three seasons is 4,453 m (table 11). NMFS has determined that 3,850 m and 4,453 m are representative estimates for the extent of the Level B harassment zones for Hilcorp's towing, holding, and positioning activities when using three and four tugs, respectively.

Table 10 -- Average Distances to the Level B Harassment Threshold (120 dB) for Three Tugs Towing (Mobile) and Holding and Positioning for 4 Hours (Stationary)

Location	Average distance to 120 dB threshold (m)			Season average distance to threshold (m)
	May	July	October	
M1	4,215	3,911	4,352	4,159
M2	3,946	3,841	4,350	4,046
M3	4,156	3,971	4,458	4,195
M4	4,040	3,844	4,364	4,083
M5	4,053	3,676	4,304	4,011
M6	3,716	3,445	3,554	3,572
M7	2,947	2,753	2,898	2,866
M8	3,270	3,008	3,247	3,175
M9	3,567	3,359	3,727	3,551
M10	3,600	3,487	3,691	3,593
M11	3,746	3,579	4,214	3,846
M12	3,815	3,600	3,995	3,803
M13	4,010	3,831	4,338	4,060
M14	3,837	3,647	4,217	3,900
M15	3,966	3,798	4,455	4,073
M16	3,873	3,676	4,504	4,018
M18	5,562	3,893	4,626	4,694
M20	5,044	3,692	4,320	4,352
M22	4,717	3,553	4,067	4,112
M24	4,456	3,384	4,182	4,007
M25	3,842	3,686	4,218	3,915
M26	3,690	3,400	3,801	3,630
M27	3,707	3,497	3,711	3,638
M28	3,546	3,271	3,480	3,432
M29	3,618	3,279	3,646	3,514
Average	3,958	3,563	4,029	3,850

Table 11 -- Average Distances to the Level B Harassment Threshold (120 dB) for Four Tugs Positioning (Stationary) for 1 Hour

Location	Average distance to Level B harassment threshold (m)			Season average distance to threshold (m)
	May	July	October	
Trading Bay	4,610	3,850	4,810	4,423
Middle CI	4,820	4,130	4,500	4,483
Average	4,715	3,990	4,655	4,453

The average Level A harassment distances for the stationary, four tug scenario were calculated assuming a SEL of 185.1 dB for a 5-hour exposure duration (table 12). For the mobile three tug scenario, the average Level A harassment distances were calculated assuming a SEL of 185.0 dB with an 18-second exposure period (table 12). This 18-second exposure was derived using the standard TL equation (Source Level − TL = Received Level) for determining threshold distance (R [m]), where TL = $15*Log_{10}(range)$. In this case, the equation was 185.0 dB − $15*Log_{10}(range)$ = 173 dB. Solving for threshold distance (R) yields a distance of approximately 6 m (20 ft), which was then used as the preliminary ensonified radius to determine the duration of time it would take for the ensonified area of the sound source traveling at a speed of 2.06 m/s (4 knots) to pass a marine mammal. The duration (twice the radius divided by speed of the source) that the ensonified area of a single tug would take to pass a marine mammal under these conditions is 6 seconds. An 18-second exposure was used in the model to reflect the time it would take for three ensonified areas (from three consecutive individual tugs) to pass a single point that represents a marine mammal (6 seconds + 6 seconds + 6 seconds = 18 seconds).

Table 12 -- Average Distances to the Level A Harassment Thresholds with a 5-Hour Exposure to Four Stationary Tugs Under Load with a Jack-Up Rig and 18-Second Exposure for Three Mobile Tugs Under Load with a Jack-Up Rig

Location	Season	Average distance (m) to Level A harassment threshold by functional hearing group									
		LF		MF		HF		PW		OW[1]	
		5-hr[1]	18-sec[2]	5-hr[1]	18-sec[2]	5-hr[1]	18-sec[2]	5-hr[1]	18-sec[2]	5-hr[1]	18-sec[2]
Trading Bay	May	181	--[3]	6	--[3]	380	--[3]	84	--[3]	30	--[3]
Trading Bay	July	193	--[3]	12	--[3]	367	--[3]	84	--[3]	36	--[3]
Trading Bay	October	153	--[3]	20	--[3]	399	--[3]	78	--[3]	35	--[3]
Middle Cook Inlet	May	110	--[3]	7	--[3]	331	--[3]	52	--[3]	20	--[3]
Middle Cook Inlet	July	121	--[3]	9	--[3]	337	--[3]	58	--[3]	20	--[3]
Middle Cook Inlet	October	117	--[3]	13	--[3]	344	--[3]	65	--[3]	26	--[3]
Average		146	--[3]	11	--[3]	360	--[3]	70	--[3]	28	--[3]

[1]5-hr thresholds represent three stationary tugs operating for 4 hours and an additional tug added for 1 additional hour for a total of four tugs working over 5 hours. Estimated level A distances do not materially change when adding a fourth tug for 1 of the 5 hours;
[2]18-second thresholds represent three tugs operating under load consecutively.
[3]The estimated Level A harassment distances are smaller than the footprint of the tugs.

Tugs involved in towing, holding, or positioning the jack-up rig are assessed for both production and exploratory drilling operations; the exposure estimate analyses for each activity are conducted separately. Three tugs are anticipated to be towing the jack-up rig from Rig Tenders Dock (mobilization), between platforms (location-to-location transfers), and back to Rig Tenders Dock (demobilization). While under tow, they are considered a mobile sound source for 6 hours in a single day per jack-up rig move between locations over an average distance of 16.77 km (10.42 mi) and for 9 hours in a single day during mobilization and demobilization over a distance up to 64.34 km (40 mi). Up to four tugs are anticipated to be holding or positioning the jack-up rig at the platforms or the Rig Tenders Dock during each move (mobilization, demobilization, and location-to-location transfers) and are considered a stationary sound source for 5 hours in the first day and 5 hours in the second day if a second attempt to pin the jack-up rig is required (note, 5 hours includes three tugs under load with a jack-up rig for 4 hours and four tugs under load with a jack-up rig for up to 1 hour). A second attempt was built into the exposure estimate for each pinning event. See table 1 for details regarding the number of annual pinning events. A summary of the estimated Level A and Level B harassment distances and areas for the various tugging scenarios is provided in table 13.

Table 13 -- Estimated Distances and Areas to the Level A and Level B Harassment Thresholds for the Various Tugging Scenarios

Activity	Level A harassment distance (m) / area (km^2)					Level B harassment distance (m) / area (km^2)
	LF	HF	VHF	PW	OW	
Demobilization / Mobilization						
3 Tugs Towing a Jack-Up Rig – Mobile	--[1] / --	--[1] / --	--[1] / --	--[1] / --	--[1] / --	3,850 / 175.67
3 Tugs Towing a Jack-Up Rig – Stationary for up to 4 hours	146 / 0.07	11 / 0.00	360 / 0.41	70 / 0.02	28 / 0	3,850 / 46.56
4 Tugs Towing a Jack-Up Rig – Stationary for up to 1 hour	146 / 0.07	11 / 0.00	360 / 0.41	70 / 0.02	28 / 0	4,453 / 62.30
Location-to-Location						
3 Tugs Towing a Jack-Up Rig – Mobile	--[1] / --	--[1] / --	--[1] / --	--[1] / --	--[1] / --	3,850 / 541.96
3 Tugs Towing a Jack-Up Rig – Stationary for up to 4 hours	146 / 0.07	11 / 0.00	360 / 0.41	70 / 0.02	28 / 0	3,850 / 46.56
4 Tugs Towing a Jack-Up Rig – Stationary for up to 1 hour	146 / 0.07	11 / 0.00	360 / 0.41	70 / 0.02	28 / 0	4,453 / 62.30

[1]The Level A harassment distances are smaller than the footprint of the tugs.

Calculations for Pipeline Replacement/Installation Using Lay Barge Methodology. Pipeline replacement/installation using lay barge methods entails anchor handling, setting, and retrieving, as well as tugs holding the barge against the current between tides. To determine source levels for anchor handling, Hilcorp consulted the tug operators, who are considered subject experts, to determine power usage for one tug anchor handling and two tugs anchor handling or holding against the tides. They reported that both tugs would operate at 50 percent power output. Because this power output is consistent with that assumed for tugs towing a jack-up rig, the same modeling methodology and sound source data was proposed. Based on the tug operators' description of 50 percent power output while anchor handling, as well as the situation wherein two tugs are working together holding a barge in place between slack tides, a conservative source level of 180 dB for a single tug and 183 dB for two tugs were proposed to estimate the distance ensonified for anchor handling and barge holding, respectively, during the pipeline replacement activities. NMFS concurs that these source levels are appropriate proxies for anchor handling as specified by Hilcorp.

Eight anchors would be set from a fixed, stationary position. Setting an anchor would require one AHT, operating at an average of 50 percent power for 1 hour to set one anchor during slack tide. Four slack tides occur daily with approximately 4.5 hours of incoming or outgoing tide between them. Four anchors would be set during the four slack tides in 1 day using AHT-1 (up to 4 hours in a 24-hour period). Between anchor settings and during slack tides, AHT-2 (plus an assist tug [*i.e.*, two tugs]) would average 50 percent power to hold the barge in place against the current for approximately 4.5 hours (up to 18 hours per 24-hour period). During this time, AHT-1 would be idle while AHT-2 and the assist tug hold the barge against the tide. During a 24-hour period of setting four anchors, AHT-1 would operate at an average of 50 percent power for 4 hours (during each slack tide), followed by AHT-2 and an assist tug working at an average of 50 percent power during each incoming or outgoing tide for approximately 4.5 hours between each slack tide. This pattern would continue until all eight anchors are set over 2 days.

Hilcorp modeled Level A harassment distances for anchor setting at three sites with representative depths for this activity, including a deep-water site (site 3 at 153 m [502 ft] depth; table 14; see table 19 of Hilcorp's application for more details regarding modeled locations). The distances to the Level B harassment threshold were calculated as the maximum distances derived for the shallow modeled locations (*i.e.*, scenarios 1 and 2) assuming a stationary single tug operating while anchor handling (2,890 m, 26.24 km^2) and two stationary tugs operating together to hold the pipelay barge at 50 percent power (3,740 m, 43.94 km^2) (see tables 22 and 23 in Hilcorp's application for more details regarding modelled scenarios).

Table 14 -- Estimated Distances and Areas to the Level A Harassment Thresholds for Anchor Setting on Days 1 and 2

Scenario	Location (depth)	Season	Source Level(s) (RMS dB re 1 µPa) and Durations	Average Distance (m) to Level A Thresholds				
				LW	HF	VHF	PW	OW
Day 1								
1	Middle Cook Inlet (21 m)	July	AHT-1: 180 dB (4 hours); AHT-2 and Assist: 183 dB (18 hours)	294	208	1,392	337	251
2	Trading Bay (36 m)	July	AHT-1: 180 dB (4 hours); AHT-2 and Assist: 183 dB (18 hours)	303	225	1,399	360	266
3	Trading Bay (153 m)	July	AHT-1: 180 dB (4 hours); AHT-2 and Assist: 183 dB (18 hours)	68	37	637	94	52
Average Distance (m) and Area (km^2)				222 (0.15)	157 (0.08)	1,143 (4.10)	264 (0.22)	190 (0.11)
Day 2								
1	Middle Cook Inlet (21 m)	July	AHT-1: 180 dB (4 hours); AHT-2 and Assist: 183 dB (13.5 hours[1])	268	182	1,262	311	225
2	Trading Bay (36 m)	July	AHT-1: 180 dB (4 hours); AHT-2 and Assist: 183 dB (13.5 hours[1])	277	204	1,232	324	240
3	Trading Bay (153 m)	July	AHT-1: 180 dB (4 hours); AHT-2 and Assist: 183 dB (13.5 hours[1])	63	31	522	84	42
Average Distance (m) and Area (km^2)				203 (0.13)	137 (0.06)	1,005 (3.18)	240 (0.18)	169 (0.09)

[1]On Day 2, AHT-2 and the assist tug would be used for only 13.5 hours because, after the third tidal cycle, all eight anchors would be set.

Once all eight anchors are set, the barge would be moved every 305 m (1,000 ft) along the pipeline route. Each time the barge needs to be repositioned, AHT-1 would be used at half power (50 percent) for anchor handling. During the pipelay, each anchor move takes approximately 15 minutes; however, each anchor would be moved individually resulting in an intermittent process. During pipelay activities, a single tug would be anchor handling for an average of 2 hours per day over an average distance of approximately 0.29 km (951 ft) resulting in a Level B harassment ensonified area of 27.89 km^2 (10.77 mi^2). Pipe laying would occur over 8 days.

Anchor retrieval would occur from a fixed, stationary position. There would be eight anchors, and recovery would occur during each of the four slack tides in 1 day. Retrieving anchors would be faster than anchor setting because it would be easier for the tug crew to capture the anchor from its fixed position on the seafloor than to initially set the anchors (refer to the description above). Two anchors could be retrieved during 1 hour at slack tide; therefore, all eight anchors could be retrieved within 24 hours.

AHT-1 would retrieve anchors during slack tide (slack tides are approximately 1 hour in duration). While AHT-1 is retrieving anchors, AHT-2 would be idle. Then, when the tide is coming in or going out, AHT-1 and AHT-2 would hold the barge against the tide for approximately 4.5 hours using an average of 50 percent power between slack tides. All eight anchors would be retrieved during four slack tides within 1 day. Hilcorp assumes that AHT-1 will retrieve two anchors during slack tides (*i.e.*, a total of 4 hours), and that AHT-1 and AHT-2 would be used for a total of 13.5 hours when they are holding the barge against the incoming or outgoing tide. The distance to the Level B harassment thresholds for anchor retrieval were calculated the same as for anchor setting (*i.e.*, the maximum distances derived for the shallow modeled locations (*i.e.*, scenarios 1 and 2) assuming a stationary single tug operating while anchor handling (2,890 m, 26.24

km^2) and two stationary tugs operating together to hold the pipelay barge at 50 percent power (3,740 m, 43.94 km^2)).

Pipelaying and anchor retrieval is anticipated to occur in shallower waters than anchor setting, thus Hilcorp calculated the average distances to the Level A harassment thresholds while pipelaying during pipeline replacement and/or installation and during anchor retrieval for the two shallow scenarios (*i.e.*, scenarios 1 and 2) (table 15). The maximum calculated distances are used to calculate exposure estimates as described below.

Table 15 -- Estimated Distances and Areas to the Level A Harassment Thresholds for Pipe Lay Operations and Anchor Retrieval Operations

Scenario	Location (depth)	Season	Source Level(s) (RMS dB re 1 µPa) and Durations	Average Distance (m) to Level A Thresholds				
				LW	HF	VHF	PW	OW
Pipe Lay Operations								
1	Middle Cook Inlet (21 m)	July	AHT-1: 180 dB (2 hours)	9	0	294	26	9
2	Trading Bay (36 m)	July	AHT-1: 180 dB (2 hours)	84	37	496	120	57
Maximum Distance (m) and Area (km^2)				84 (0.07)	37 (0.03)	496 (1.06)	120 (0.11)	57 (0.04)
Anchor Retrieval								
1	Middle Cook Inlet (21 m)	July	AHT-1: 180 dB (4 hours); AHT-2 and Assist: 183 dB (13.5 hours)	268	182	1,262	311	225
2	Trading Bay (36 m)	July	AHT-1: 180 dB (4 hours); AHT-2 and Assist: 183 dB (18 hours)	277	204	1,232	324	240
Maximum Distance (m) and Area (km^2)				277 (0.24)	204 (0.13)	1,262 (5.00)	324 (0.33)	240 (0.18)

Calculations for Pipeline Replacement/Installation Using Pipe Pull Methodology. Pipeline replacement/installation using pipe pulling methods would involve two tugs engaged in pipe pulling operations. Bottom impact sounds would be generated from the pipe interacting with the seafloor during the pipe pulling. In lieu of information more specific to the area and activity, which is currently unavailable, Hilcorp used the modeling undertaken for tugs towing a jack-up rig as a proxy for pipe-pulling based on discussions with pipe-pulling tug operators regarding the anticipated tug energy output. Lawrence *et al.* (2024) reported that the entire 3-tug convoy towing a jack-up rig in their analysis acted as a single point sound source. The spatial arrangement of the three tugs during the towing of the jack-up rig (two tugs in front and one in the rear) aligns with the configuration used for pipe pulling operations with two tugs at the front, emitting sound, while the interaction of the pipeline with the seafloor creates bottom impact sounds at the rear. The sound source levels considered for the single point source during pipe pulling operations are based on the following concurrent sound sources: one primary tug operating at a maximum power output of 85 percent while actively engaged in pipe pulling (205.9 dB RMS; Lawrence *et al.,* 2022 updated to be consistent with NMFS 2024), one assisting tug operating at an average power output to provide navigation support during pipe pulling activity (180 dB RMS; Lawrence *et al.,* 2022 updated to be consistent with NMFS 2024), and the production of sounds resulting from the interaction between the pipeline and the seafloor as the pulling process takes place (*i.e.*, bottom impact sounds) (132.7 dB RMS; Castellote, 2019). These three sound sources would occur concurrently, and thus are treated as a single sound source, represented by the primary tug's source level (*i.e.,* 205.9 dB RMS).

Pipe pulling is considered a mobile, continuous sound source and would occur for an average of 3 hours per day for a total of 24 hours over 8 days to complete the 2,286 m (7,500 ft) pipelay. Hilcorp anticipates that approximately 305 m (1,000 ft) of pipe would be laid each day. Hilcorp used the NMFS User Spreadsheet to calculate Level A harassment isopleths for pipe pulling activities. This tool requires the use of a source level at 1 m and a TL coefficient of 20*Log_{10}(range) for mobile, non-impulsive, continuous sources, such as pipe pulling; however, the proxy source level for this activity as described above (*i.e.,* 205.9 dB RMS) was determined using a TL coefficient of 23*Log_{10}(range) and is assumed for a 10 m distance (Lawrence *et al.*, 2022). Therefore, Hilcorp adjusted the proxy source level to account for these requirements to 193.29 dB RMS at 1 m (see section 6.2.5.1 of Hilcorp's application for additional technical details) and assumed a source velocity of 0.358 m/s (1 kn); NMFS finds this approach reasonable. To calculate the estimated Level B harassment isopleth (which does not require the use of a source level at 1 m and a TL coefficient of 20*Log_{10}(range)), Hilcorp assumed an unweighted sound source level of 205.9 dB and a TL coefficient of 23.1*Log_{10}(range). Estimated distances to the Level A and Level B harassment thresholds for pipe pulling are provided in table 16.

Table 16 -- Estimated Distances and Areas to the Level A and Level B Harassment Thresholds for Pipe Pull Operations

Source Level(s) (RMS dB re 1 μPa) and Source Velocity	Distance (m) and Area (km^2) to Level A Thresholds					Distance (m) and Area (km^2) to the Level B Thresholds
	LW	HF	VHF	PW	OW	
193.29 dB (0.3858 m/s)	3.39 (0.01)	0.81 (0.00)	2.51 (0.01)	4.96 (0.01)	0.97 (0.00)	5,150 (95.87)

Marine Mammal Occurrence

In this section we provide information about the occurrence of marine mammals, including density or other relevant information which will inform the take calculations.

Densities for marine mammals in Cook Inlet were derived from NMFS' AFSC Marine Mammal Laboratory (MML) aerial surveys, typically flown in June, from 2000 to 2022 (Rugh *et al.*, 2005; Shelden *et al.*, 2013, 2015b, 2017, 2019, 2022; Goetz *et al.*, 2023). While the surveys are concentrated for a few days in summer annually, which may skew densities for seasonally present species, they represent the best available long-term dataset of marine mammal sightings available in Cook Inlet. Densities were calculated by summing the total number of animals observed during the MML surveys and dividing the number sighted by the approximate area of Cook Inlet. For CIBWs, several correction factors were applied to the density estimates to address perception, availability, and proximity bias; correction factors were not applied to the non-CIBW density estimates. For CIBWs, densities were derived for the entirety of Cook Inlet as well as for middle and lower Cook Inlet; for non-CIBW marine mammals, densities account for both lower and upper Cook Inlet. There are no density estimates available for California sea lions and Pacific white-sided dolphins in Cook Inlet, as they were so infrequently sighted. Average densities across survey years are presented in table 17.

CIBW densities estimated from the MML surveys across regions are low, however, there is a known effect of seasonality on their distribution. Thus, densities derived directly from these summer surveys might underestimate the density of CIBWs in lower Cook Inlet at other ice-free times of the year. Therefore, additional CIBW densities were considered as a comparison of available data. The other mechanism for arriving at CIBW density considered here is the Goetz *et al.* (2012a) habitat-based model. This model is derived from sightings and incorporates depth soundings, coastal substrate type, environmental sensitivity index, anthropogenic disturbance, and anadromous fish streams to predict densities throughout Cook Inlet. The output of this model is a density map of Cook Inlet, which predicts spatially explicit density estimates for CIBW. Using the resulting grid densities, average densities were calculated for two regions applicable to Hilcorp's operations (table 17). The densities applicable to the area of activity (*i.e.,* the North Cook Inlet Unit density for middle Cook Inlet activities and the Trading Bay density for activities in Trading Bay) are provided in table 9 above and were carried forward to the exposure estimates as they were deemed to likely be the most representative estimates available. Likewise, when a range is given, the higher end of the range was used to calculate exposure estimates (*i.e.,* Trading Bay in the Goetz model has a range of 0.004453 to 0.015053; 0.015053 was used for the exposure estimates).

Table 17 -- Average Densities of Marine Mammal Species in Cook Inlet

Species	Density (individuals per km^2)[1]
Humpback whale	0.00185
Minke whale	0.00003
Gray whale	0.00007
Fin whale	0.00028
Killer whale	0.00061
Beluga whale (Entire Cook Inlet)	0.07166
Beluga whale (Middle Cook Inlet)	0.00658
Beluga whale (Lower Cook Inlet)	0.00003
Beluga whale (North Cook Inlet)[2]	0.00166
Beluga whale (Lower Cook Inlet)[2]	0.00000
Beluga whale (Trading Bay)[2]	0.01505
Dall's porpoise	0.00014
Harbor porpoise	0.00380
Pacific white-sided dolphin	N/A[3]
Harbor seal	0.26819
Steller sea lion	0.00669
California sea lion	N/A[3]

[1]Density estimates are derived from MML surveys unless otherwise identified.
[2]Density estimates are derived from the Goetz *et al*. (2012a) habitat-based model.
[3]Density estimates are not available in Cook Inlet for this species.

Take Estimation

Here we describe how the information provided above is synthesized to produce a quantitative estimate of the take that is reasonably likely to occur and proposed for authorization. For stationary activities (e.g., pile driving), potential take, by Level A harassment and Level B harassment, was quantified using the following equation: (density) x (ensonified area) x (proportion of the day activities would occur) x (number of piles/moves per day) x (total number of piles/moves). For mobile activities, potential take, by Level A harassment and Level B harassment, was quantified using the following equation: (density) x (area) x (number of days). The estimated exposures for each activity in a given year (see table 1) were then summed to estimate total annual exposures (see tables 38, 39, 40, 41, and 42 in Hilcorp's application for individual exposure estimates per year and per activity). A summary of the maximum annual and total estimated exposures is provided in table 18. There are no estimated exposures based on this method of calculation for California sea lions and Pacific white-sided dolphins because the assumed density of these species in Cook Inlet is 0.00 animals per km^2.

Harassment in the form of AUD INJ from tugs towing, holding, or positioning a jack-up rig as well as for pipeline projects using pipe pull methods is not anticipated for any species in any year due to the small size of the estimated Level A harassment distances (*i.e.*, ≤ 360 m), which are calculated assuming that an animal would remain within those distances of the source for several hours of noise-producing activity. Given that the locations of the specified activities are not in any areas known to be essential habitat for any marine mammal species with extreme site fidelity over the course of the planned activities, in addition to the exposure estimates for take by Level A harassment being zero or less than 0.01 for these activities for all species (see tables 38, 39, 40, 41, and 42 in Hilcorp's application), the mobile nature of marine mammals, and the general tendencies of most marine mammals to avoid loud noises, AUD INJ is unlikely to result from these activities. Therefore, Hilcorp has not requested, and NMFS is not proposing to authorize, takes by Level A harassment for these activities. Hilcorp has requested authorization of take by Level A harassment incidental to pile driving activities and for the pipeline project using lay barge methods (*i.e.*, anchor handling) based on the larger estimated size of ensonified Level A harassment zones. While it is not likely that a mobile, marine mammal would be within these zones for a duration long enough to incur AUD INJ, it may occur and NMFS has proposed to authorize some take by Level A harassment for 10 marine mammal species as a result of Hilcorp's request (table 18).

Table 18 – Modeled Maximum Estimated Exposures per Each Year of Activities for Each Species

Species	Year 1		Year 2		Year 3		Year 4		Year 5	
	Level A	Level B	Level A	Level B	Level A	Level B	Level A	Level B	Level A	Level B
Humpback whale	0.294	3.555	0.344	4.161	0.294	3.555	0.370	5.006	0.294	3.555
Minke whale	0.004	0.054	0.005	0.064	0.004	0.054	0.006	0.076	0.004	0.054
Gray whale	0.011	0.128	0.012	0.150	0.011	0.128	0.013	0.180	0.011	0.128
Fin whale	0.044	0.532	0.050	0.622	0.044	0.532	0.055	0.748	0.044	0.532
Killer whale	0.002	1.178	0.002	1.379	0.002	1.178	0.002	1.659	0.002	1.178
Beluga whale	0.017	15.998	0.032	26.565	0.017	15.998	0.021	23.296	0.017	15.998
Dall's porpoise	0.052	0.263	0.061	0.308	0.052	0.263	0.066	0.371	0.052	0.263
Harbor porpoise	1.448	7.313	1.703	8.559	1.448	7.313	1.821	10.297	1.448	7.313
Pacific white-sided dolphin	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Harbor seal	33.706	516.411	38.434	604.395	33.706	516.411	42.366	727.166	33.706	516.411
Steller sea lion	0.117	12.884	0.136	15.079	0.117	12.884	0.147	18.142	0.117	12.884
California sea lion	0.000	0.000	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000

As described in the **Description of Proposed Activity** section of this proposed rule, pipeline/installation presents multiple execution methodologies. Hilcorp calculated estimated exposures for the various pipeline/installation scenarios (see table 1) and requested an equal amount of take. The greatest annual estimated exposure scenario for CIBWs resulted from the following activities occurring in Year 2: two lay barge projects (Scenario 2), winter pile driving at the Tyonek platform, tugs under load with a jack-up rig, and exploratory drilling (one well) between the Anna & Bruce platforms. The greatest annual estimated exposure scenario for all other marine mammals resulted from the following activities occurring in Year 4: exploratory drilling (two wells) in the MGS Unit, tugs under load with a jack-up rig, winter pile driving at Tyonek, and pipe pulling (Scenario 1).

Generally, annual exposure estimates calculated by Hilcorp were rounded up to the nearest whole number. However, for CIBWs, the maximum annual exposure estimate for Level A harassment (*i.e.*, 0.032) was rounded down to zero based on the expected effectiveness of proposed mitigation requirements, and takes by Level A harassment were not requested and are not proposed to be authorized for this species. In addition, requested and proposed take was adjusted up for species where the calculated exposure estimates were less than the estimated group size for that species to reflect more realistic potential versus using a density-based exposure estimate alone. Explanations for species for which take proposed to be authorized is greater than the calculated exposure estimates are included below.

Hilcorp used these two scenario combinations of activities to calculate the maximum annual exposures for each species. In their application, Hilcorp assumed the annual worst-case scenario would occur every year due to potential shifts in activity timing (*i.e.*, maximum annual take x 5 years). However, NMFS recalculated the total 5-year take estimates to more accurately reflect the potential for take due to the total amount of activity proposed. Because the amount of take requested for many species reflected group sizes, there was no change between the total amount of take proposed to be authorized between the application and this proposed rule. For CIBWs, harbor porpoise, harbor seals, Steller sea lions, and California sea lions, the total amount of take proposed to be authorized over the 5-year period is less than that included in Hilcorp's application. Annual exposure estimates and the amount of take NMFS proposes to authorize annually and across 5 years is provided in table 19.

Table 19 – Calculated Maximum Exposure Estimates and Total Proposed Take by Level A and Level B Harassment as a Percentage of Species, Stock, and Stock Abundance

Species	Stock	Level A Harassment		Level B Harassment		Total Annual Proposed Take		Total 5-Year Proposed Take		
		Maximum Annual Estimated Exposures	Annual Proposed Take	Maximum Annual Estimated Exposures	Annual Proposed Take	Total Annual Proposed Take	Percentage of the Population[1]	Level A Harassment	Level B Harassment	Level A and Level B Harassment
Humpback whale*	Mexico North Pacific	0.370	1	5.006	6	7	unk[2]	5	30	35
	Western North Pacific						0.65			
	Hawai'i						0.06			
Minke whale*	Alaska	0.006	1	0.076	3	4	unk[2]	5	15	20
Gray whale*	Eastern Pacific	0.013	1	0.180	5	6	0.02	5	25	30
Fin whale*	Northeastern Pacific*	0.055	1	0.748	3	4	<0.01[3]	5	15	20
Killer whale*	Alaska Resident	0.002	1	1.659	10	11	0.57	5	50	55
	Alaska Transient						1.87			
Beluga whale	Cook Inlet	0.032	0	26.565	27	27	9.68	0	94	94
Dall's porpoise*	Alaska	0.066	1	0.371	10	11	unk[2]	5	50	55
Harbor porpoise	Gulf of Alaska	1.821	4	10.29	11	15	0.05[4]	10	44	54
Pacific white-	North Pacific	0	0	0	3	3	0.01	0	15	15

sided dolphin**										
Harbor seal	Cook Inlet/ Shelikof	42.366	43	727.166	728	771	2.71	184	2,884	3,068
Steller sea lion	Western United States	0.147	1	18.142	19	20	0.04	5	74	79
California sea lion**	United States	0.000	0	0.000	2	2	0.00	0	10	10

[1] The values presented here conservatively assume each take authorized is of a different individual of any given stock (*i.e.*, repeated exposures do not occur). However, for some species, individuals are more likely to be exposed on different days (*e.g.*, seals or a Steller sea lion may remain in an area and be exposed on multiple days) which would reduce the percent of population taken.
[2] Population estimates are not available for these stock and a percentage of proposed take for this stock cannot be calculated. Please see Friday *et al.*, (2013) and Zerbini *et al.*, (2006) for additional information on numbers of minke whales in Alaska.
[3] This value is calculated using the best provisional estimate (N) of 3,168 from the 2013 survey (NMFS, 2020).
[4] The best available abundance estimate (n= 31,046) used to determine the percentage of population is more than 25 years old (NMFS, 2024).
[*]Signifies species for which group behavior influenced the amount of Level B harassment to be authorized.
[**] Signifies species for which Level B harassment was based on the number of individuals sighting during past project monitoring as exposures were not modeled due to lack of density data.

During annual aerial surveys conducted in Cook Inlet from 2000 to 2016, humpback group sizes ranged from 1 to 12 individuals, with most groups comprised of 1 to 3 individuals (Shelden *et al.*, 2013). Three humpback whales were observed in Cook Inlet during SAExploration's seismic study in 2015: two near the Forelands and one in Kachemak Bay (Kendall and Cornick, 2015). In total, 14 sightings of 38 humpback whales (ranging in group size from 1 to 14) were recorded in the 2019 Hilcorp lower Cook Inlet seismic survey in the fall (Fairweather Science, 2020). Two sightings totaling three individual humpback whales were recorded near Ladd Landing north of the Forelands on the recent Harvest Alaska CIPL Extension Project (Sitkiewicz *et al.*, 2018). Commensurate with the maximum calculated exposure estimates, Hilcorp has requested, and NMFS proposes to authorize, one take by Level A harassment per year for humpback whales. Based on documented observations from the CIPL Extension Project, which is the data closest to the specific geographic region, Hilcorp has requested, and NMFS is proposing to authorize, an annual maximum of six takes per year by Level B harassment for this species, which is slightly greater than the maximum calculated exposures using the methods described above (5.006, table 19).

Minke whales usually travel in groups of two to three individuals (NMFS, 2023b). During Cook Inlet-wide aerial surveys conducted from 1993 to 2004, minke whales were encountered three times (1998, 1999, and 2006), all were observed off Anchor Point (Shelden *et al.*, 2013, 2015b, and 2017). Several minke whales were recorded off Cape Starichkof in early summer 2013 during exploratory drilling (Owl Ridge, 2014), suggesting this location is regularly used by minke whales year-round. During Apache's 2014 survey, a total of two minke whale groups (three individuals) were observed. One sighting occurred southeast of Kalgin Island while the other sighting occurred near Homer (Lomac-MacNair *et al.*, 2014). SAExploration noted one minke whale near Tuxedni Bay in 2015 (Kendall and Cornick, 2015). Eight sightings of eight minke whales were recorded in the 2019 Hilcorp lower Cook Inlet seismic survey (Fairweather Science, 2020). During a June aerial survey in 2021 three minke whales were observed near Anchor Point (Shelden *et al.*, 2022) and a single minke whale was observed during Hilcorp's marine vibroseis seismic survey in 2024 near Anchor Point. Commensurate with the maximum calculated exposure estimates, Hilcorp has requested, and NMFS proposes to authorize, one take by Level A harassment per year for minke whales. Based on these observations of group size and consistency of sightings in Cook Inlet, Hilcorp has requested, and NMFS proposes to authorize, three takes by Level B harassment per year for minke whales. This is higher than the exposure estimate (*i.e.*, 0.076, table 19) to allow for the potential occurrence of a group, or several individuals, each year.

During Apache's 2012 seismic program, nine sightings of a total of nine gray whales were observed in June and July along the western side of middle Cook Inlet and northern Trading Bay; areas within the specific geographic area of Hilcorp's specified activities (Lomac-MacNair *et al.*, 2013). In 2014, one gray whale was observed during Apache's seismic program (Lomac-MacNair *et al.*, 2014) and in 2015, no gray whales were observed during SAExploration's seismic survey (Kendall and Cornick, 2015). No gray whales were observed during the 2018 CIPL Extension Project (Sitkiewicz *et al.*, 2018) or during the 2019 Hilcorp seismic survey in lower Cook Inlet (Fairweather Science, 2020). Three sightings of individual gray whales have also been observed near the POA and Port Woronzof in 2020 and 2021 (61 N Environmental 2021, 2022a; Easley-Appleyard and Leonard 2022). The greatest densities of gray whales in Cook Inlet occur from November through January and March through May; the former are southbound, the latter are northbound (Ferguson *et al.*, 2015). Commensurate with the maximum calculated exposure estimates, Hilcorp has requested, and NMFS proposes to authorize, one take by Level A harassment per year for gray whales. Based on the recent sightings of gray whales in upper Cook Inlet, observations made in the specified geographic area and known group size, Hilcorp has requested, and NMFS has proposed to authorize, five takes by Level B harassment per year for gray whales. This is higher than the exposure estimate (*i.e.,* 0.180, table 19) to allow for the potential occurrence of a group, or several individuals, particularly during the fall shoulder season during the higher density periods mentioned above.

Fin whales most often travel alone, although they are sometimes seen in groups of two to seven individuals. During migration they may be in groups of 50 to 300 individuals (NMFS, 2010). During the NMFS aerial surveys in Cook Inlet from 2000 to 2018, 10 sightings of 26 estimated individual fin whales were recorded in lower Cook Inlet (Shelden *et al.*, 2013, 2015b, and 2017; Shelden and Wade, 2019). Wild *et al.* (2023) identified areas south of the mouth of Cook Inlet as a fin whale feeding BIA from June to September with an importance score of 1 and an intensity score of 1 (see Harrison *et al.*, 2023 for more details regarding BIA scoring). As such, the potential for fin whales to occupy waters adjacent to the BIA during that time period and near the specified area may be higher. Acoustic detections of fin whales were recorded during passive acoustic monitoring in the fall of 2019 (Castellote *et al.*, 2020). Additionally, during seismic surveys conducted in 2019 by Hilcorp in lower Cook Inlet, 8 sightings of 23 fin whales were recorded in groups ranging in size from 1 to 15 individuals (Fairweather Science, 2020). The higher number of sightings in a single year relative to the multi-year NMFS aerial surveys flown earlier in season each year suggests fin whales may be present in greater numbers in the fall. Commensurate with the maximum calculated exposure estimates, Hilcorp has requested, and NMFS proposes to authorize, one take by Level A harassment per year for fin whales. Given the possible presence of fin whales, Hilcorp has requested, and NMFS has proposed to authorize, three takes by Level B harassment per year for fin whales during Hilcorp’s planned activities.

Killer whale pods typically consist of a few to 20 or more animals (NMFS, 2023c). During seismic surveys conducted in 2019 by Hilcorp in lower Cook Inlet, 21 killer whales were observed. Although also observed as single individuals, killer whales were recorded during this survey in groups ranging in size from two to five individuals (Fairweather Science, 2020). One killer whale group of two individuals was observed during the 2015 SAExploration seismic program near the North Foreland (Kendall and Cornick, 2015). Passive acoustic monitoring efforts throughout Cook Inlet documented killer whales at the Beluga River, Kenai River, and Homer Spit. These detections were likely resident killer whales since transient killer whales tend to move quietly through waters to track marine mammal prey (Small 2010; Lammers *et al.*, 2013). In addition, two killer whales were sighted offshore of Point Woronzof in upper Cook Inlet in September 2021 (61 North Environmental 2022a). Commensurate with the maximum calculated exposure estimates, Hilcorp has requested, and NMFS proposes to authorize, one take by Level A harassment per year for killer whales. Based on recent documented sightings, observed group sizes, and the established presence of killer whales in Cook Inlet, Hilcorp has requested, and NMFS has proposed to authorize 10 takes by Level B harassment per year for killer whales. This will account for two sightings with a group size of five individuals, which represents the upper end of recorded group size in recent surveys conducted in Cook Inlet.

The 2018 MML aerial survey (Shelden and Wade, 2019) reported a median CIBW group size estimate of approximately 11 whales, although estimated group sizes were highly variable (ranging from 2 to 147 whales) as was the case in previous survey years (Boyd *et al.*, 2019). The median group size during 2021 and 2022 MML aerial surveys was 34 and 15, respectively, with variability between 1 and 174 between the years (Goetz *et al.*, 2023). Additionally, vessel-based surveys in 2019 found CIBW groups in the Susitna River Delta (roughly 24 km north of the Tyonek Platform) that ranged from 5 to 200 animals (McGuire *et al.*, 2022). However, the very large groups seen in the Susitna River Delta are not expected near Hilcorp's activities because groups of this size have not been observed or documented outside river deltas in upper Cook Inlet. During Hilcorp's jack-up rig move in May 2024, approximately 25 CIBWs were sighted outside of the aerial survey area, approximately 20 of which were at the mouth of the Big Susitna River (Horsley and Larson 2024). One sighting of 3 CIBWs was also reported near the Tyonek Platform during Hilcorp's October jack-up rig move (Horsley *et al.*, 2024). Hilcorp is not requesting, and NMFS is not proposing to authorize, any take by Level A harassment for CIBWs and none is expected. Hilcorp is requesting, and NMFS is proposing to authorize, a maximum of 27 takes in any given year by Level B harassment, which is commensurate with the maximum estimated exposure estimate with Year 2, Scenario 2, and would allow for the possibility of one observation of the 2022 mean group size of 15 whales in Cook Inlet, plus a few smaller groups and individuals. Across the effective period of the 5-year LOA, no more than 94 takes are proposed to be authorized.

Dall's porpoises are usually found in groups averaging between 2 and 12 individuals (NMFS, 2023d). The 2012 Apache survey recorded two groups of three individual Dall's porpoises (Lomac-MacNair *et al.*, 2014). During seismic surveys conducted in 2019 by Hilcorp in lower Cook Inlet, Dall's porpoises were recorded in groups ranging from two to seven individuals (Fairweather Science, 2020). During Hilcorp's 2023 jack-up rig move in June, one Dall's porpoise was sighted by a PSO in middle Cook Inlet, just offshore from Rig Tenders Dock (Horsley and Larson 2023). Commensurate with the maximum calculated exposure estimates, Hilcorp has requested, and NMFS proposes to authorize, one take by Level A harassment per year for Dall's porpoises. Based on observed group size and frequency of recent observations of Dall's porpoise in the specified geographic area, Hilcorp has requested, and NMFS has proposed to authorize, 10 takes by Level B harassment per year for this species. This is greater than the estimated exposure estimate for this species (0.371, table 10), but will allow for at least one group at the higher end of documented group size or a combination of small groups plus individuals.

Harbor porpoises are most often seen in groups of two to three (NMFS, 2023e); however, based on observations during project-based marine mammal monitoring, they can also occur in larger group sizes. Shelden *et al.* (2014) compiled historical sightings of harbor porpoises from lower to upper Cook Inlet that spanned from a few animals to 92 individuals. The 2018 CIPL Extension Project that occurred in middle Cook Inlet reported 29 sightings of 44 individuals (Sitkiewicz *et al.*, 2018). Fifteen harbor porpoise sightings of 18 individuals and 22 harbor porpoise sightings of 27 individuals were observed in upper Cook Inlet near the POA in 2020 and 2021, respectively (61 North Environmental 2021, 2022). During jack-up rig moves in 2021, a PSO observed an individual harbor porpoise in middle Cook Inlet in July and another in October (Horsley and Larson 2023). Additionally, another harbor porpoise was sighted during the June 2023 jack-up rig move in middle Cook Inlet (Horsley and Larson 2023). Hilcorp is requesting, and NMFS is proposing to authorize, four takes by Level A harassment each year for harbor porpoises, and 11 takes by Level B harassment per year for this species (but no more than 44 takes occurring across the 5-year effective period of the LOA). The amount of take requested and proposed for Level A harassment is higher than the maximum annual exposure estimate (*i.e.*, 1.821, table 19) to account for the less-known winter distribution of harbor porpoises, which also may travel in groups. The proposed amount of take by Level B harassment would allow for multiple group sightings across a year and is commensurate with the maximum annual exposure estimate (*i.e.*, 10.297, table 19).

Recent data specific to Pacific white-sided dolphins within Cook Inlet are lacking, and the calculated exposure estimate is zero based on the paucity of sightings of this species in this region (table 19). However, Pacific-white sided dolphins have been observed in Cook Inlet. During an aerial survey in May 2014, Apache observed three Pacific white-sided dolphins near Kenai. No large groups of Pacific white-sided dolphins have been reported within Cook Inlet, although acoustic detections of several Pacific white-sided dolphins were recorded near Iniskin Bay during Hilcorp's 3D seismic survey in 2020. Prior to this, only one other survey in the last 20 years noted the presence of Pacific white-sided dolphins (three animals) within Cook Inlet. As a result of the dearth of current data on this species, an accurate density for Pacific white-sided dolphins in the specific project region has not been generated. However, based on the possibility of this species present near Hilcorp's specified activities, NMFS proposes to authorize three takes by Level B harassment per year for Pacific white-sided dolphins, the maximum number of Pacific white-sided dolphins that have been recorded in the somewhat recent past in Cook Inlet. This is consistent with recent IHAs issued to Hilcorp for similar activities (87 FR 62364, October 14, 2022; 89 FRN 79529, September 30, 2024). Hilcorp has not requested, and NMFS is not proposing to authorize, take by Level A harassment for this species, and none is expected.

Harbor seals are often solitary in water but can haul out in groups of a few to thousands (ADF&G, 2022). Given their known presence in the study region, Hilcorp has requested, and NMFS has proposed to authorize, a maximum of 43 takes by Level A harassment and 728 takes by Level B harassment in any given year for harbor seals, which is commensurate with the maximum annual calculated exposure estimates (table 19). Across the 5-year effective period, NMFS has proposed to authorize a maximum of 184 takes by Level A harassment and 2,884 takes by Level B harassment.

Steller sea lions tend to forage individually or in small groups (Fiscus and Baines, 1966) but have been documented feeding in larger groups when schooling fish were present (Gende *et al.*, 2001). Steller sea lions have been observed during marine mammal surveys conducted in Cook Inlet. During NMFS CIBW aerial surveys from 1993 to 2022, 64 sightings of 1,111 individual Steller sea lions mostly in lower Cook Inlet were reported (Shelden *et al.*, 2017; Shelden *et al.*, 2022). In 2012, during Apache's 3D seismic survey, three sightings of approximately four individuals in upper Cook Inlet were reported (Lomac-MacNair *et al.*, 2013). Marine mammal observers associated with Buccaneer's drilling project off Cape Starichkof observed seven Steller sea lions during the summer of 2013 (Owl Ridge, 2014). During SAExploration's 3D Seismic Program in 2015, four Steller sea lions were observed in Cook Inlet. One sighting occurred between the West and East Forelands, one occurred near Nikiski, and one occurred northeast of the North Foreland in the center of Cook Inlet (Kendall and Cornick, 2015). During NMFS CIBW aerial surveys from 2000 to 2016, 39 sightings of 769 estimated individual Steller sea lions in lower Cook Inlet were reported (Shelden *et al.*, 2017). During a waterfowl survey in upper Cook Inlet, an observer documented an estimated 25 Steller sea lions hauled out at low tide in the Lewis River on the west side of Cook Inlet (K. Lindberg, pers. comm., August 15, 2022). Steller sea lions have also been observed during marine mammal monitoring at the POA (*e.g.*, Easley-Appleyard and Leonard, 2022). Hilcorp reported one sighting of two Steller sea lions while conducting pipeline work in upper Cook Inlet (Sitkiewicz *et al.*, 2018). In 2023, one Steller sea lion was observed off Anchor Point in October during Hilcorp's marine vibroseis pilot project (Hanks *et al.*, 2024). Based on exposure estimates and the documented occurrence of Steller sea lions throughout Cook Inlet, Hilcorp is requesting, and NMFS is proposing to authorize, 1 annual take by Level A harassment and a maximum of 19 takes in any given year by Level B harassment for Steller sea lions. Across the 5-year effective period, NMFS has proposed to authorize a maximum of 5 takes by Level A harassment and 74 takes of Steller sea lions by Level B harassment.

While California sea lions are uncommon in the specific geographic region, two individuals were seen during the 2012 Apache seismic survey in Cook Inlet (Lomac-MacNair *et al.*, 2013). California sea lions in Alaska are typically alone but may be seen in small groups usually associated with Steller sea lions at their haul outs and rookeries (Maniscalco *et al.*, 2004). Despite the exposure estimate being zero due to the lack of sightings during aerial surveys, Hilcorp is requesting, and NMFS is proposing to authorize, two takes annually by Level B harassment for California sea lions. This is consistent with recent IHAs issued to Hilcorp for similar activities (87 FR 62364, October 14, 2022; 89 FRN 79529, September 30, 2024). Hilcorp has not requested, and NMFS is not proposing to authorize, take by Level A harassment for this species, and none is expected.

Proposed Mitigation

In order to issue an authorization under section 101(a)(5)(A) of the MMPA, NMFS must set forth in regulations the permissible methods of taking pursuant to the activity, and other means of effecting the least practicable adverse impact on the species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of the species or stock for taking for certain subsistence uses (referred to in shorthand as mitigation). NMFS 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 the 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 effect the least practicable adverse impact on species or stocks and their habitat, as well as subsistence uses where applicable, NMFS considers two primary factors which are described below. For a full discussion of NMFS' implementation of the least practicable adverse impact standard, see 89 FR 31488, 31517 (April 24, 2024) as an example.

(1) The manner in which, and the degree to which, the successful implementation of the measure(s) is expected to reduce impacts to marine mammals, marine mammal species or stocks, and their habitat, as well as subsistence uses. This considers the nature of the potential adverse impact being mitigated (likelihood, scope, range). It further considers the likelihood that the measure will be effective if implemented (probability of accomplishing the mitigating result if implemented as planned), the likelihood of effective implementation (probability implemented as planned); and

(2) The practicability of the measures for applicant implementation, which may consider such things as cost and impact on operations.

Temporal restrictions in places where marine mammals are concentrated, engaged in biologically important behaviors, and/or present in sensitive life stages are effective measures for reducing the magnitude and severity of human impacts. Accordingly, to effect the least practicable adverse impact, Hilcorp proposed to conduct pile driving at the Tyonek Platform (which is located closer to concentrated foraging areas) only during winter months (November 15-April 15) which is expected to greatly reduce the amount and consequences of take that may have otherwise occurred should pile driving at the Tyonek Platform be conducted during spring and summer months when CIBW are engaged more frequently in foraging behaviors. Restricting pile driving to winter months at the Tyonek Platform also affords protection to other marine mammals that are known to use the area where with greater frequency during months when the restrictions would be in place. Pile driving in support of exploratory wells would occur between April and

December; however, the location of this activity is far south of primary foraging areas and would only occur for approximately 18 intermittent days over the 5-year effective period of the regulations (6 days in Year 2 and 12 days in Year 4).

Seasonal restrictions for all other activities are not proposed. Tugs towing, holding, or positioning a jack-up and pipeline replacement/installation work emit relatively low source levels and the majority of tug use would occur outside of key CIBW foraging habitats. Furthermore, Level B harassment that may occur from exposure to these activities would be relatively minor with respect to impact intensity. Further, given that jack-up rigs are moved during specific tidal cycles, restricting the time frames for this work to occur would not be practicable as the amount of time for this work to occur is already greatly limited.

NMFS proposes the establishment of both clearance and, where technically feasible, shutdown zones during project activities that have the potential to result in harassment of marine mammals. The purpose of "clearance" of a particular zone is to minimize potential instances of auditory injury and more severe behavioral disturbances by delaying the commencement of an activity if marine mammals are near the activity. The purpose of a shutdown is to prevent a specific acute impact, such as auditory injury or severe behavioral disturbance of sensitive species, by halting the activity.

Hilcorp would use NMFS-approved PSOs to monitor for marine mammals to the greatest extent possible before, during, and after all specified activities. For 30 minutes prior to commencing new operational activities, or if there is a 30-minute lapse in operational activities (*e.g.*, pauses between intermittent pile driving or tugging activities), PSOs would observe and implement clearance procedures as described below (*i.e.*, pre-clearance monitoring). Note: transitioning from towing to positioning without shutting down would not be considered commencing a new operational activity. If no marine mammals are observed within the relevant clearance zones (table 20) during this 30-

minute clearance monitoring period, specified sound-producing activities could commence. If a marine mammal(s) is observed within the relevant clearance zone (table 20) during the 30 minute pre-clearance monitoring period, activities would not commence until the PSOs observe that the animal(s) is outside of and on a path away from the clearance zone or 30 minutes have elapsed without observing the marine mammal (the latter being the only applicable option for CIBWs with clearance zones equivalent to any distance), unless the delay interferes with the safety of working conditions. In the event that the entire clearance zone is not visible (*e.g.*, fog, rain, snow, low light), the specified sound-producing activity would not commence until the clearance zone could be cleared. The 1,500-m (4,900-ft) clearance zone proposed for non-CIBW species during tugging activities is consistent with previous authorizations for tugging activities (87 FR 62364, October 14, 2022; 89 FRN 79529, September 30, 2024) and was determined to be appropriate as it is larger than the largest Level A harassment zones (tables 13, 14, 15, and 16) and is a reasonable distance within which cryptic species (*e.g.*, porpoises, pinnipeds) could be observed. The larger clearance zone for CIBWs (*i.e.*, any distance) is consistent with mitigation measures required in the most recent authorization to Hilcorp for tugging activities (89 FR 79529, September 30, 2024) and is aimed to further minimize any potential impacts from tugs under load on this species. After cessations of any sound-generating activities resulting from the specified activities described herein, PSOs would continue to monitor for an additional 30 minutes (*i.e.*, post-clearance monitoring).

Table 20 – Summary of Proposed Clearance and Shutdown Zones by Activity

Activity	Species or Hearing Group	Clearance Zone (m)	Shutdown Zone (m)
Production and Exploratory Drilling			
Tugs Towing, Holding, or Positioning a Jack-Up Rig[1]	CIBWs	Any distance	N/A
	Non-CIBWs	1,500	N/A
Production Well Development at the Tyonek Platform			
Winter Pile Driving	All Marine Mammal Species	500	500
Exploratory Drilling: MSF Unit and Between Anna and Bruce			
Exploratory Pile Driving	VHF Cetaceans	1,650	1,650
	LF Cetaceans, HF Cetaceans, Phocids, Otariids	1,200	1,200
Pipeline Replacement or Installation			
Anchor Handling[1]	CIBWs	Any distance	N/A
	Non-CIBWs	1,500	N/A
Pipe Pulling[1]	CIBWs	Any distance	N/A
	Non-CIBWs	1,500	N/A

[1]This activity cannot shut down once started and therefore has no associated shutdown zone.

If a shutdown zone is applicable for an activity (*e.g.*, during impact pile driving, table 20), Hilcorp would immediately shut down the corresponding sound-producing activity any time a marine mammal is observed entering or within the applicable shutdown zone. Sound-generating activities would not resume until either the animal is observed exiting and is on a trajectory away from the shutdown or the animal has not been seen in the shutdown zone for at least 15 minutes (for pinnipeds) or 30 minutes (for cetaceans). In addition, if during pile driving a PSO(s) can no longer effectively monitor the entirety of the corresponding shutdown zone due to environmental conditions (*e.g.*, fog, rain, wind), pile driving may continue only until the current segment of the pile is driven; no additional sections of pile or additional piles may be driven until conditions improve such that the shutdown zone can be effectively monitored. If the shutdown zone cannot be monitored for more than 15 minutes, the entire zone must be cleared again for 30 minutes prior to reinitiating pile driving.

If a shutdown procedure should be initiated but human safety or pile instability is at risk, as determined by the best professional judgment of the vessel operator or project engineer, the in-water activity (*e.g.*, pile driving) would be allowed to continue until the risk to human safety and pile instability has dissipated. In this scenario, pile driving may continue only until the current segment of the pile is driven; no additional sections of pile or additional piles may be driven until a PSO(s) has determined that the shutdown zones are clear of marine mammals.

During winter pile driving at the Tyonek Platform, Hilcorp would only be required to clear and shut down activities if marine mammals occurred within the 500-m (1,640-ft) shutdown zone, which is larger than the estimated distances to all Level A harassment isopleths, but smaller than the estimated 1,000-m (3,281-ft) distance to the Level B harassment isopleth. This reduced shutdown zone varies from other shutdown zones for pile driving activities which are greater than both the estimated Level A and

Level B harassment zones. This reduced distance is to meant to minimize the potential for shutdowns of this activity during the winter operational season when many marine mammals, including CIBWs, are less likely to be in the specified geographic area (*i.e.,* it is preferred that as much impact driving as possible happens in the winter season to minimize potential takes to marine mammals, specifically CIBWs). Should a larger clearance and shutdown zone be implemented, this would extend Hilcorp's activity schedule requiring more work days wherein marine mammals could be exposed to construction noise and the effectiveness of monitoring for marine mammals beyond 500 m (1,640 ft) is reduced due to poor weather/visibility conditions during winter months. Therefore, an increased clearance and shutdown zone is not practicable and is unlikely to result in meaningful benefits for marine mammals.

Tugs towing, holding, or positioning a jack-up rig, and tugs engaged in anchor handling and pipe pulling activities are not able to shut down while under load. Hilcorp would maneuver the tugs engaged in these activities such that they maintain a consistent speed (approximately 4 knots [7 km/hr]) and avoid multiple changes of speed and direction to make the course of the vessels as predictable as possible to marine mammals in the surrounding environment, characteristics that are expected to be associated with a lower likelihood of disturbance. If a marine mammal is observed while a tug is under load and the tug cannot shut down, tug operators would determine if there is ample time and space to safely alter course, considering the safety and practicality of the maneuver.

If a species for which authorization has not been granted or a species for which authorization has been granted but the authorized takes have been reached is observed approaching, entering, or within the corresponding zone, in-water work would be delayed (if during pre-clearance) or shut down (except for tugs towing, holding, or positioning the jack-up rig, pipe pulling, or anchor handling activities if already initiated) and NMFS would be notified. Activities would not resume until either the animal has voluntarily exited and been visually confirmed beyond the clearance zone indicated in table 20, or 15 minutes (for pinnipeds) or 30 minutes (for cetaceans) have passed without re-detection of the animal.

For tug towing rig activities, Hilcorp would operate with the tide, resulting in a low power output and decreased radiated noise from the tugs. Due to the nature of tidal cycles in Cook Inlet, it is possible that the most favorable tide for towing operations would occur during nighttime hours. In all cases, Hilcorp will make every effort to ensure the clearance zone is free of marine mammals before initiating towing; however, towing may proceed if the standing down would prohibit towing on that tidal cycle. That is, in some cases, it may not be practicable for Hilcorp to wait until the clearance zone is clear to initiate towing. Favorable tides do not occur often and Hilcorp has intermittent contractual use of the tugs creating a tight timeline to conduct the work. Further, waiting until the next favorable tidal cycle would result in tugs circling the staging area, resulting in more noise than necessary entering the water column. Towing jack-up rigs on a non-favorable tide would necessitate increased power which would increase noise levels during towing. Therefore, while Hilcorp will delay towing as long as practicable before initiating towing should a marine mammal be in the clearance zone, they may proceed with towing when delaying is not practicable.

Anchor handling could only occur during the approximate 1.5-hr period at one of the four slack tides each day. If anchor handling is not completed during this time (particularly during setup and retrieval), the assist tugs may need to hold the barge in place during the next 4.5-hr tide cycle until slack tide occurs again. Because the timeframe to position anchors is brief, shutdowns are impractical; additionally, the sound generated by tugs holding the barge is louder than anchor handling operations and so pose a greater acoustic risk. Once anchor handling commences after pre-clearance monitoring (*i.e.*, anchor setting, retrieving, and anchor moving during pipelay), operations would continue until all anchors are set or retrieved and may continue into the night.

During nighttime hours or low/no-light conditions, night-vision devices (NVDs) shown to be effective at detecting marine mammals in low-light conditions within clearance zones (*e.g.*, Portable Visual Search-7 model with 5x magnifier, or similar) would be provided to PSOs to aid in their monitoring of marine mammals to determine if the relevant clearance zone is free of marine mammals. Except for tug towing the jack-up rig, if the entire clearance zone is not visible with NVDs due to adverse weather conditions such as snow, rain, or fog, operations may not begin or must cease (except tugs under load with a jack-up rig, anchor handling, and pipe pulling activities which cannot shut down) until visibility is restored.

Soft-start procedures would be implemented for all impact pile driving. Soft-start procedures are used to provide additional protection to marine mammals by providing warning and/or giving marine mammals a chance to leave the area prior to the hammer operating at full capacity. For impact pile driving, Hilcorp's proposed soft start would involve an initial set of three to six strikes at reduced energy, followed by a 1-minute waiting period, then two subsequent reduced-energy strike sets. A soft start would be implemented at the start of each day's impact pile driving and at any time following cessation of impact pile driving for a period of 30 minutes or longer. Where concerns with safety or pile stability/refusal occur, Hilcorp would be required to conduct soft starts using the lowest energy possible.

Out of concern for potential disturbance to CIBWs in sensitive and essential habitat, Hilcorp would maintain a distance of 2.4 km from the MLLW line of the Susitna River Delta (Beluga River to the Little Susitna River) between April 15 and November 15 as data suggest that substantial numbers of CIBWs continue to occur in the Susitna Delta area through at least mid-November. (*e.g.*, Young *et al.*, 2023.).

For transportation of a jack-up rig to or from the Tyonek platform, in addition to the PSOs stationed on the rig during towing, an additional PSO would be stationed on the Tyonek Platform to monitor for marine mammals. The PSO would be on-watch for at least 1 hr before tugs are expected to arrive (scheduled to approach the estimated 120-dB isopleth).

Hilcorp also considered the use of noise attenuation systems, unmanned aerial vehicles, passive acoustic monitoring, and additional placement of PSOs, but these measures were deemed to be either impracticable or ineffective for the proposed work. Noise attenuation systems (*e.g.*, bubble curtains) cannot be deployed around moving vessels or pipeline activities; however, Hilcorp would utilize favorable tides to tow the jack-up rig such that engine power is reduced (*i.e.*, vessel would move with the tides rather than against it) which serves as mitigation. Noise attenuation systems are commonly deployed around pile driving activities where currents allow, when the amount of work warrants them, and where noise levels are of elevated concern (*e.g.*, impact pile driving large piles where animals are engaged in critical behaviors). In this case, Hilcorp would be conducting pile driving at well sites where currents can be strong (making bubble curtains likely ineffective and also reducing effectiveness of passive acoustic monitoring) and only conducting a small amount of pile driving work. Further, pile driving at the Tyonek Platform would be conducted when marine mammals, particularly CIBWs, are not engaging in concentrated behaviors (*e.g.*, foraging). Hilcorp would deploy multiple PSOs per activity; however, space on the vessels are limited and the benefit of additional observers is negligible. Overall, NMFS preliminarily concurs with Hilcorp that the mitigation measures proposed in their application and provided in this proposed rule effect the least practicable adverse impact on marine mammals.

Vessel strike is not an anticipated outcome of vessel use as vessels are traveling slowly or would be stationary during work. However, to further reduce risk of vessel interaction, Hilcorp would abide by speed restrictions set forth in the regulations below, maintain consistent directionality (*i.e.*, avoid erratic changes in direction), not actively approach a marine mammal, and avoid engaging propellers should interaction be possible. Hilcorp would also abide by NOAA Alaska Region Marine Mammal Viewing Guidelines. Lastly, Hilcorp's vessels are subject to the following existing approach regulations: Alaska humpback whale approach regulations (50 CFR 216.18, 223, 214, and 224,103(b)), and Western DPS Steller sea lion regulations (50 CFRR 224.103(d)). In cases where there are concern about safety, the maneuverability of the vessel is restricted, or Hilcorp is engaged in an emergency response, deviation from these operational requirements would be allowed. However, Hilcorp would include information regarding any deviation taken to NMFS within monitoring reports.

Mitigation for Subsistence Uses of Marine Mammals or Plan of Cooperation

Regulations at 50 CFR 216.104(a)(12) further require ITA applicants conducting activities in or near a traditional Arctic subsistence hunting area and/or that may affect the availability of a species or stock of marine mammals for Arctic subsistence uses to provide a Plan of Cooperation or information that identifies what measures have been taken and/or will be taken to minimize adverse effects on the availability of marine mammals for subsistence purposes. A plan must include the following:

• A statement that the applicant has notified and provided the affected subsistence community with a draft plan of cooperation;

• A schedule for meeting with the affected subsistence communities to discuss proposed activities and to resolve potential conflicts regarding any aspects of either the operation or the plan of cooperation;

• A description of what measures the applicant has taken and/or will take to ensure that proposed activities will not interfere with subsistence whaling or sealing; and

• What plans the applicant has to continue to meet with the affected communities, both prior to and while conducting the activity, to resolve conflicts and to notify the communities of any changes in the operation.

As described in the Unmitigable Adverse Impact Analysis and Determination section below, harbor seals are harvested by the Kenai, Salamatof, and Tyonek communities. Steller sea lions are also harvested (except in the Tyonek community), but at relatively low rates. A moratorium on harvesting of CIBWs is in effect.

Hilcorp has developed a Stakeholder Engagement Plan that includes subsistence communities to minimize adverse effects on the availability of subsistence marine mammals for subsistence purposes from the activities. Broadly, Hilcorp developed this plan to communicate the scope of the specified activity to stakeholders, demonstrate sensitivity and responsiveness to stakeholder issues and ideas, and facilitate communication and cooperation among stakeholders. Hilcorp will schedule and host virtual informational meetings for subsistence stakeholders detailing Hilcorp’s upcoming activities. When requested by stakeholders, Hilcorp will establish virtual meetings to provide updated information on ongoing oil and gas exploration, development, production, and decommissioning activities. During those meetings, Hilcorp’s Alaska Government and Public Affairs Advisor will bring in subject matter experts to assist in sharing information and responding to questions from stakeholders, including subsistence users. Hilcorp will also set up a dedicated email address for stakeholder concerns and comments and send out mailings to stakeholders regarding Hilcorp’s activities. Based on our evaluation of our proposed measures, NMFS has preliminarily determined that the required mitigation provide the means of effecting the least practicable impact on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of such species or stock for subsistence uses.

Proposed Monitoring and Reporting

In order to issue take authorization for an activity, section 101(a)(5)(A) of the MMPA states that NMFS must set forth requirements pertaining to the monitoring and reporting of such taking. The MMPA implementing regulations at 50 CFR 216.104(a)(13) indicate that requests for authorizations must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present while conducting the activities. Effective reporting is critical both to compliance as well as ensuring that the most value is obtained from the required monitoring.

Monitoring and reporting requirements prescribed by NMFS should contribute to improved understanding of one or more of the following:

- Occurrence of marine mammal species or stocks in the area in which take is anticipated (*e.g.,* presence, abundance, distribution, density);
- Nature, scope, or context of likely marine mammal exposure to potential stressors/impacts (individual or cumulative, acute or chronic), through better understanding of: (1) action or environment (*e.g.,* source characterization, propagation, ambient noise); (2) affected species (*e.g.,* life history, dive patterns); (3) co-occurrence of marine mammal species with the activity; or (4) biological or behavioral context of exposure (*e.g.,* age, calving or feeding areas);
- Individual marine mammal responses (behavioral or physiological) to acoustic stressors (acute, chronic, or cumulative), other stressors, or cumulative impacts from multiple stressors;
- How anticipated responses to stressors impact either: (1) long-term fitness and survival of individual marine mammals; or (2) populations, species, or stocks;

- Effects on marine mammal habitat (*e.g.,* marine mammal prey species, acoustic habitat, or other important physical components of marine mammal habitat); and
- Mitigation and monitoring effectiveness.

Hilcorp would abide by all monitoring and reporting measures contained within this proposed rule, any issued LOA, and a NMFS-approved Marine Mammal Monitoring and Mitigation Plan (see appendix A of Hilcorp's application). A summary of those proposed measures is provided below.

Hilcorp would monitor for marine mammals once all specified activities are underway to the maximum distance possible based on the required number of PSOs, required monitoring locations, and environmental conditions. PSOs would also conduct monitoring for marine mammals during the pre-clearance monitoring periods, through 30 minutes post-completion of any activity each day, and after each stoppage of 30 minutes or greater. PSOs would monitor for marine mammals from the best available vantage point, ideally an elevated stable platform from which the PSO has an unobstructed 360-degree view of the water or a total 360-degree view between all PSOs on watch. PSOs would be stationed for each activity as summarized in table 21.

Table 21 – PSO Stations and Locations per Activity

Activity	Number of PSOs	On-Watch Count and Position	PSO Location(s)
Tugs Towing, Holding, or Positioning a Jack-Up Rig	4	2 on watch (1 port, 1 starboard)	Jack-Up Rig
Tugs Towing, Holding, or Positioning a Jack-Up Rig at Tyonek Platform	6-8	2 on watch (1 port, 1 starboard)	Jack-Up Rig
		1 on watch	Tyonek Platform
Winter Season Pile Driving for Production Well Development	4-6	2 on watch (1 port, 1 starboard)	Tyonek Platform
Pile Driving for Exploratory Drilling	4	2 on watch (1 port, 1 starboard)	Drilling Rig
Anchor Handling	2-3	1 on watch	Anchor Handling Vessel
Pipe Pulling	4-6	1 on watch[1]	Pipe Pulling Vessel
		2 on watch (1 port, 1 starboard)	Nearest Platform

[1]The placement of additional PSOs on the pipe pull vessel and platform were evaluated by Hilcorp and determined to be impractical due to the necessity of another vessel to accommodate the extra PSOs.

PSOs would be independent of the activity contractor (for example, employed by a subcontractor) and have no other assigned tasks during monitoring periods. At least one PSO must have prior experience performing the duties of a PSO during an activity pursuant to a NMFS-issued ITA or Letter of Concurrence. Other PSOs may substitute other relevant experience (including relevant Alaska Native traditional knowledge), education (degree in biological science or related field), or training for prior experience performing the duties of a PSO.

PSOs should also have the following additional qualifications:

(a) The ability to conduct field observations and collect data according to assigned protocols;

(b) Experience or training in the field identification of marine mammals, including the identification of behaviors;

(c) Sufficient training, orientation, or experience with the tugging operation to provide for personal safety during observations;

(d) Sufficient writing skills to record required information including but not limited to the number and species of marine mammals observed; dates and times when tugs were under load with the jack-up rig; dates, times, and reason for implementation of mitigation (or why mitigation was not implemented when required); and marine mammal behavior; and

(e) The ability to communicate orally, by radio, or in person with project personnel to provide real-time information on marine mammals observed in the area as necessary.

PSOs could use a combination of equipment to scan the appropriate monitoring area and to verify the required monitoring distance from the project site, including the naked eye, 7 by 50 binoculars, and NVDs for low light and nighttime operations. PSOs would be in communication with all vessel captains via VHF radio and/or cell phones at all times and alert vessel captains to all marine mammal sightings relative to the vessel location. PSOs would work in shifts lasting no more than 4 hr without a minimum of 1-hr break, and would be allowed to watch no more than 12 hr in a 24-hr period.

Hilcorp would submit interim monthly reports for all months in which specified activities occur. Monthly reports would be submitted on the 15th day of the following month, and would include a summary of marine mammal species and behavioral observations, delays, shutdowns, and activities completed. The reports would also include an assessment of the amount of work remaining to be completed, in addition to the number of marine mammals observed within estimated harassment zones for the reporting period.

Hilcorp would submit draft annual reports to NMFS within 90 calendar days of the completion of marine mammal monitoring each year. Each report(s) would include an overall description of all work completed, a narrative regarding marine mammal sightings, and associated marine mammal observation data sheets (data must be submitted electronically in a format that can be queried such as a spreadsheet or database). Revised annual reports must be prepared and submitted to NMFS within 30 days following receipt of any NMFS comments on the draft reports. If no comments are received from NMFS within 30 days of receipt of the draft report, the report shall be considered final.

A draft 5-year comprehensive summary report would be submitted to NMFS 90 days after the expiration of the regulations. The draft report would synthesize the activity and marine mammal data recorded during all years of marine mammal monitoring. NMFS would provide comments within 30 days after receiving this draft report, and Hilcorp would address the comments and submit revisions within 30 days of receipt. If no comments are received from NMFS within 30 days, the draft report can be considered as final.

All draft and final marine mammal monitoring reports would be submitted to *PR.ITP.MonitoringReports@noaa.gov*. The report(s) should contain the following informational elements, at minimum, including:

- Date and time that monitored activity begins or ends;
- Activities occurring during each observation period, including (a) the type of activity (tugs under load with a jack-up rig, pile driving, anchor handling, pipe pulling), (b) the total duration of each type of activity, (c) when nighttime operations were required (and if they were, whether NVDs were employed, including which lenses were utilized), and (d) whether towing against the tide was required;
- PSO locations during marine mammal monitoring;
- Environmental conditions during monitoring periods (at the beginning and end of the PSO shift, every 30 minutes during a watch, and whenever conditions change significantly), including Beaufort sea state, tidal state, and any other relevant weather conditions including cloud cover, fog, sun glare, overall visibility to the horizon, and estimated observable distance;
- Upon observation of a marine mammal, the following information:
    - Name of PSO who sighted the animal(s) and PSO location and activity at time of sighting;
    - Time of sighting;
    - Identification of the animal(s) (*e.g.,* genus/species, lowest possible taxonomic level, or unidentified), PSO confidence in identification, and the composition of the group if there is a mix of species;

- Distance and location of each observed marine mammal relative to the tug boats for each sighting;
- Estimated number of animals (min/max/best estimate);
- Estimated number of animals by cohort (adults, juveniles, neonates, group composition, *etc.*);
- Animal's closest point of approach and estimated time spent within the harassment zone;
- Description of any marine mammal behavioral observations (*e.g.,* observed behaviors such as feeding or traveling), including an assessment of behavioral responses thought to have resulted from the activity (*e.g.,* no response or changes in behavioral state such as ceasing feeding, changing direction, flushing, or breaching);

- Number of marine mammals detected within the harassment zones, by species; and
- Detailed information about implementation of any mitigation (*e.g.,* delays), a description of specific actions that ensued, and resulting changes in behavior of the animal(s), if any.

In the event that personnel involved in Hilcorp's activities discover an injured or dead marine mammal, Hilcorp would report the incident to the Office of Protected Resources, NMFS (*PR.ITP.MonitoringReports@noaa.gov*), and to the Alaska Regional Stranding Coordinator as soon as feasible. If the death or injury was clearly caused by the specified activity, Hilcorp would be required to immediately cease the specified activities until NMFS is able to review the circumstances of the incident and determine what, if any, additional measures are appropriate to ensure compliance with the ITR. Hilcorp would not resume their activities until notified by NMFS. The report must include the following information:

- Time, date, and location (latitude and longitude) of the first discovery (and updated location information if known and applicable);
- Species identification (if known) or description of the animal(s) involved;
- Condition of the animal(s) (including carcass condition if the animal is dead);
- Observed behaviors of the animal(s), if alive;
- If available, photographs or video footage of the animal(s); and
- General circumstances under which the animal was discovered.

Negligible Impact Analysis and Determination

NMFS has defined negligible impact as an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival (50 CFR 216.103). A negligible impact finding is based on the lack of likely adverse effects on annual rates of recruitment or survival (*i.e.*, population-level effects). An estimate of the number of takes alone is not enough information on which to base an impact determination. In addition to considering estimates of the number of marine mammals that might be "taken" through harassment, NMFS considers other factors, such as the likely nature of any impacts or responses (*e.g.*, intensity, duration), the context of any impacts or responses (*e.g.*, critical reproductive time or location, foraging impacts affecting energetics), as well as effects on habitat, and the likely effectiveness of the mitigation. We also assess the number, intensity, and context of estimated takes by evaluating this information relative to population status. Consistent with the 1989 preamble for NMFS' implementing regulations (54 FR 40338, September 29, 1989), the impacts from other past and ongoing anthropogenic activities are incorporated into this analysis via their impacts on the baseline (*e.g.*, as reflected in the regulatory status of the species, population size and growth rate where known, ongoing sources of human-caused mortality, or ambient noise levels).

To avoid repetition, our analysis applies to all the species listed in table 6 given that many of the anticipated effects of this project on different marine mammal stocks are expected to be relatively similar in nature. For CIBWs, there are potentially meaningful differences in anticipated responses to activities, impact of expected take on the population, or impacts on habitat. Therefore, we provide a separate, additional detailed analysis for this species following the general analysis.

NMFS has identified several key factors to assess whether potential impacts associated with a specified activity should be considered negligible. These include (but are not limited to) the type and magnitude of taking, the amount and importance of the available habitat for the species or stock that is affected, the duration of the anticipated effect on the individuals, and the status of the species or stock. The potential effects of the specified activity on humpback whales, minke whales, gray whales, fin whales, killer whales, Dall's porpoises, harbor porpoises, Pacific white-sided dolphins, Steller sea lions, harbor seals, and California sea lions are discussed below. These factors also apply to CIBWs but an additional analysis for CIBWs is provided in a separate sub-section.

Exposures to elevated sound levels produced during Hilcorp's activities may cause behavioral disturbance of some individuals within the vicinity of the sound source and, for all species except CIBWs and California sea lions, have the potential to cause slight auditory injury. For most activities, exposure estimates (which are inherently conservative because they do not consider mitigation or animal movement) demonstrate that the risk of auditory injury for CIBWs is either non-existent (*e.g.*, zero exposures are predicted from exposure to tug towing jack-up rigs) or very low. Where exposure estimates predicted potential for auditory injury, the mitigation measures proposed for CIBWs would reduce that risk to the degree that these conservative estimates are unlikely to occur. For California sea lions, exposure estimate modeling did produce zero potential for auditory injury. Due to the relatively limited amount of work proposed, the amount of annual take proposed to be authorized by Level B harassment is less than 3 percent of all stocks (except CIBW) even assuming there are no repeat exposures (*i.e.*, each take is of a different individual). Behavioral responses of marine mammals to tugs under load with a jack-up rig, impact pile driving, or tugs engaged in anchor handling or pipe pulling are expected to be mild, short term, and temporary. Effects on individuals that are taken by Level B harassment, as enumerated in the **Estimated Take of Marine Mammals** section, on the basis of reports in the literature as well as monitoring from other similar activities conducted by Hilcorp (Horsley and Larson, 2023, 2024), would likely be limited to behavioral response such as increased swimming speeds, changing in directions of travel and diving and surfacing behaviors, increased respiration rates, or decreased foraging (if such activity were occurring) (Ridgway *et al.*, 1997; Nowacek *et al.*, 2007; Thorson and Reyff, 2006; Kendall and Cornick, 2015; Goldbogen *et al.*, 2013b; Blair *et al.*, 2016; Wisniewska *et al.*, 2018; Piwetz *et al.*, 2021). Marine mammals may not present any visual cues they are disturbed by activities, or they could become alert, avoid the area, leave the area, or have other mild responses that are not observable such as increased stress levels (*e.g.,* Rolland *et al.*, 2012; Bejder *et al.*, 2006; Rako *et al.*, 2013; Pirotta *et al.*, 2015; Pérez-Jorge *et al.*, 2016). They may also exhibit increased vocalization rates (*e.g.,* Dahlheim, 1987; Dahlheim and Castellote, 2016), louder vocalizations (*e.g.*, Frankel and Gabriele, 2017; Fournet *et al.*, 2018), alterations in the spectral features of vocalizations (*e.g.,* Castellote *et al.*, 2012), or a cessation of communication signals (*e.g.*, Tsujii *et al.*, 2018). As described in the **Potential Effects of Specified Activities on Marine Mammals and Their Habitat** section of this proposed rule, marine mammals observed near Hilcorp's planned activities have shown little to no observable reactions to tugs under load with a jack-up rig or impact pile driving. NMFS is not aware that any severe, overt responses to Hilcorp's or other similar activities in Cook Inlet, such as fleeing, have occurred.

Based on sighting data from 90-day marine mammal monitoring reports, including Lomac-McNair *et al.* (2014) and Sitkiewicz *et al.* (2018), most marine mammals (in particular CIBWs) sighted during aerial-, land-, and vessel-based monitoring were noted as "traveling" through middle Cook Inlet. That is, most animals present in the region will likely be transiting through the area; therefore, exposure from the moving tug configuration (which comprises most of the tug activity being considered) would likely be on the order of minutes to tens of minutes depending on the animal's persistence near the activity. Moreover, tugs towing, holding, and positioning a jack-up rig and tugs engaged in anchor handling or pipe pulling are slow-moving as compared to typical recreational and commercial vessel traffic. The slow, predictable, and generally straight path or stationary nature of Hilcorp's tugging activities is expected to further lessen the likelihood that sound exposures at the expected levels will result in meaningful effects of the assumed harassment of marine mammals. Tug use is planned in an area of routine vessel traffic where many large vessels move in slow straight-line paths, and some individuals are expected to be habituated to these sorts of sounds. While it is possible that animals may avoid close approaches to the vessels, we do not expect them to abandon any intended path.

Effects on individuals that are taken during pile driving, on the basis of reports in the literature as well as monitoring from other similar activities, would likely be limited to reactions such as increased swimming speeds, increased surfacing time, or interrupted foraging (if such activity were occurring; *e.g.*, Thorson and Reyff, 2006; HDR, Inc., 2012; Lerma, 2014; ABR, 2016; 61N Environmental, 2021, 2022a, 2022b, and 2022c, 2025). Most likely, individuals will simply move away from the sound source and be temporarily displaced from the areas of pile driving (*e.g.*, Graham *et al.*, 2023, Degraer *et al.*, 2022). Marine mammals would be exposed to no more than 26 intermittent days of pile driving each year, resulting in limited exposure.

Most of the species for which take is proposed to be authorized would only be present temporarily based on seasonal patterns or during transit between other habitats. These temporarily present species would be exposed to even shorter periods of noise-generating activity, further decreasing the impacts. For some species, like seals who tend to exhibit residency patterns, takes have the potential to occur where animals are foraging. However, the area ensonified above NMFS's harassment thresholds represents a small portion of available foraging habitat and impacts on marine mammal feeding for all species should be minimal.

Generally, the density of marine mammals in middle Cook Inlet during spring through fall correlates with the presence or absence of anadromous fish species during spawning activities. While a temporal overlap exists between activities in the specified geographical region and the occurrence of several species of marine mammals in middle and lower Cook Inlet (primarily CIBWs, harbor seals, and harbor porpoise), the spatial overlap is considerably smaller. The distance between the class of activities in the specified geographical region most closely centered in Trading Bay and eastern middle Cook Inlet and dense concentrations of foraging marine mammals at the mouths of major spawning rivers in upper Cook Inlet (namely the Beluga River and Susitna River) exceeds 40 to 50 km (25 to 31 mi). This correlates with the assumption that CIBWs occur in higher densities near foraging areas, including the Susitna Delta, approximately 27 km (17 mi) from the Tyonek platform, where the nearest activities would occur.

We anticipate that any potential reactions and behavioral changes are expected to subside quickly when the exposures cease, and therefore, we do not expect long-term adverse consequences from Hilcorp's planned activities for individuals of any species. The intensity of harassment events would be minimized through use of mitigation measures described herein, which were not quantitatively factored into the take estimates. Hilcorp would use PSOs to monitor for marine mammals before commencing any of the specified activities, which would minimize the potential for marine mammals to be present within the estimated Level A and Level B harassment areas, further reducing the likely amount of any potential Level A or Level B harassment. Further, given the absence of any major rookeries or other areas of known biological significance for marine mammals (*e.g.*, foraging hot spots) within the estimated harassment zones (other than critical habitat and a BIA for CIBWs as described below), we predict that potential takes by Level B harassment would have an inconsequential short-term effect on individuals and would not result in population-level impacts.

Theoretically, repeated, sequential exposure to elevated noise from tugs under load with a jack-up rig, impact pile driving, and tugs engaged in anchor handling or pipe pulling activities over a long duration could result in more severe impacts to individuals that could affect individual fitness or reproductive success (via sustained or repeated disruption of important behaviors such as feeding, resting, traveling, and socializing; Southall *et al.*, 2007). Alternatively, marine mammals exposed to repetitious sounds may become habituated, desensitized, or tolerant after initial exposure to these sounds (reviewed by Richardson *et al.*, 1995; Southall *et al.*, 2007). Cook Inlet is a regional hub of marine transportation and is used by various classes of vessels, including containerships, bulk cargo freighters, tankers, commercial and sport-fishing vessels, and recreational vessels. Off-shore vessels, tug vessels, and tour boats represent 86 percent of the total operating days for vessels in Cook Inlet (BOEM, 2016). Given that marine mammals still frequent and use Cook Inlet despite being exposed to anthropogenic sounds such as those produced by pile driving, tug boats and other vessels across many years, and that it is unlikely that any individual would be exposed to repeated, sequential exposures or repetitious sounds from Hilcorp's activities, no impacts to the reproduction or survival of any marine mammal individuals from the additional noise produced by the specified activities are anticipated. The absence of any pinniped haul outs or other known home-ranges in the planned action area further decreases the likelihood of any more severe energetic impacts that might affect reproduction or survival.

Take by Level A harassment for nine species is conservatively proposed to be authorized to account for the potential that an animal could enter and remain within the area between a Level A harassment zone and the shutdown zone during impact pile driving and anchor handling for a duration long enough to be taken by Level A harassment. Any take by Level A harassment is expected to arise from, at most, a small degree of PTS because animals would need to be exposed to higher levels and/or longer duration than are expected to occur here in order to incur any more than a small degree of PTS. Additionally, some subset of the individuals that are behaviorally harassed could also simultaneously incur some small degree of TTS for a short duration of time. Because of the small degree anticipated though, any PTS or TTS potentially incurred here is not expected to adversely impact individual fitness, let alone annual rates of recruitment or survival.

Hilcorp's planned activities are also not expected to have significant adverse effects on any marine mammal habitat as any impacts to marine mammal habitat (*i.e.*, elevated sound levels) would be temporary. In addition to being temporary, intermittent, and short in overall duration, the acoustic footprint of the planned activity would be small relative to the overall distribution of the animals in the area and their use of the area. Additionally, the habitat within the estimated acoustic footprint is not known to be heavily used by marine mammals or of particular importance.

Impacts to marine mammal prey species are also expected to be minor and temporary and to have, at most, short-term effects on foraging of individual marine mammals, and likely no effect on the populations of marine mammals as a whole. Overall, as described above, the area anticipated to be impacted by Hilcorp's planned activities is very small compared to the available surrounding habitat and does not include habitat of particular importance to marine mammals. The most likely impact to prey will be temporary behavioral avoidance of the immediate area. During tugging and pile driving activities, it is expected that some fish would temporarily leave the area of disturbance (*e.g.*, Nakken, 1992; Olsen, 1979; Ona and Godo, 1990; Ona and Toresen, 1988), thus impacting marine mammals' foraging opportunities in a limited portion of their foraging range. But, because of the relatively small area of the habitat that may be affected, and lack of any foraging habitat of particular importance, the impacts to marine mammal habitat are not expected to cause significant or long-term negative consequences.

Finally, Hilcorp would minimize potential exposure of marine mammals to elevated noise levels by implementing mitigation measures for specified activities, including delaying activities if marine mammals are observed within corresponding clearance zones before beginning an activity and, if practicable, shut down an activity should marine mammals enter a pre-defined mitigation zone. Hilcorp would also implement vessel maneuvering measures to reduce the likelihood of disturbing marine mammals during any periods when marine mammals may be present near the vessels. Hilcorp would also reduce the impact of some tugging activities by conducting tugging operations with favorable tides whenever feasible. For pile driving at the Tyonek Platform, Hilcorp would conduct the activity during winter periods (November 15- April 15) when marine mammal foraging is less likely to be occurring and implement soft-start procedures to provide warning and/or give marine mammals a chance to leave the area prior to the hammer operating at full capacity.

In summary and as described above, the following factors (with additional analyses for CIBWs included below) primarily support our preliminary determinations that the impacts resulting from Hilcorp’s activities described herein are not expected to affect any individual marine mammal’s fitness for survival or reproduction, and thus are not expected to adversely affect the species or stocks through effects on annual rates of recruitment or survival:

- No takes by mortality or serious injury are anticipated or proposed to be authorized;
- Level A harassment proposed for authorization is expected to be of a lower degree that would not impact the fitness of any animals;
- The intensity of anticipated takes by Level B harassment is low for all stocks consisting of, at worst, temporary modifications in behavior and would not be of a duration or intensity expected to result in impacts on reproduction or survival;
- Exposure and resulting impacts would likely be brief given the short duration of the specified activity and the transiting behavior of marine mammals in the action area;
- Marine mammal densities are low where and when Hilcorp would conduct activities; therefore, there would not be substantial numbers of marine mammals exposed to the noise from the project compared to the affected population sizes;
- Take would not occur in places and/or times where take is more likely to accrue to impacts on reproduction or survival, such as within ESA-designated or proposed critical habitat or BIAs (other than for CIBWs as described below), or other habitats critical to recruitment or survival (*e.g.,* rookery);
- The area ensonfied by Hilcorp's activities represents a very small portion of the available foraging area for all potentially impacted marine mammal species;
- Take would only occur within middle Cook Inlet and Trading Bay – a limited, confined area of any given stock's home range;
- Monitoring reports from previous projects with pile driving or tugging activities in Cook Inlet have documented little to no observable effect on individuals of the same species impacted by the specified activities; and

- The proposed mitigation requirements are expected to be effective in reducing the effects of the specified activity by minimizing the numbers of marine mammals exposed to sound and the intensity of the exposures;

Cook Inlet Beluga Whales. For CIBWs, we further discuss additional factors in addition to the factors discussed above for all species in the context of potential impacts to this endangered stock based on our evaluation of the take proposed for authorization (table 19).

All of Hilcorp's activities would be done in a manner implementing best management practices to preserve water quality, and no work would occur around creek mouths or river systems leading to prey abundance reductions. In addition, no physical structures would restrict passage, though impacts to the acoustic habitat are relevant and discussed here. While the specified activities would occur within CIBW Critical Habitat Area 2, and the CIBW small and resident BIA (see the **Description of Marine Mammals in the Area of Specified Activities** section in this proposed rule), monitoring data from Hilcorp's activities suggest that the presence of pile driving or tugs under load do not discourage CIBWs from transiting throughout Cook Inlet and between critical habitat areas and that the whales do not abandon critical habitat areas (*e.g.*, Horsley and Larson, 2023, 2024). In addition, large numbers of CIBWs have continued to use Cook Inlet and pass through the area, likely traveling to critical foraging grounds found in upper Cook Inlet, while noise-producing anthropogenic activities, including vessel use, have taken place during the past two decades (*e.g.,* Shelden *et al.*, 2013, 2015b, 2017, 2022; Shelden and Wade, 2019; Geotz *et al.*, 2023). These findings are not surprising as food is a strong motivation for marine mammals. As described in Forney *et al.* (2017), animals typically favor particular areas because of their importance for survival (*e.g.,* feeding or breeding), and leaving may have significant costs to fitness (reduced foraging success, increased predation risk, increased exposure to other anthropogenic threats).

Consequently, animals may be highly motivated to maintain foraging behavior in historical foraging areas despite negative impacts such as stress (*e.g.,* Rolland *et al.*, 2012).

Generation of sound may result in avoidance behaviors that would be limited in time and space relative to the larger availability of important habitat areas in Cook Inlet; however, the area ensonified by sound from the specified activity is anticipated to be small compared to the overall available critical habitat for CIBWs to feed and travel. Therefore, the specified activity would not create a barrier to movement through or within important areas. We anticipate that disturbance to CIBWs would manifest in the same manner as other marine mammals described above (*i.e.,* increased swimming speeds, changes in the direction of travel and dive behaviors, increased respiration rates, decreased foraging (if such activity were occurring), or alterations to communication signals). We do not expect exposure to elevated noise levels during transit past Hilcorp's activities would have adverse effects on individuals' fitness for reproduction or survival.

Results of an expert elicitation (EE) at a 2016 workshop, which predicted the impacts of noise on CIBW survival and reproduction given a specific amount of lost foraging opportunities, helped to inform our assessment of impacts on this stock. The 2016 EE workshop used conceptual models of an interim population consequences of disturbance (PCoD) for marine mammals (NRC, 2005; New *et al.*, 2014; Tollit *et al.*, 2016) to help in understanding how noise-related stressors might affect vital rates (survival, birth rate and growth) for CIBW (King *et al.*, 2015). NMFS (2016b) suggests that the main direct effects of noise on CIBWs are likely to be through masking of vocalizations used for communication and prey location and habitat degradation. The 2016 workshop on CIBWs was specifically designed to provide regulators with a tool to help understand whether chronic and acute anthropogenic noise from various sources and projects are likely to be limiting recovery of the CIBW population. The full report can be found at *https://www.smruconsulting.com/publications/*with a summary of the expert elicitation portion of the workshop below.

For each of the noise effect mechanisms chosen for the EE, the experts provided a set of parameters and values that determined the forms of a relationship between the number of days of disturbance a female CIBW experiences in a particular period and the effect of that disturbance on her energy reserves. Examples included the number of days of disturbance during the period April, May, and June that would be predicted to reduce the energy reserves of a pregnant CIBW to such a level that she is certain to terminate the pregnancy or abandon the calf soon after birth, the number of days of disturbance in the period April-September required to reduce the energy reserves of a lactating CIBW to a level where she is certain to abandon her calf, and the number of days of disturbance where a female fails to gain sufficient energy by the end of summer to maintain herself and her calf during the subsequent winter. Overall, median values ranged from 16 to 69 days of disturbance depending on the question. However, for the 2016 EE, a "day of disturbance" was defined as any day on which an animal loses the ability to forage for at least one tidal cycle (*i.e.,* it forgoes 50–100 percent of its energy intake on that day). The day of disturbance considered in the context of the report is notably more severe than any Level B harassment expected to result from these activities, which as described is expected to be comprised predominantly of temporary modifications in the behavior of individual CIBWs (*e.g.,* faster swim speeds, longer dives, decreased sighting durations, alterations in communication). Also, NMFS proposes to authorize 27 annual instances of take, with the instances representing disturbance events within a day—this means that either 27 different individual CIBWs are disturbed on no more than 1 day each, or some lesser number of individuals may be disturbed on more than 1 day, but with the product of individuals and days not exceeding 27. Given the overall expected take, and the short duration of the specified activities (*i.e.,* up to a maximum of 54 intermittent days), it is unlikely that any one CIBW would be disturbed on more than a couple of days. Further, Hilcorp would implement mitigation measures specific to CIBWs whereby they would not begin tugging activities should a CIBW be observed at any distance. For winter pile driving, shutdown zones are smaller than the estimated Level B harassment zone, but CIBWs are not anticipated to be in the action area during this time. These measures, along with other mitigation measures described herein, would limit the severity of the effects of that Level B harassment to behavioral changes such as increased swim speeds, changes in diving and surfacing behaviors, and alterations to communication signals, not the loss of foraging capabilities. Finally, take by mortality, serious injury, or Level A harassment of CIBWs is not anticipated or authorized.

In summary and as described above, and in addition to the factors described above for other stocks, the following factors primarily support our preliminary determination that the impacts resulting from Hilcorp's planned activities are not expected to adversely affect the CIBWs through effects on annual rates of recruitment or survival:

- The area of exposure would be limited to habitat primarily used for transiting, and not areas known to be of particular importance for feeding or reproduction;
- The activities are not expected to result in CIBWs abandoning critical habitat nor are they expected to restrict passage of CIBWs within or between critical habitat areas; and
- Any disturbance to CIBWs is expected to be limited to temporary modifications in behavior, and would not be of a duration or intensity expected to result in impacts on reproduction or survival.

Based on the analysis contained herein of the likely effects of the specified activity on marine mammals and their habitat, and taking into consideration the implementation of the required monitoring and mitigation measures, NMFS preliminarily finds that the total marine mammal take from the planned specified activity would have a negligible impact on all affected marine mammal species or stocks.

Small Numbers

As noted previously, only take of small numbers of marine mammals may be authorized under section 101(a)(5)(A) and (D) of the MMPA for specified activities other than military readiness activities. The MMPA does not define small numbers and so, in practice, where estimated numbers are available, NMFS compares the maximum number of individuals taken in any year to the most appropriate estimation of abundance of the relevant species or stock in our determination of whether an authorization is limited to small numbers of marine mammals. When the predicted maximum annual number of individuals to be taken is fewer than one-third of the species or stock abundance, the take is considered to be of small numbers (see 86 FR 5322, January 19, 2021). Additionally, other qualitative factors may be considered in the analysis, such as the temporal or spatial scale of the activities.

For all stocks whose abundance estimate is known, the maximum annual amount of take proposed to be authorized is less than one-third of the best available population abundance estimates (in fact it is less than 3 percent for all stocks, except for CIBWs whose maximum annual amount of take proposed to be authorized is for up to 9.68 percent of the stock; see table 19). The numbers of animals authorized to be taken are small relative to the relevant species or stock abundances even if each estimated take occurred to a new individual.

Abundance estimates for the Mexico-North Pacific stock of humpback whales are are currently considered unknown (Young *et al.*, 2023). The most recent minimum population estimates (N_{MIN}) for this population include an estimate of 2,241 individuals between 2003 and 2006 (Martinez-Aguilar, 2011) and 766 individuals between 2004 and 2006 (Wade, 2021). NMFS' Guidelines for Assessing Marine Mammal Stocks suggest that the N_{MIN} estimate of the stock should be adjusted to account for potential abundance changes that may have occurred since the last survey and provide reasonable assurance that the stock size is at least as large as the estimate (NMFS, 2023a). The abundance trend for this stock is unclear; therefore, there is no basis for adjusting these estimates (Young *et al.*, 2023). Assuming the population has been stable, and that the maximum annual seven takes proposed to be for humpback whale would all be of the Mexico-North Pacific stock, this represents small numbers of this stock (0.31 percent of the stock assuming an N_{MIN} of 2,241 individuals and 0.91 percent of the stock assuming an N_{MIN} of 766 individuals).

A lack of an accepted stock abundance value for the Alaska stock of minke whale did not allow for the calculation of an expected percentage of the population that may be affected. The most relevant estimate of partial stock abundance is 1,233 minke whales in coastal waters of the Alaska Peninsula and Aleutian Islands (Zerbini *et al.*, 2006). Given four maximum annual takes proposed to be authorized for the stock, comparison to the best estimate of stock abundance shows, at most, less than 1 percent of the stock would be expected to be impacted.

There is no stock-wide abundance estimate for Northeast Pacific fin whales. However, Young *et al.* (2022) estimate the minimum stock size for the areas surveyed is 2,554. Assuming the maximum annual take proposed to be authorized is four for this stock, comparison to the minimum population estimate shows, at most, less than 1 percent of the stock would be expected to be impacted.

The Alaska stock of Dall's porpoise has no official NMFS abundance estimate. As described in the 2022 Alaska SAR (Young *et al.*, 2023) the minimum population estimate is assumed to correspond to the point estimate of the 2015 vessel-based abundance computed by Rone *et al.* (2017) in the Gulf of Alaska (N = 13,110; CV = 0.22). A maximum annual 11 takes are proposed to be authorized for the stock. Comparison to the minimum population estimate shows, at most, less than 1 percent of the stock is expected to be impacted.

Based on the analysis contained herein of the proposed activity (including the proposed mitigation and monitoring measures) and the anticipated take of marine mammals, NMFS preliminarily finds that small numbers of marine mammals would be taken relative to the population size of the affected species or stocks.

Unmitigable Adverse Impact Analysis and Determination

In order to issue an ITA, NMFS must find that the specified activity will not have an "unmitigable adverse impact" on the subsistence uses of the affected marine mammal species or stocks by Alaskan Natives. NMFS has defined "unmitigable adverse impact" in 50 CFR 216.103 as an impact resulting from the specified activity: (1) that is likely to reduce the availability of the species to a level insufficient for a harvest to meet subsistence needs by: (i) causing the marine mammals to abandon or avoid hunting areas; (ii) directly displacing subsistence users; or (iii) placing physical barriers between the marine mammals and the subsistence hunters; and (2) that cannot be sufficiently mitigated by other measures to increase the availability of marine mammals to allow subsistence needs to be met.

Subsistence communities identified as project stakeholders near Hilcorp's middle Cook Inlet activities include the Kenaitze Indian Tribe, the Village of Salamatof, and the Native Village of Tyonek. The last ADF&G subsistence survey conducted in Kenai was in 1998 (Fall *et al*., 2000). In the greater Kenai area, an estimated 13 harbor seals and no sea lions were harvested in 1988 by an estimated 10 households. In the Kenai area, estimated harbor seal harvest has ranged between 13 (1998) and 35 (1997) animals. In 1996, two sea lions and six harbor seals were harvested. ADF&G Community Subsistence Information System harvest data are not available for Salamatof, so Hilcorp assumes the subsistence harvest patterns are similar to other communities along the road system on the southern Kenai Peninsula, namely Kenai.

Hilcorp's activities at the Tyonek Platform in the North Cook Inlet Unit in middle Cook Inlet would occur approximately 10 km (6 mi) from the Native Village of Tyonek. Tyonek, on the western side of middle Cook Inlet, has a subsistence harvest area that extends south from the Susitna River to Tuxedni Bay (Stanek *et al*., 2007). The Anna and Bruce platforms are in the Granite Point Unit at the north end of Trading Bay. The Bruce platform is nearer to shore than the Anna which is located approximately 5 km (3 mi) offshore and to the southeast of Tyonek. On the western side of middle Cook Inlet, Tyonek has a subsistence harvest area that extends south from the Susitna River to Tuxedni Bay (Fall *et al.*, 1984; Stanek *et al.*, 2007). Moose and salmon are the most important subsistence resources measured by harvested weight (Stanek, 1994). 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 32 km (20 mi) along the Cook Inlet coastline from the McArthur 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).

Currently, whale hunts are not known to occur in Cook Inlet. Seal hunting occurs opportunistically among Alaska Natives who may be fishing or traveling in upper Cook Inlet near the mouths of the Susitna River, Beluga River, and Little Susitna River. Hilcorp's activities may overlap with subsistence hunting of seals. However, these activities typically occur along the shoreline or very close to shore near river mouths, rather than offshore near where Hilcorp's activities would occur.

Any harassment to marine mammals would primarily be limited to minor behavioral changes (*e.g.*, increased swim speeds, changes in dive behaviors and communication signals, temporary avoidance near the tugs) and is anticipated to be short-term, mild, and not result in any abandonment or behaviors that would make the animals unavailable to Alaska Natives.

To further minimize any potential effects of their action on subsistence activities, Hilcorp has outlined their communication plan for engaging with subsistence users in their Stakeholder Engagement Plan (see appendix B of Hilcorp's application). This includes using traditional/subsistence knowledge to inform planning for the activity. Hilcorp is required to abide by this plan and update the plan accordingly.

Based on the description of the specified activity, the measures described to minimize adverse effects on the availability of marine mammals for subsistence purposes, and the proposed mitigation and monitoring measures, NMFS has preliminarily determined that there will not be an unmitigable adverse impact on subsistence uses from Hilcorp's proposed activities.

Adaptive Management

The regulations governing the take of marine mammals incidental to Hilcorp's proposed oil and gas activities would contain an adaptive management component.

The reporting requirements associated with this proposed rule are designed to provide NMFS with monitoring data from the previous year to allow consideration of whether any changes are appropriate. The use of adaptive management allows NMFS to consider new information from different sources to determine (with input from Hilcorp regarding practicability) on an annual basis if mitigation or monitoring measures should be modified (including additions or deletions). Mitigation or monitoring measures could be modified if new data suggests that such modifications would have a reasonable likelihood more effectively achieving the goals of the mitigation and monitoring and if the measures are practicable.

The following are some of the possible sources of applicable data to be considered through the adaptive management process: (1) results from monitoring reports, as required by MMPA authorizations; (2) results from general marine mammal and sound research; and (3) any information which reveals that marine mammals may have been taken in a manner, extent, or number not authorized by these regulations or subsequent LOAs.

Endangered Species Act

Section 7(a)(2) of the ESA of 1973 (16 U.S.C. 1531 *et seq*.) requires that each Federal agency insure 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. To ensure ESA compliance for the issuance of ITAs, NMFS consults internally whenever we propose to authorize take for endangered or threatened species, in this case with the NMFS Alaska Regional Office (AKRO).

NMFS is proposing to authorize take of fin whale, humpback whale (Mexico DPS and Western North Pacific DPS), fin whale (Northeastern Pacific stock), beluga whale (Cook Inlet), and Steller sea lion (Western DPS), which are listed under the ESA. NMFS Office of Protected Resources has requested initiation of section 7 consultation with NMFS AKRO for the issuance of this proposed rule and associated LOA. NMFS will conclude the ESA consultation prior to making a decision to promulgate a final rule and issue an LOA.

Proposed Promulgation

As a result of these preliminary determinations, NMFS proposes to promulgate regulations that allow for take by Level A and Level B harassment incidental to Hilcorp's oil and gas activities in Cook Inlet, Alaska for a 5-year period, provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated.

Request for Information

NMFS requests interested persons to submit comments, information, and suggestions concerning Hilcorp's request, our preliminary determinations, and the proposed regulations (see **ADDRESSES**). All comments will be reviewed and evaluated as we prepare a final rule and make final determinations on whether to issue the requested authorization. This proposed rule and referenced documents provide all environmental information relating to our proposed action for public review.

Classification

The Office of Management and Budget has determined that this proposed rule is not significant for purposes of Executive Order (E.O.) 12866. This proposed rule is not an E.O. 14192 regulatory action because this rule is not significant under E.O. 12866.

Pursuant to section 605(b) of the Regulatory Flexibility Act (RFA) (5 U.S.C. 601 *et seq.*), the Chief Counsel for Regulation of the Department of Commerce has certified to the Chief Counsel for Advocacy of the Small Business Administration that this proposed rule, if adopted, would not have a significant economic impact on a substantial number of small entities. Hilcorp is the only entity that would be subject to the requirements in these proposed regulations. Hilcorp employs thousands of people worldwide, and has a market value in the billions of dollars. Therefore, Hilcorp is not a small governmental jurisdiction, small organization, or small business as defined by the RFA. Because of this certification, a regulatory flexibility analysis is not required and none has been prepared.

This proposed rule contains a collection-of-information requirement subject to the provisions of the Paperwork Reduction Act (PRA). Notwithstanding any other provision of law, no person is required to respond to nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the PRA unless that collection of information displays a currently valid OMB control number.

These requirements have been approved by OMB under control number 0648-0151 and include applications for regulations, subsequent LOAs, and reports.

List of Subjects in 50 CFR Part 217

Acoustics, Alaska, Administrative practice and procedure, Endangered and threatened species, Fish, Marine mammals, Mitigation and monitoring requirements, Oil and Gas exploration, Reporting requirements, Transportation, Wildlife.

Dated: July 21, 2025.

Samuel D. Rauch III,

Deputy Assistant Administrator for Regulatory Programs,

National Marine Fisheries Service.

For reasons set forth in the preamble, NMFS proposes to amend 50 CFR part 217 to read as follows:

PART 217 – REGULATIONS GOVERNING THE TAKE OF MARINE MAMMALS INCIDENTAL TO SPECIFIED ACTIVITIES

1. The authority citation for part 217 continues to read as follows:

AUTHORITY: 16 U.S.C. 1361 *et seq*.

2. Add subpart Q, consisting of §§ 217.160 through 217.169, to read as follows:

Subpart Q – Taking Marine Mammals Incidental to Hilcorp Alaska, LLC Oil and Gas Activities in Cook Inlet, Alaska

Sec.
217.160 Specified activity and specified geographical region.
217.161 Effective dates.
217.162 Permissible methods of taking.
217.163 Prohibitions.
217.164 Mitigation requirements.
217.165 Requirements for monitoring and reporting.
217.166 Letters of authorization.

Subpart Q – Taking Marine Mammals Incidental to Hilcorp Alaska, LLC Oil and Gas Activities in Cook Inlet, Alaska

§ 217.160 Specified activity and specified geographical region.

(a) Regulations in this subpart apply only to Hilcorp Alaska LLC (Hilcorp) and those persons it authorizes or funds to conduct activities on its behalf for the taking of marine mammals in Cook Inlet, Alaska, and that occurs incidental to the activities described in paragraph (c) of this section. Requirements imposed on Hilcorp must be implemented by those persons it authorizes or funds to conduct activities on its behalf.

(b) The incidental taking of marine mammals by Hilcorp may be authorized in a letter of authorization (LOA) only if it occurs within in Cook Inlet, Alaska.

(c) The taking of marine mammals by Hilcorp is only authorized if it occurs incidental to the use of tugs towing, holding, or positioning a jack-up rig, impact pile driving, and pipeline installation and/or replacement involving anchor handling and/or pipe pulling.

§ 217.161 Effective dates.

Regulations in this subpart are effective from September 24, 2025, through September 23, 2030.

§ 217.162 Permissible methods of taking.

Under an LOA issued pursuant to §§ 217.106 of this chapter and 217.166, the holder of the LOA (hereinafter “Hilcorp”) may incidentally, but not intentionally, take marine mammals within the specified geographical region described in § 217.160(b) by harassment associated with the specified activities provided they are in compliance with all terms, conditions, and requirements of the regulations in this subpart and the applicable LOA.

§ 217.163 Prohibitions.

Except for the takings permitted in § 217.162 and authorized by an LOA issued under §§ 216.106 of this chapter and 217.166, it is unlawful for any person to do any of the following in connection with the specified activities:

(a) Violate or fail to comply with the terms, conditions, and requirements of this subpart or an LOA issued under this subpart or an LOA issued under §§ 216.106 of this chapter and 217.166;

(b) Take any marine mammal not specified in such LOA;

(c) Take any marine mammal specified in such LOA in any manner other than specified;

(d) Take a marine mammal should NMFS withdraw or suspend such LOA; or

(e) Take a marine mammal specified in such LOA after NMFS determines such taking results in an unmitigable adverse impact on the species or stock of such marine mammal for taking for subsistence uses.

§ 217.164 Mitigation requirements.

When conducting the specified activities identified in § 217.160(c), Hilcorp must implement the mitigation measures contained in this section and any LOA issued under §§ 216.106 of this chapter and 217.166 unless implementing the mitigation measure would create a risk to human safety or cause pile instability or refusal. These mitigation measures include, but are not limited to:

(a) A copy of any issued LOA should be in the possession of Hilcorp, its designees, and work crew personnel operating under the authority of the issued LOA.

(b) Hilcorp must coordinate with local Tribes as described in its Stakeholder Engagement Plan, notify the communities of any changes in the operation, and take action to avoid or mitigate impacts to subsistence harvests.

(c) Tug boat and pile driving supervisors and crews, the monitoring team, and relevant Hilcorp staff must be trained prior to the start of all activities so that responsibilities, communication procedures, mitigation measures, monitoring protocols, and operational procedures are clearly understood. New personnel joining during the project must be trained prior to commencing work.

(d) Hilcorp must implement clearance and shutdown zones with radial distances as identified in any LOA issued under §§ 216.106 of this chapter and 217.166.

(e) Pre-start clearance monitoring.

(1) Prior to initiating any activity, Hilcorp must conduct monitoring of the clearance zones from 30 minutes prior to commencing activities identified in § 217.160(c) (*i.e.*, pre-start clearance monitoring), or if there is a 30-minute lapse in operational activities (*e.g.*, pauses between intermittent pile driving).

(2) Except for tugs towing a jack-up rig, activities may commence if, following 30 minutes of observation of the clearance zone, it is determined by a PSO that the clearance zones are clear of marine mammals.

(3) Should a marine mammal be within the clearance zone during the clearance monitoring period, the activity (except for tugs under tow if tidal restrictions necessitate) must not commence until the animal(s) has left the clearance zone and is on a path away from the clearance zone or at least 30 minutes has elapsed for all baleen whale species and CIBWs without subsequent detection, or 15 minutes has elapsed without subsequent detection for all other species.

(f) Pile driving at the Tyonek Platform may only occur November 15-April 15.

(g) Hilcorp must cease all pile driving activities, including soft starts, if a marine mammal is observed entering or within the shutdown zone. In this scenario, pile driving may continue only until the current segment of the pile is driven; no additional sections of pile or additional piles may be driven until a PSO(s) has determined that the shutdown zones are clear of marine mammals.

(1) If pile driving is halted or delayed due to the presence of a marine mammal, the activity may not commence or resume until either the animal has voluntarily left and is been visually confirmed beyond the shutdown zone or at least 30 minutes has elapsed for all baleen whale species and CIBWs without subsequent detection, or 15 minutes has elapsed without subsequent detection for all other species.

(2) If during pile driving, a PSO(s) can no longer effectively monitor the entirety of the corresponding shutdown zone due to environmental conditions (*e.g.*, fog, rain, wind), pile driving may continue only until the current segment of the pile is driven. No additional sections of pile or additional piles may be driven until conditions improve such that the shutdown zone can be effectively monitored. If the shutdown zone cannot be monitored for more than 15 minutes, the entire zone must be cleared again for 30 minutes prior to reinitiating pile driving.

(h) Hilcorp must use soft-start techniques when impact pile driving. Should safety or pile instability/refusal concerns arise during a soft start wherein this process cannot be met, Hilcorp must use the minimum amount of energy practicable. Prior to soft-start beginning, the operator must receive confirmation from the PSO that the clearance zone is clear of any marine mammals.

(i) For transportation of a jack-up rig to or from the Tyonek platform, in addition to PSOs stationed on the rig during towing, an additional PSO must be stationed on the Tyonek Platform to monitor for marine mammals. The PSO should be on-watch for at least 1 hour before tugs are expected to arrive (scheduled to approach the estimated 120-dB isopleth).

(j) Unless deviation is necessary to maintain safe maneuvering speed and justified because the vessel is in an area where oceanographic, hydrographic, and/or meteorological conditions severely restrict the maneuverability of the vessel; an emergency situation presents a threat to the health, safety, life of a person; or when a vessel is actively engaged in emergency rescue or response duties, including vessel-in distress or environmental crisis response, Hilcorp must:

(1) Maneuver tugs engaged in towing, holding, or positioning a jack-up rig, and anchor handling and pipe pulling activities such that they maintain a consistent speed (approximately 4 knots [kt; 7 kilometers (km)/hr]) and avoid multiple changes of speed and direction to make the course of the vessels as predictable as possible to marine mammals in the surrounding environment, characteristics that are expected to be associated with a lower likelihood of disturbance;

(2) Not actively approach a marine mammal purposefully and must adhere to NOAA Alaska Region Marine Mammal Viewing Guidelines;

(3) Reduce vessel speed to < 9 km/hr (5 kt) when within 274 meters (m; 300 yards) of any whale, reduce speed to 18.5 km/hr (10 kt) or less when weather conditions reduce visibility to 1.6 km (1 mile [mi]) or less, avoid multiple changes in direction and speed when within 274 m (300 yards) of any whale, and place the engine in neutral if a whale is approaching within 91 m (100 yards) of a vessel;

(4) Maintain a distance of at least 2.4 km from the Mean Lower Low Water line of the Susitna River Delta (Beluga River to the Little Susitna River) between April 15 and November 15; and

(5) Maintain a watch for marine mammals while underway and check water immediately adjacent to the vessel prior to engaging propellers; should a marine mammal be observed near propellers and it is determined that interaction is possible, delay engaging propellers;

(k) Hilcorp must maintain clean, taught lines in the water such that no lines are in the water unless both ends are under tension and affixed to vessels or gear.

(l) [Reserved]

§ 217.165 Requirements for monitoring and reporting.

Hilcorp must implement the following monitoring and reporting measures:

(a) Monitoring must be conducted by NMFS-approved PSOs during all activities for which take is authorized, in accordance with Hilcorp's Marine Mammal Monitoring and Mitigation Plan (see appendix A of Hilcorp's application). PSOs must be independent of the activity contractor (*e.g.*, employed by a subcontractor) and have no other assigned tasks during monitoring duties.

(b) A lead PSO must be designated for all specified activities. The lead PSO must have prior experience performing the duties of a PSO during in-water activities pursuant to a NMFS-issued incidental take authorization or letter of concurrence.

(c) PSOs must monitor for marine mammals from the best available vantage point, ideally an elevated stable platform from which the PSO has an unobstructed 360-degree view of the water or a total 360-degree view of water between all PSOs on watch. Monitoring must occur from 30 minutes before an activity commences to 30 minutes after the activity ceases.

(d) PSO(s) must use a combination of equipment to scan the appropriate monitoring area and to identify the relevant mitigation distance from an activity, including the naked eye, binoculars (minimum 7x50), and night vision devices for low light and nighttime operations.

(e) PSO(s) must be in communication with all vessel captains via VHF radio and/or cell phones at all times and alert vessel captains to all marine mammal sightings relative to the vessel location.

(f) PSOs may not work in shifts lasting more than 4 hours without a minimum of 1-hour break, and may not be on watch more than 12 hours in a 24-hour period.

(g) Hilcorp must notify NMFS Office of Protected Resources (OPR) at least 48 hours prior to the start of the specified activities each year.

(h) Hilcorp must submit interim monthly monitoring reports on the 15th day of the month after any specified activities occurred. These reports must include a summary of marine mammal species and behavioral observations, delays, shutdowns, and activities completed during the reporting period. The reports also must include an assessment of the amount of work remaining for the year, in addition to the number of CIBWs observed within estimated Level B harassment zones during activities to date, and any deviations from the vessel operation requirements.

(i) Hilcorp must submit a draft annual summary monitoring report on all monitoring conducted during each project year which includes final electronic data sheets within 90 calendar days of the completion of marine mammal monitoring or 90 days prior to a requested date of issuance of any future incidental take authorization for projects at the same location, whichever comes first. A draft comprehensive 5-year summary report must also be submitted to NMFS within 90 days of the end of year 5 of the project. The reports must detail the monitoring protocol and summarize the data recorded during monitoring. If no comments are received from NMFS within 30 days of receipt of the draft reports, the report may be considered final. If comments are received, revised reports addressing NMFS comments must be submitted within 30 days after receipt of comments. At a minimum, the reports must contain:

(1) Dates and times (begin and end) of all marine mammal monitoring;

(2) Activities occurring during each daily observation period, including the type of activity (tugs under load with a jack-up rig, pile driving, anchor handling, pipe pulling), the total duration of each type of activity, when nighttime operations occurred (and if they did, whether NVDs were employed, including which lenses were utilized), and whether towing against the tide was required;

(3) PSO locations during marine mammal monitoring;

(4) Environmental conditions during monitoring periods (at beginning and end of PSO shift and whenever conditions change significantly), Beaufort sea state, and any other relevant weather conditions including cloud cover, fog, sun glare, and overall visibility to the horizon, and estimated observable distance;

(5) Upon observation of a marine mammal, the following information must be collected and included in the annual and 5-year reports:

(6) Name of the PSO who sighted the animal, observer location, and activity at time of sighting;

(7) Time of sighting;

(8) Identification of the animal (*e.g.*, genus/species, lowest possible taxonomic level, or unidentified), PSO confidence in identification, and the composition of the group if there is a mix of species;

(9) Distances and bearings of each marine mammal observed in relation to the pile being driven for each sighting (if pile driving was occurring at time of sighting);

(10) Estimated number of animals (min/max/best);

(11) Estimated number of animals by cohort (adults, juveniles, neonates, group composition, *etc.*);

(12) Animal's closest point of approach and estimated time spent within the harassment zone;

(13) Description of any marine mammal behavioral observations (*e.g.*, observed behaviors such as feeding or traveling), including an assessment of behavioral responses to the activity (*e.g.*, no response or changes in behavioral state such as ceasing feeding, changing direction, flushing, or breaching);

(14) Detailed information about any implementation of any mitigation (*e.g.*, shutdowns and delays), a description of specific actions that ensued, and resulting changes in the behavior of the animal, if any;

(15) All PSO datasheets and raw sightings data in electronic spreadsheet format; and

(16) Any deviations taken from the vessel operation requirements.

(j) In the event that personnel involved in Hilcorp's activities discover an injured or dead marine mammal, Hilcorp must report the incident to NMFS OPR and the Alaska Regional Stranding Network as soon as feasible. If the death or injury was caused by a specified activity, Hilcorp must immediately cease the specified activity until NMFS is able to review the circumstances of the incident and determine what, if any, additional measures are appropriate to ensure compliance with the ITR. Hilcorp must not resume their activities until notified by NMFS. The report must include the following information:

(1) Time, date, and location (latitude/longitude) of the first discovery (and updated location information if known and applicable);

(2) Species identification (if known) or description of the animal(s) involved;

(3) Condition of the animal(s) (including carcass condition if the animal is dead);

(4) Observed behaviors of the animal(s), if alive;

(5) If available, photographs or video footage of the animal(s); and

(6) General circumstances under which the animal was discovered.

(k) [Reserved]

§ 217.166 Letters of authorization.

(a) To incidentally take marine mammals pursuant to these regulations, Hilcorp must apply for and obtain an LOA.

(b) An LOA, unless suspended or revoked, may be effective for a period of time not to exceed the effective dates of this subpart.

(c) In the event Hilcorp proposes projected changes to the activity or to mitigation and monitoring measures required by an LOA, Hilcorp must request and obtain a modification of the LOA as described in § 217.167.

(d) The LOA must set forth the following information:

(1) Permissible methods of incidental taking;

(2) Means of effecting the least practicable adverse impact (*i.e.*, mitigation) on the species, its habitat, and on the availability of the species for subsistence uses; and

(3) Requirements for monitoring and reporting.

(e) Issuance of the LOA should be based on a determination that the level of taking will be consistent with the findings made for the total taking allowable under this subpart.

(f) Notice of issuance or denial of an LOA should be published in the **Federal Register** within 30 days of a determination.

§ 217.167 Modifications of Letters of Authorization.

(a) An LOA issued under §§ 216.106 of this chapter and 217.166 for the specified activities may be modified upon request by Hilcorp, provided that:

(1) the change(s) to the activity or the mitigation, monitoring or reporting do not change the findings made for the regulations and do not result in more than a minor change in the total estimated number of takes (or distribution by species or stock or years); and

(2) NMFS determines that Hilcorp implemented the mitigation, monitoring, and reporting measures required by the LOA for which modification is requested.

(b) An LOA issued under §§ 216.106 of this chapter and 217.166 may be modified at NMFS' initiation if:

(1) Doing so creates a reasonable likelihood of more effectively accomplishing the goals of the mitigation and monitoring measures; or

(2) NMFS determines that an emergency exists that poses a significant risk to the well-being of the species or stocks of marine mammals specified in an LOA issued pursuant to §§ 216.106 of this chapter and 217.166, in which case, the LOA may be modified without prior notice or opportunity for public comment; however, notification will be published in the **Federal Register** within 30 days of the action.

(c) If the modifications to the specified activities, mitigation, monitoring, or reporting measures are substantial, NMFS shall publish a notice of proposed LOA in the **Federal Register** and solicit public comment prior to making a determination on issuance.

(d) Possible sources of data that could contribute to a decision to modify the LOA include, but are not limited to:

(1) Results from Hilcorp's monitoring;

(2) Results from other marine mammal and/or sound research or studies; and

(3) Any information that reveals marine mammals may have been taken in a manner, extent or number not authorized by this subpart or subsequent LOAs.

§ 217.168 -- 217.169 [Reserved]

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