DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

[RTID 0648–XD682]

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

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

ACTION: Notice; proposed incidental harassment authorizations; request for comments on proposed authorizations and possible renewals.

SUMMARY: NMFS has received a request from Furie Operating Alaska, LLC (Furie) for authorization to take marine mammals incidental to oil and gas activities in Cook Inlet, Alaska. Pursuant to the Marine Mammal Protection Act (MMPA), NMFS is requesting comments on its proposal to issue two consecutive incidental harassment authorizations (IHAs) to incidentally take marine mammals during the specified activities. NMFS is also requesting comments on a possible one-time, 1-year renewal that could be issued for either or both of the two IHAs under certain circumstances and if all requirements are met, as described in Request for Public Comments at the end of this notice. NMFS will consider public comments prior to making any final decision on the issuance of the requested MMPA authorizations and agency responses will be summarized in the final notice of our decision.

DATES: Comments and information must be received no later than July 15, 2024.

ADDRESSES: Comments should be addressed to Jolie Harrison, Chief, Permits and Conservation Division, Office of Protected Resources, National Marine Fisheries Service and should be submitted via email to *ITP.Davis@noaa.gov.* 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.

Instructions: NMFS is not responsible for comments sent by any other method, to any other address or individual, or received after the end of the comment period. Comments, including all attachments, must not exceed a 25-megabyte file size. All comments received are a part of the public record and will generally be posted online at *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-oil-and-gas* without change. All personal identifying information (*e.g.,* name, address) voluntarily submitted by the commenter may be publicly accessible. Do not submit confidential business information or otherwise sensitive or protected information.

FOR FURTHER INFORMATION CONTACT: Leah Davis, 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 proposed or, if the taking is limited to harassment, a notice of a proposed IHA is provided to the public for review.

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). Further, 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 requirements pertaining to the mitigation, monitoring and reporting of the takings are set forth. The definitions of all applicable MMPA statutory terms cited above are included in the relevant sections below.

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.,* the issuance of an IHA) with respect to potential impacts on the human environment. Accordingly, NMFS is preparing an Environmental Assessment (EA) to consider the environmental impacts associated with the issuance of the proposed IHA. NMFS' EA will be made available at *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-oil-and-gas* at the time of publication. We will review all comments submitted in response to this notice prior to concluding our NEPA process or making a final decision on the IHA request.

Summary of Request

On July 19, 2023, NMFS received a request from Furie for two consecutive IHAs to take marine mammals incidental to oil and gas activities in Cook Inlet, Alaska. The application was deemed adequate and complete on April 5, 2024. Furie's request is for take of 12 species of marine mammals, by Level B harassment and, for harbor seals, Level A harassment. Neither Furie nor NMFS expect serious injury or mortality to result from this activity and, therefore, an IHA is appropriate.

Description of Proposed Activity

Overview

From April 1, 2024, through March 31, 2025 (Year 1), and from April 1, 2025 through March 31, 2026 (Year 2), Furie is planning to conduct the following oil and gas activities in Middle Cook Inlet, Alaska. In Year 1, Furie proposes to relocate the Enterprise 151 jack-up production rig (Enterprise 151 or rig) to the Julius R. Platform (JRP) site, install up to two conductor piles using an impact hammer, and conduct production drilling of up to two natural gas wells at the JRP with the Enterprise 151 rig (or a similar rig) across 45–180 days. During Year 2, Furie proposes to relocate the Enterprise 151 rig to the JRP site again, potentially install one to two conductor piles using an impact hammer (depending on whether either or both of these piles are installed or not during Year 1), and conduct additional production drilling at the JRP. Furie proposes to conduct the rig towing and pile driving activities between April 1 and November 15 each year, but if favorable ice conditions occur outside of that period, it may tow the rig or pile drive outside of that period. Noise produced by rig towing and installation of the conductor piles may result in take, by Level B harassment, of marine mammals, and for harbor seals, also Level A harassment. Thus references to tugging activities herein refer to activities where tugs are under load with the rig.

Dates and Duration

NMFS anticipates that the proposed Year 1 IHA would be effective for 1 year beginning mid-to-late 2024, and the proposed Year 2 IHA would be effective for one year beginning mid-to-late 2025. The final effective dates would be determined based upon when Furie anticipates being able to secure the rig from another operator in Cook Inlet. As noted above, Furie expects to conduct the rig towing and pile driving activities between April 1 and November 15 each year, but if favorable ice conditions occur outside of that period, it may tow the rig or pile drive outside of that period. Furie will conduct impact installation of conductor piles during daylight hours only, and it will only conduct rig towing at night if necessary to accommodate a favorable tide. Production drilling may be conducted 24 hours per day.

Specific Geographic Region

Furie's proposed activities would take place in Cook Inlet, Alaska. For the purposes of this project, lower Cook Inlet refers to waters south of the East and West Forelands; middle Cook Inlet refers to waters north of the East and West Forelands and south of Threemile River on the west and Point Possession on the east; and upper Cook Inlet refers to waters north and east of Beluga River on the west and Point Possession on the east. The JRP is located in middle Cook Inlet, approximately 8 miles due south of Tyonek, Alaska, and approximately 10 miles offshore from the shoreline to the southeast of the JRP.

The southernmost area of operation during Furie's Year 1 and Year 2 drilling projects is the Rig Tenders Dock, located in Nikiski, Alaska, where the Enterprise 151 rig overwinters. The Rig Tenders Dock is in lower Cook Inlet, approximately 2.3 miles south of the East Foreland. The northernmost location at which Furie may assume operatorship of the Enterprise 151 rig is Hilcorp Alaska LLC's (Hilcorp) Bruce platform, located 6.4 miles (10.3 kilometers (km)) northwest of the JRP. Hilcorp has stated that they do not intend to conduct work at the Tyonek platform in 2024 or 2025, and therefore, Furie does not intend to operate or tow the Enterprise 151 north of the Bruce platform. The Tyonek platform is within the Susitna Delta Exclusion Zone identified in Hilcorp's IHAs (87 FR 62364, October 14, 2022). If Hilcorp does conduct work at the Tyonek platform, it would maintain operatorship and control of the Enterprise 151 until the tow is underway with lines taut and the Enterprise 151 is under tug power. As a result, Hilcorp would maintain responsibility for any applicable mitigation measures in their current IHA that must be met before a tow may be initiated. Once the tow is underway, Furie representatives would take over operatorship of the Enterprise 151.

Furie expects to tow the Enterprise 151 once or twice each season. The origin of the first rig tow before Furie's use at the JRP and the destination of the tow after use at the JRP is yet to be determined, as Hilcorp also intends to use the Enterprise 151 for similar work in the same region of Cook Inlet, so Furie and Hilcorp must coordinate the use of the Enterprise 151. Furie may assume operatorship of the Enterprise 151 from Hilcorp mid-season, pass operatorship to Hilcorp mid-season, or be the sole operator of the rig if Hilcorp does not use it.

If Furie is the first to operate the Enterprise 151 in a season, the origination of the first tow is likely to begin at the Rig Tenders Dock and would end at the JRP. If Furie is the sole operator of the Enterprise 151 within a season, the rig would be returned to Rig Tenders at the end of the production drilling operation. However, if Hilcorp is the first to use the Enterprise 151 rig, the origination of Furie's tow could be any of Hilcorp's assets (*i.e.,* platforms or well locations within the lease areas operated by Hilcorp). If Hilcorp uses the Enterprise 151 after Furie, operatorship and responsibility for the rig tow will pass to Hilcorp when it is towed from JRP to one of its Cook Inlet assets.

A map of the specific area in which Furie plans to operate is provided in figure 1.

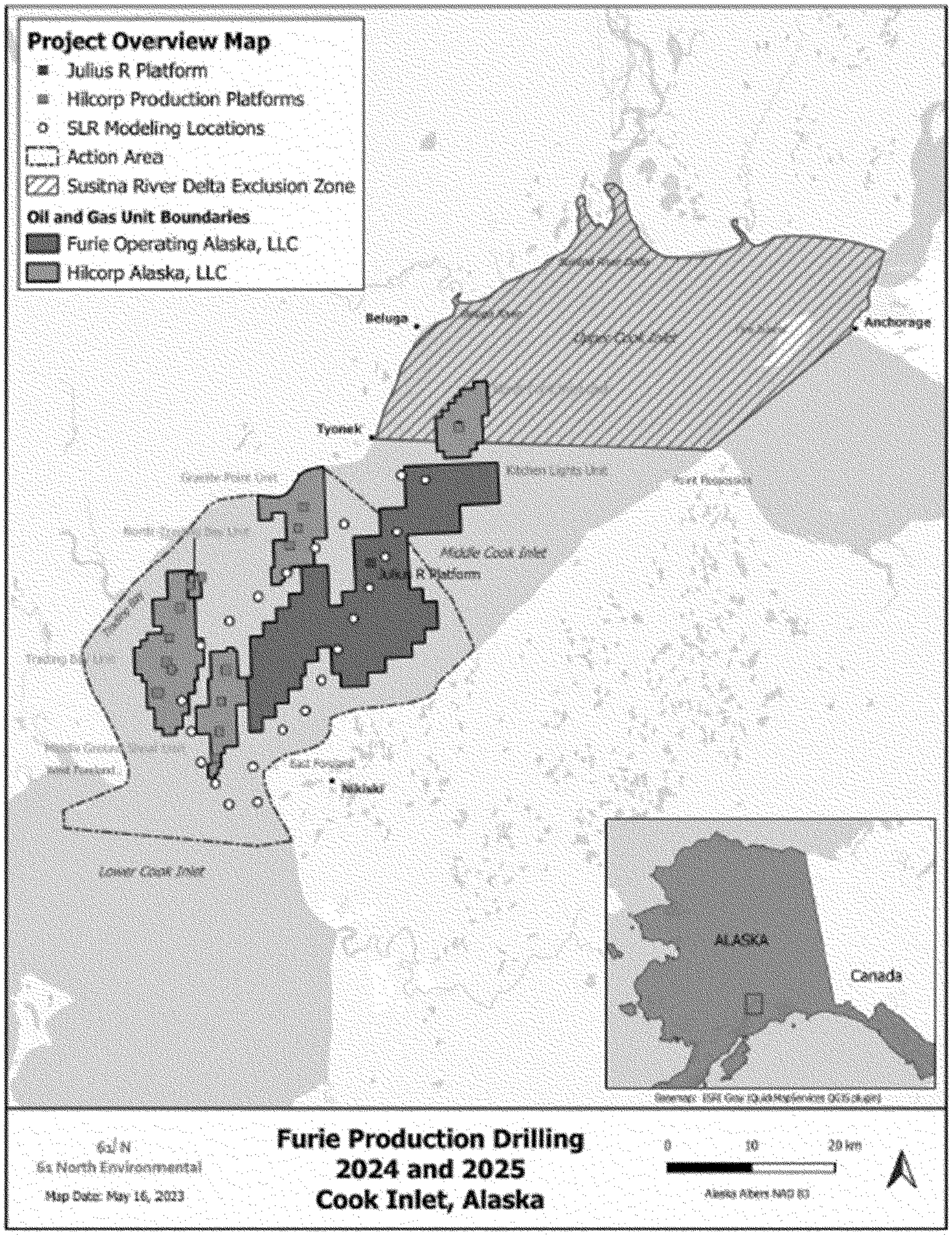

Figure 1-- Furie's Proposed Activity Location

Detailed Description of the Specified Activity

Year 1

Tug Towing and Positioning- Furie proposes to conduct production drilling at the JRP with the Enterprise 151 rig (or a similar rig; see Furie's IHA application for additional information about the Enterprise 151 rig). A jack-up rig is not self-propelled and requires vessels (tugs or heavy-lift ships) to transport it to an offshore drilling location. The Enterprise 151 has a buoyant triangular hull, allowing it to be towed like a barge. The rig will be towed to the JRP by up to three ocean-going tugboats. (Table 2 describes potential rig tow origins and destinations.) Upon arrival at the JRP, a fourth tugboat may join the other three for up to 1 hour to complete the precise positioning of the rig next to the JRP. The tugboats are expected to be rated between 4,000 horsepower (hp) and 8,000 hp. Specifications of the proposed tugs are provided in table 1.

TABLE 1—TUGBOAT SPECIFICATIONS

Vessel	Activity	Length	Width	Gross tonnage
M/V Bering Wind	Towing and positioning the jack-up rig	22 m (72 ft)	10 m (33 ft)	144.
M/V Anna T	Towing and positioning the jack-up rig	32 m (105 ft)	11 m (36 ft)	160.

TABLE 1—TUGBOAT SPECIFICATIONS—Continued

Vessel	Activity	Length	Width	Gross tonnage
M/V Bob Franco	Towing and positioning the jack-up rig	37 meters (121 ft)	11 meters (36 ft)	196.
M/V TBD	Positioning the jack-up rig	Unknown	Unknown	Unknown.

Note: m= meters, ft= feet.

Several factors will determine the duration that the tugboats are towing the Enterprise 151, including the origin and destination of the towing route (*e.g.,* Rig Tenders Dock, the JRP, one of Hilcorp's platforms) and the tidal conditions. For safety reasons, a high slack tide is required to access the shallow water near the dock at Rig Tenders Dock, whether beginning a tow or returning the Enterprise 151. In all other locations, a slack tide at either high or low tide is required to attach the tugs to the rig and float it off position or to position the rig and detach from it. Potential tug power output for these scenarios is discussed in further detail in the Estimated Take of Marine Mammals section.

The specific towing origin and destination of the Enterprise 151 depends on whether Hilcorp contracts to use the Enterprise 151 before or after Furie in the same season. For example, Furie may assume operatorship of the Enterprise 151 at the beginning of the season from the Rig tenders dock, or it may assume operatorship mid-season at one of Hilcorp's platforms or drilling locations (rather than at the Rig Tenders Dock), and tow the rig to the JRP. However, Hilcorp may assume operatorship and begin towing the rig from the JRP to one of their platforms or drilling locations. As a result, Furie may tow the rig once or twice within the season, beginning at several potential locations. However, if Furie operates the Enterprise 151 last, or is the only operator, the second tow of the season would return the Enterprise 151 to the Rig Tenders Dock. Table 2 displays the potential scenarios.

TABLE 2—POTENTIAL RIG TOW ORIGINS AND DESTINATIONS

Scenario	Tow #1	Tow #2
Furie is Sole Operator	Furie tows from the Rig Tenders Dock to the JRP.	Furie tows from the JRP to the Rig Tenders Dock.
Furie Early Season, Hilcorp Late Season	Furie tows from the Rig Tenders Dock to the JRP.	Hilcorp tows from the JRP to a Hilcorp-operated platform or drill site.
Hilcorp Early Season, Furie Late Season [1]	Furie tows from a Hilcorp-operated platform or drill site to the JRP.	Furie tows from the JRP to the Rig Tenders Dock.

[1] One potential variation to this scenario may result if Hilcorp operates the Enterprise 151 early season and conducts work at the Tyonek platform or elsewhere within the North Cook Inlet Unit. The Tyonek platform is within the Susitna Delta Exclusion Zone identified in Hilcorp's IHAs (87 FR 62364, October 14, 2022). If Hilcorp does conduct work at the Tyonek platform, it would maintain operatorship and control of the Enterprise 151 until the tow is underway with lines taut and the Enterprise 151 is under tug power. As a result, Hilcorp would maintain responsibility for any applicable mitigation measures in their existing IHA that must be met before a tow may be initiated. Once the tow is underway, Furie representatives will take over operatorship of the Enterprise 151.

A tow starting at the Rig Tenders Dock would begin at high slack tide, pause near the Offshore Systems Kenai (OSK) Dock to wait for currents to slow (up to three hours), then arrive at the JRP at the next high slack tide (approximately 12 hours after departure). Once the tugs arrive at the JRP, there is a 1- to 2-hour window when the slack tide current velocity is slow (1 to 2 knots), allowing the tugs to position the Enterprise 151 rig and pin the legs to the bottom. Upon return, the tugs would be secured to the Enterprise 151 at the JRP on a high slack tide, float off location, and transit south with the outgoing tide south towards Nikiski, Alaska. The tow will likely pause near OSK to wait for the tide cycle to return to a high flood before moving near the Rig Tenders Dock to bring it close to shore on high slack. Therefore, the tugs will be under load, typically at half-power or less, for up to 14 hours during mobilization to the JRP from Rig Tenders or demobilization in reverse order.

If the rig tow begins at a Hilcorp platform or drill site (excluding the northern locations), then the Enterprise 151 may be lowered, secured to the tugs, and floated off location during low slack to take advantage of the flood tide to tow the rig north or east to the JRP. In this scenario, the total tow duration is expected to be approximately 8 hours, allowing for the 6 hours between the low slack and high slack and an additional 1 to 2 hours to position the rig.

The tugs may abort the first positioning attempt until favorable conditions return if it takes longer than anticipated and the current velocity exceeds 3 to 4 knots. If so, the tugs will move the rig nearby, where the legs can be temporarily lowered to the seafloor to secure it. The tugs will remain close by, jogging in the current until the positioning attempt can be resumed. The tugs usually complete the positioning on the first attempt, but they may be under power for approximately five additional hours if a second attempt is needed.

The tugs will generally attempt to transport the rig by traveling with the tide, except when circumstances threaten human safety, property, or infrastructure. The rig may need to be towed against the tide to a safe harbor if a slack tide window is missed or extreme weather events occur.

Conductor Pipe Installation—Active wells occupy four of the six well slots within the caisson (monopod leg) of the JRP. During Year 1, Furie intends to drill up to two natural gas wells, either ''grassroots'' or ''sidetrack'' wells. A grassroots well requires drilling a new wellbore from the surface to the gas-bearing formations, and requires all new components from the surface to the bottom depth, including a conductor pipe, surface and subsurface casing, cement, production liner, tubulars, chokes, sleeves, and a wellhead. A sidetrack well is a new branch drilled from within an existing well. A sidetrack well requires fewer new components because many existing components, such as the conductor pipe, surface casing, and wellhead, are re-used.

The conductor pipe is the uppermost portion of a gas well and supports the initial sedimentary part of the well, preventing the surface layers from collapsing and obstructing the wellbore. The pipe also facilitates the return of cuttings from the drill head and supports the wellhead components.

Furie expects to install a 20-inch conductor pipe in each of the two empty well slots in Year 1 but expects to complete only one grassroots well and one sidetrack well in Year 1. Furie would install the conductor pipe with an impact hammer Delmag D62 impact hammer (see Furie's IHA application for additional hammer details). As the pipe is driven into the sediment, the sections are connected either by welding or drivable quick connections. Once installed, the conductor pipes remain a permanent component of the natural gas wells. Installation of each conductor pile is anticipated to take approximately 2 days, with 70 percent of the installation occurring on day 1, and the remaining 30 percent of the installation occurring on day 2. Furie will conduct the pile driving during daylight hours only.

Drilling Operations—Furie proposes to conduct production drilling activities after the conductor pipe installation is complete and the Enterprise 151 is positioned at the JRP. Furie expects to drill up to two wells each year, which could be any combination of new grassroots wells or sidetrack wells, to maintain or increase natural gas production levels to meet critical local energy needs.

After the Enterprise 151 is positioned next to the JRP, the rig will jack up so that the hull is initially approximately 5 to 10 ft out of the water. To set the spud cans on the bottoms of the legs securely into the seafloor and ensure stability, the Enterprise 151 has specialized ''preload'' tanks within the hull that are filled with seawater and designed to add weight to the hull. The preload is conducted while the hull is only slightly out of the water to maintain a lower center of gravity until full settling and stability are achieved. After preloading, the seawater is discharged, and the hull is raised so that the drilling derrick can be cantilevered over the top deck of the JRP and positioned over a well slot.

Offshore support vessels (OSVs) support all operating offshore platforms in Cook Inlet throughout the open water season and will be used during Furie's planned drilling operations to transport equipment and supplies between the OSK Dock and the Enterprise 151. During production drilling, an average of two daily vessel trips are expected between the OSK Dock and the rig. No take of marine mammals is anticipated from the operation of OSVs, and OSVs are not discussed further in this application beyond the explanation provided here. Because vessels will be in transit, exposure to vessel noise will be temporary, relatively brief and will occur in a predictable manner, and also the sounds are of relatively lower levels. Elevated background noise from multiple vessels and other sources can interfere with the detection or interpretation of acoustic cues, but the brief exposures to OSVs would be unlikely to disrupt behavioral patterns in a manner that would qualify as take.

Helicopters will transport personnel and supplies from shore to the rig and platform during production drilling activities. Helicopters would be required to follow the mitigation measures described in the Proposed Mitigation section of this notice (*e.g.,* helicopters must maintain an altitude of 1,500 ft (457 m)), and therefore, take from helicopter activity is not anticipated, and helicopter activity is not discussed further aside from the mitigation discussion in the Proposed Mitigation section.

Other potential sources of sound from the Enterprise 151 include the operation of the diesel generators, mud and cement pumps, and ventilation fans. In 2016, while the Randolph Yost jack-up rig was drilling at the JRP, Denes and Austin (2016) characterized drilling and mud pumping sound as 158 decibels (dB) root mean square (rms) at 1 m and 148.8 dB rms at 1 m, respectively. In 2011, while the Enterprise 151 was conducting exploration drilling in Furie's Kitchen Lights Unit lease area, Marine Acoustics Inc. (2011) performed a sound source verification (SSV) near the JRP in water depths ranging from 24.4 to 27.4 m (80 to 90 ft). The SSV measured sound from the diesel generator engines at 137 dB re 1 μPa rms at 1 meter within the frequency bandwidth of 141 to 178 hertz (Hz). The SSV also identified the PZ–10 mud pump and ventilation fans as minor sources of underwater sound. Based on the 137 dB re 1 microPascal (μPa) rms measured at 1 m, the Level B harassment isopleth was estimated to be 50 m from the jack-up leg or drill riser. As such, drilling, mud pumping, and generator noise are not anticipated to result in take of marine mammals, and these activities are not discussed further.

Year 2

In Year 2, Furie would use the same tugboat arrangement to tow the Enterprise 151 to and from the JRP and position it, as described above for Year 1. Furie proposes to drill up to two wells in Year 2 that could be either new grassroots wells, sidetracks, or a combination of each. Furie intends to conduct additional production drilling in Year 2 at the JRP with the Enterprise 151 rig (or a similar rig). Furie expects to install both conductor pipes at the JRP in Year 1, but one or both may be installed in Year 2 instead (though no more than two will be installed over the course of both seasons because only two well slots remain to accept new conductors).

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 3 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 Endangered Species Act (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 serious injury or mortality is anticipated or proposed to be authorized here, PBR and annual serious injury and mortality 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 this document 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 managed stocks in this region are assessed in NMFS' U.S. 2022 SARs. All values presented in table 3 are the most recent available at the time of publication (including from the draft 2023 SARs) and are available online at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments.*

TABLE 3—SPECIES [1] LIKELY IMPACTED BY THE SPECIFIED ACTIVITIES

Common name	Scientific name	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	UND [5] (UND, UND, 2013).	UND	0.6
Humpback Whale	*Megaptera novaeangliae.*	Hawai'i	-, -, N	11,278 (0.56, 7,265, 2020).	127	27.09
Humpback Whale	*Megaptera novaeangliae.*	Mexico-North Pacific	T, D, Y	N/A [6] (N/A, N/A, 2006)	UND	0.57
Humpback Whale	*Megaptera novaeangliae.*	Western North Pacific	E, D, Y	1,084 [7] (0.088, 1,007, 2006).	3.4	5.82
Minke Whale	*Balaenoptera acutorostrata.*	AK	-, -, N	N/A [8] (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
Killer Whale	*Orcinus orca*	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.*	N Pacific	-, -, N	26,880 (N/A, N/A, 1990)	UND	0
Family Monodontidae (white whales):						
Beluga Whale	*Delphinapterus leucas*	Cook Inlet	E, D, Y	279 [9] (0.061, 267, 2018)	0.53	0
Family Phocoenidae (porpoises):						
Dall's Porpoise	*Phocoenoides dalli*	AK	-, -, N	UND [10] (UND, UND, 2015).	UND	37
Harbor Porpoise	*Phocoena phocoena*	Gulf of Alaska	-, -, Y	31,046 (0.21, N/A, 1998).	UND	72
Order Carnivora—Pinnipedia						
Family Otariidae (eared seals and sea lions):						
CA 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 [11] (N/A, 49,837, 2022).	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/;* Committee on Taxonomy (2022)).

[2] 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 SARs 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's 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 best available abundance estimate for this stock is not considered representative of the entire stock as surveys were limited to a small portion of the stock's range. Based upon this estimate and the Nmin, the PBR value is likely negatively biased for the entire stock.

[6] Abundance estimates are based upon data collected more than 8 years ago and, therefore, current estimates are considered unknown.

[7] The best estimates of abundance for the stock (1,084) and the portion of the stock migrating to summering areas in U.S. waters (127) were derived from a reanalysis of the 2004–2006 SPLASH data (Wade 2021). Although these data are more than fifteen years old, the estimates are still considered valid minimum population estimates.

[8] 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.

[9] On June 15, 2023, NMFS released an updated abundance estimate for endangered Cook Inlet beluga whales in Alaska (Goetz *et al.* 2023). Data collected during NOAA Fisheries' 2022 aerial survey suggest that the whale population is stable or may be increasing slightly. Scientists estimated that the population size is between 290 and 386, with a median best estimate of 331. In accordance with the MMPA, this population estimate will be incorporated into the Cook Inlet beluga whale SAR, which will be reviewed by an independent panel of experts, the Alaska Scientific Review Group. After this review, the SAR will be made available as a draft for public review before being finalized.

[10] 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.

[11] 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 14 number managed stocks) in table 3 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 document.

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 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 occur infrequently in Cook Inlet, but can occur seasonally 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).

Some gray whales remain in certain coastal areas in the Pacific Northwest, including lower Cook Inlet, instead of migrating to the Arctic in summer (Moore *et al.* 2007). 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. 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 (NOAA Fisheries 2020). One gray whale was sighted in Knik Arm near the POA in upper Cook Inlet in May of 2020 during observations conducted during construction of the Petroleum and Cement Terminal project (61N 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 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

Humpback whales have been observed during marine mammal surveys conducted in Cook Inlet, with the majority sighted in lower Cook Inlet south of Kalgin Island. Eighty-three groups containing an estimated 187 humpbacks were sighted during the Cook Inlet beluga whale 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. Vessel-based observers participating in the Apache Corporation's 2014 survey operations recorded three humpback whale sightings near Moose Point in upper Cook Inlet and two sightings near Anchor Point, while aerial and land-based observers recorded no humpback whale sightings, including in the upper Inlet (Lomac-MacNair *et al.* 2014). In 2015, during the construction of Furie's 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 northeast of the JRP. 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 from their aerial or rig-based monitoring efforts in 2023 (Horsley and Larson 2023).

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 WNP 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 (BIAs).

Minke Whale

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, 2015, 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 Cross Inlet Pipeline (CIPL) project near Tyonek (Sitkiewicz *et al.* 2018). Minke whales were also not recorded during

Hilcorp's aerial or rig-based monitoring efforts in 2023 (Horsley and Larson 2023).

Fin Whale

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 2010a). Fin whales in Cook Inlet have only been observed as individuals or in small groups. Sightings of fin whales in Cook Inlet are rare; most occur near the entrance. 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, 2015, 2017, 2022; Shelden and Wade 2019). None were observed in the area of Furie's proposed drilling project. In the fall of 2019, during Hilcorp's seismic survey in lower Cook Inlet, eight sightings of 23 fin whales were documented, suggesting greater numbers may use the area in the fall than previously estimated (Fairweather Science 2020). Hilcorp did not record any sightings of fin whales from their aerial or rig-based monitoring efforts in 2023 (Horsley and Larson 2023)

Beluga Whale

NMFS designated Cook Inlet beluga whales as depleted under the MMPA in 2000 and listed the population as endangered under the ESA in 2008 (73 FR 62919, October 10, 2008) when it failed to recover following a moratorium on subsistence harvest (65 FR 34590, May 31, 2000). In April 2011, NMFS designated critical habitat for the beluga under the ESA (76 FR 20180, April 11, 2011). NMFS finalized the Conservation Plan for the Cook Inlet beluga in 2008 (NMFS 2008a) and the Recovery Plan for Cook Inlet beluga whales in 2016 (NMFS 2016a). Between 2008 and 2018, Cook Inlet belugas experienced a decline of about 2.3 percent per year (Wade *et al.* 2019). The decline overlaps 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.* 2020, as cited in Goetz *et al.* 2023). The most recent abundance estimate calculated an average annual increase between 0.2 and 0.9 percent between 2012 and 2022 (Goetz *et al.* 2023).

Threats that have the potential to impact this stock and its habitat include the following: 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, Lowry *et al.* 2006, Hobbs *et al.* 2015, NMFS 2016). Another source of Cook Inlet beluga whale 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 Cook Inlet beluga whales 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 Cook Inlet beluga whales has not occurred since 2008 (NMFS 2008b).

Generally, female beluga whales reach sexual maturity at 9 to 12 years old, while males reach maturity later (O'Corry-Crowe 2009); however, this can vary between populations. For example, in Greenland, males in a population of beluga whales were found to reach sexual maturity at 6 to 7 years of age and females at 4 to 7 years. (Heide-Joregensen and Teilmann 1994). Suydam (2009) estimated that 50 percent of females were sexually mature at age 8.25 and the average age at first birth was 8.27 years for belugas sampled near Point Lay. Mating behavior in beluga whales typically occurs between February and June, peaking in March (Burns and Seaman 1986; Suydam 2009). In the Chukchi Sea, the gestation period of beluga whales was determined to be 14.9 months, with a calving interval of 2 to 3 years and a pregnancy rate of 0.41, declining after 25 years of age (Suydam 2009). Calves are born between mid-June and mid-July and typically remain with the mother for up to 2 years of age (Suydam 2009).

Several studies (Johnson *et al.* 1989; Klishin *et al.* 2000; Finneran *et al.* 2002; Erbe 2008; White *et al.* 1978; Awbrey *et al.* 1988; Ridgway *et al.* 2001; Finneran *et al.* 2005; Castellote *et al.* 2019) describe beluga whale hearing capabilities. One study on beluga whales captured and released in Bristol Bay, Alaska measured hearing ranges at 4 to 150 (kilohertz) kHz with greatest variation between individuals at the high end of the auditory range in combination with frequencies near the maximum sensitivity (Castellote *et al.* 2014). All animals tested heard well up to 128 kHz, with two individuals hearing up to 150 kHz (Castellote *et al.* 2014). Beluga whales are included in the NMFS-identified mid-frequency functional hearing group.

The Cook Inlet beluga stock remains within Cook Inlet throughout the year (Goetz *et al.* 2012a). The ecological range of Cook Inlet belugas 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).

Two areas, consisting of 7,809 square kilometers (km^2) of marine and estuarine environments considered essential for the species' survival and recovery, were designated critical habitat. Area 1 of the Cook Inlet beluga whale critical habitat encompasses all marine waters of Cook Inlet north of a line connecting Point Possession (61.04° N, 150.37° W) and the mouth of Threemile Creek (61.08.55° N, 151.04.40° W), including waters of the Susitna, Little Susitna, and Chickaloon Rivers below the mean higher high water line (MHHW). This area provides important habitat during ice-free months and is used intensively by Cook Inlet beluga between April and November for feeding and other biological functions (NMFS 2016a). Critical Habitat Area 2 encompasses some of the fall and winter feeding grounds in middle Cook Inlet.

Since 1993, NMFS has conducted annual aerial surveys in June, July, or August to document the distribution and abundance of beluga whales in Cook Inlet. The collective survey results show that beluga whales have been consistently found near or in river mouths along the northern shores of middle and upper Cook Inlet. In particular, beluga whale groups are seen in the Susitna River Delta, Knik Arm, and along the shores of Chickaloon Bay. Small groups had also been recorded farther south in Kachemak Bay, Redoubt Bay (Big River), and Trading Bay (McArthur River) prior to 1996, but very rarely thereafter. Since the mid-1990s, most beluga whales have been concentrated in shallow areas near river mouths north and east of Beluga River and Point Possession (Hobbs *et al.* 2008). Based on these aerial surveys, there is a consistent pattern of beluga whale presence in the northernmost portion of Cook Inlet from June to October (Rugh *et al.* 2000, 2004a, 2004b, 2005, 2006, 2007).

Though Cook Inlet beluga whales occur throughout the inlet at any time of year, generally they spend the ice-free months in the upper Cook Inlet, shifting into deeper waters in middle Cook Inlet in winter (Hobbs *et al.* 2008). In 1999, one beluga whale was tagged with a satellite transmitter, and its movements were recorded from June through September of that year. Since 1999, 18 beluga whales in upper Cook Inlet have been captured and fitted with satellite tags to provide information on their movements during late summer, fall, winter, and spring. Using location data from satellite-tagged Cook Inlet belugas, Ezer *et al.* (2013) found most tagged whales were in the lower to middle inlet during January through March, near the Susitna River Delta from April to July) and in the Knik and Turnagain Arms from August to December. The transmitters collected data for as little as a few days and up to 293 days with at least some data obtained each calendar month. None of the tagged belugas left the inlet. All but three remained north of the forelands for the duration of transmission, and those that traveled south did so only briefly (Shelden *et al.* 2018).

In the winter, belugas are more widely dispersed based on aerial surveys, opportunistic sighting reports, and tagging results, with animals found between Kalgin Island and Point Possession. In November, beluga whales remained in Knik Arm, Turnagain Arm, and Chickaloon Bay, similar to locations observed in September. 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).

During the spring and summer, beluga whales are generally concentrated near the warmer waters of river mouths where prey availability is high and predator occurrence is low (Moore *et al.* 2000). Beluga whales in Cook Inlet are believed to mostly calve between mid-May and mid-July, and concurrently breed between late spring and early summer (NMFS 2016a), primarily in upper Cook Inlet. Beluga movement was correlated with the peak discharge of seven major rivers emptying into Cook Inlet. Boat-based surveys from 2005 to the present (McGuire and Stephens 2017), and initial results from passive acoustic monitoring across the entire inlet (Castellote *et al.* 2016) also support seasonal patterns observed with other methods, and other surveys confirm Cook Inlet belugas near the Kenai River during summer months (McGuire and Stephens 2017).

During the summer and fall, beluga whales are concentrated near the Susitna River mouth, Knik Arm, Turnagain Arm, and Chickaloon Bay (Nemeth *et al.* 2007) where they feed on migrating eulachon (*Thaleichthys pacificus*) and salmon (*Onchorhyncus spp.;* Moore *et al.* 2000). Data from tagged whales (14 tags between July and March 2000 through 2003) show beluga whales use upper Cook Inlet intensively between summer and late autumn (Hobbs *et al.* 2005). Critical Habitat Area 1 encompasses this summer distribution.

Using the June aerial survey data from 1994 to 2008, Goetz *et al.* (2012) constructed a model of summer habitat preference for the entire Cook Inlet. The model identified a positive geographic association with rivers with prey species (primarily eulachon and salmon), shallow tidal flats, and sandy substrate and a negative association with sources of anthropogenic disturbance. A heat map of the summer habitat was generated, with 1 km^2 cells ranging from 0 to 1.12 belugas per km^2. The areas of highest concentration were the Susitna River delta (from the Beluga River to the Little Susitna River), upper Knik Arm, and Chickaloon Bay. Each area has generally large salmon runs, shallow tidal flats, and little anthropogenic disturbance. The location of the JRP and the towing routes between the Rig Tenders Dock and the JRP are areas of predicted low density in the summer months.

As late as October, beluga whales tagged with satellite transmitters continued to use Knik Arm and Turnagain Arm and Chickaloon Bay, but some ranged into lower Cook Inlet south to Chinitna Bay, Tuxedni Bay, and Trading Bay (McArthur River) in the fall (Hobbs *et al.* 2005). Data from NMFS aerial surveys, opportunistic sighting reports, and satellite-tagged beluga whales confirm they are more widely dispersed throughout Cook Inlet during the winter months (November to April), with animals found between Kalgin Island and Point Possession. In November, beluga whales moved between Knik Arm, Turnagain Arm, and Chickaloon Bay, similar to patterns observed in September (Hobbs *et al.* 2005). By December, beluga whales were distributed throughout the upper to middle Cook Inlet. From January into March, they moved as far south as Kalgin Island and slightly beyond in central offshore waters. Beluga whales also made occasional excursions into Knik Arm and Turnagain Arm in February and March despite ice cover greater than 90 percent (Hobbs *et al.* 2005).

Wild *et al.* (2023) delineated a Small and Resident Population BIA in Cook Inlet that is active year-round and overlaps Furie's proposed project area. 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. 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).

During Apache's seismic test program in 2011 along the west coast of Redoubt Bay, lower Cook Inlet, a total of 33 beluga whales were sighted during the survey (Lomac-MacNair *et al.* 2013). During Apache's 2012 seismic program in mid-inlet, a total of 151 sightings consisting of an estimated 1,463 beluga whales were observed (Lomac-MacNair *et al.* 2014). During SAExploration's 2015 seismic program, a total of eight sightings of 33 estimated individual beluga whales were visually observed during this time period and there were two acoustic detections of beluga whales (Kendall *et al.* 2015). During Harvest Alaska's recent CIPL project on the west side of Cook Inlet in between Ladd Landing and Tyonek Platform, a total of 143 beluga whale sightings (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 beluga whale 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 protected species observers (PSOs). Daily aerial surveys specifically for beluga whales were flown over the lower Cook Inlet region, but no beluga whales were observed. In 2023, Hilcorp recorded 21 sightings of more than 125 beluga whales during aerial surveys and an additional 21 opportunistic sightings that included approximately 81 beluga whales (Horsley and Larson, 2023). Hilcorp did not record any sightings of beluga whales from their rig-based monitoring efforts (Horsley and Larson, 2023)

Killer Whale

Killer whales from the Alaska Resident stock and the Gulf of Alaska, Aleutian Islands, and Bering Sea Transient stock occur in lower Cook Inlet but rarely in middle and upper Cook Inlet. Recent studies have documented the movements of Alaska Resident killer whales from the Bering Sea into the Gulf of Alaska as far north as southern Kodiak Island (Muto *et al.* 2017).

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). 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: six in May 1991 and five 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 2022a). Hilcorp did not record any sightings of fin whales from their aerial or rig-based monitoring efforts in 2023 (Horsley and Larson 2023).

Pacific White-Sided Dolphin

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 (*e.g.* 92 animals in NMFS' IHAs for Tongass Narrows).

Harbor Porpoise

Harbor porpoises prefer shallow coastal waters less than 100 m in depth (Hobbs and Waite 2010). They 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).

Harbor porpoises have been observed during most aerial surveys conducted in Cook Inlet since 1993. They are frequently documented in 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. There were 137 groups comprised of 190 individuals documented between May and August during Apache's 2012 seismic program (Lomac-MacNair *et al.* 2013). Kendall *et al.* (2015, as cited in Weston and SLR 2022) documented 52 groups comprised of 65 individuals north of the Forelands during SAExploration's 2015 seismic survey. Two groups totaling three harbor porpoises were observed in the fall of 2019 during Hilcorp's lower Cook Inlet seismic survey (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 comprised of 50 individual porpoises were documented over 285 days of observation (61N 2021, 2022a, 2022b, and 2022c). One harbor porpoise was observed during Hilcorp's monitoring boat-based monitoring efforts in June 2023 (Horsley and Larson 2023).

Dall's Porpoise

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). Dall's porpoises were observed (two groups of three individuals) during Apache's 2014 seismic survey which occurred in the summer months (Lomac-MacNair *et al.* 2014). In August 2015, one Dall's porpoise was reported in the mid-inlet north of Nikiski during SAExploration's seismic program (Kendall *et al.* 2015 as cited in Weston and SLR 2022). During aerial surveys in Cook Inlet, they were observed in Iniskin Bay, Barren Island, Elizabeth Island, and Kamishak Bay (Shelden *et al.* 2013). Ten groups totaling 30 Dall's porpoises were observed in the fall of 2019 during Hilcorp's lower Cook Inlet seismic survey (Fairweather Science 2020). No Dall's porpoises were observed during the CIPL project monitoring program in middle Cook Inlet in 2018 (Sitkiewicz *et al.* 2018). Hilcorp recorded one sighting of a Dall's porpoise from their rig-based monitoring efforts in the project area in 2023 (Horsley and Larson, 2023).

Steller Sea Lion

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. 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.

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 Port of Alaska (POA) in Anchorage in 2020, 2021, and 2022 (61N 2021, 2022a, 2022b, and 2022c).

California Sea Lion

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. None 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 2023 Hilcorp aerial or rig-based monitoring efforts (Horsley and Larson, 2023).

Harbor Seal

In the spring and summer, harbor seals display an affinity for coastal haulout areas for feeding, breeding, pupping, and molting, while ranging further offshore and outside of Cook Inlet during the winter. 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 during eulachon and salmon runs (Nemeth *et al.* 2007; Boveng *et al.* 2012), but most remain south of the forelands (Boveng *et al.* 2012).

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. The two haulout locations closest to the JRP are located at Middle Ground Shoal, which becomes inundated with water at most high tides (London *et al.* 2015).

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 2021, 2022a, 2022b, and 2022c; Fairweather Science 2020; Kendall *et al.* 2015 as cited in Weston and SLR 2022; Lomac-MacNair *et al.* 2013, 2014; Sitkiewicz *et al.* 2018).

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.*). Note that no direct measurements of hearing ability have been successfully completed for mysticetes (*i.e.,* low-frequency cetaceans). Subsequently, NMFS (2018) described generalized hearing ranges for these marine mammal hearing groups. Generalized hearing ranges were chosen based on the approximately 65 dB threshold from the normalized 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. Marine mammal hearing groups and their associated hearing ranges are provided in table 4.

TABLE 4—MARINE MAMMAL HEARING GROUPS (NMFS, 2018)

Hearing group	Generalized hearing range *
Low-frequency (LF) cetaceans (baleen whales)	7 Hz to 35 kHz.
Mid-frequency (MF) cetaceans (dolphins, toothed whales, beaked whales, bottlenose whales)	150 Hz to 160 kHz.
High-frequency (HF) cetaceans (true porpoises, *Kogia,* river dolphins, Cephalorhynchid, *Lagenorhynchus cruciger* & *L. australis*).	275 Hz to 160 kHz.
Phocid pinnipeds (PW) (underwater) (true seals)	50 Hz to 86 kHz.
Otariid pinnipeds (OW) (underwater) (sea lions and fur seals)	60 Hz to 39 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 are typically not as broad. Generalized hearing range chosen based on ~65 dB threshold from normalized composite audiogram, with the exception for lower limits for LF cetaceans (Southall *et al.* 2007) and PW pinniped (approximation).

The pinniped functional hearing group was modified from Southall *et al.* (2007) on the basis of data indicating that phocid species have consistently demonstrated an extended frequency range of hearing compared to otariids, especially in the higher frequency range (Hemilä *et al.* 2006; Kastelein *et al.* 2009; Reichmuth *et al.* 2013). This division between phocid and otariid pinnipeds is now reflected in the updated hearing groups proposed in Southall *et al.* (2019).

For more detail concerning these groups and associated frequency ranges, please see NMFS (2018) 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.

Description of Sound Sources

The marine soundscape is comprised of both ambient and anthropogenic sounds. Ambient sound is defined as the all-encompassing sound in a given place and is usually a composite of sound from many sources both near and far (ANSI 1995). The sound level of an area is defined by the total acoustical energy being generated by known and unknown sources. These sources may include physical (*e.g.,* waves, wind, precipitation, earthquakes, ice, atmospheric sound), biological (*e.g.,* sounds produced by marine mammals, fish, and invertebrates), and anthropogenic sound (*e.g.,* vessels, dredging, aircraft, construction).

The sum of the various natural and anthropogenic sound sources at any given location and time—which comprise ''ambient'' or ''background'' sound—depends not only on the source levels (as determined by current weather conditions and levels of biological and shipping activity) but also on the ability of sound to propagate through the environment. In turn, 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, 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 10–20 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.

The proposed project includes the use of three to four tugs towing a jack-up rig as well as impact pile driving of conductor piles. The sounds produced by these activities fall into one of two general sound types: impulsive and non-impulsive. Impulsive sounds (*e.g.,* explosions, sonic booms, impact pile driving) are typically transient, brief (less than 1 second), broadband, and consist of high peak sound pressure with rapid rise time and rapid decay (ANSI 1986; NIOSH 1998; NMFS 2018). Non-impulsive sounds (*e.g.,* machinery operations such as drilling or dredging, vibratory pile driving, underwater chainsaws, and active sonar systems) can be broadband, narrowband or tonal, brief or prolonged (continuous or intermittent), and typically do not have the high peak sound pressure with rise/decay time that impulsive sounds do (ANSI 1995; NIOSH 1998; NMFS 2018). The distinction between impulsive and non-impulsive sound sources is important because they have differing potential to cause physical effects, particularly with regard to hearing (*e.g.,* Ward 1997 in Southall *et al.* 2007).

An impact hammer that operates 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 considered impulsive.

Towing the rig would emit consistent low levels of noise into a small portion of Cook Inlet for an extended period of time. Furie's tugging and positioning activities would occur for approximately 20–25 hours over 2 days at the beginning and end of the drilling season in Year 1 and in Year 2. Unlike projects that involve discrete noise sources with known potential to harass marine mammals (*e.g.,* pile driving, seismic surveys), both the noise sources and impacts from the tugs towing the rig are less well documented. The various scenarios that may occur during this project extend from tugs in a stationary mode positioning the drill rig to pulling the rig at nearly full power against strong tides. Our assessments of the potential for harassment of marine mammals incidental to Furie's tug activities specified here 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.

The proposed project has the potential to harass marine mammals from exposure to noise and the physical presence of working vessels (*e.g.,* tug configuration and pile driving equipment) as well as associated noise with pile driving and the moving and positioning of the rig. In this case, NMFS considers potential for harassment from the collective use of these technologies working in a concentrated area (relative to the entire Cook Inlet) for an extended period of time (for tugging, when making multiple positioning attempts) and noise created when moving and positioning the rig using tugs, as well as impact installation of the conductor piles. Essentially, the project area will become a concentrated work area in an otherwise non-industrial setting for a period of several days.

Acoustic Impacts

The introduction of anthropogenic noise into the aquatic environment from tugs and pile driving equipment is the primary means by which marine mammals may be harassed from Furie's specified activities. 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). Generally, exposure to pile driving and tugging has the potential to result in auditory threshold shifts (TS) and behavioral disturbance (*e.g.,* avoidance, temporary cessation of foraging and vocalizing, changes in dive behavior). Exposure to anthropogenic noise can also lead to non-observable physiological responses such as an increase in stress hormones. Additional noise in a marine mammal's habitat can mask acoustic cues used by marine mammals to carry out daily functions such as communication and predator and prey detection. The effects of pile driving and tugging 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 sound source and the animal, received levels, behavior at time of exposure, and previous history with exposure (Wartzok *et al.* 2003; Southall *et al.* 2007). Here we discuss physical auditory effects (TSs) followed by behavioral effects and potential impacts on habitat.

NMFS defines a noise-induced TS 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'' (NMFS 2018). The amount of TS is customarily expressed in dB (ANSI 1995, Yost 2007). A TS can be permanent (PTS) or temporary (TTS). As described in NMFS (2016), 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 and vocalization 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). When analyzing the auditory effects of noise exposure, it is often helpful to broadly categorize sound as either impulsive—noise with high peak sound pressure, short duration, fast rise-time, and broad frequency content—or non-impulsive. For example, when considering auditory effects, impact pile driving is treated as an impulsive source. The sounds produced by tugs towing and positioning the rig are characterized as non-impulsive sounds.

Permanent Threshold Shift—NMFS defines PTS 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 2018). Available data from humans and other terrestrial mammals indicate that a 40 dB TS approximates PTS onset (see NMFS 2018 for review). PTS levels for marine mammals are estimates, because there are limited empirical data measuring PTS in marine mammals (*e.g.,* Kastak *et al.* 2008), largely due to the fact that, for various ethical reasons, experiments involving anthropogenic noise exposure at levels inducing PTS are not typically pursued or authorized (NMFS 2018).

Temporary Threshold Shift—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 2018). Based on data from cetacean TTS measurements (see Finneran 2015 for a review), a TTS of 6 dB is considered the minimum TS clearly larger than any day-to-day or session-to-session variation in a subject's normal hearing ability (Schlundt *et al.* 2000; Finneran *et al.* 2002; Finneran 2015). As described in Finneran (2016), marine mammal studies have shown the amount of TTS increases with cumulative sound exposure level (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.

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 times when hearing is critical, such as 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). For cetaceans, published data on the onset of TTS are limited to the captive bottlenose dolphin (*Tursiops truncatus*), beluga whale, harbor porpoise, and Yangtze finless porpoise (*Neophocoena asiaeorientalis*), and for pinnipeds in water, measurements of TTS are limited to harbor seals, elephant seals (*Mirounga angustirostris*), and California sea lions. These studies examine hearing thresholds measured in marine mammals before and after exposure to intense sounds. The difference between the pre-exposure and post-exposure thresholds can be used to determine the amount of TS at various post-exposure times. The amount and onset of TTS depends on the exposure frequency. Sounds at low frequencies, well below the region of best sensitivity, are less hazardous than those at higher frequencies, 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, 2019b, 2020a, 2020b). 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 sound exposure level (SEL; Finneran *et al.* 2010; Kastelein *et al.* 2014; Kastelein *et al.* 2015a; Mooney *et al.* 2009). 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) and Finneran (2018) describe the 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).

Activities for this project include tugging and impact pile driving. Tugging is a transient activity, and there would likely be pauses in pile driving during each day that it occurs. Given the nature of these activities and the fact that many marine mammals are likely moving through the project areas and not remaining for extended periods of time, the potential for TS declines.

Behavioral Disturbance

Finally, exposure of marine mammals to certain sounds could result in behavioral disturbance (Richardson *et al.* 1995), not all of which constitutes harassment under the MMPA. The onset of behavioral disturbance from anthropogenic noise depends on both external factors (*e.g.,* characteristics of noise sources and their paths) and the receiving animals (*e.g.,* hearing, behavioral state, experience, demography) and is difficult to predict (Southall *et al.* 2007, 2021). Currently NMFS uses a received level of 160 dB re 1 micro Pascal (μPa) rms to predict the onset of Level B harassment from impulse noises (such as impact pile driving), and 120 dB re 1 μPa (rms) for continuous noises (such as operating dynamic positioning (DP) thrusters), although in certain circumstances there may be contextual factors that alter our assessment. Furie's activity includes the use of continuous (tug towing and positioning) and impulsive (impact pile driving) sources, and therefore the RMS SPL thresholds of 120 and 160 dB re 1 μPa are applicable.

Disturbance may result in changing durations of surfacing and dives, number of blows per surfacing, moving direction and/or speed, reduced/increased vocal activities; changing/cessation of certain behavioral activities (such as socializing or feeding), visible startle response or aggressive behavior (such as tail/fluke slapping or jaw clapping), avoidance of areas where sound sources are located, and/or flight responses. Pinnipeds may increase their haul-out time, possibly to avoid in-water disturbance (Thorson and Reyff 2006). These potential behavioral responses to sound are highly variable and context-specific and reactions, if any, depend on species, state of maturity, experience, current activity, reproductive state, auditory sensitivity, time of day, and many other factors regarding the source eliciting the response (Richardson *et al.* 1995; Wartzok *et al.* 2004; Southall *et al.* 2007). 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; NRC 2003; Wartzok *et al.* 2004). The biological significance of many of these 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.

In consideration of the range of potential effects (PTS to behavioral disturbance), we consider the potential exposure scenarios and context in which species would be exposed to pile driving and tug-related activity. Cook Inlet beluga whales 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 threshold for continuous or impulsive noise. However, beluga whales 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, as belugas 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 area of the tugs. 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 porpoises, they are unlikely to remain at any particular well site for the full duration of the noise-producing activity. Because of this and the relatively low-level sources, the likelihood of PTS and TTS over the course of the tug activities is discountable. Harbor seals may linger or haul-out in the area but they are not known to do so in any large number or for extended periods of time (there are no known major haul-outs or rookeries coinciding with the well sites). Here we find there is small potential for TTS over the course of tug activities but again, PTS is not likely due to the nature of tugging. Potential for PTS and TTS due to pile driving is discussed further in the Estimated Take section.

Given most marine mammals are likely transiting through the area, exposure is expected to be brief but, in combination with the actual presence of the tug and rig configuration as well as conductor pipe pile driving, may result in animals shifting pathways around the work site (*e.g.,* avoidance), increasing speed or dive times, or cessation of vocalizations. The likelihood of no more than a short-term, localized disturbance response is supported by data indicating belugas regularly pass by industrialized areas such as the Port of Anchorage; 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.

While in some cases marine mammals have exhibited little to no obviously detectable response to certain common or routine industrialized activity (Cornick *et al.* 2011), it is possible some animals may at times be exposed to received levels of sound above the Level B harassment threshold. This potential exposure in combination with the nature of the tug and rig configuration (*e.g.,* difficult to maneuver, potential need to operate at night) and pile driving activities means it is possible that take could occur over the total estimated period of activities.

Masking

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 marine mammal (Southall *et al.* 2007; Clark *et al.* 2009; Hatch *et al.* 2012). 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). Acoustic masking is when other noises such as from human sources interfere with animal detection and/or interpretation of acoustic signals such as communication calls, echolocation sounds, and environmental sounds important to marine mammals. Therefore, under certain circumstances, marine mammals whose acoustical sensors or environment are being severely masked could also be impaired from maximizing their fitness for survival and reproduction.

Masking occurs in the frequency band that the animals utilize. 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 Cook Inlet beluga whales. 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. Further, noise generated by impact pile driving will be intermittent and will occur over a maximum of 2 days per year.

Marine Mammal Habitat Effects

Furie'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. Increased noise levels may affect acoustic habitat and adversely affect marine mammal prey in the vicinity of the project areas (see discussion below). Elevated levels of underwater noise would ensonify the project areas where both fishes and mammals occur and could affect foraging success.

The total seafloor area likely impacted by the pile driving associated with the project is relatively small compared to the available habitat in Cook Inlet. Avoidance by potential prey (*i.e.,* fish) of the immediate area due to the temporary loss of this foraging habitat is possible. The duration of fish and marine mammal avoidance of this area after pile driving stops 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 would still leave significantly large areas of fish and marine mammal foraging habitat in the nearby vicinity.

Increased turbidity near the seafloor is not anticipated, as installation of the conductor piles would occur within the monopod leg of the platform.

Effects on Potential Prey

Sound may affect marine mammals through impacts on the abundance, behavior, or distribution of prey species (*e.g.,* fish). Marine mammal prey varies by species, season, and location. Here, we describe studies regarding the effects of noise on known marine mammal prey.

Fish 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 and Mann 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. Key impacts to fishes may include behavioral responses, hearing damage, barotrauma (pressure-related injuries), and mortality.

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 fish and fish mortality. 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.* (2012a) showed that a TTS of 4–6 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.* 2012b; Casper *et al.* 2013).

For pile driving, the most likely impact to fishes at the project site would be temporary avoidance of the area. The duration of fish avoidance of this area after pile driving stops is unknown, but a rapid return to normal recruitment, distribution, and behavior is anticipated. For tugging activities, 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.

In summary, given the short daily duration of sound associated with individual pile driving events and the relatively small areas being affected, as well as the temporary and mostly transitory nature of the tugging, Furie's activities are not likely to have a permanent, adverse effect on any fish habitat, or populations of fish species. 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 through the IHA, 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).

Takes proposed for authorization would primarily be by Level B harassment, as use of the acoustic sources (*i.e.,* pile driving and tug towing and positioning) has 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 of tug towing and positioning, the likelihood of a resulting disruption of marine mammal behavioral patterns that would qualify as harassment is considered relatively low, however, at the request of the applicant, we have quantified the potential take from this activity, analyzed the impacts, and proposed its authorization. There is also some potential for auditory injury (Level A harassment) to result to phocids because of species occurrence and because predicted auditory injury zones are larger than for mid-frequency and otariid species. Auditory injury is unlikely to occur for low-frequency, mid-frequency, high-frequency, or otariid species. The proposed mitigation and monitoring measures are expected to minimize 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. Below we describe how the proposed take numbers are estimated.

For acoustic impacts, generally speaking, we estimate take by considering: (1) acoustic thresholds above which NMFS believes the best available science indicates marine mammals will be behaviorally harassed or incur some degree of permanent hearing impairment; (2) the area 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 Thresholds

NMFS recommends the use of acoustic thresholds that identify the received level of underwater sound above which exposed marine mammals would be reasonably expected to be behaviorally harassed (equated to Level B harassment) or to incur PTS of some degree (equated to Level A harassment).

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 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) or intermittent (*e.g.,* scientific sonar) sources. Generally speaking, Level B harassment take estimates based on these thresholds are expected to include any likely takes by TTS as, in most cases, the likelihood of TTS occurs at distances from the source smaller 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.

Furie's proposed activity includes the use of continuous (tugs towing rig) 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' Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0) (Technical Guidance, 2018) identifies dual criteria to assess auditory injury (Level A harassment) to five different marine mammal groups (based on hearing sensitivity) as a result of exposure to noise from two different types of sources (impulsive or non-impulsive). Furie's proposed activity includes the use of impulsive (impact pile driving) and non-impulsive (tugs towing and positioning rig) sources.

These thresholds are provided in the table below. The references, analysis, and methodology used in the development of the thresholds are described in NMFS' 2018 Technical Guidance, which may be accessed at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance.*

TABLE 5—THRESHOLDS IDENTIFYING THE ONSET OF PTS

Hearing group	PTS onset acoustic thresholds * (received level)	
	Impulsive	Non-impulsive
Low-Frequency (LF) cetaceans	*Cell 1:* $L_{pk,flat}$: 219 dB; $L_{E,LF,24h}$: 183 dB	*Cell 2:* $L_{E,LF,24h}$: 199 dB.
Mid-Frequency (MF) cetaceans	*Cell 3:* $L_{pk,flat}$: 230 dB; $L_{E,MF,24h}$: 185 dB	*Cell 4:* $L_{E,MF,24h}$: 198 dB.
High-Frequency (HF) cetaceans	*Cell 5:* $L_{pk,flat}$: 202 dB; $L_{E,HF,24h}$: 155 dB	*Cell 6:* $L_{E,HF,24h}$: 173 dB.
Phocid Pinnipeds (PW) (underwater)	*Cell 7:* $L_{pk,flat}$: 218 dB; $L_{E,PW,24h}$: 185 dB	*Cell 8:* $L_{E,PW,24h}$: 201 dB.
Otariid Pinnipeds (OW) (underwater)	*Cell 9:* $L_{pk,flat}$: 232 dB; $L_{E,OW,24h}$: 203 dB	*Cell 10:* $L_{E,OW,24h}$: 219 dB.

* Dual metric acoustic thresholds for impulsive sounds: Use whichever results in the largest isopleth for calculating PTS onset. If a non-impulsive sound has the potential of exceeding the peak sound pressure level thresholds associated with impulsive sounds, these thresholds should also be considered.

Note: Peak sound pressure (L_{pk}) has a reference value of 1 μPa, and cumulative sound exposure level (L_E) has a reference value of 1μPa^{2}s. In this table, thresholds are abbreviated to reflect American National Standards Institute standards (ANSI 2013). However, peak sound pressure is defined by ANSI as incorporating frequency weighting, which is not the intent for this Technical Guidance. Hence, the subscript "flat" is being included to indicate peak sound pressure should be flat weighted or unweighted within the generalized hearing range. The subscript associated with cumulative sound exposure level thresholds indicates the designated marine mammal auditory weighting function (LF, MF, and HF cetaceans, and PW and OW pinnipeds) and that the recommended accumulation period is 24 hours. The cumulative sound exposure level thresholds 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 acoustic thresholds 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 transmission loss (TL) coefficient.

The sound field in the project area is the existing background noise plus additional noise from the proposed project. Marine mammals are expected to be affected via sound generated by the primary components of the project (*i.e.,* pile driving and tug towing and positioning). The calculated distance to the farthest Level B harassment isopleth is approximately 4,483 m (2.8 miles (mi)).

The project includes impact installation of up to two 20-inch conductor pipe piles in each year. The monopod leg of the JRP will encase the well slot, which will encase the conductor pipes; therefore, some attenuation is expected during conductor pipe pile installation. However, water-filled isolation casings (such as the well slot and caisson at the JRP) are expected to provide limited sound attenuation (Caltrans 2015). Due to the well slot's reflective surfaces and the monopod leg's caisson inside the JRP, some attenuation of the impact noise is expected before reaching the open water. However, lacking project-specific empirical data for a 20-inch conductor installed within a well slot located within a monopod leg, the unaltered sound source levels (SSLs) from U.S. Navy (2015) are used to calculate Level A harassment and Level B harassment isopleths.

For tug activities, as described in 87 FR 27597 (May 9, 2022), Hilcorp conducted a literature review of available source level data for tugs under load in varying power output scenarios. Table 6 below provides values of measured source levels for tugs varying from 2,000 to 8,200 horsepower. For the purposes of this table, berthing activities could include tugs either pushing or pulling a load. The SSLs appear correlated to speed and power output, with full power output and higher speeds generating more propeller cavitation and greater SSLs than lower power output and lower speeds. Additional tug source levels are available from the literature but they are not specific to tugs under load but rather measured values for tugs during activities such as transiting, docking, and anchor pulling. For a summary of these additional tug values, see table 7 in Hilcorp's 2022 IHA application, available at *https://www.fisheries.noaa.gov/action/incidental-take-authorization-hilcorp-alaska-llc-oil-and-gas-activities-cook-inlet-alaska-0.*

TABLE 6—LITERATURE VALUES OF MEASURED TUG SOURCE LEVELS

Vessel	Vessel length (m)	Speed (knots)	Activity	Source level @1 m (re: 1 μPa)	Horsepower	Reference
Eagle	32	9.6	Towing barge	173	6,770	Bassett *et al.* 2012.
Valor	30	8.4	Towing barge	168	2,400	
Lela Joy	24	4.9	Towing barge	172	2,000	
Pacific Eagle	28	8.2	Towing barge	165	2,000	
Shannon	30	9.3	Towing barge	171	2,000	
James T Quigg	30	7.9	Towing barge	167	2,000	
Island Scout	30	5.8	Towing barge	174	4,800	
Chief	34	11.4	Towing barge	174	8,200	
Lauren Foss	45	N/A	Berthing barge	167	8,200	Austin *et al.* 2013.
Seaspan Resolution	30	N/A	Berthing at half power	180	6,000	Roberts Bank Terminal 2 Technical Report 2014.
Seaspan Resolution	30	N/A	Berthing at full power	200	6,000	

The Roberts Bank Terminal 2 Technical Report (2014), although not in Cook Inlet, includes repeated measurements of the same tug operating under different speeds and loads. This allows for a comparison of source levels from the same vessel at half power versus full power, which is an important distinction for Furie's activities, as a small fraction of the total time spent by tugs under load will be at greater than 50 percent power. The Seaspan Resolution's half-power berthing scenario has a sound source level of 180 dB re 1 μPa at 1 m. In addition, the Roberts Bank Report (2014) analyzed 650 tug transits under varying load and speed conditions and reported mean tug source levels of 179.3 dB re 1 μPa at 1 m; the 25th percentile was 179.0 dB re 1 μPa at 1 m, and 5th percentile source levels were 184.9 dB re 1 μPa at 1 m.

Based solely on the literature review, a source level of 180 dB for a single tug under load would be appropriate. However, Furie's use of a three tug configuration would increase the literature source level to approximately 185 dB at 1 m (Lawrence *et al.* 2022, as cited in Weston and SLR 2022).

As described above in the *Detailed Description of the Specific Activity* section, based on in situ measurements of Hilcorp's tug and a review of the available literature of tugs under load described above, NMFS finds that a source level of 185 dB re 1 μPa is appropriate for Furie's three tug configuration for towing the rig.

As described above in the *Detailed Description of the Specific Activity* section, Furie may need to use four tugs to position the rig at the JRP. The SPL_{RMS} of 185 dB for three tugs at 50 percent power implies each tug individually has a source level of 180.2 dB SPL_{rms} because the addition of three equal-intensity sound signals adds 4.8 dB to the sound level of a single source (Engineering Toolbox 2023). Each doubling of sound intensity adds 3 dB to the baseline (Engineering Toolbox 2023), and four tugs represents two doublings of a single source. Therefore, adding 6 dB to the 180.2 dB baseline results in an expected SSL of 186.2 dB rms SPL for the use of four tugs. Source levels for each activity are presented in table 7.

TABLE 7—SSLS FOR PROJECT ACTIVITIES

Sound source	SSL	
	SEL	SPL_{RMS}
3 tugs at 50 percent power		185 dB at 1 m.
4 tugs at 50 percent power		186.2 dB at 1 m.
Conductor pipe pile (20 in, impact)	184 dB at 1 m	193 dB at 10 m.

Several factors will determine the duration that the tugboats are towing the Enterprise 151, including the origin and destination of the towing route (*e.g.,* Rig Tenders Dock, the JRP, one of Hilcorp's platforms) and the tidal conditions. The power output will be variable and influenced by the prevailing wind direction and velocity, the current velocity, and the tidal stage. To the extent feasible, transport will be timed with the tide to minimize towing duration and power output.

TL is the decrease in acoustic intensity as an acoustic pressure wave propagates out from a source. TL parameters vary with frequency, temperature, sea conditions, current, source and receiver depth, water depth, water chemistry, and bottom composition and topography. The general formula for underwater TL is:

TL = B * Log10 (R1/R2),

Where
TL = transmission loss in dB
B = transmission loss coefficient
R1 = the distance of the modeled SPL from the driven pile, and
R2 = the distance from the driven pile of the initial measurement

Absent site-specific acoustical monitoring with differing measured TL, a practical spreading value of 15 is used as the TL coefficient in the above formula. Site-specific TL data for pile driving at the JRP site are not available; therefore, the default coefficient of 15 is used to determine the distances to the Level A harassment and Level B harassment thresholds for conductor pile driving.

For its tugging activities, Hilcorp contracted SLR Consulting to model the extent of the Level B harassment isopleth as well as the extent of the Level A harassment isopleth for their proposed tugging using three tugs. Rather than applying practical spreading loss, SLR Consulting created a more detailed propagation loss model in an effort to improve the accuracy of the results by considering the influence of environmental variables (*e.g.,* bathymetry) at Hilcorp's specific well sites. Modeling was conducted using dBSea software. The fluid parabolic equation modeling algorithm was used with 5 Padé terms (see pg. 57 in 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,* for more detail) 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 TL 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 depth resolution along each propagation path by summing all frequency band spectral levels.

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 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 (1981) and are presented in table 8 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 9 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 TL modeling in dBSea used the source level of 185 dB re 1 μPa at 1 m 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 PTS 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.

Furie plans to use the tugs towing the rig for two functions, rig positioning and towing. The activity was divided into two parts (stationary and mobile) and two approaches were taken for modeling the relevant isopleths.

SLR's model, described above, calculated the Level B harassment isopleth propagating from three tugs towing a jack-up rig at 25 locations between Hilcorp platforms and well sites and the Rig Tenders Dock in Nikiski, Alaska. The average Level B harassment isopleth across all locations and seasons was determined to be 3,850 m (Weston and SLR 2022). Given that Furie is conducting the same three tug activity as Hilcorp, also in middle Cook Inlet, Furie estimates, and NMFS concurs, that 3,850 m is also an appropriate estimate of its Level B harassment zone for tugging using three tugs. Similarly, Hilcorp modeled Level A harassment zones for each hearing group; Furie proposed using these Level A harassment zones for its towing and positioning activities using three tugs, and NMFS concurs. These zones are included in table 8.

As described in the Description of Proposed Activity section, when positioning the rig, Furie may use four tugs for up to 1 hour. Hilcorp did not model a Level B harassment zone accounting for the use of four tugs. Furie estimated the Level B harassment zones for tugging and positioning with four tugs using a sound source level of 186.2 dB and a TL of 18.129.

NMFS estimated the Level A harassment zones from the use of four tugs using its User Spreadsheet and the Level A harassment zones modeled by Hilcorp for the use of three tugs. First, NMFS calculated the Level A harassment zones for the three tug scenario using the User Spreadsheet (sound source level of 185 dB, 5 hours of sound production, and a propagation loss coefficient of 18.129). Next, NMFS calculated the Level A harassment zones for the "combined scenario" (use of three tugs for 5 hours and four tugs for 1 hour, combined). NMFS then calculated the ratio between the three tug scenario and the combined scenario. For all hearing groups the combined scenario Level A harassment isopleths are 13.8 percent larger than the three tug scenario. Rather than using the Level A harassment isopleths for the combined scenario that were calculated using the User Spreadsheet, NMFS applied a 13.8 percent increase to the three tug Level A harassment isopleths modeled by Hilcorp, given that those isopleths are more conservative than the isopleths NMFS calculated using the User Spreadsheet. The Level A harassment isopleths that Furie will implement are included in table 10.

The Level B harassment isopleth from the use of four tugs is 4,483 m, as described in Furie's application and included in table 6, calculated using a sound source level of 186.2 dB SPL. NMFS concurs and proposes a Level B harassment zone of 4,483 m for tugging and positioning using four tugs (table 10).

TABLE 8—USER SPREADSHEET INPUTS (SOURCE LEVELS PROVIDED IN TABLE 7)

Source	Number of strikes per pile	Number of piles per day	Transmission loss coefficient
Conductor pipe pile, Day 1 (70 percent installation)	6,100	0.7	15
Conductor pipe pile, Day 2 (30 percent installation)		0.3	

TABLE 9—LEVEL A HARASSMENT ISOPLETHS CALCULATED USING NMFS' USER SPREADSHEET, AND USED TO DETERMINE THE RATIO BETWEEN THE THREE TUG SCENARIO AND THREE AND FOUR TUGS COMBINED SCENARIO

Scenario	Level A harassment isopleth (m)				
	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
Three Tug Scenario Level A harassment Isopleth	17.2	9.7	178.9	9.1	0.9
Combined Scenario Level A harassment Isopleth	19.6	11.0	203.6	10.3	1.0

The 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 Technical Guidance that can be used to relatively simply predict an isopleth distance for use in conjunction with marine mammal density or occurrence to help predict potential takes. We note that because of some of the assumptions included in the methods underlying this optional tool, we anticipate that the resulting isopleth estimates are typically overestimates of some degree, which may result in an overestimate of potential take by Level A harassment. However, 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 conductor pipe pile driving and rig positioning, 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 PTS. For mobile sources such as tugging, the optional User Spreadsheet tool predicts the closest distance at which a stationary animal would not be expected to incur PTS if the sound source traveled by the stationary animal in a straight line at a constant speed. Inputs used in the optional User Spreadsheet tool, and the resulting estimated isopleths, are reported below.

TABLE 10—LEVEL A HARASSMENT AND LEVEL B HARASSMENT ISOPLETHS FROM TUGGING AND IMPACT PILE DRIVING

Sound source	Level A harassment isopleths (m)	Level B harassment isopleths (m)				
		LF	MF	HF	PW	OW
Conductor pipe pile, 70 percent installation	3,064	109	3,650	1,640	119	1,585
Conductor pipe pile, 30 percent installation	1,742	62	2,075	932	68	
Tugging/Positioning, 3 Tugs [1]	95	78	679	69	0	3,850
Tugging/Positioning, 4 Tugs [2]	108	89	773	79	1	4,483

[1] These zones are results from Hilcorp's modeling.
[2] For otariids, Hilcorp's model estimated a Level A harassment zone of 0 during tugging/positioning with three tugs. Therefore, for four tugs, NMFS applied the Level A harassment zone calculating with the User Spreadsheet.

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' Marine Mammal Laboratory (MML) aerial surveys, typically flown in June, from 2000 to 2018 (Rugh *et al.* 2005; Shelden *et al.* 2013, 2015, 2017, 2019). While the surveys are concentrated for a few days in June annually, which may skew densities for seasonally present species, they are still the best available long-term dataset of marine mammal sightings available in Cook Inlet. (Note that while more recent surveys have been conducted and published (Shelden *et al.* 2022; Goetz *et al.* 2023), the surveyed area was not included in either report, therefore they were not used to calculate density). Density was calculated by summing the total number of animals observed and dividing the number sighted by the area surveyed.

The total number of animals observed accounts 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 are so infrequently sighted. Densities are presented in table 11.

TABLE 11—MARINE MAMMAL DENSITIES

Species	Density (individuals/km²)
Humpback whale	0.00177
Minke whale	0.000009
Gray whale	0.000075
Fin whale	0.000311
Killer whale	0.000601
Beluga (Trading Bay)	0.004453–0.015053
Beluga (North Cook Inlet)	0.001664
Dall's porpoise	0.000154
Harbor porpoise	0.004386
Pacific white-sided dolphin	0
Harbor seal	0.241401
Steller sea lion	0.007609
California sea lion	0

For the beluga whale density, Furie, and subsequently NMFS, used the Goetz *et al.* (2012) 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 beluga density map of Cook Inlet, which predicts spatially explicit density estimates for Cook Inlet belugas. Using the resulting grid densities, average densities were calculated for two regions applicable to Furie's operations. 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 11 and were carried forward to the take estimates. Likewise, when a range is given, the higher end of the range was conservatively used to calculate take estimates (*i.e.,* Trading Bay in the Goetz model has a range of 0.004453 to 0.015053; 0.015053 was used for the take estimates).

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 in each IHA.

Year 1 IHA

As described above, Furie plans to conduct rig towing and positioning and may install up to two conductor piles using an impact hammer in Year 1. To estimate take by Level B harassment from tugging, for each species, Furie summed the estimated take for towing the rig at the beginning of the season, positioning the rig, and towing the rig at the end of the season. To estimate take for towing the rig (beginning and end of season), Furie multiplied the area of the Level B harassment zone (316.1 km²; inclusive of the full potential tug path of 35 km) by the species density (table 11). To estimate take for positioning the rig, Furie multiplied the maximum area of the Level B harassment zone (63.1 km², four tugs) by the species density (table 11), by the number of potential positioning attempts (two attempts). NMFS concurs that this method for estimating take from tugging activities is appropriate.

To estimate take by Level B harassment from installation of conductor piles, Furie multiplied the Level B harassment zone (7.98 km²) by the species density (table 11) by the estimated number of days that conductor pile installation would occur (4 days, 2 per pile). The Level B harassment zone used in the calculation conservatively assumes 70 percent installation of a conductor pile on a given day, and therefore, on 2 of the 4 days that conductor piles would be installed, the Level B harassment zone would likely be smaller. NMFS concurs that this method for estimating take from pile driving activities is appropriate.

NMFS summed the estimated take by Level B harassment from tugging and pile driving activities for each species. For species where the total calculated take by Level B harassment is less than the estimated group size for that species, NMFS rounded up the take by Level B harassment proposed for authorization to the anticipated group size. Take proposed for authorization during Year 1 activities is included in table 12.

Based on the analysis described above, NMFS does not propose to authorize take by Level A harassment related to Furie's tugging activity. For mobile tugging activity, the distances to the PTS thresholds for high frequency cetaceans (the only hearing group for which modeling results in a Level A harassment zone greater than 0 m) are smaller than the overall size of the tug and rig configuration, making it unlikely a cetacean would remain close enough to the tug engines for a long enough duration to incur PTS. For stationary positioning of the rig, the PTS isopleths are up to 679 m for high frequency cetaceans, but calculated with the assumption that an animal would remain within several hundred meters of the rig for the full 5 hours of noise-producing activity which is unlikely. Therefore, take by Level A harassment due to stationary or mobile tugging is neither anticipated nor proposed for authorization.

For conductor pile installation, NMFS anticipates take by Level A harassment for harbor seal only. For all other species, calculated take by Level A harassment takes is less than one. Considering that along with the low likelihood that an individual of these species would enter and remain within the Level A harassment zone for long enough to incur PTS, particularly in consideration of implementation of required shutdown zones, Furie did not request, nor does NMFS propose to authorize, take by Level A harassment. For harbor seal, NMFS proposes to authorize three takes by Level A harassment, conservatively rounded up from 2.7 Level A harassment takes calculated.

TABLE 12—ESTIMATED TAKE BY LEVEL B HARASSMENT, BY SPECIES, ACTIVITY, AND IN TOTAL, YEAR 1

Species	Rig tow, 3 tugs		Rig positioning, 4 tugs		Conductor pile installation		Total year 1 estimated take by Level B harassment	Proposed take by Level B harassment [a]
	Ensonified area (km²) [1]	Calculated take by Level B harassment [2]	Ensonified area (km²)	Calculated take by Level B harassment [3]	Ensonified area (km²)	Calculated take by Level B harassment [4]		
Humpback whale	316.1	1.2	63.1	0.2	7.89	0.06	1.5	3
Minke whale		0.006		0.001		0.0003	0.007	3
Gray whale		0.04		0.009		0.002	0.05	3
Fin whale		0.2		0.04		0.01	0.3	2
Killer whale		0.4		0.08		0.02	0.5	10
Beluga (Trading Bay)		0.5		0.2		0.05	0.8	11
Beluga (NCI)		4.8		NA		NA	4.8	

TABLE 12—ESTIMATED TAKE BY LEVEL B HARASSMENT, BY SPECIES, ACTIVITY, AND IN TOTAL, YEAR 1—Continued

Species	Rig tow, 3 tugs		Rig positioning, 4 tugs		Conductor pile installation		Total year 1 estimated take by Level B harassment	Proposed take by Level B harassment [a]
	Ensonified area (km^2) [1]	Calculated take by Level B harassment [2]	Ensonified area (km^2)	Calculated take by Level B harassment [3]	Ensonified area (km^2)	Calculated take by Level B harassment [4]		
Dall's porpoise		0.1		0.01		0.005	0.1	6
Harbor porpoise		2.8		0.3		0.1	3.2	12
Pacific white-sided dolphin		0.000		0.000		0.000	0.000	3
Harbor seal		152.6		15.2		7.6	175.4	176
Steller sea lion		4.8		0.5		0.2	5.5	6
California sea lion		0.000		0.000		0.000	0.000	2

[1] This zone assumes a 35 km towing distance (the farthest potential distance that Furie may need to tow the rig).
[2] Level B harassment zone area × density × 2 (towing at beginning and end of season), with the exception of Cook Inlet beluga whale. For Cook Inlet beluga whale, Furie used the Trading Bay density for the initial rig tow since the density is predicted to be higher there than in the North Cook Inlet Lease Unit (located offshore in middle Cook Inlet), and Furie may tug the rig though that area. Furie used the NCI density to estimate take for the end of season tow. NMFS concurs and has used these two separate densities in its analysis.
[3] Level B harassment zone (63.1 km^2) × species density (table 11), × number of potential positioning attempts (2).
[4] Level B harassment zone (7.89 km^2) × species density (table 11) × estimated number of days that conductor pile installation would occur (4).

Explanations for species for which take proposed for authorization is greater than calculated take are included below.

Several recent surveys and monitoring programs have documented groups of humpback whales ranging up to 14 whales in size. During the annual survey, Shelden *et al.* (2022) recorded a group of three humpback whales west of Kachemak Bay in June of 2022. Past annual aerial surveys have documented groups up to 12 in number (Shelden *et al.* 2013, 2015, 2016, 2019). During Hilcorp's lower Cook Inlet seismic survey, group size ranged from 1 to 14 (Fairweather Science 2020). During monitoring of the Harvest Alaska CIPL project (the closest to Furie's Action Area), two sightings of three humpbacks were reported. During construction of the JRP in 2015, a group of 6 to 10 unidentified whales, thought to be either gray whales or humpbacks, was observed approximately 15 km northeast of the platform (Jacobs 2015). There were two sightings of three humpback whales observed near Ladd Landing north of the Forelands during the Harvest Alaska CIPL project (Sitkiewicz *et al.* 2018). Furie requested, and NMFS is proposing to authorize, three takes of humpback whale by Level B harassment in Year 1. This estimate accounts for the potential of take of a group of two animals and a solitary animal.

Groups of up to three minke whales have been recorded in recent years, including one group of three southeast of Kalgin Island (Lomac-MacNair *et al.* 2014). Other recent surveys in Cook Inlet typically have documented minkes traveling alone (Shelden *et al.* 2013, 2015, 2017; Kendall *et al.* 2015, as cited in Weston and SLR 2022; Fairweather Science 2020). As the occurrence of minke whales is expected to be less in middle Cook Inlet than lower Cook Inlet and considering the observed group sizes, Furie requested, and NMFS is proposing to authorize, three takes of minke whale by Level B harassment in Year 1 to account for the potential of take of a group of three minke whales.

During Apache's 2012 seismic program, nine gray whales were observed in June and July (Lomac-MacNair *et al.* 2013). During Apache's seismic program in 2014, one gray whale was observed (Lomac-MacNair *et al.* 2014). During construction of the JRP in 2015, 1 gray whale was documented approximately 5 km from the platform, and a group of 6 to 10 unidentified whales, thought to be either gray whales or humpbacks, was observed approximately 15 km northeast of the platform (Jacobs 2015). During SAExploration's seismic survey in 2015, the 2018 CIPL project, and Hilcorp's 2019 seismic survey, no gray whales were observed (Kendall *et al.* 2015; Sitkiewicz *et al.* 2018; Fairweather Science, 2020). None were observed during the 2018 CIPL project in middle Cook Inlet (Sitkiewicz *et al.* 2018). In 2020 and 2021, one gray whale was reported in each season at the POA (61N 2021, 2022a). The documented occasional presence of gray whales near and north of the project area suggests that gray whale density may be seasonally higher than the relatively low density suggested by the aerial surveys. Considering the project area is in middle Cook Inlet where sightings of gray whales are less common, Furie requested, and NMFS is proposing to authorize, take of three gray whales in Year 1.

During seismic surveys conducted in 2019 by Hilcorp in the lower Cook Inlet, fin whales were recorded in groups ranging in size from one to 15 individuals (Fairweather, 2020). During the NMFS aerial surveys in Cook Inlet from 2000 to 2018, 10 sightings of 26 estimated individual fin whales in lower Cook Inlet were observed (Shelden *et al.* 2013, 2015, 2016, 2019). Furie requested, and NMFS is proposing to authorize, take of one group of two fin whales (the lower end of the range of common group sizes) in Year 1.

Killer whales are typically sighted in pods of a few animals to 20 or more (NOAA, 2022a). During seismic surveys conducted in 2019 by Hilcorp in the lower Cook Inlet, 21 killer whales were observed, either as single individuals or in groups ranging in size from 2 to 5 individuals (Fairweather, 2020). Furie requested 10 takes by Level B harassment in Year 1 to account for 2 groups of 5 animals. NMFS concurs and proposes to authorize 10 takes by Level B harassment of killer whale.

The 2018 MML aerial survey (Shelden and Wade 2019) estimated a median group size of approximately 11 beluga whales, although group sizes were highly variable (2 to 147 whales) as was the case in previous survey years (Boyd *et al.* 2019). Over 3 seasons of monitoring at the POA, 61N reported groups of up to 53 belugas, with a median group size of 3 and a mean group size of 4.4 (61N 2021, 2022a, 2022b, and 2022c). Additionally, vessel-based surveys in 2019 observed beluga whale groups in the Susitna River Delta (roughly 24 km [15 miles] north of the Tyonek Platform) that ranged from 5 to 200 animals (McGuire *et al.* 2022). The very large groups seen in the Susitna River Delta are not expected in Trading Bay or offshore areas near the JRP or the towing route for the Enterprise 151. However, smaller groups (*i.e.,* around the median group size) could be traveling through to access the Susitna River Delta and other nearby coastal locations, particularly in the shoulder seasons when belugas are more likely to occur in middle Cook Inlet. Few if any takes of beluga whale are anticipated during impact installation of the conductor piles. Therefore, Furie requested, and NMFS is proposing to authorize, 11 takes by Level B harassment of beluga whale in Year 1.

Dall's porpoises typically occur in groups averaging between 2 and 12 individuals (NOAA, 2024b). During seismic surveys conducted in 2019 by Hilcorp in the lower Cook Inlet, Dall's porpoises were observed in groups ranging in size from two to seven individuals (Fairweather, 2020). The 2012 Apache survey recorded two groups of three individual Dall's porpoises (Lomac-MacNair, 2014). Because occurrence of Dall's porpoise is anticipated to be less in middle Cook Inlet than lower Cook Inlet, the smaller end of documented group sizes (three individuals) is used. NMFS is proposing to authorize six takes (two groups of three animals) by Level B harassment of Dall's porpoise in Year 1.

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 project that occurred just north of the Action Area in Cook Inlet reported 29 sightings of 44 individuals (Sitkiewicz *et al.* 2018). While the duration of days that the tugs are towing a jack-up rig will be less than the CIPL project, given the increase in sightings of harbor porpoise in recent years, the sighting of harbor porpoise during Hilcorp's rig move in June 2022, and the inability to shut down the tugs, Furie requested, and NMFS is proposing to authorize, 12 takes by Level B harassment of harbor porpoise. This accounts for two potential groups of six animals.

Calculated take of Pacific white-sided dolphin was zero because the estimated density is zero. However, in 2014, during Apache's seismic survey program, three Pacific white-sided dolphins were reported (Lomac-MacNair *et al.* 2014). They are considered rare in most of Cook Inlet, including in the lower entrance, but their presence was documented in Iniskin Bay and mid-inlet through passive acoustic recorders in 2019 (Castellote *et al.* 2020). Furie conservatively requested three takes based on the potential that a group similar in size to that encountered in 2014 could occur within the Level B harassment zone during project activities. NMFS concurs, and has conservatively proposed to authorize three takes of Pacific white-sided dolphin by Level B harassment.

Calculated take of California sea lions was zero because the assumed density in Cook Inlet is zero. Any potential sightings would likely be of lone out of habitat individuals. Two solitary individuals were seen during the 2012 Apache seismic survey in Cook Inlet (Lomac-MacNair *et al.* 2013). Furie requested two takes based on the potential that two lone animals could be sighted over a year of work, as was seen during Apache's year of work. NMFS concurs, and has conservatively proposed to authorize two takes of California sea lion by Level B harassment.

Year 2 IHA

Given that Furie intends to conduct the same activities in Year 2 as in Year 1, take by Level A harassment and Level B harassment proposed for authorization for Year 2 is the same as that proposed for authorization for Year 1 (table 12).

TABLE 13—TAKE PROPOSED FOR AUTHORIZATION AS A PERCENTAGE OF STOCK ABUNDANCE

Species	Stock	Abundance (Nbest)	Year 1		Year 2	
			Total take (Level A and Level B harassment)	Take as a percentage of stock abundance	Total take (Level A and Level B harassment)	Take as a percentage of stock abundance
Humpback whale	Hawaii (Hawaii DPS)	11,278	3	<1	3	<1
	Mexico-North Pacific (Mexico DPS)	[1] N/A		N/A		N/A
	Western North Pacific	1,084		<1		<1
Minke whale	Alaska	[2] N/A	3	N/A	3	N/A
Gray whale	Eastern Pacific	26,960	3	<1	3	<1
Fin whale	Northeast Pacific	[3] UND	2	N/A	2	N/A
Killer whale	Eastern North Pacific Alaska Resident	1,920	10	<1	10	<1
	Eastern North Pacific Gulf of Alaska, Aleutian Islands, and Bering Sea Transient.	587		<1		<1
Beluga	Cook Inlet	[4] 279	11	3.9	11	3.9
Dall's porpoise	Alaska	[5] UND	6	N/A	6	N/A
Harbor porpoise	Gulf of Alaska	31,046	12	<1	12	<1
Pacific white-sided dolphin.	North Pacific	26,880	3	<1	3	<1
Harbor seal	Cook Inlet/Shelikof	28,411	179	<1	179	<1
Steller sea lion	Western U.S.	[6] 49,932	6	<1	6	<1
California sea lion	U.S.	257,606	2	<1	2	<1

[1] Abundance estimates are based upon data collected more than 8 years ago and, therefore, current estimates are considered unknown.
[2] 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.
[3] The best available abundance estimate for this stock is not considered representative of the entire stock as surveys were limited to a small portion of the stock's range.
[4] On June 15, 2023, NMFS released an updated abundance estimate for endangered Cook Inlet beluga whales in Alaska (Goetz *et al.* 2023). Data collected during NOAA Fisheries' 2022 aerial survey suggest that the whale population is stable or may be increasing slightly. Scientists estimated that the population size is between 290 and 386, with a median best estimate of 331. In accordance with the MMPA, this population estimate will be incorporated into the Cook Inlet beluga whale SAR, which will be reviewed by an independent panel of experts, the Alaska Scientific Review Group. After this review, the SAR will be made available as a draft for public review before being finalized. When the number of instances of takes is compared to this median abundance, the percent of the stock proposed for authorization is 3.3 percent.
[5] 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.
[6] Nest is best estimate of counts, which have not been corrected for animals at sea during abundance surveys.

Proposed Mitigation

In order to issue an IHA under section 101(a)(5)(D) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to the activity, and other means of effecting the least practicable 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. 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 ensure the least practicable adverse impact on species or stocks and their habitat, as well as subsistence uses where applicable, NMFS considers two primary factors:

(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.

In addition to the measures described in detail below, Furie will conduct briefings between conductor pipe installation supervisors, vessel captains and crew, and the marine mammal monitoring team before the start of all in-water work and when new personnel join the work to explain responsibilities, communication procedures, marine mammal monitoring protocol, and operational procedures.

Mitigation for Rig Tugging/Positioning

NMFS anticipates that there is a discountable potential for marine mammals to incur PTS from the tugging and positioning, as source levels are relatively low, non-impulsive, and animals would have to remain at very close distances for multiple hours to accumulate acoustic energy at levels that could damage hearing. Therefore, we do not believe there is reasonable potential for Level A harassment from rig tugging or positioning. However, Furie will implement a number of mitigation measures designed to reduce the potential for and severity of Level B harassment, and minimize the acoustic footprint of the project.

Protected Species Observers

Furie will station PSOs at the highest possible vantage point on either the rig or on one of the tugs.

Pre-Clearance and Post-Activity Monitoring

The tugs towing a rig are not able to shut down while transiting or positioning the rig. Furie will maneuver the tugs towing the rig such that they maintain a consistent speed (approximately 4 knots or less[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.

During tugging activities, Furie would implement a clearance zone of 1,500 m around the rig for all marine mammals other than Cook Inlet beluga whales. This proposed clearance zone was determined to be appropriate as it is approximately twice as large as largest Level A harassment zone (table 10) and is a reasonable distance within which cryptic species (*e.g.,* porpoises, pinnipeds) could be observed. For Cook Inlet beluga whales, Furie would implement a clearance zone that extends as far as PSOs can feasibly observe for Cook Inlet beluga whales. Prior to commencing new activities during daylight hours or if there is a 30-minute lapse in operational activities, the PSOs will monitor the clearance zone for marine mammals for 30 minutes (*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 zone during this pre-clearance monitoring period, tugging activities may commence. If a marine mammal(s) is observed within the relevant clearance zone during the pre-clearance monitoring period, tugging activities would be delayed, unless the delay interferes with the safety of working conditions. Operations would not commence until the PSO(s) observe that: (1) the non-Cook Inlet beluga whale animal(s) is outside of and on a path away from the clearance zone; (2) the Cook Inlet beluga whale is no longer detected at any range; or (3) for non-ESA-listed species, 15 minutes have elapsed without observing the marine mammal, or for ESA-listed species, 30 minutes have elapsed without observing the marine mammal. Once the PSOs have determined one of those conditions are met, operations may commence. PSOs would also conduct monitoring for marine mammals through 30 minutes post-completion of any tugging activity each day, and after each stoppage of 30 minutes or greater.

During nighttime hours or low/no-light conditions, night-vision devices (NVDs) shown to be effective at detecting marine mammals in low-light conditions (*e.g.,* Portable Visual Search-7 model, or similar) would be provided to PSOs to aid in their monitoring of marine mammals. Every effort would be made to observe that the relevant clearance zone is free of marine mammals by using night-vision devices and or the naked eye, however it may not always be possible to see and clear the entire clearance zones prior to nighttime transport. Prior to commencing new operational activities during nighttime hours, or if there is a 30-minute lapse in operational activities in low/no-light conditions, the PSOs must observe the extent visible while using night vision devices for 30 minutes (*i.e.,* pre-clearance monitoring). If no marine mammals are observed during this pre-clearance period, tugging activities may commence. If a marine mammal(s) is observed within the pre-clearance monitoring period, tugging activities would be delayed, unless the delay interferes with the safety of working conditions. Operations would not commence until the PSO(s) observe that: (1) the animal(s) is outside of the observable area; or (2) for non-ESA-listed species, 15 minutes have elapsed without observing the marine mammal, or for ESA-listed species, 30 minutes have elapsed without observing the marine mammal Once the PSOs have determined one of those conditions are met, operations may commence.

PSOs must scan the waters for at least 30 minutes after tugging and positioning activities have been completed each day, and after each stoppage of 30 minutes or greater.

Should a marine mammal be observed during towing or positioning of the rig, the PSOs will monitor and carefully record any reactions observed until the towing or positioning has concluded. PSOs will also collect behavioral information on marine mammals sighted during monitoring efforts.

Nighttime Work

Furie will conduct tug towing operations with the tide, resulting in a low power output from the tugs towing the rig, unless human safety or equipment integrity is at risk. Due to the nature of tidal cycles in Cook Inlet, it is possible the most favorable tide for the towing operation will occur during nighttime hours. Furie will only operate the tug towing activities at night if necessary to accommodate a favorable tide. Prior to commencing operational activities during nighttime hours or low/no-light conditions, Furie must implement the pre-clearance measures described above.

Susitna Delta

The Tyonek platform is within the Susitna Delta Exclusion Zone identified in Hilcorp's IHAs (87 FR 62364, October 14, 2022). If Hilcorp does conduct work at the Tyonek platform, it would maintain operatorship and control of the Enterprise 151 until the tow is underway with lines taut and the Enterprise 151 is under tug power. Once the tow is underway, Furie representatives will take over operatorship of the Enterprise 151.

Out of concern for potential disturbance to Cook Inlet beluga whales in sensitive and essential habitat, Furie would maintain a distance of 2.4 km from the mean lower-low water (MLLW) line of the Susitna River Delta (Beluga River to the Little Susitna River) between April 15 and November 15. The dates of applicability of this exclusion zone have been expanded based on new available science, including visual surveys and acoustic studies, which indicate that substantial numbers of Cook Inlet beluga whales continue to occur in the Susitna Delta area through at least mid-November (M. Castellote, pers. comm., T. McGuire, pers. comm.). Of note, Furie does not expect to operate in this area, but if it does, this measure would apply.

Mitigation for Conductor Pile Installation

NMFS proposes that Furie must implement the following measures for impact driving of conductor piles.

Shutdown Zones

The purpose of a shutdown zone is generally to define an area within which shutdown of the activity would occur upon sighting of a marine mammal (or in anticipation of an animal entering the defined area). Construction supervisors and crews, PSOs, and relevant Furie staff must avoid direct physical interaction with marine mammals during construction activity. If a marine mammal comes within 10 m of such activity, operations must cease and vessels must reduce speed to the minimum level required to maintain steerage and safe working conditions, as necessary to avoid direct physical interaction. Further, Furie must implement shutdown zones as described in table 14. Furie states that if a shutdown or delay occurs, impact installation of the conductor pipe will not commence or resume until the animal has voluntarily left and been visually confirmed to be 100 m beyond the shutdown zone and on a trajectory away from the zone, or 30 minutes have passed without subsequent detections. If Cook Inlet beluga whales are observed within or approaching the Level B harassment zone for conductor pipe installation, impact installation of the conductor pipe will be delayed or halted until the beluga(s) have voluntarily left and been visually confirmed to be 100 m beyond the Level B harassment zone and on a trajectory away from the zone, or 30 minutes have passed without subsequent detections.

TABLE 14—SHUTDOWN ZONES FOR CONDUCTOR PIPE PILE DRIVING

Hearing group	Shutdown zone (m)
Low-frequency Cetaceans	2,000
Mid-frequency Cetaceans	110
High-frequency Cetaceans	400
Phocids	400
Otariids	120

Protected Species Observers

Furie will establish a monitoring location on the JRP at the highest possible vantage point to monitor to the maximum extent possible in all directions. Monitoring is described in more detail in the Proposed Monitoring and Reporting section, below.

Pre- and Post-Activity Monitoring

Monitoring must take place from 30 minutes prior to initiation of pile driving activity (*i.e.,* pre-start clearance monitoring) through 30 minutes post-completion of pile driving activity. Pre-start clearance monitoring must be conducted during periods of visibility sufficient for the lead PSO to determine that the shutdown zones indicated in table 14 are clear of marine mammals. Pile driving may commence following 30 minutes of observation when the determination is made that the shutdown zones are clear of marine mammals. If a marine mammal is observed entering or within the shutdown zones, pile driving activity must be delayed or halted. If pile driving is delayed or halted due to the presence of a marine mammal, the activity may not commence or resume until either the animal has voluntarily exited and been visually confirmed beyond the shutdown zone for 15 minutes (for non-ESA-listed species) or 30 minutes (for ESA-listed species) have passed without re-detection of the animal. With the exception of Cook Inlet beluga whales, if a marine mammal for which take by Level B harassment is authorized is present in the Level B harassment zone but beyond the relevant shutdown zone, activities may begin and Level B harassment take would be recorded.

Monitoring for Level A and Level B Harassment

PSOs would monitor the shutdown zones and beyond to the extent that PSOs can see. Monitoring beyond the shutdown zones enables observers to be aware of and communicate the presence of marine mammals in the project areas outside the shutdown zones and thus prepare for a potential cessation of activity should the animal enter the shutdown zone.

Soft Start

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, soft start requires contractors to provide an initial set of three strikes at reduced energy, followed by a 30-second waiting period, then two subsequent reduced-energy strike sets. A soft start must 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.

Mitigation for Helicopter Activities

Helicopters must transit at an altitude of 1,500 ft (457 m) or higher, to the extent practicable, while adhering to Federal Aviation Administration flight rules (*e.g.,* avoidance of cloud ceiling, *etc.*), excluding takeoffs and landing. If flights must occur at altitudes less than 1,500 ft due to environmental conditions, aircraft must make course adjustments, as needed, to maintain at least a 1,500- foot separation from all observed marine mammals. Helicopters must not hover or circle above marine mammals. A minimum transit altitude is expected to reduce the potential for disturbance to marine mammals from transiting aircraft.

Based on our evaluation of Furie's proposed measures, as well as other measures considered by NMFS (*i.e.,* the extended clearance zone for beluga whales), for both IHAs, NMFS has preliminarily determined that the proposed mitigation measures 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 an IHA for an activity, section 101(a)(5)(D) 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.

Monitoring

Furie would abide by all monitoring and reporting measures contained within the IHA, if issued, and their Marine Mammal Monitoring and Mitigation Plan (see Appendix B of Furie's application). A summary of those measures and additional requirements proposed by NMFS is provided below.

A minimum of two NMFS-approved PSOs will be on-watch during all activities wherein the rig is attached to the tugs for the duration of the project. PSOs will be stationed aboard a tug or the rig during tug towing and positioning and may use a combination of equipment to perform marine mammal observations and to verify the required monitoring distance from the project site, including 7 by 50 binoculars and NMFS approved NVDs for low light and nighttime operations. A minimum of two NMFS-approved PSOs will be stationed on the JRP at the highest possible vantage point to monitor to the maximum extent possible in all directions during pile driving. 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 would have prior experience performing the duties of a PSO during an activity pursuant to a NMFS-issued Incidental Take Authorization 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. Where a team of three or more PSOs is required, a lead observer or monitoring coordinator must be designated. The lead observer must have prior experience performing the duties of a PSO during an activity pursuant to a NMFS-issued incidental take authorization.

PSOs would also have the following additional qualifications:

- PSOs must be able to conduct field observations and collect data according to assigned protocols;
- PSOs must have experience or training in the field identification of marine mammals, including the identification of behaviors;
- PSOs must have sufficient training, orientation, or experience with the tugging operation to provide for personal safety during observations;
- PSOs must have sufficient writing skills to record required information including but not limited to the number and species of marine mammals observed; dates and times when in-water tugging activities were conducted; dates, times, and reason for implementation of mitigation (or why mitigation was not implemented when required); and marine mammal behavior; and
- PSOs must have 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.

Reporting

Furie would submit interim monthly reports for all months in which tugs towing, holding, or positioning the rig occurs. Monthly reports would include a summary of marine mammal species and behavioral observations, delays, and tugging activities completed. They also must include an assessment of the amount of tugging remaining to be completed, in addition to the number of Cook Inlet beluga whales observed within estimated harassment zones to date.

A draft marine mammal monitoring report would be submitted to NMFS within 90 days after the completion of the tug towing rig activities for the year. It will include an overall description of work completed, a narrative regarding marine mammal sightings, and associated marine mammal observation data sheets in an electronic format. Specifically, the report must include the following information:

- Date and time that monitored activity begins or ends;
- Activities occurring during each observation period, including (a) the type of activity, (b) the total duration of each type of activity, (c) the number of attempts required for positioning, (d) when nighttime operations were required (e) whether towing against the tide was required, (f) the number and type of piles that were driven and the method (*e.g.,* impact, vibratory, down-the-hole), and (g) total number of strikes for each pile.
- PSO locations during marine mammal monitoring;
- Environmental conditions during monitoring periods (at the beginning and end of the PSO shift 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, (a) name of PSO who sighted the animal(s) and PSO location and

activity at time of sighting, (b) time of sighting, (c) 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, (d) distance and location of each observed marine mammal relative to the tugs or pile being driven for each sighting, (e) estimated number of animals (min/max/best estimate), (f) estimated number of animals by cohort (adults, juveniles, neonates, group composition, *etc.*), (g) animal's closest point of approach and estimated time spent within the harassment zone, (h) 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.,* shutdowns and delays), a description of specific actions that ensued, and resulting changes in behavior of the animal(s), if any.

If no comments are received from NMFS within 30 days, the draft summary report will constitute the final report. If NMFS submits comments, Furie will submit a final summary report addressing NMFS comments within 30 days after receipt of comments.

In the event that personnel involved in Furie's activities discover an injured or dead marine mammal, Furie must report the incident to the Office of Protected Resources (OPR), NMFS (*PR.ITP.MonitoringReports@noaa.gov* and *ITP.davis@noaa.gov*) and to the Alaska regional stranding network as soon as feasible. If the death or injury was clearly caused by the specified activity, Furie must immediately cease the activities until NMFS OPR is able to review the circumstances of the incident and determine what, if any, additional measures are appropriate to ensure compliance with the IHAs. The Holder must not resume their activities until notified by NMFS.

The report must include the following information:

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

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

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

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

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

(vi) 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, the majority of our analysis applies to all the species listed in table 13, except for Cook Inlet beluga whale and harbor seal, given that many of the anticipated effects of this project on different marine mammal stocks are expected to be relatively similar in nature. For Cook Inlet beluga whales and harbor seals, there are meaningful differences in anticipated individual responses to activities, impact of expected take on the population, or impacts on habitat; therefore, we provide a separate independent detailed analysis for Cook Inlet beluga whales and harbor seals following the analysis for other species for which we propose take authorization.

NMFS has identified several key factors which may be employed to assess the level of analysis necessary to conclude 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, and California sea lions are discussed below. These factors also apply to Cook Inlet beluga whales and harbor seals; however, additional analysis for Cook Inlet beluga whales and harbor seals is provided in a separate subsection below.

Furie's tugging activities associated with this project, as outlined previously, have the potential to harass marine mammals. Specifically, the specified activities may result in take, in the form of Level B harassment, from underwater sounds generated by tugs towing, holding, and positioning a rig. Potential takes could occur if marine mammals are present in zones ensonified above the thresholds for Level B harassment, identified above, while activities are underway.

Furie's planned activities and associated impacts would occur within a limited area of the affected species' or stocks' ranges over a total of 4 days each year for tugging, and 2 days for pile driving. The intensity and duration of take by Level B harassment would be minimized through use of mitigation measures described herein. Further the amount of take proposed to be authorized is small when compared to stock abundance (table 13). In addition, NMFS does not anticipate that serious injury or mortality would occur as a result of Furie's planned activity given the nature of the activity, even in the absence of required mitigation.

Exposures to elevated sound levels produced during tugging and pile driving activities may cause behavioral disturbance of some individuals within the vicinity of the sound source. Behavioral responses of marine mammals to Furie's tugging activities 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 section, on the basis of reports in the literature as well as monitoring from other similar activities conducted by Furie (Horsley and Larson, 2023), 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 interrupted 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 within the Level B harassment zones may not present any visual cues they are disturbed by activities, or they may 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; Lusseau, 2005; Bejder *et al.* 2006; Rako *et al.* 2013; Pirotta *et al.* 2015b; 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). However, as described in the Potential Effects of Specified Activities on Marine Mammals and Their Habitat section, marine mammals observed near Furie's tugging activities have shown little to no observable reactions to tugging activities (Horsley and Larson 2023).

Tugs pulling, holding, and positioning a rig are slow-moving as compared to typical recreational and commercial vessel traffic. Assuming an animal was stationary, exposure to sound above the Level B harassment threshold from the moving tug configuration (which comprises most of the tug activity being considered) would be on the order of minutes in any particular location. The slow, predictable, and generally straight path of this activity is expected to further lower the likelihood of more than low-level responses to the sound. Also, this slow transit along a predictable path 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 swim around the project area, avoiding closer approaches to the boats, we do not expect them to abandon any intended path. Further, most animals present in the region would likely be transiting through the area; therefore, any potential exposure is expected to be brief. Based on the characteristics of the sound source and the other activities regularly encountered in the area, it is unlikely Furie's planned tugging activities would be of a duration or intensity expected to result in impacts on reproduction or survival.

Effects on individuals that are taken by Level B harassment 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). Most likely, individuals would simply move away from the sound source and be temporarily displaced from the areas of pile driving and removal. If sound produced by project activities is sufficiently disturbing, animals are likely to simply avoid the area while the activity is occurring, particularly as the project is expected to occur over a maximum of just 2 days of in-water pile driving during each year.

Most of the species present in the region would only be present temporarily based on seasonal patterns or during transit between other habitats. These temporarily present species would be exposed to even smaller periods of noise-generating activity, further decreasing the impacts. Most likely, individual animals would simply move away from the sound source and be temporarily displaced from the area. Takes may also occur during important feeding times. The project area though represents a small portion of available foraging habitat and impacts on marine mammal feeding for all species should be minimal.

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 Furie's proposed activities for individuals of any species other than harbor seal (for which take by Level A harassment is proposed for authorization, discussed further below). The intensity of Level B harassment events would be minimized through use of mitigation measures described herein. Furie would use PSOs to monitor for marine mammals before commencing any tugging or construction activities, which would minimize the potential for marine mammals to be present within Level B harassment zones when tugs are under load or within the shutdown zones at the commencement of construction. Further, given the absence of any major rookeries, haulouts, or 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 Cook Inlet beluga whales as described below), we preliminarily conclude that any 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 tugging activities over a long duration could result in more severe impacts to individuals that could affect a population (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 tug boats and other vessels across many years, population level impacts resulting from the additional noise produced by Furie's tugging activities are not anticipated.

Take by Level A harassment of harbor seals is proposed for authorization 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 conductor pile installation 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.

Furie's tugging activities are not expected to have significant adverse effects on any marine mammal habitat as no temporary or physical impacts to habitat are anticipated to result from the specified activities. During both tugging and construction, marine mammal habitat may be impacted by elevated sound levels, but these impacts would be temporary. In addition to being temporary and short in overall duration, the acoustic footprint of the proposed activity is 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.

Impacts to marine mammal prey species are expected to be minor and temporary, having, at most, short-term effects on foraging success 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 Furie's tugging and construction activities is very small compared to the available surrounding habitat, and does not include habitat of particular importance. The most likely impact to prey would be temporary behavioral avoidance of the immediate area. During tugging and construction 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, Furie will minimize exposure of marine mammals to elevated noise levels by implementing mitigation measures for tugging and construction activities. For tugging, Furie would delay tugging activities if marine mammals are observed during the pre-clearance monitoring period. Furie 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. Lastly, Furie would also reduce the impact of their activity by conducting tugging operations with favorable tides whenever feasible. For construction, Furie would also delay the start of pile driving activities if marine mammals are observed during the pre-clearance monitoring period and would implement hearing group-specific shutdown zones during the activities. Furie would also 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 Cook Inlet beluga whales included below) primarily support our preliminary determination that the impacts resulting from the activities described for both of these proposed IHAs are not expected to adversely affect the species or stocks through effects on annual rates of recruitment or survival:

- No serious injury or mortality is anticipated or proposed for authorization;
- Take by Level A harassment is not anticipated or proposed for authorization for any species except harbor seal;
- Exposure to sounds above harassment thresholds 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 in the project area; therefore, there will 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 would be more likely to accrue to impacts on reproduction or survival, such as within ESA-designated or proposed critical habitat, BIAs (other than for Cook Inlet beluga whales as described below), or other habitats critical to recruitment or survival (*e.g.,* rookery);
- The project area 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 area of any given species or stock's home range;
- Monitoring reports from previous tugging activities in Cook Inlet have documented little to no observable effect on individuals of the same species and stocks impacted by the specified activities;
- The required mitigation measures (*i.e.,* pre-clearance monitoring, vessel maneuver) 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; and
- The intensity of anticipated takes by Level B harassment is low for all species and 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 of individuals.

Cook Inlet Beluga Whale

For Cook Inlet beluga whales, we further discuss our negligible impact analysis in addition to the assessment above for all species in the context of potential impacts to this endangered stock based on our evaluation of the take proposed to be authorized (table 13).

All tugging 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; however, impacts to the acoustic habitat are relevant and discussed here.While the specified activity would occur within Cook Inlet beluga whale Critical Habitat Area 2 (and potentially Area 1, depending on the origin of the tug tow), and recognizing that Cook Inlet beluga whales have been identified as a small and resident population, monitoring data from Hilcorp's activities suggest that tugging activities do not discourage Cook Inlet beluga whales from transiting throughout Cook Inlet and between critical habitat areas and that the whales do not abandon critical habitat areas (Horsley and Larson, 2023). In addition, large numbers of Cook Inlet beluga whales 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, 2015, 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 (*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 Cook Inlet beluga whales 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 Cook Inlet beluga whales 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 believe exposure to elevated noise levels during transit past tugging or construction activities would have adverse effects on individuals' fitness for reproduction or survival.

Although data demonstrate that Cook Inlet beluga whales are not abandoning the planned project area during anthropogenic activities, results of an expert elicitation (EE) at a 2016 workshop, which predicted the impacts of noise on Cook Inlet beluga whale survival and reproduction given 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 Cook Inlet beluga whale (King *et al.* 2015). NMFS (2016b) suggests that the main direct effects of noise on Cook Inlet beluga whales are likely to be through masking of vocalizations used for communication and prey location and habitat degradation. The 2016 workshop on Cook Inlet beluga whales 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 Cook Inlet beluga whale 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 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 Cook Inlet beluga whale 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 of April, May, and June that would be predicted to reduce the energy reserves of a pregnant Cook Inlet beluga whale 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 of April-September required to reduce the energy reserves of a lactating Cook Inlet beluga whale 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 this elicitation, 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 the 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 Cook Inlet beluga whales (*e.g.,* faster swim speeds, longer dives, decreased sighting durations, alterations in communication). Also, NMFS proposes to authorize 11 instances of take by Level B harassment during each year, with the instances representing disturbance events within a day—this means that either 11 different individual Cook Inlet beluga whales 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 total number of takes not exceeding 11. Given the overall anticipated take, and the short duration of the specified activities, it is unlikely that any one Cook Inlet beluga whale will be disturbed on more than a couple of days. Further, Furie has proposed mitigation measures specific to Cook Inlet beluga whales whereby they would not begin tugging activities should a Cook Inlet beluga whale be observed at any distance. While take by Level B harassment (behavioral disturbance) would be authorized, this measure, 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 Cook Inlet beluga whales is not anticipated or proposed to be authorized.

In summary and as described above, the additional following factors primarily support our preliminary determination that the impacts resulting from this activity are not expected to adversely affect the Cook Inlet beluga whale 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 Cook Inlet beluga whales abandoning critical habitat nor are they expected to restrict passage of Cook Inlet beluga whales within or between critical habitat areas; and
- Any disturbance to Cook Inlet beluga whales 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 proposed monitoring and mitigation measures, NMFS preliminarily finds that the total marine mammal take proposed for Year 1 of activity will have a negligible impact on all affected marine mammal species or stocks. Separately, NMFS preliminary finds that the total marine mammal take proposed for Year 2 of activity will have a negligible impact on all affected marine mammal species or stocks.

Small Numbers

As noted previously, take of only small numbers of marine mammals may be authorized under sections 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 number of individuals taken 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 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. Additionally, other qualitative factors may be considered in the analysis, such as the temporal or spatial scale of the activities.

Table 13 provides the quantitative analysis informing our small numbers determinations for the Year 1 and Year 2 IHAs. For all stocks whose abundance estimate is known, the amount of taking is less than one-third of the best available population abundance estimate (in fact it is less than 1 percent for all stocks, except for Cook Inlet beluga whales whose proposed take is 3.9 percent of the stock; table 13). The number of animals proposed for authorization to be taken from these stocks therefore, would be considered small relative to the relevant stock's abundances even if each estimated take occurred to a new individual.

Abundance estimates for the Mexico-North Pacific stock of humpback whales are based upon data collected more than 8 years ago and, therefore, current estimates are 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 2023b). 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 3 takes of humpback whale proposed for authorization would all be of the Mexico-North Pacific stock, this represents small numbers of this stock (less than 1 percent of the stock assuming an N_{MIN} of 2,241 individuals and <1 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 would be affected during each year. 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 three takes by Level B harassment proposed for authorization for the stock during Year 1 and Year 2, 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. Given 2 takes by Level B harassment proposed for authorization for the stock during Year 1 and Year 2, 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 for this area, as the most recent estimate is greater than 8 years old. 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). Given 6 takes by Level B harassment proposed for authorization for the stock during Year 1 and Year 2, comparison to the minimum population estimate shows, at most, less than 1 percent of the stock would be 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 for the Year 1 IHA. Separately, NMFS also preliminarily finds that small numbers of marine mammals will be taken relative to the population size of the affected species or stocks for the Year 2 IHA.

Unmitigable Adverse Impact Analysis and Determination

In order to issue an IHA, 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 Furie's middle Cook Inlet (and potentially Trading Bay, depending on where Furie takes over the rig from Hilcorp) activities include the Village of Salamatof and the Native Village of Tyonek. The Alaska Department of Fish and Game Community Subsistence Information System does not contain data for Salamatof. For the purposes of our analyses for the Year 1 and Year 2 IHAs, we assume the subsistence uses are similar to those of nearby communities such as Kenai. Tyonek, on the western side of lower Cook Inlet, has a subsistence harvest area that extends from the Susitna River south to Tuxedni Bay (BOEM 2016). 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 32.2 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). Subsistence hunting of whales is not known to currently occur in Cook Inlet.

Furie's tug towing rig activities may overlap with subsistence hunting of seals. However, these activities typically occur along the shoreline or very close to shore near river mouths, whereas most of Furie's tugging (all, with the exception of returning the rig to the Rig Tender's Dock, located in an industrialized area of Nikiski, Alaska), as well as its pile driving, is in the middle of the Inlet and rarely near the shoreline or river mouths. Any harassment to harbor seals is anticipated to be short-term, mild, and not result in any abandonment or behaviors that would make the animals unavailable for harvest. However, to further minimize any potential effects of their action on subsistence activities, Furie plans to conduct stakeholder outreach before the planned operations in 2024 and 2025, according to its Stakeholder Engagement Plan. According to Furie, they contacted Alaska Native Tribes in the Cook Inlet Region by email and phone message. To date, Furie has not received any responses from the Tribes. Furie states it will expand the effort to include Cook Inlet Regional Inc. and Chugach Alaska Corporation and will continue to reach out to the Tribes as the project nears. Furie 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.

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 Furie's proposed activities under the Year 1 IHA. Separately, NMFS has also preliminarily determined that there will not be an unmitigable adverse impact on subsistence uses from Furie's proposed activities under the Year 2 IHA.

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 IHAs, 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 Distinct Population Segment (DPS), beluga whale (Cook Inlet), and Steller sea lion (Western DPS), which are listed under the ESA. The Permits and Conservation Division has requested initiation of section 7 consultation with the NMFS AKRO for the issuance of this IHA. NMFS will conclude the ESA consultation prior to reaching a determination regarding the proposed issuance of the authorization.

Proposed Authorization

As a result of these preliminary determinations, NMFS proposes to issue two IHAs to Furie for conducting oil and gas activities in Cook Inlet, Alaska from 2024–2026, provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated. Drafts of the proposed IHAs can be found at: *https://www.fisheries.noaa.gov/permit/incidental-take-authorizations-under-marine-mammal-protection-act.*

Request for Public Comments

We request comment on our analyses, the proposed authorization, and any other aspect of this notice of proposed IHAs for the proposed oil and gas activities. We also request comment on the potential renewal of these proposed IHAs as described in the paragraph below. Please include with your comments any supporting data or literature citations to help inform decisions on the proposed IHAs or a subsequent renewal IHA.

On a case-by-case basis, NMFS may issue a one-time, 1-year renewal IHA following notice to the public providing an additional 15 days for public comments when (1) up to another year of identical or nearly identical activities as described in the Description of Proposed Activity section of this notice is planned; or (2) the activities as described in the Description of Proposed Activity section of this notice would not be completed by the time the IHA expires and a renewal would allow for completion of the activities beyond that described in the *Dates and Duration* section of this notice, provided all of the following conditions are met:

- A request for renewal is received no later than 60 days prior to the needed renewal IHA effective date (recognizing that the renewal IHA expiration date cannot extend beyond one year from expiration of the initial IHA).
- The request for renewal must include the following:

(1) An explanation that the activities to be conducted under the requested renewal IHA are identical to the activities analyzed under the initial IHA, are a subset of the activities, or include changes so minor (*e.g.,* reduction in pile size) that the changes do not affect the previous analyses, mitigation and monitoring requirements, or take estimates (with the exception of reducing the type or amount of take); and

(2) A preliminary monitoring report showing the results of the required monitoring to date and an explanation showing that the monitoring results do not indicate impacts of a scale or nature not previously analyzed or authorized;

- Upon review of the request for renewal, the status of the affected species or stocks, and any other pertinent information, NMFS determines that there are no more than minor changes in the activities, the mitigation and monitoring measures will remain the same and appropriate, and the findings in the initial IHA remain valid.

Dated: June 10, 2024.

Angela Somma,

Acting Director, Office of Protected Resources, National Marine Fisheries Service.

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