Issuance of Incidental Harassment Authorizations for the Take of Marine Mammals Incidental to Furie Operating Alaska, LLC Natural Gas Activities in Cook Inlet, Alaska

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U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service

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ABSTRACT:
This Environmental Assessment analyzes the environmental impacts of the National Marine Fisheries Service, Office of Protected Resources' decision regarding issuance of an Incidental Harassment Authorization, pursuant to section 101(a)(5)(D) of the Marine Mammal Protection Act, to Furie Operating Alaska, LLC for the take of small numbers of marine mammals incidental to rig towing and pile driving in Cook Inlet, Alaska.

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Acronyms and Abbreviations

°C	degrees Celsius
ADF&G	Alaska Department of Fish & Game
AFSC	Alaska Fisheries Science Center
AKRO	Alaska Regional Office
AMMOP	Alaska Marine Mammal Observer Program
ANHSC	Alaska Native Harbor Seal Commission
Apache	Apache Alaska Corporation
BA	Biological Assessment
BIA	Biologically Important Area
BiOp	Biological Opinion
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CIMMC	Cook Inlet Marine Mammal Council
CIPL	Cook Inlet Pipeline Cross Inlet Extension Project
cm	centimeter(s)
CM	Companion Manual
CTR	Cargo Terminals Replacement
CV	coefficient of variation
dB	decibels
dB re 1 µPa	decibels referenced to 1 micropascal
DOT&PF	Department of Transportation and Public Facilities
DPS	Distinct Population Segment
EA	Environmental Assessment
EEZ	Exclusive Economic Zone
EFH	essential fish habitat
ESA	Endangered Species Act
FONSI	Finding of No Significant Impact
FR	*Federal Register*
FRN	*Federal Register* Notice
ft	foot/feet
G&G	geophysical and geotechnical
Harvest	Harvest Alaska, LLC
Hilcorp	Hilcorp Alaska, LLC
HF	high frequency
hr	hour(s)
Hz	hertz
IHA	Incidental Harassment Authorization
in	inch(es)
ITA	Incidental Take Authorization
ITS	Incidental Take Statement
JASCO	JASCO Applied Sciences
JBER	Joint Base Elmendorf Richardson
kHz	kilohertz
km	kilometer(s)
km^2	square kilometer(s)
$L_{pk,flat}$	peak sound pressure level (unweighted)
$L_{E,24h}$	sound exposure level, cumulative 24 hours
LF	low frequency

LOA	Letter of Authorization
LOC	Letter of Concurrence
m	meter(s)
MF	mid-frequency
mi	mile
MML	Marine Mammal Laboratory
MLLW	mean lower low water
MMAP	Marine Mammal Authorization Program
MMPA	Marine Mammal Protection Act
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
nmi	nautical mile(s)
NA	not applicable
NAO	NOAA Administrative Order
NEPA	National Environmental Policy Act
NES1	North Extension Stabilization Step 1
NES2	North Extension Stabilization Step 2
NMFS	National Marine Fisheries Service
NOAA	National Oceanographic and Atmospheric Administration
OPR	Office of Protected Resources
OSP	Optimum Sustainable Population
OW	otariid in water
PAMP	Port of Alaska Modernization Program
POA	Port of Alaska
POL	Petroleum Oil Lubricants
PSO	Protected Species Observers
PTS	permanent threshold shift
PW	phocid in water
RMS	root mean square
SAR	Stock Assessment Report
SEL	sound exposure level
SEL_{cum}	cumulative sound exposure levels
SFA	Sustainable Fisheries Act
SSV	sound source verification
T&E	threatened and endangered
TL	transmission loss
TTS	temporary threshold shift
UME	Unusual Mortality Event
U.S.	United States
USACE	U.S. Army Corps of Engineers
U.S.C.	U.S. Code
USFWS	U.S. Fish and Wildlife Service

Chapter 1 Introduction and Purpose and Need

1.1 Introduction and Background

On July 19, 2023, NMFS received a request from Furie Operating Alaska, LLC (Furie) for two consecutive one-year Incidental Harassment Authorizations (IHAs) to take marine mammals incidental to natural 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.

NMFS is required to review applications and, if appropriate, issue Incidental Take Authorizations (ITAs) pursuant to the Marine Mammal Protection Act of 1972, as amended (MMPA; 16 United States [U.S.] Code [U.S.C.] 1361 et seq.). An authorization for incidental take of marine mammals 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 subsistence uses (where relevant). NMFS evaluated Furie's request, proposes to make the required findings under the MMPA, and proposes to determine that issuing an Incidental Harassment Authorization (IHA) would be appropriate. NMFS criteria for determining whether to grant or deny an applicant's request are explained in this chapter, and detailed information is available at *https://www.fisheries.noaa.gov/topic/laws-policies/marine-mammal-protection-act*.

The National Environmental Policy Act (NEPA), 42 U.S.C. 4321 et seq (2023), the 2020 Council on Environmental Quality (CEQ) Regulations as modified by the Phase I 2022 revisions (40 Code of Federal Regulations [CFR] 1500–1508 (2022))[1], and National Oceanic and Atmospheric and Administration (NOAA) policy and procedures[2] each require all proposals for major federal actions to be reviewed with respect to environmental consequences on the human environment. NMFS' consideration of whether to issue two IHAs to Furie allowing take of marine mammals, consistent with provisions under the MMPA and incidental to the applicant's lawful activities, is a major federal action. NMFS determined that an Environmental Assessment (EA) was the appropriate level of NEPA analysis for this action.

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

- Chapter 2 describes Furie's proposed activities, and the alternatives carried forward for analysis as well as alternatives not carried forward for analysis.
- Chapter 3 describes the baseline conditions of the affected environment.
- Chapter 4 describes the direct, indirect, and cumulative impacts to the affected environment; specifically, it describes impacts to marine mammals and their habitat associated with NMFS' Proposed Action and alternatives.

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[1] This EA applies the 2020 CEQ NEPA regulations as modified by the CEQ's Phase 1 2022 revisions (87 FR 2345, 20 April 2022) because review of this proposed action began on 5 April 2024, the date on which NMFS deemed the Furie ITA application adequate and complete, which preceded the effective date of CEQ's Phase 2 NEPA regulations (July 1, 2024).

[2] NOAA Administrative Order (NAO) 216-6A, "Compliance with the National Environmental Policy Act, Executive Orders 12114, Environmental Effects Abroad of Major Federal Actions; l1988 and 13690, Floodplain Management and 11990, Protection of Wetlands," issued 22 April 2016, and the Companion Manual for NAO 216-6A, "Policy and Procedures for Implementing the National Environmental Policy Act and Related Authorities," issued 13 January 2017.

- Chapter 5 lists document preparers and agencies consulted.
- Chapter 6 lists literature cited.

1.2 Marine Mammal Protection Act Overview

Section 101(a) of the MMPA (16 U.S.C. 1361) prohibits persons or vessels subject to the jurisdiction of the United States from taking any marine mammal in waters or on lands under the jurisdiction of the United States or on the high seas (16 U.S.C. 1372(a)(l), (a)(2)). Sections 101(a)(5)(A) and (D) of the MMPA provide exceptions to the prohibition on take, which give NMFS (and U.S. Fish and Wildlife Service [USFWS]) the authority to authorize the incidental but not intentional take of small numbers of marine mammals, provided certain findings are made and statutory and regulatory procedures are met. The incidental take of a marine mammal can be classified as mortality, serious injury, or harassment[3]. ITAs may be issued as either (1) regulations and an associated Letter of Authorization (LOA) or (2) an IHA. LOAs may be issued for a maximum period of 5 years and IHAs may be issued for a maximum period of 1 year and may only authorize incidental take by harassment. Detailed information about the MMPA is available at *https://www.fisheries.noaa.gov/topic/laws-policies/marine-mammal-protection-act*.

NMFS promulgated regulations to implement the provisions of the MMPA governing the taking and importing of marine mammals (see 50 CFR Part 216) and published application instructions that prescribe the procedures necessary to apply for ITAs. U.S. citizens, including entities such as Furie, seeking to obtain authorization for the incidental take of marine mammals under NMFS jurisdiction[4] must comply with these regulations and application instructions in addition to the provisions of the MMPA. Information on the NMFS implementing regulations and application process is available at *https://www.fisheries.noaa.gov/national/marine-mammal-protection/apply-incidental-take-authorization*.

Once NMFS determines an application is adequate and complete, it has a corresponding duty to determine whether and how to authorize take of marine mammals incidental to the activities described in the application. To authorize the incidental take of marine mammals, NMFS must determine, using the best available science, that the taking would be of small numbers of a species or stock, would have a negligible impact on the affected marine mammal species or stocks, and would not have an unmitigable impact on the availability of such stocks for subsistence uses. NMFS must also prescribe the "means of effecting the least practicable adverse impact" on the affected species or stocks and their habitat[5], and on the availability of those species or stocks for subsistence uses, as well as monitoring and reporting requirements.

1.2.1 Required Mitigation

In accordance with the MMPA, NMFS must prescribe, in the IHA, the means of effecting the least practicable adverse impact on the species or stocks of marine mammals and their habitat. To do so, NMFS considers an applicant's proposed mitigation measures and assesses how such measures could benefit the affected species or stocks and their habitat. NMFS' evaluation of potential measures includes consideration of the following factors in relation to one another: (1) the manner in which and the degree to which NMFS expects the successful implementation of the measure to minimize adverse impacts to marine mammals; (2) the proven or likely efficacy of the specific measure to minimize adverse impacts as planned; and (3) the practicability of the measure for applicant implementation.

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[3] Except with respect to certain activities not pertinent here, 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). 50 CFR 216.3.

[4] NMFS has jurisdiction over most marine species, (e.g., marine mammals and pinnipeds).

[5] Habitat includes rookeries, mating grounds, and other areas of similar significance.

Though any mitigation must be evaluated in the context of the specific activity and the species or stocks affected, measures with the following types of goals are often applied to reduce the likelihood or severity of adverse species- or stock-level impacts:

- Avoidance or minimization of marine mammal injury, serious injury, or death whenever possible;
- Reduction in the number of marine mammals taken (total number or number at a biologically important time or location);
- Reduction in the number of times the activity takes individual marine mammals (total number or number at a biologically important time or location);
- Reduction in the degree of effect of the anticipated takes (either total number or number at a biologically important time or location);
- Avoidance or minimization of adverse effects to marine mammal habitat, paying special attention to the food base, activities that block or limit passage to or from biologically important areas, permanent destruction of habitat, or temporary destruction/disturbance of habitat during a biologically important time; and
- For monitoring related directly to mitigation, an increase in the probability of detecting marine mammals, thus allowing for more effective implementation of the mitigation.

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

In their application, Furie proposed several avoidance, minimization, and mitigation measures, outlined in Section 11, which would apply to all marine mammals. Additional mitigation measures are proposed specifically for Cook Inlet beluga whales.These measures are discussed in detail in the notice of proposed IHA (89 FR 51102, 14 June 2024). Through the MMPA IHA process, NMFS evaluated whether the proposed measures would effect the least practicable adverse impact. The final IHA, if issued, would contain mitigation requirements developed through the consultation and authorization processes and summarized in the Final EA.

1.2.2 Required 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 in the proposed action area. Effective reporting is critical to compliance as well as to 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:

(1) Occurrence of marine mammal species or stocks in the area in which take is anticipated (e.g., presence, abundance, distribution, density).
(2) Nature, scope, or context of likely marine mammal exposure to potential stressors/impacts (individual or cumulative, acute or chronic), through better understanding of:
    a. Action or environment (e.g., source characterization, propagation, ambient noise);
    b. Affected species (e.g., life history, dive patterns);

c. Co-occurrence of marine mammal species with the action; or
d. Biological or behavioral context of exposure (e.g., age, calving or feeding areas).

(3) Individual marine mammal responses (behavioral or physiological) to acoustic stressors (acute, chronic, or cumulative), other stressors, or cumulative impacts from multiple stressors.
(4) How anticipated responses to stressors impact either:
    a. Long-term fitness and survival of individual marine mammals; or
    b. Populations, species, or stocks.
(5) Effects on marine mammal habitat (e.g., marine mammal prey species, acoustic habitat, or other important physical components of marine mammal habitat).
(6) Mitigation and monitoring effectiveness.

In their application, Furie proposed several monitoring and reporting measures, outlined in Section 2.2.3.1, which would apply to all marine mammals. General monitoring plan criteria are discussed in Section 13 of Furie's IHA application and the notice of proposed IHA (89 FR 51102, 14 June 2024). Additional information is found in the Marine Mammal Monitoring and Mitigation Plan in Appendix B of the IHA application (available at *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-construction-activities*). The final IHA, if issued, would contain the monitoring and reporting requirements developed through the consultation and authorization processes and summarized in the Final EA.

1.3 Summary of the Applicant's Incidental Take Authorization Request

NMFS received a request from Furie Operating Alaska, LLC (Furie) for authorization to take marine mammals incidental to natural gas activities in Cook Inlet, Alaska. Pursuant to the MMPA, NMFS requested comments on its proposal to issue two consecutive IHAs to incidentally take marine mammals during the specified activities. 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.

1.4 Purpose and Need

1.4.1 Description of Proposed Action

NMFS proposes to issue two IHAs to Furie under Section 101(a)(5)(D) of the MMPA. Each IHA would be valid for 1 year and would be timed to be in effect sequentially. The IHAs, if issued, would authorize takes of small numbers of twelve species of marine mammals by Level B harassment incidental to tugs towing, holding, and positioning a jack-up rig as well as a small amount of pile driving in middle Cook Inlet and Trading Bay, Alaska. The IHAs, if issued, would also authorize take by Level A harassment of harbor seals. No serious injury or mortality is anticipated or will be authorized; therefore, IHAs are appropriate. NMFS' Proposed Action (i.e., issuance of the IHAs) is a direct outcome of Furie requesting authorizations to take small numbers of marine mammals incidental to tug towing activities. Additional details about NMFS' Proposed Action are provided in the notice of the proposed IHAs, published in the *Federal Register* (FR) on 14 June, 2024 (89 FR 51102). The proposed IHA does not permit or authorize Furie's project activities, only the take of marine mammals incidental to those activities.

1.4.2 Purpose

The purpose of NMFS' Proposed Action is to authorize take under the MMPA of marine mammals incidental to Furie's proposed activity. The acoustic stimuli from tug towing and pile driving activities

has the potential to harass, as defined under the MMPA, marine mammals in and near the activity area. Twelve species of marine mammals may be taken by Level B (behavioral) harassment and harbor seals may also be taken by Level A harassment. No mortality or serious injury is anticipated or authorized in either IHA. Therefore, the activity warrants IHAs from NMFS.

The IHAs, if issued, provide an exemption to Furie from the take prohibitions contained in the MMPA. To authorize the incidental take of small numbers of marine mammals, NMFS must evaluate the best available scientific information to determine whether the take would have a negligible impact on marine mammals or stocks and whether the activity would have an unmitigable impact on the availability of affected marine mammal species for subsistence use. In addition, NMFS must prescribe, in an IHA, the permissible methods of taking and other means of effecting the least practicable adverse impact on the species or stocks of marine mammals and their habitat, paying particular attention to rookeries, mating grounds, and other areas of similar significance. If appropriate, NMFS must prescribe means of effecting the least practicable adverse impact on the availability of the species and/or stocks of marine mammals for subsistence uses. NMFS also must include requirements or conditions pertaining to monitoring and reporting. Thus, the purpose of NMFS' action—which is a direct outcome of Furie's request for authorization to take marine mammals incidental to their proposed activities (specifically, impact pile driving, tugs towing, holding, and positioning a jack-up rig)—is to evaluate the information in Furie's application pursuant to the MMPA and 50 CFR 216 and issue the requested ITA, if appropriate.

1.4.3 Need

U.S. citizens seeking to obtain authorization for the incidental take of marine mammals under NMFS' jurisdiction must submit a request (in the form of an application). Once NMFS determines that an application is adequate and complete, NMFS has a corresponding duty to determine whether and how to authorize take of marine mammals incidental to the activities described in the application. On 5 April 2024, NMFS determined that Furie submitted an adequate and complete application demonstrating the need and potential eligibility for two IHAs under the MMPA. The need for NMFS' Proposed Action is to consider the impacts of authorizing the requested take on marine mammals and their habitat and determine the appropriate mitigation, monitoring, and reporting measures. NMFS' responsibilities under Section 101(a)(5)(D) of the MMPA and its implementing regulations establish and frame the need for NMFS' Proposed Action.

1.5 Environmental Review Process and Background

Under NEPA, federal agencies are required to examine the environmental impacts of their proposed actions within the U.S. and its territories. A NEPA analysis is a concise public document that provides an assessment of the potential effects a major federal action may have on the human environment. Major federal actions include activities that federal agencies fully or partially fund, regulate, conduct, or approve. Because NMFS' issuance of IHAs to Furie would allow for the taking of marine mammals, consistent with provisions under the MMPA and incidental to the applicant's lawful activities, NMFS considers this a major federal action subject to NEPA; therefore, NMFS analyzed the environmental effects associated with authorizing incidental takes of marine mammals and prepared the appropriate NEPA documentation. In addition, NMFS, to the fullest extent possible, integrates the requirements of NEPA with other regulatory processes required by law or by agency practice so that all procedures run concurrently, rather than consecutively. This includes coordination within NOAA and with other regulatory agencies, as appropriate, during NEPA reviews prior to implementation of the Proposed Action to ensure that requirements are met. Regarding the issuance of ITAs, NMFS relies substantially on the public process required by the MMPA for proposed ITAs, to develop and evaluate relevant environmental information and provide a meaningful opportunity for public participation when NMFS prepares NEPA documents. NMFS considers public comments received in response to the publication of the proposed IHA during the NEPA review process.

1.5.1 Scoping and Public Involvement

The NEPA process enables NMFS to make decisions based on an understanding of the environmental consequences of a proposed action and take actions to protect, restore, and enhance the environment. Although agency procedures do not require publication of the draft EA prior to finalizing an EA, NMFS relies substantially on the public process pursuant to the MMPA to develop and evaluate environmental information relevant to an analysis under NEPA. In the notice of proposed IHAs (89 FR 51102, June 14, 2024), NMFS alerted the public that it intended to use the MMPA public review process to solicit relevant environmental information and provide the public an opportunity to submit comments.

The *Federal Register* notice (FRN) of the proposed IHA included a detailed description of the Proposed Action, the potential effects of the Project on marine mammals, their habitat, and on subsistence uses, proposed mitigation to avoid and minimize potential adverse impacts on marine mammals and their habitat, proposed monitoring and reporting measures, and NMFS' preliminary findings. The FRN of the proposed IHA and the corresponding public comment period are instrumental in providing the public with information regarding relevant environmental issues and offering the public a meaningful opportunity to provide comments for NMFS' consideration in both the MMPA and NEPA processes.

NMFS accepted public comments during the 30-day period advertised in the FRN. NMFS received comments from Furie, Friends of Animals, U.S. Geological survey, and a member of the public. A detailed summary of the comments, and NMFS' responses to those comments, will be included in the FRN for the final IHA, if issued.

1.5.2 Compliance with Other Environmental Laws or Consultations

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

1.5.2.1 The Endangered Species Act

The Endangered Species Act (ESA) (16 U.S.C. 1531 et seq.) establishes a national policy for conserving threatened and endangered (T&E) species of fish, wildlife, plants, and the habitat they depend on. NMFS and USFWS jointly administer the ESA and are responsible for listing a species as T&E, designating critical habitat[6], developing and implementing protective regulations and recovery plans[7], and undertaking several other management and conservation efforts pursuant to the ESA. Other management and conservation efforts include monitoring and evaluating the status of listed species, candidate species[8] or species proposed for listing[9], and recently delisted species as well as consulting on federal actions that

[6] Critical habitat is a specific area within a geographical area occupied by the species at the time of listing that has physical or biological features essential to conservation of the species and that may require special management considerations or protection and specific areas outside the geographical area occupied by the species if the agency determines that the area itself is essential for conservation.

[7] Section 4(f) of the ESA directs NMFS to develop and implement recovery plans for T&E species. Each species has different needs and requires different conservation strategies to achieve recovery. Recovery is the process of restoring listed species and their ecosystems to the point that they no longer require ESA protections. A key role of NMFS in recovering species is to set goals for each species' recovery comeback through the development of recovery plans.

[8] Candidate species are species in the listing petition and for which NMFS determined the listing is warranted pursuant to Section 4(b)(3)(a) of the ESA. Per 71 FR 61022, candidate species also include species that are not the subject of a petition but for which NMFS announced initiation of a status review of the species.

[9] Species proposed for listing are those candidate species found to warrant listing as threatened or endangered and officially proposed for listing in the *Federal Register* after completion of a status review. A public comment period is associated with NMFS' proposal to list a species as threatened or endangered, and NMFS generally has 1 year after a species is proposed for listing to make a final determination whether to list a species as threatened or endangered.

may affect a listed species or its designated critical habitat. The ESA generally prohibits the "take"[10] of an ESA species listed as endangered unless an exception or exemption applies. NMFS has extended the "take" prohibition to some ESA-listed threatened species under its jurisdiction through promulgation of protective rules. However, as discussed below, federal agencies and applicants for federal permits may receive exemption from incidental take through the Section 7 consultation process. Section 7(a)(2) of the ESA requires federal agencies to ensure that their actions are not likely to jeopardize the continued existence of T&E species, or adversely modify or destroy their designated critical habitat. Federal agencies must do so in consultation with NMFS and/or USFWS for actions that may affect species listed per Section 4 of the ESA as threatened or endangered or critical habitat designated for such species (per Section 4 of the ESA). Formal consultation with NMFS and USFWS is required unless exceptions per 50 CFR 402.14(b) apply.

When a federal action agency determines, through a Biological Assessment (BA) or other review, that an action is likely to adversely affect a listed species or result in the destruction or adverse modification of critical habitat, the federal action agency initiates the formal consultation process by submitting a request for formal consultation to the consulting agency (see 50 CFR 402.14). Section 7(b)(3) of the ESA requires that at the conclusion of formal consultation, the consulting agency provides an opinion stating whether the federal action agency's action is likely to jeopardize ESA-listed species or destroy or adversely modify designated critical habitat. A similar opinion is included for proposed species or proposed critical habitat if either or both were part of the consultation. If the consulting agency determines the action is likely to jeopardize ESA-listed species or destroy or adversely modify critical habitat, they then provide a reasonable and prudent alternative that may allow the action to proceed in compliance with Section 7(a)(2) of the ESA. If a federal action will cause incidental take and is reasonably certain to occur and certain conditions are met, Section 7(b)(4) of the ESA requires the consulting agency to provide an Incidental Take Statement (ITS) that specifies the impact of any incidental taking and includes mandatory reasonable and prudent measures to avoid, minimize, and mitigate such impacts and terms and conditions to implement the reasonable and prudent measures. An agency or applicant's compliance with these measures exempts the incidental take from the ESA take prohibition.

Marine mammals under NMFS' jurisdiction that are listed as T&E under the ESA with confirmed or possible occurrence in the proposed Project area (i.e., upper Cook Inlet) are the Cook Inlet Distinct Population Segment (DPS) of beluga whales (*Delphinapterus leucas*); the Western DPS of Steller sea lions (*Eumetopias jubatus*); the Mexico DPS and Western North Pacific DPS of humpback whales (*Megaptera novaeangliae*), and the Northeastern Pacific stock of fin whales (Balaenoptera physalus). Furie's activities would take place in Cook Inlet beluga whale Critical Habitat Area 2 (and potentially Area 1, depending on the origin of the tug tow) (See Section 3.2.2).

NMFS Office of Protected Resources' (OPR) issuance of two IHAs is a federal action subject to the requirements of Section 7 of the ESA. As a result, NMFS OPR is required to consult and ensure the issuance of the IHAs to Furie is not likely to jeopardize the continued existence of any T&E species or result in the destruction or adverse modification of designated critical habitat for these species. On 25 June 2024, the NMFS OPR requested a Section 7 consultation with the NMFS Alaska Regional Office (AKRO) on the proposed issuance of two IHAs to Furie. Formal consultation between NMFS OPR and AKRO will conclude with the issuance of a Biological Opinion (BiOp) regarding the potential for NMFS' Proposed Action to jeopardize the continued existence or recovery of the Cook Inlet beluga whale, the Mexico DPS and Western North Pacific DPS of humpback whales, the Western DPS of Steller sea lions, and the Northeastern Pacific stock of fin whales or adversely modify the Critical Habitat of Cook Inlet beluga whales. This determination will be made based on review of the status of the ESA-listed species,

[10] Take, as defined in Section 3 of the ESA, means to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."

the environmental baseline within the action area, and the effects of the Proposed Action as well as effects of interrelated and interdependent actions and cumulative effects.

1.5.2.2 Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) was enacted to address impacts to fisheries on the U.S. continental shelf. It established U.S. fishery management over fishes within the Fishery Conservation Zone from the seaward boundary of the coastal states out to 200 nautical miles (nmi) (i.e., the boundary of the U.S. Exclusive Economic Zone [EEZ]). The MSFCMA also established regulations for foreign fishing within the Fishery Conservation Zone and issued national standards for fishery conservation and management to be applied by regional fishery management councils. Each council is responsible for developing Fishery Management Plans for domestic fisheries within its geographic jurisdiction. In 1996, Congress enacted amendments to the MSFCMA, known as the Sustainable Fisheries Act (SFA) of 1996 (Public Law 104-297), to address substantially reduced fish stocks resulting from direct and indirect habitat loss. Under the MSFCMA, federal agencies are required to consult with the Secretary of Commerce with respect to any action authorized, funded, or undertaken or proposed to be authorized, funded, or undertaken, by such agency that may adversely affect essential fish habitat (EFH) identified under the MSFCMA. EFH is defined as the waters and substrate necessary to fishes or invertebrates for spawning, breeding, feeding, and growth to maturity. Areas designated as EFH contain habitat essential to the long-term survival and health of U.S. fisheries. This typically includes aquatic areas and their associated physical, chemical, and biological properties used by fish, and may include areas historically used by fish. Substrate types include sediment, hard bottom, structures underlying the waters, and associated biological communities. NMFS recommends consolidated EFH consultations with interagency coordination procedures required by other statutes such as NEPA or the ESA (50 CFR 600.920(e)(1)) to reduce duplication and improve efficiency. If an action may adversely affect EFH, the applicant must consult with NMFS to identify conservation measures to minimize or avoid adverse impacts. If NMFS identifies conservation measures, the applicant must determine whether it will implement them and provide a formal response if it fails to do so.

EFH has been identified in Cook Inlet for species including walleye Pollock (Theragra chalcogramma), rock sole (Lepidopsetta spp.), Pacific cod (Gadus macrocephalus), skate (Rajidae), weathervane scallop (Pationpecten caurinus), Pacific salmon (Chinook (Oncorhynchus tshawytscha), chum (O. keta), coho (O. kisutch), sockeye (O. nerka), and pink (O. gorbuscha)), and sculpin (Cottidae). However, under the 2017 Office of Habitat Conservation guidance on EFH and ITAs, NMFS has determined that the issuance of the IHA will not result in adverse impacts to EFH and, further, that it will not require separate consultation per Section 305(B)(2) of the MSFCMA as amended by the SFA (Public Law 104-267).

1.6 Document Scope

The analysis in this EA addresses potential effects or impacts on marine mammals and their habitat resulting from NMFS' Proposed Action to authorize incidental take associated with tugs towing, holding, and positioning a jack-up rig and impact pile driving in Cook Inlet, Alaska proposed by Furie. Under the 2022 revised CEQ NEPA regulations, effects or impacts are defined as: changes to the human environment from the proposed action or alternatives that are reasonably foreseeable and include (1) direct effects, which are caused by the action and occur at the same time and place; (2) indirect effects, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable; (3) cumulative effects, which are effects on the environment that result from the incremental effects of the action when added to the effects of other past, present, and reasonably foreseeable actions regardless of what agency (federal or non-federal) or person undertakes such other actions[11] (40 CFR

[11] The regulatory definition of effects or impacts also reads, "Effects include ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions which may have both

1508.1(g)). Any effect evaluated in this analysis has been determined to be reasonably foreseeable. However, the scope of this analysis is limited to the decision for which NMFS is responsible (i.e., whether to issue the IHA). This EA is intended to provide focused information on the primary issues and impacts of environmental concern, which include NMFS' issuance of the IHA authorizing the take of marine mammals incidental to Furie's tug towing and impact pile driving activities, and the mitigation and monitoring measures to minimize the effects of that take. For these reasons, this EA does not provide a detailed evaluation of the effects on the elements of the human environment listed in Table 1.

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

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

beneficial and detrimental effects, even if on balance the agency believes that the effects will be beneficial." Section 4.1 describes how impacts are assessed.

Chapter 2 Alternatives

As described in Chapter 1, the NMFS Proposed Action is to issue two IHAs to Furie to authorize the take of small numbers of marine mammals incidental to tugs towing, holding, and positioning a jack-up rig and impact pile driving in Cook Inlet, Alaska. NMFS' Proposed Action is triggered by Furie's request for the IHA per the MMPA (16 U.S.C. 1361 et seq.). In accordance with NEPA and the 2022 revised CEQ regulations, NMFS is required to consider a reasonable range of alternatives to a Proposed Action, as well as a No Action Alternative. Reasonable alternatives means a reasonable range of alternatives that are technically and economically feasible, and meet the purpose and need for the proposed action (40 CFR 1508.1(z)). The evaluation of alternatives under NEPA assists NMFS with understanding and, as appropriate, minimizing impacts through an assessment of alternative ways to achieve the purpose and need for its Proposed Action. Reasonable alternatives are carried forward for detailed evaluation under NEPA, while alternatives considered but determined not to meet the purpose and need are not carried forward. For the purposes of this EA, an alternative will meet the purpose and need only if it satisfies the requirements of Section 101(a)(5)(D) of the MMPA. Therefore, NMFS applied the screening criteria and considerations outlined in Section 2.1 to the alternatives to identify which alternatives to carry forward for analysis. Accordingly, an alternative must meet these criteria to be considered "reasonable."

2.1 Criteria and Considerations for Selecting Alternatives

Per Section 101(a)(5)(D) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to such activity, and other means of effecting the "least practicable adverse impact on such species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of such species or stock for taking for certain subsistence uses ." NMFS does not have a regulatory definition for "least practicable adverse impact." NMFS must also find that the authorized taking does not have an unmitigable adverse impact on the availability of marine mammal species or stocks for subsistence uses.

NMFS' implementing regulations require applicants to include information about the "availability and feasibility (economic and technological) of equipment, methods, and manner of conducting such activity or other means of effecting the least practicable adverse impact upon the affected species or stocks and their habitat" (50 CFR 216.104(a)(11)). In evaluating how mitigation may or may not be appropriate to ensure the least practicable adverse impact on species or stocks and their habitat, NMFS carefully considered two primary factors:

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

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

While the language of the least practicable adverse impact standard calls for minimizing impacts to affected species and stocks, NMFS recognizes that the reduction of impacts to those species or stocks accrues through the application of mitigation measures that limit impacts on individual animals. Accordingly, NMFS' analysis focuses on measures designed to avoid or minimize impacts to marine mammals from activities that are likely to increase the probability or severity of population-level effects, including auditory injury or disruption of important behaviors, such as foraging, breeding, or mother/calf interactions. To satisfy the MMPA's least practicable adverse impact standard, NMFS proposes a suite of basic mitigation protocols that are required regardless of the status of a stock. Additional or enhanced protections are proposed for species whose stocks are in poor health and/or are subject to some significant

additional stressor that lessens that stock's ability to weather the effects of the specified activity without worsening its status.

In the evaluation of specific measures, the details of the specified activity will necessarily inform each of the two primary factors discussed above (expected reduction of impacts and practicability), and will be carefully considered to determine the types of mitigation that are appropriate under the least practicable adverse impact standard. Analysis of how a potential mitigation measure may reduce adverse impacts on a marine mammal stock or species and practicability of implementation are not issues that can be meaningfully evaluated through a binary lens. The manner in which, and the degree to which, implementation of a measure is expected to reduce impacts, as well as its practicability in terms of these considerations, can vary widely. For example, a time/area restriction could be of very high value for decreasing population-level impacts (e.g., avoiding disturbance of feeding females in an area of established biological importance) or it could be of lower value (e.g., decreased disturbance in an area of high productivity but of less firmly established biological importance). Regarding practicability, a measure might involve operational restrictions that completely impede the operator's ability to carry out the project (higher impact), or it could mean additional incremental delays that increase operational costs but still allow the activity to be conducted (lower impact). Expected effects of the activity and of the mitigation, as well as status of the stock, all weigh into these considerations. Accordingly, the greater the likelihood that a measure will contribute to reducing the probability or severity of adverse impacts to the species or stock, the greater the weight that measure is given when considered in combination with practicability to determine the appropriateness of the mitigation measure, and vice versa.

2.2 Description of the Applicant's Specified Activities

2.2.1 Specified Geographic Area

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 Three mile 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) Tyonek platform. The Tyonek platform is within the Susitna Delta Exclusion Zone identified in Hilcorp's IHAs (87 FR 62364, October 14, 2022). If Hilcorp conducts 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 would 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.

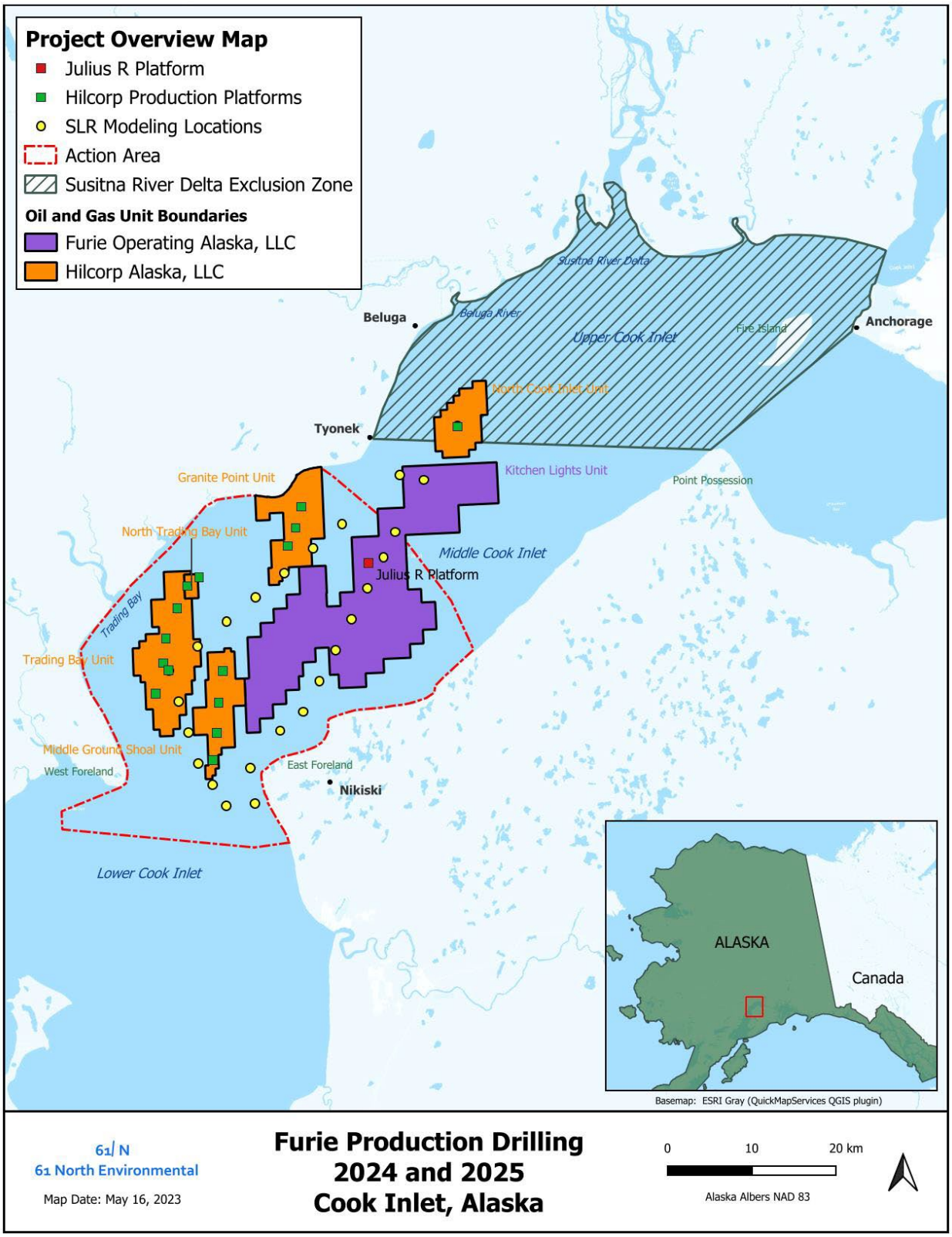

Figure 1. Furie action area.

2.2.2 Applicant's Proposed Project

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 would be towed to the JRP by up to three ocean-going tugboats. (Table 3 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 2.

Table 2. 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
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 would 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 Section 4.6.2.1 (Applicable Noise Criteria and Take Estimates).

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 3 displays the potential scenarios.

Table 3. 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 conducts 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 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.

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 would 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 would 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 would move the rig nearby, where the legs can be temporarily lowered to the seafloor to secure it. The tugs would 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 would 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 would 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 would 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 would 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 would be in transit, exposure to vessel noise would be temporary, relatively brief and would 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 would 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 would be installed over the course of both seasons because only two well slots remain to accept new conductors).

2.2.3 Applicant's Required Avoidance and Minimization Measures

In their October 2023 IHA application, Furie identified several avoidance and minimization measures as components of the Proposed Action to eliminate the potential for injury and to minimize disturbance harassment of marine mammals. NMFS has also proposed additional measures in the proposed IHA. The avoidance, minimization, and mitigation measures proposed by Furie, and proposed to be required for the project are identified in Appendix I. The required reporting measures are also identified in Appendix I.

2.3 Alternative 1 - No Action Alternative

In accordance with NOAA's implementing regulations, the Companion Manual (CM) for NAO 216-6A, Section 6.B.i, NMFS is defining the No Action Alternative as not issuing the requested IHA under Section 101(a)(5)(D) of the MMPA. This is consistent with the NMFS statutory obligation under the MMPA to either (1) deny the requested authorization, or (2) grant the requested authorization and prescribe mitigation, monitoring, and reporting requirements. Thus, under the No Action Alternative, NMFS assumes that Furie would not proceed with their tug towing and impact pile driving activities proposed in their IHA application. Although the No Action Alternative would not meet the purpose and need to allow incidental takes of small numbers of marine mammals under certain conditions (i.e., when the statutory requirements are satisfied), the 2022 revised CEQ regulations require consideration and analysis of a No Action Alternative for the purposes of presenting a comparative analysis to the action alternatives. The No Action Alternative, consistent with 2022 revised CEQ regulations and the CM, serves as a baseline against which the impacts of the Preferred Alternative are compared and contrasted.

2.4 Alternative 2 - Issuance of Requested IHA (Preferred Alternative)

Under Alternative 2, the Preferred Alternative, NMFS would issue the requested IHAs to Furie allowing the take, by Level B harassment of twelve species of marine mammals and also Level A harassment of harbor seals, incidental to tugs towing, holding, and positioning a jack-up rig and impact pile driving in Cook Inlet, Alaska (see Section 2.2), subject to the mitigation measures, monitoring, and reporting requirements set forth in the IHAs, if issued. This alternative also includes mandatory requirements for Furie to achieve the MMPA standard of effecting the least practicable adverse impact on the species or stocks of marine mammals and their habitat, paying particular attention to rookeries, mating grounds, and other areas of similar significance and not having an unmitigable adverse impact on the availability of marine mammals for subsistence use.

2.5 Alternatives Considered but Eliminated from Further Consideration

In coordination with Furie, NMFS considered whether other alternatives could meet the purpose and need of NMFS' proposed action while supporting Furie's proposal to use tugs to tow, hold, and position a jack-

up rig and conduct impact pile driving in middle Cook Inlet, Alaska. After thorough review, NMFS did not identify other alternatives.

Chapter 3 Affected Environment

NMFS considered all relevant environmental, cultural, historical, social, and economic resources based on the geographic location associated with NMFS' Proposed Action, alternatives, and Furie's request for two IHAs. Based on this review, this chapter describes the affected environment, existing (baseline) conditions for select resource categories (e.g., marine environment), and reasonably foreseeable environmental trends. As explained in Section 1.6, certain resource categories were not carried forward for further consideration or evaluation in this EA (see Table 1 in Section 1.6).

3.1 Physical Environment

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

Cook Inlet is a complex Gulf of Alaska estuary (as described in the Bureau of Ocean Energy Management (BOEM), 2016) that covers roughly 20,000 square kilometers (km^2; 7,700 square miles (mi^2 square kilometers (km^2)), with approximately 1,350 linear km (840 mi) of coastline (Rugh et al. 2000). The physical oceanography of Cook Inlet is characterized by complex circulation with variability at tidal, seasonal, annual, and inter-annual timescales. This region has the fourth largest tidal range in the world and as a result, extensive tidal mudflats that are exposed at low tides occur throughout Cook Inlet, especially in the upper reaches.

3.2 Biological Environment

The primary component of the biological environment that would be affected by the Proposed Action and alternatives is marine mammals, which would be directly affected by the authorization of incidental take.

3.2.1 History of Incidental Take Authorized in the Project Area

The environmental baseline for the biological environment for the proposed action includes the effects of previously authorized take of marine mammals in the project area, including recent authorizations for similar activities recently conducted by Hilcorp Alaska, LLC.

In 2015, NMFS issued an IHA (80 FR 28807, May 20, 2015) to SAExploration, Inc to take eight species of marine mammals incidental to an oil and gas exploration seismic survey program in Cook Inlet, Alaska between May 13, 2015 and May 12, 2016 (80 FR 29162, 20 May 2015). During this program, a total of 932 sightings (i.e., groups) of approximately 1,878 individual marine mammals were visually observed from 15 May – 27 September 2015 (Kendall et al. 2015). Harbor seals were the most commonly observed species with 823 sightings (approximately 1,680 individuals), followed by harbor porpoises with 52 sightings (approximately 65 individuals), and beluga whales with eight sightings (approximately 33 individuals). Large whale sightings consisted of three humpback whale sightings (3 individuals), one minke whale (1 individual) and one unidentified large cetacean. Other observations include one killer whale sighting (2 individuals), one Dall's porpoise, four Steller sea lions, two unidentified dolphins/porpoises, five unidentified pinnipeds and two unidentified marine mammals (Kendall et al. 2015). Approximately two beluga whales and 13 unidentified purposes were also acoustically detected during the SAExploration's activities (Kendall et al. 2015). A total of 207 marine mammals were confirmed visually or acoustically detected within the Level A and B harassment zones, resulting in 194 potential takes by Level B harassment (2 beluga whales, 15 harbor porpoises, 1 Steller sea lion, 174 harbor seals, 1 unidentified large cetacean, 1 unidentified dolphin/porpoise) and 13 potential takes by Level A harassment (2 harbor porpoises, 1 Steller sea lion, and 10 harbor seals). These observations resulted in activities being shutdown for a total of 18 times.

In 2016, NMFS issued an LOA (81 FR 47240, July 20, 2016) to Apache Alaska Corporation (Apache) for authorization to take nine marine mammal species, by harassment, incidental to its oil and gas exploration

seismic survey program in Cook Inlet, Alaska from August 19, 2016 through July 20, 2021. No work was completed under this authorization.

In 2018, NMFS issued an IHA to Harvest Alaska, LLC (Harvest) to incidentally take, by Level B harassment, eight species of marine mammals incidental to oil and gas pipeline installation activities associated with the Cook Inlet Pipeline Cross Inlet Extension Project (CIPL), Cook Inlet, Alaska (83 FR 19224, 2 May 2018). Harvest observed a total of 493 sightings (i.e., groups) of an estimated 1,184 individual marine mammals from 9 May to 15 September, 2018 (Sitiewicz et al. 2018). Harbor seals were the most commonly observed species with 313 sightings of approximately 316 individuals, followed by beluga whales with 143 sightings (approximately 814 individuals), harbor porpoises with 29 sightings (approximately 44 individuals), 3 sightings of unidentified individual pinnipeds, 2 sightings of humpback whales (approximately 3 individuals), 1 Steller sea lion sighting (approximately 2 individuals), 1 unidentified marine mammal sighting (1 individual), and 1 'other' sighting of a marine mammal carcass (Sitiewicz et al. 2018). From these sightings, Harvest estimated that one humpback whale and 17 harbor seals were potentially exposed to Level B acoustic harassment thresholds resulting from their activities (Sitiewicz et al. 2018). In addition, one shut down of activities was implemented when a beluga whale entered the estimated Level B harassment zone (Sitiewicz et al. 2018).

In 2019, NMFS issued incidental take regulations to Hilcorp for the take of marine mammals incidental to oil and gas activities in Cook Inlet, Alaska, including 3D seismic surveys and associated activities in support of production drilling over the course of five years (2019-2024) (84 FR 37442; 31 July 2019). NMFS also issued a BiOp and completed an EA analyzing the environmental impacts of NMFS' issuance of these regulations and associated LOAs, and issued a Finding of No Significant Impact (FONSI). NMFS issued LOAs to Hilcorp under the 2019 regulations on 31 July 2019 (84 FR 37442) (modified on 20 September 2019 (84 FR 53119, 4 October 2019)), 22 April 2020 (86 FR 6878, 25 January 2021), and 30 March 2021 (86 FR 19228; 13 April 2021).

In 2019, operating under the 2019 LOA, vessel-based PSOs observed a total of 134 sightings (i.e., groups) of 232 individual animals while aerial PSOs recorded 844 sightings of 6,147 animals (Fairweather Science, LLC, 2020). Humpback whales were the most commonly observed marine mammals by the vessel-based PSOs, while harbor seals were most commonly observed by the aerial PSOs. Hilcorp recorded 5 dead animals over the project, including two moderately decomposed beluga whales (no live beluga whales were sighted). They estimated that there were potentially 93.3 takes by Level B harassment, which includes the raw count of marine mammals observed within the estimated Level B harassment zones as well as the species-specific, density-based, exposure estimate applied to ESA-listed species to account for animals potentially not seen by PSOs during seismic operations (Fairweather Science, LLC, 2020).

No work was completed under the 2020 LOA. Under the 2021 LOA, Hilcorp's in-water activities in Cook Inlet were comprised of three Spartan 151 transportations using tugs, a shallow hazard survey using a sub-bottom profiler and side scan sonar over Outer Continental Shelf leases in lower Cook Inlet, and a routine maintenance survey using a sub-bottom profiler in middle Cook Inlet (Korsmo et al. 2022). Seven marine mammals were recorded during in-water activities, including an unknown pinniped and two harbor porpoises during Spartan 151 transportation (though not all observations occurred when the tugs were under load); one harbor seal, and three Dall's porpoises during the shallow hazard survey in lower Cook Inlet. The presence of the three Dall's porpoises resulted in shutdown of a sub-bottom profiler and side-scan sonar for 15 minutes. Only one of the harbor porpoises was observed within the estimated Level B harassment ensonified area because the tugs were not under load when the second observation occurred; however, no changes in behavior were observed in response to the tugging activities that were active at the time (tugs under load; Korsmo et al, 2022). No additional LOAs were issued to Hilcorp under the 2019 regulations, and no work by Hilcorp occurred from 2022 to 2024 under the 2019 regulations.

The 2019 regulations issued to Hilcorp were challenged by environmental groups in the U.S. District Court for the District of Alaska. The court in 2021 ruled largely in NMFS' favor but found a lack of adequate support in NMFS's record for the agency's determination that tug towing of drill rigs in connection with production activity would not cause take of beluga whales, and remanded back to NMFS for further analysis of tug use. NMFS analyzed the tugs towing the jack-up rig and determined that, given the slow, predictable, and generally straight path of tug towing and positioning, the likelihood of harassment was relatively low. However, at Hilcorp's request for incidental take authorization, we quantified the potential take from their tugging activity, analyzed the impacts, and issued two consecutive IHAs in 2022 for Hilcorp's activity (87 FR 62364, October 14, 2022), with a new EA and FONSI.

Under the 2022 IHA, Hilcorp observed 21 sightings of more than 125 beluga whales during aerial survey monitoring efforts in September 2022 prior to tugs being under load with the jack-up rig (Horsley and Larson, 2023). Hilcorp also recorded an additional 22 opportunistic sightings of 1 harbor seal, 1 unknown porpoise, and 176 to 181 beluga whales as well as an additional four sightings of animals within the estimated Level B harassment zones while the tugs were under load: one Dall's porpoise, two individual harbor seals, and one harbor porpoise (Horsley and Larson, 2023). All mitigation and monitoring measures were implemented, as appropriate, and the applicants submitted the required reports.

These projects had, at most, only a temporary effect on marine mammal behavior, resulting in at most short-term behavioral effects for individuals impacted, and they had no known long-term effects on marine mammal populations.

3.2.2 Marine Mammal Habitat

NMFS presented information on marine mammal habitat and the potential impacts to marine mammal habitat in the proposed FRN of IHA issuance (89 FR 51102, June 14, 2024). In summary, several marine mammal species use the waters of Cook Inlet for foraging, calving, and other important life history functions. The mouths of rivers and streams are important beluga whale feeding habitat. Harbor seals haul-out along the Cook Inlet shoreline. Killer whales, humpback whales, and Steller sea lions more commonly use the lower Cook Inlet area but can venture into the upper Inlet where the project will occur. Fin whales, gray whales, minke whales, Dall's porpoises, harbor porpoises, and Steller sea lions occasionally use the lower Inlet and could be sighted in the middle Inlet. California sea lions have only been sighted twice in the Inlet (Lomac-MacNair 2013).

Pursuant to the ESA, critical habitat has been designated for Cook Inlet beluga in the project area.[12] The action falls within critical habitat designated in Cook Inlet for beluga whales. On April 11, 2011, NMFS announced the two areas of critical habitat (76 FR 20180, 11 April 2011) comprising 7,800 km^2 (3,013 mi^2) of marine habitat (Figure 3). Critical habitat includes two areas (Areas 1 and 2) that encompass 7,800 km^2 (3012 mi^2) of marine and estuarine habitat in Cook Inlet. Designated beluga whale Critical Habitat Area 1 consists of 1,909 km^2 (737 mi^2) of Cook Inlet, north of Three Mile Creek and Point Possession. Critical Habitat Area 1 contains shallow tidal flats or mudflats and mouths of rivers that provide important areas for foraging, calving, molting, and escape from predators. High concentrations of beluga whales are often observed in these areas from spring through fall. Additionally, anthropogenic threats have the greatest potential to adversely impact beluga whales and their habitat in Critical Habitat Area 1. Critical Habitat Area 2 consists of 5,891 km^2 (2275 mi^2) located south of Critical Habitat Area 1, and includes nearshore areas along western Cook Inlet and Kachemak Bay. Critical Habitat Area 2 is known fall and winter foraging and transit habitat for beluga whales, as well as spring and summer habitat for smaller concentrations of beluga whales. Furie's activities would likely occur primarily throughout

[12] CRITICAL HABITAT FOR STELLER SEA LIONS AND HUMPBACK WHALES DOES NOT OCCUR NEAR THE NES1 PROJECT AREA OR IN UPPER COOK INLET.

Critical Habitat Area 2 (though activities could potentially overlap Area 1, depending on the origin of the tow). More information regarding Cook Inlet beluga whale critical habitat can be found on NOAA's website[13] and in NMFS' critical habitat rule at 76 FR 20180 (11 April 2011).

Wild et al. (2023) delineated portions of Cook Inlet, including portions of Furie's project area, as a Biologically Important Area (BIA) for the small and resident population of Cook Inlet beluga whales based on scoring methods outlined by Harrison et al. (2023) (see https://oceannoise.noaa.gov/biologically-important-areas for more information). The BIA is used year-round by beluga whales for feeding and breeding, and there are limits on food supply such as salmon runs and seasonal movement of other fish species (Wild et al. 2023). The authors assigned the BIA an importance score of 2, an intensity score of 2, a data support score of 3, and a boundary certainty score of 2 (scores range from 1 to 3, with a higher score representing an area of more concentrated or focused use and higher confidence in the data supporting the BIA; Harrison et al. 2023). These scores indicate that the BIA is of moderate importance and intensity, the authors have high confidence in both the fact that the population is small and resident and in the abundance and range estimates of the population, and the boundary certainty is medium The boundary of the Cook Inlet beluga whale BIA is consistent with NMFS' critical habitat designation (Wild et al. 2023). Furie's activities would overlap this BIA.

[13] HTTPS://WWW.FISHERIES.NOAA.GOV/ACTION/CRITICAL-HABITAT-COOK-INLET-BELUGA-WHALE

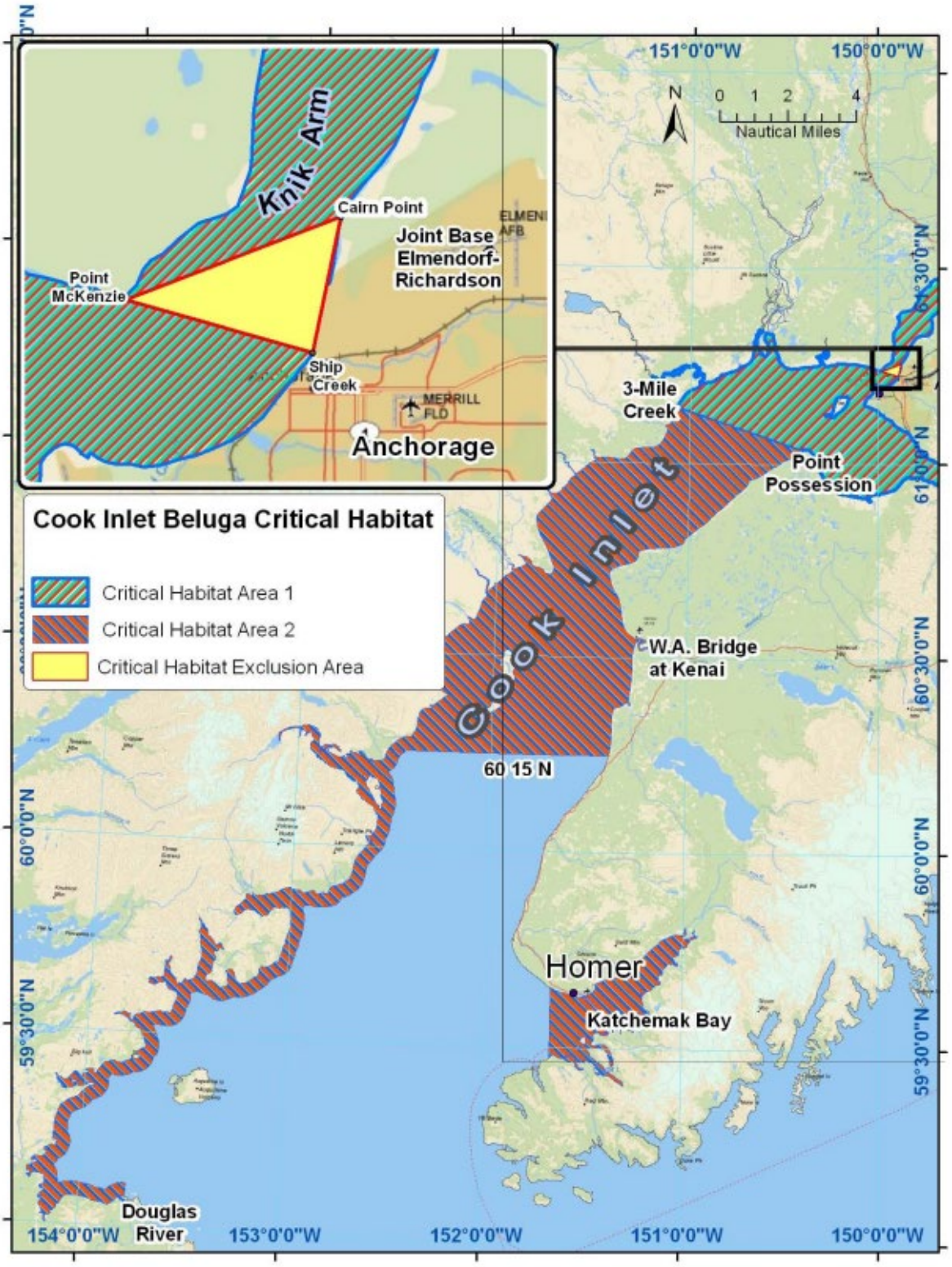

Figure 2. Final critical habitat of Cook Inlet beluga whales (76 FR 20180, April 11, 2011).

3.2.2.1 Marine Mammals

Twelve species of marine mammals may be harassed incidental to conducting the rig towing and impact pile driving activities. Information about these marine mammal species is included in Appendix II.

3.2.2.2 Marine Mammal Acoustics and Hearing

Since the potential effects of sound on marine mammal species present in the action area, involve analysis of the manner in which sound interacts with the physiology of marine mammals and the potential responses of those animals to sound,[14] general information about sound and marine mammal hearing is provided in this section, and potential effects of sound on marine mammal species are provided in Section 4.6.2. An understanding of the frequency ranges marine mammals are able to hear (described in this section) is essential to the consideration of the effects of pile driving on marine mammals specified in Furie's IHA application and explained in the notice of the proposed IHA (89 FR 51102, 14 June 2024) to be issued under the MMPA. The exposure estimates associated with the activities specified in the application and the notice of the proposed IHA were considered in addition to other factors that may affect the impacts of those exposures on marine mammals.

Overview of Sound and Marine Mammal Hearing

Hearing is the most important sensory modality for marine mammals because they rely on sound to obtain detailed information about their surroundings, communicate, navigate, reproduce, socialize, and avoid predators. Therefore, the surrounding soundscape is a key component of marine mammal habitat and can be considered their acoustic habitat (Clark et al. 2009). Underwater sound comes from numerous natural sources (biological and physical processes) and anthropogenic sources. Biological sounds include marine life (marine mammals, fish, snapping shrimp). Physical sounds include wind and wave activity, rain, cracking sea ice, undersea earthquakes, and volcano eruptions. Anthropogenic sound includes shipping and other vessel traffic, military activity, marine construction, oil and gas exploration, and more. Some of these natural and anthropogenic sounds are present more or less everywhere in the ocean all of the time; therefore, background sound in the ocean is commonly referred to as "ambient noise" (Discovery of Sound in the Sea 2019). Ambient sound is defined as a composite of naturally occurring (i.e., non-anthropogenic) sound from many sources both near and far (ANSI, 1995). Background sound is similar, but includes all sounds, including anthropogenic sounds, minus the sound produced by the proposed activities (NMFS, 2012, 2016a).

Sound travels in waves, the basic components of which make up frequency, wavelength, velocity, and amplitude. Frequency is the number of pressure waves that pass by a reference point per unit of time and is measured in Hertz or cycles per second. Wavelength is the distance between two peaks or corresponding points of a sound wave (length of one cycle). Higher frequency sounds have shorter wavelengths than lower frequency sounds, and typically attenuate (decrease) more rapidly, except in certain cases in shallower water. Amplitude is the height of the sound pressure wave or the "loudness" of a sound and is typically described using the relative unit of the decibel. When underwater objects vibrate or activity occurs, sound-pressure waves are created. These waves alternately compress and decompress the water as the sound wave travels. Underwater sound waves radiate in a manner similar to ripples on the surface of a pond and may be directed either in a beam or beams or may radiate in all directions

[14] For example, predicting how many marine mammals could be harassed required potential effects to be evaluated within the context of applicable laws and regulations. Both the MMPA and ESA require that all anticipated responses to sound resulting from the proposed research activities be considered relative to their potential impact on animal growth, survivability, and reproduction. Although a variety of effects may result from an acoustic exposure, not all effects will impact survivability or reproduction (e.g., short-term changes in respiration rate would have no effect on survivability or reproduction).

(omnidirectional sources). The compressions and decompressions associated with sound waves are detected as changes in pressure by aquatic life and human-made sound receptors such as hydrophones.

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

The sound level of a region is defined by the total acoustical energy being generated by known and unknown sources. In general, ambient sound levels (i.e., naturally occurring) tend to increase with increasing wind speed and wave height. Precipitation can be an important component of total sound at frequencies above 500 Hz and possibly down to 100 Hz during quiet times. Marine mammals can contribute significantly to ambient sound levels, as can some fish and snapping shrimp. The frequency band for biological contributions is from approximately 12 Hz to more than 100 kilohertz (kHz). In deep water, low-frequency ambient sound from 1 to 10 Hz comprises mainly turbulent pressure fluctuations from surface waves and the motion of water at the air-water interface. At these frequencies, sound levels depend only slightly on wind speed. Between 20 and 300 Hz, distant ships transiting dominates wind-related sounds. Above 300 Hz, the ambient sound level depends on weather conditions, with wind- and wave-related effects mostly dominating the soundscape. Vessel noise typically dominates the total background sound for frequencies between 20 and 300 Hz. In general, the frequencies of anthropogenic sounds are below 1 kHz and, if higher frequency sound levels are created, they attenuate rapidly.

In Cook Inlet, existing anthropogenic sources include shipping and other vessel traffic (e.g., dredging, commercial and recreational fishing) from multiple port locations, pile driving activities, geophysical surveys for research and other purposes, and commercial and recreational fisheries.

For frequency ranges marine mammals are able to hear, current data indicate that 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 functional hearing groups based on directly measured or estimated hearing ranges on the basis of available behavioral response data, audiograms derived using auditory evoked potential techniques, anatomical modeling, and other data. Subsequently, NMFS described generalized hearing ranges for these marine mammal hearing groups in their revision to the technical guidance for assessing effects of anthropogenic sound published in April 2018 and in July 2020 (NMFS 2018). Generalized hearing ranges were chosen based on the approximately 65-dB threshold from the normalized composite audiograms, with the exception of 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) was retained. Table 6 provides marine mammal hearing groups and their associated hearing ranges. Specific to this action, gray whales, fin whales, minke whales, and humpback whales are considered low-frequency (LF) cetaceans, beluga whales, Pacific white-sided dolphins, and killer whales are considered mid-frequency (MF) cetaceans, harbor porpoises and Dall's porpoises are considered high-frequency (HF) cetaceans, Steller sea lions and California sea lions are otariid pinnipeds, and harbor seals are phocid pinnipeds.

Table 4. Marine Mammal Functional Hearing Groups.

Hearing Group	Generalized Hearing Range[a]
Low-Frequency Cetaceans (Mysticetes – baleen whales)	7 Hz to 35 kHz
Mid-Frequency Cetaceans (Odontocetes – toothed whales)	150 Hz to 160 kHz
High-frequency Cetaceans (Odontocetes)	275 Hz to 160 kHz
Phocid pinnipeds (true seals)	50 Hz to 86 kHz
Otariid pinnipeds (sea lions and fur seals)	60 Hz to 39 kHz

[a] Represents the generalized hearing range for the entire group as a composite (i.e., all species in the group), where individual species hearing ranges are typically not as broad. Generalized hearing range chosen based on an approximately 65-dB threshold from the normalized composite audiogram, with the exception for lower limits for low-frequency cetaceans (Southall et al. 2007) and Phocid pinniped (approximation). Note: Hz = Hertz; kHz = kilohertz.

3.3 Socioeconomic Environment

3.3.1 Subsistence

Subsistence communities identified as project stakeholders near Furie's middle Cook Inlet and Trading Bay activities include the Village of Salamatof and the Native Village of Tyonek. ADF&G Community Subsistence Information System harvest data is not available for Salamatof, so we assume that the subsistence harvest patterns are similar to other communities along the road system on the southern Kenai Peninsula, namely Kenai. Tyonek is the closest community to Furie's tugs towing jack-up rig routes, at 3.5 km from the closest approach. 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).

Currently, whale hunts are not known to occur in Cook Inlet. Furie's tug towing jack-up rig activities may overlap temporally with subsistence hunting areas for other marine mammals such as seals, because they will occur during summer and fall months. However, subsistence harvests typically occur close to shore and are concentrated near communities and mouths of rivers, as opposed to offshore near areas along Furie's tug towing jack-up rig transit routes. The closest community to Furie's planned rig move routes is Tyonek. Salamatof is also in the vicinity of the southernmost platforms and the dock facilities in Nikiski.

Native hunters historically have hunted beluga whales and harbor seals for food. The subsistence harvest of beluga transcends nutritional and economic value of the whale, as the harvest is an integral part of the cultural identity of the region's Alaska Native communities. Inedible parts of the whale provide Native artisans with materials for cultural handicrafts, and the hunting perpetuates Native traditions by transmitting traditional skills and knowledge to younger generations. However, due to dramatic declines in the Cook Inlet beluga whale population, on May 21, 1999, legislation was passed to temporarily prohibit (until October 1, 2000) the taking of Cook Inlet beluga whales under the subsistence harvest exemption in Section 101(b) of the MMPA without a cooperative agreement between NMFS and the

affected Alaska Native Organizations (Public Law No. 106-31, Section 3022, 113 Statute 57, 100). That prohibition was extended indefinitely on 21 December 2000 (Public Law No. 106-553, Section 1(a)(2), 114 Statute 2762). NMFS subsequently entered into six annual co-management agreements (2000 to 2003, 2005 to 2006) with the Cook Inlet Marine Mammal Council, an Alaska Native organization representing beluga whale hunters, which allowed for the annual harvest of one to two Cook Inlet beluga whales. On October 15, 2008, NMFS published a final rule that established long-term harvest limits on Cook Inlet beluga whales that may be taken by Alaska Natives for subsistence purposes (73 FR 60976). That rule prohibited harvest for a 5-year period (e.g., 2008 to 2012, 2013 to 2017) if the average abundance for the Cook Inlet beluga whales from the prior 5 years (e.g., 2003 to 2007) was below 350 whales. No subsistence harvest of beluga whales has occurred in Cook Inlet since 2005 (NMFS 2016), and it is unlikely the hunt will resume within the timeframe of Furie's activity. These figures demonstrate that subsistence harvests of marine mammal species are minimal.

While Steller sea lions are used for subsistence purposes in Alaska, in general, they are not regularly hunted in Cook Inlet, given their uncommon occurrence in the action area. The only marine mammal species with subsistence value in upper Cook Inlet is the harbor seal. Much of the harbor seal harvest occurs incidental to other fishing and hunting activities, and at areas outside of the project area such as the Susitna Delta or the west side of lower Cook Inlet. The Alaska Native subsistence harvest of harbor seals has been estimated by the Alaska Native Harbor Seal Commission (ANHSC) and ADF&G. The minimum, maximum, and average annual harvest for 2004 to 2008, 2011 to 2012, 2014, and 2017 was 177, 288, and 233 harbor seals, respectively (Muto et al. 2022). Killer whales, harbor porpoises, and humpback whales in Cook Inlet are not used for subsistence purposes. Further, subsistence harvests typically occur close to shore and are concentrated near the communities and mouths of rivers rather than offshore near where the specified activity would occur.

Chapter 4 Environmental Consequences

This section evaluates the anticipated environmental impacts resulting from implementation of each of the construction activities presented in Chapter 2. The potential impacts would be applicable to the affected environment described in Chapter 3 Affected Environment, with slight variations due to local Project-level site conditions and resources.

The potential impacts have been described by their characteristics: type (direct, indirect, or cumulative), duration (short- or long-term), geographic extent (localized or beyond the Project site), and significance. Each of these characteristics is described in the following sections (Sections 4.1 through 4.4), and summarized in Table 7. Based on this review, this section describes the degree of effects for the affected resources described in Chapter 3.

4.1 Type of Potential Impacts

The following categories are used to describe the timing and proximity of potential impacts on the action area only. They have no bearing on the significance of the potential impacts, as described below, and are used only to describe or characterize the nature of potential impacts. For the purposes of this analysis the timing and proximity of impacts are defined by type below, per 40 CFR 1508.1(g). [15]

- Direct effects, which are caused by the action and occur at the same time and place.
- Indirect effects, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use; population density or growth rate; and related effects on air and water and other natural systems, including ecosystems.
- Cumulative effects, which are effects on the environment that result from the incremental effects of the action when added to the effects of other past, present, and reasonably foreseeable actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.

4.2 Duration of Potential Impacts

The duration of the potential impact can be defined as either short-term or long-term and indicates the period of time during which the environmental resource would be impacted. Duration takes into account the permanence of an impact or the potential for natural attenuation of an impact. In general, the impacts of construction and other activities undertaken to implement a proposed Project be short-term, and the impacts of the Project results would be long-term. For the purposes of this analysis, the duration of each potential impact is defined as follows:

- Short-Term Impact: A known or potential impact of limited duration, relative to the proposed Project and the environmental resource. For the purposes of this analysis, these impacts may be instantaneous or may last minutes, hours, days, or years.
- Long-Term Impact: A known or potential impact of extended duration, relative to the proposed Project and the environmental resource. For the purposes of this analysis, these improvements or disruptions to a given resource would last longer than 5 years.
- Permanent Impact: A known or potential impact that is likely to remain unchanged indefinitely.

[15] The regulatory definition of effects or impacts also reads, "Effects include ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions which may have both beneficial and detrimental effects, even if on balance the agency believes that the effects will be beneficial." These effects are analyzed and incorporated into this EA's effects analysis but are not distinctly identified as a type category.

4.3 Geographic Extent

Construction activities can cause impacts at a variety of geographic scales. For the purposes of this analysis, impacts are assessed in two ways:

- Localized: Site-specific and generally limited to the immediate surroundings of a Project site.
- Beyond the Project Site: Unconfined or unrestricted to the Project site. These impacts may extend throughout a watershed or beyond.

4.4 Significance of Potential Impacts

The 2022 revised CEQ regulations state that the significance of an action be analyzed by the potentially affected environment and the degree of the effects of the action. Agencies should consider connected actions consistent with § 1501.9(e)(1) (40 CFR 1501.3(b))[16]. NOAA's Interim Guidance on Application of Revised CEQ NEPA Regulations (17 June 2022) requires consideration of these two criteria along with additional factors for determining whether the impacts of a proposed action are significant. To determine the proposed action's significance, NOAA qualitatively assessed the degree to which the alternatives would impact a particular resource. The qualitative assessment is based on a review of the available and relevant reference material, and is based on professional judgment using standards that include consideration of the permanence of an impact or the potential for natural attenuation of an impact; the uniqueness or irreplaceability of the resource; the abundance or scarcity of the resource; the geographic, ecological, or other context of the impact; and the potential that mitigation measures can offset the anticipated impact. For the purposes of this analysis, significance definitions are as follows:

- Negligible: The impacts on individual marine mammals and/or their habitat, if any, would be at the lowest levels of detection and barely measurable, with no perceptible consequences to individuals or the population, or to subsistence users.
- Minor: Impacts on individual marine mammals and/or their habitat are detectable and measurable; however, they are of low intensity, short-term, and localized. Impacts on individuals and/or their habitat do not lead to population-level effects, and would not affect the long-term subsistence use of the species.
- Moderate: Impacts on individual marine mammals and/or their habitat are detectable and measurable; they are of medium intensity, can be short-term or long-term, and can be localized or extensive. Impacts on individuals and/or their habitat could have population-level effects that could impact subsistence uses of the species, but the population can sufficiently recover from the impacts or enough habitat remains functional to maintain the viability of the species both locally and throughout their range.
- Major: Impacts on individual marine mammals and/or their habitat are detectable and measurable; they are of severe intensity, can be long lasting or permanent, and are extensive. Impacts to individuals and/or their habitat would have severe population-level effects and compromise the viability of the species, as well as subsistence uses of the species.

4.5 Effects of Alternative 1 – No Action

Where a choice of "no action" by the agency would result in predictable actions by others, this consequence of the "no action" alternative should be included in the analysis (CEQ, Forty Questions, 3.A). NMFS' view is that it is likely an applicant would choose to undertake its action in compliance with

[16] The CEQ regulations at 1501.3(b)(1) provide, "In considering the potentially affected environment, agencies should consider, as appropriate to the specific action, the affected area (national, regional, or local) and its resources, such as listed species and designated critical habitat under the Endangered Species Act. Significance varies with the setting of the proposed action. For instance, in the case of a site-specific action, significance would usually depend only upon the effects in the local area" and at 1501(b)(2), "In considering the degree of the effects, agencies should consider the following, as appropriate to the specific action: (i) Both short- and long-term effects; (ii) Both beneficial and adverse effects; (iii) Effects on public health and safety, and; (iv) Effects that would violate Federal, State, Tribal, or local law protecting the environment."

the law rather than proceed without an ITA. Under the No Action Alternative, NMFS would not issue the IHA to Furie authorizing take of small numbers of marine mammals. As a result, the exceptions to the prohibition on take of marine mammals per the MMPA would not apply, and Furie would not complete the project as described in the IHA application. Therefore, the marine mammal species and their habitat conditions would remain substantially similar to the condition described in Chapter 3.

4.6 Effects of Alternative 2 – Issuance of the Authorization

The following sections describe the environmental consequences of the Preferred Alternative. For each section, the type of impact is defined; the duration, geographic extent, and significance are identified; and an adverse or beneficial qualifier is applied (Table 7). Potential impacts are often reduced through mitigating measures. CEQ regulations (40 CFR 1508.1(s)) define mitigation as:

- Avoiding the impact altogether by not taking a certain action or parts of an action.
- Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
- Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
- Compensating for the impact by replacing or providing substitute resources or environments.

Mitigating measures for the proposed activities are presented in Sections 2.2.3. However, not all adverse impacts can be mitigated below the levels analyzed in this document. The environmental activities described in Section 2.2 and their associated levels of impacts described in Section 4.6 are the maximum level of adverse impact for projects that will receive NEPA compliance through this analysis. Additional NEPA analysis will be completed if the proposed project has adverse effects that are beyond the scope of those analyzed here, including adverse effects that are significant.

Table 5. Summary of Terms Used to Describe Potential Environmental Impacts.

Type of Impact	Duration of Impact	Geographic Extent	Significance	Qualifier
No Effect	Short-term	Localized	Negligible	Adverse
Direct	Long-term	Beyond Project Site	Minor	Beneficial
Indirect	Permanent		Moderate	
Cumulative			Major	

4.6.1 Impacts on Marine Mammal Habitat

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. 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.

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. The notice of the proposed IHA (89 FR 51102; June 14, 2024) includes a full discussion of potential impacts to marine mammal prey; that discussion is summarized herein.

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. 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.

Further, underwater noise from Furie's activities would be perceptible in designated critical habitat for beluga whales. Section 7 consultation under the ESA requires an analysis of potential impacts on critical habitat; therefore, additional information on potential effects to designated critical habitat for Cook Inlet beluga whales will be included in the BiOp for Furie's project.

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. Due to the relatively small area of the habitat affected and short duration of the Project, impacts on marine mammal habitat are not expected to cause significant or long-term adverse consequences for individual marine mammals or their populations, including Cook Inlet beluga whales. Last, 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.

The final IHA, if issued, would contain the information regarding potential impacts on marine mammal habitat developed through the consultation and authorization processes and summarized in the Final EA.

4.6.2 Impacts on Marine Mammals

In general, NMFS uses several quantitative and qualitative methodologies for assessing impacts to marine mammal stocks and their habitats. NMFS evaluates impact through its negligible impact determinations; small numbers analyses; consideration of the number of takes of marine mammals by Level A and Level B harassment; status of stocks; how animals are using habitat when potentially harassed; geospatial consideration of habitat area where takes could occur; known impacts from the stressor being analyzed,

and, among other things; qualitative reviews of mitigation measures and effectiveness at reducing impacts. NMFS relies on and incorporates information from Furie's application and the notice of the proposed IHAs, when considering potential effects to marine mammals resulting from Furie's activities. Furie's application and the IHAs are available for review on NOAA Fisheries website at *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-oil-andgas#authorizations-in-process*.

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. Sound energy associated with the specified activity is produced by vessel propeller cavitation. Bow thrusters would be occasionally used for a short duration (20 to 30 seconds) to either push or pull a vessel in or away from a dock or platform. Other sound sources include onboard diesel generators and sound from the main engine, but both are subordinate to the thruster and main propeller blade rate harmonics (Gray and Greeley, 1980). The various 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 likelihood 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.

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 below the region of best sensitivity are less hazardous than those near the region of best sensitivity (Finneran and Schlundt 2013). At low frequencies, onset-TTS exposure levels are higher compared to those in the region of best sensitivity (*i.e.,* a low frequency noise would need to be louder to cause TTS onset when TTS exposure level is higher), as shown for harbor porpoises and harbor seals (Kastelein *et al.* 2019a, 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). 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, 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. In fact, during Hilcorp's jack-up rig-based monitoring efforts in 2023, only one Dall's porpoise, two harbor seals, and one harbor porpoise were observed across four different sightings, and observations only lasted 1 to 5 minutes (Horsley and Larson, 2023). 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.

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 would 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 would be intermittent and would occur over a maximum of 2 days per year.

Disruption of feeding behavior has also been reported in marine mammals in response to ship noise. For example, Blair et al. (2016) reported significant effects on humpback whale foraging behavior in Stellwagen Bank in response to ship noise including slower descent rates, and fewer side-rolling events per dive with increasing ship nose. In addition, Wisniewska et al. (2018) reported that tagged harbor porpoises demonstrated fewer prey capture attempts when encountering occasional high-noise levels resulting from vessel noise as well as more vigorous fluking, interrupted foraging, and cessation of echolocation signals observed in response to some high-noise vessel passes. Given, the waters near Furie's activities are not known to be near any important foraging and that the activities would only occur across six days, any impacts to foraging in marine mammals in anticipated to be minimal and are not expected to adversely affect the species or stocks through effects on annual rates of recruitment or survival.

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

In summary, NMFS has determined that these effects on all marine mammals fall within the MMPA definition of Level A and Level B harassment. NMFS expects impacts to represent a short-term, localized, negligible, adverse, direct impact on marine mammals. NMFS also expects these impacts to be minor because measurable changes to the population or impacts to rookeries, mating grounds, and other areas of similar significance are not anticipated. Under the Preferred Alternative, NMFS would authorize incidental take, by Level B harassment of 12 species of marine mammals, and for harbor seals, Level A harassment, based on the activity. NMFS does not expect any long-term or substantial adverse effects on marine mammals, their habitats, or their role in the environment. Furie would implement a number of monitoring and mitigation measures for marine mammals. In consideration of the potential effects of the action, NMFS determined that the mitigation and monitoring measures described in Section 2.3.1 of this EA would be appropriate for the preferred alternative to meet the Purpose and Need.

4.6.2.1 Applicable Noise Criteria and Take Estimates

Noise Criteria and Source Sound Levels
Furie relied on the NMFS Technical Guidance for assessing auditory impacts and relied on NMFS interim criteria to assess Level B harassment levels when preparing their application. A summary of PTS onset acoustic thresholds for assessing Level A harassment, and acoustic criteria for assessing Level B harassment, from exposure to noise from impulsive and non-impulsive underwater sound sources is provided in Table 8.

Table 6. Summary of PTS Onset Acoustic Thresholds for Assessing Level A Harassment, and Acoustic Criteria for Assessing Level B Harassment, of Marine Mammals from Exposure to Noise from Impulsive (Pulsed) and Non-impulsive (Continuous) Underwater Sound Sources.

Species Group	PTS Onset Acoustic Thresholds (Received Level)			
	Hearing Group	Impulsive (Pulsed or Intermittent)		Non-impulsive (Continuous)
Level A Harassment				
Cetaceans	LF	$L_{pk,flat}$	219 dB	$L_{E, LF, 24h}$: 199 dB
		$L_{E, LF, 24h}$	183 dB	
	MF	$L_{pk,flat}$	230 dB	$L_{E, MF, 24h}$: 198 dB
		$L_{E, MF, 24h}$	185 dB	
	HF	$L_{pk,flat}$	202 dB	$L_{E, HF, 24h}$: 173 dB
		$L_{E, HF, 24h}$	155 dB	
Pinnipeds	PW pinnipeds	$L_{pk,flat}$	218 dB	$L_{E, PW, 24h}$: 201 dB
		$L_{E, PW, 24h}$	185 dB	
	OW pinnipeds	$L_{pk,flat}$	232 dB	$L_{E, OW, 24h}$: 219 dB
		$L_{E, OW, 24h}$	203 dB	
Level B Harassment				
Cetaceans	LF	160 dB RMS		120 dB RMS or background level
	MF			
	HF			
Pinnipeds	PW pinnipeds			
	OW pinnipeds			

Source: NMFS 2018a, 2020d
Note: HF = high-frequency; PTS = permanent threshold shift; $L_{pk,flat}$ = peak sound pressure level (unweighted); $L_{E,24h}$ = sound exposure level, cumulative 24 hours; LF = low-frequency; MF = mid-frequency; OW = otariid in water; PW = phocid in water; RMS = root mean square

The sound field in the project area is the existing background noise plus additional noise resulting 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 tugs towing, holding, and positioning a jack-up rig). Calculation of the area ensonified by the proposed action is dependent on the background sound levels at the project site, the source levels of the proposed activities, and the estimated transmission loss coefficients for the proposed activities at the site. These factors are addressed below.

Sound Source Levels of Proposed Activities

The project includes impact installation of up to two 20-inch conductor pipe piles in each year. The monopod leg of the JRP would encase the well slot, which would 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 9 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 7. 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 would 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 10.

Table 8. 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 10 m	193 dB at 10 m

Several factors would 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 would be variable and influenced by the prevailing wind direction and velocity, the current velocity, and the tidal stage. To the extent feasible, transport would be timed with the tide to minimize towing duration and power output.

Underwater Sound Propagation Modeling

Transmission Loss (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 11.

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 12.

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 13, 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 13).

Table 9. User Spreadsheet Inputs (Source Levels Provided in Table 10).

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 10. 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.

	Level A Harassment Isopleth (m)				
Scenario	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 11. 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 2022 (Rugh et al. 2005; Shelden et al. 2013, 2015, 2017, 2019, 2022; Goetz, 2023). While the surveys are concentrated for a few days in summer annually, which may skew densities for seasonally present species, they represent the best available long-term dataset of marine mammal sightings available in Cook Inlet. (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 were so infrequently sighted. Average densities across survey years are presented in Table 14.

Table 12. Average Densities of Marine Mammal Species in Cook Inlet.

Species	Density (individuals/km^2)
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 14 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).

Estimated Take of Marine Mammals

Potential estimates of take, pursuant to the analysis required under the MMPA, were derived based on the data available and the expected frequency of observing the species during Furie's Project. To estimate take, numbers of marine mammals are rounded up to the nearest integer, because a fraction of a marine mammal cannot be exposed to noise or taken. Calculations used to estimate exposure from pile installation for all marine mammals are described below. NMFS notes that the estimated take does not necessarily equate to individual animals (i.e., the same harbor seal may be exposed on different days).

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 km^2; inclusive of the full potential tug path of 35 km) by the species density (Table 14). To estimate take for positioning the rig, Furie multiplied the maximum area of the Level B harassment zone (63.1 km^2, four tugs) by the species density (Table 14), 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 km^2) by the species density (Table 14) 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 15.

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.

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 15).

Table 13. Estimated Take by Level B Harassment, by Species, Activity, and in Total, for Each IHA (Year 1 and Year 2).

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]		
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	
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 x density x 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) x species density (Table 14), x number of potential positioning attempts (2).
[4] Level B harassment zone (7.89 km^2) x species density (Table 14) x estimated number of days that conductor pile installation would occur (4).

Humpback Whales
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.

Minke Whales
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.

Gray 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.

Fin Whales
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
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 whales.

Beluga Whales
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
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.

Harbor Porpoises
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 would 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.

Pacific White Sided Dolphins
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.

Harbor Seals
Harbor seals are often solitary in water but can haul out in groups of a few to thousands (Alaska Department of Fish and Game (ADF&G), 2022). Given their presence in the study region, NMFS

proposes to authorize 176 takes by Level B harassment for harbor seals, which is commensurate with the calculated exposure estimate based on harbor seal densities and Furie's estimated durations for tugs under load with a jack-up rig (Table 15). NMFS proposes to authorize three takes by Level A harassment of harbor seal, conservatively rounded up from 2.7 Level A harassment takes calculated.

Steller Sea Lions

Steller sea lions tend to forage individually or in small groups (Fiscus and Baines, 1966) but have been documented feeding in larger groups when schooling fish were present (Gende et al. 2001). Steller sea lions have been observed during marine mammal surveys conducted in Cook Inlet. In 2012, during Apache's 3D Seismic survey, three sightings of approximately four individuals in upper Cook Inlet were reported (Lomac-MacNair et al. 2013). Marine mammal observers associated with Buccaneer's drilling project off Cape Starichkof observed seven Steller sea lions during the summer of 2013 (Owl Ridge, 2014). During SAExploration's 3D Seismic Program in 2015, four Steller sea lions were observed in Cook Inlet. One sighting occurred between the West and East Forelands, one occurred near Nikiski, and one occurred northeast of the North Foreland in the center of Cook Inlet (Kendall and Cornick, 2015). During NMFS Cook Inlet beluga whale aerial surveys from 2000 to 2016, 39 sightings of 769 estimated individual Steller sea lions in lower Cook Inlet were reported (Shelden et al. 2017). During a waterfowl survey in upper Cook Inlet, an observer documented an estimated 25 Steller sea lions hauled-out at low tide in the Lewis River on the west side of Cook Inlet (K. Lindberg, pers. comm., August 15, 2022). Hilcorp reported one sighting of two Steller sea lions while conducting pipeline work in upper Cook Inlet (Sitkiewicz et al. 2018). Commensurate with exposure estimates shown in Table 15, NMFS is proposing to authorize six takes by Level B harassment for Steller sea lions.

California Sea Lions

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.

4.6.2.2 Vessel Strike Impacts to Marine Mammals

The potential for striking marine mammals with vessels during the proposed activities is low. Studies of whale strikes have established that vessel speed is correlated with risk of striking a whale and with the resulting level of injury (Laist et al. 2001; Vanderlaan and Taggart 2007; Neilson et al. 2012). In Alaska, an analysis of the characteristics of whale strike incidents found that 44 percent of the vessels were traveling at speeds of 12 knots or greater, and 14 percent were traveling at speeds less than 12 knots prior to collision (for 17 percent, the vessel's activities prior to the collision were unknown; Neilson et al. 2012). In addition to vessel speed, factors that increase a vessel's risk of striking a whale include drifting with the engine off, sailing with the motor off, and following or watching whales (Neilson et al. 2012). The influence of vessel speed in contributing to either a lethal or a non-lethal injury was examined for records of ship strikes worldwide (Laist et al. 2001; Vanderlaan and Taggart 2007). Among collisions between motorized vessels and whales that caused lethal or severe injuries, 89 percent involved vessels moving at 14 knots or faster, and 11 percent involved vessels moving at 10 to 14 knots; no lethal or severe injuries were documented at speeds below 10 knots (Laist et al. 2001). Tugs, regardless of whether they are under-load, do not generally approach vessel speeds that have been reported to result in vessel strikes. Analysis of the influence of vessel type on whale strikes has not documented any instances of a tug striking a free-swimming whale in the wild (see Laist et al. 2001; Neilson et al. 2012).

Project-related vessels would not be engaging in activities that heighten the risk of striking whales (e.g., drifting with the engine off, sailing with the motor off, and following or watching whales). Project-related vessels would move at slow speeds (i.e., approximately 4 knots) 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. Tugs and other Project-related vessels would therefore be at low risk of striking a whale or other marine mammal, and the potential for this adverse impact is discountable.

4.7 Impacts on Subsistence

Under Alternative 2 (the Preferred Alternative), Furie's tugging activities in Cook Inlet are not expected to affect subsistence uses of wildlife and marine mammals in the area because subsistence use is limited to a small number of marine mammals. The background and additional information about subsistence users within or near Cook Inlet is summarized below.

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 Year 1 and Year 2, 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.

NMFS does not anticipate that the authorized taking of affected species or stocks would reduce the availability of the species to a level insufficient for a harvest to meet subsistence needs by (1) causing the marine mammals to abandon or avoid hunting areas, (2) directly displacing subsistence users, or (3) placing physical barriers between marine mammals and subsistence hunters that cannot be sufficiently mitigated by other measures to increase the availability of marine mammals to allow subsistence needs to be met. Therefore, direct or indirect, short or long-term, adverse impacts on subsistence beyond the Project site are not expected.

4.8 Cumulative Effects

In reviewing the information provided in Furie's IHA application about the action area, NMFS determined that activities with the potential to permanently remove a resource would be expected to have additive or synergistic impacts if they affect the same population, even if the effects were separated geographically or temporally. Therefore, this cumulative effects analysis considers these potential

impacts; however, it focuses on activities that may temporally or geographically overlap with Furie's activities such that the effects of harassment warrant consideration for potential cumulative impacts to the following potentially affected marine mammal species: humpback whale, minke whale, gray whale, fin whale, killer whale, beluga whale, Dall's porpoise, harbor porpoise, Pacific white-sided dolphin, Steller sea lion, harbor seal, and California sea lion.

Incidental take of 12 species of marine mammals is the primary environmental effect associated with the consideration of whether to issue the IHA to Furie. Individuals found in the action area may be adversely affected by activities anywhere within their habitat range, as a number of natural and human activities occur in Cook Inlet. These generally include subsistence hunting; pollution; fisheries interaction; vessel traffic; coastal zone development; oil and gas development; mining; marine mammal research; and climate change.

The following sections briefly summarize the natural and human-related activities affecting the marine mammal species in the action area.

4.8.1 Subsistence Hunting

The practice of hunting marine mammals for food, clothing, shelter, heating, and other uses is an integral part of the cultural identity of Alaska Native peoples and communities. In Cook Inlet, Alaska Natives historically hunted beluga whales and continue to hunt harbor seals. However, NMFS determined that subsistence harvest activities by Alaska Natives would not contribute to significant cumulative impacts when considered with other past, current, or reasonably foreseeable future actions. As explained in Section 3.3.1, not all of the potentially affected marine mammal species in Cook Inlet are used for subsistence purposes and, of these, the only marine mammal species currently with subsistence value in Cook Inlet is the harbor seal. Alaska Natives have not hunted Cook Inlet beluga whales since 2005, and issuance of IHAs would not adversely affect annual rates of recruitment or survival of the Cook Inlet beluga whale stock (i.e., the Proposed Action would not contribute to the population decline). Furthermore, based on harvest limitations established for harbor seals, known annual harvest rates (as monitored by ANHSC and ADF&G), combined with the fact that no subsistence takes of harbor seals are known to occur in the vicinity of the Furie's activities in the middle of the Inlet, NMFS has reasonably concluded that take associated with subsistence harvest would have no significant cumulative impacts on the harbor seal population.

4.8.2 Pollution

The amount of pollutants that enter Cook Inlet is likely to increase as populations in urban areas continue to grow. Sources of pollutants in urban areas include runoff from streets and discharge from wastewater treatment facilities. Gas, oil, and coastal zone development projects (see Sections 4.8.5 and 4.8.6) also contribute to pollutants that enter Cook Inlet through discharge. These sources of pollutants are expected to continue in Cook Inlet; therefore, it would be anticipated that pollutants could increase in the area. However, the U.S. Environmental Protection Agency and the Alaska Department of Environmental Conservation will continue to regulate the amount of pollutants that enter Cook Inlet from point and nonpoint sources through Alaska Pollutant Discharge Elimination System permits. As a result, permit holders will be required to renew their permits, verify that they meet permit standards, and upgrade facilities if necessary. Additionally, the extreme tides and strong currents in Cook Inlet may contribute to a reduction in the amount of pollutants found there.

Potential sources of pollution which could affect marine mammals in Cook Inlet include: offshore oil and gas development; municipal waste and bilge discharge; marine oil spills; runoff from roads, airport, military sites, mines, construction sites, and farms; terrestrial and marine spills of contaminants other than oil; resuspension of contaminants through dredging; ship ballast discharge; watercraft exhaust and effluent; coal transportation and burning; auto exhaust; antifouling paint; and trash. Possible contaminants marine mammals in Cook Inlet could be exposed to include: persistent organic pollutants; aromatic

hydrocarbons; chlorinated hydrocarbons; heavy metals; endocrine disruptors; pharmaceuticals; antibiotics; sanitizers; disinfectants; detergents; insecticides; fungicides; and de-icers. While NMFS has some data about levels of traditionally studied contaminants in Cook Inlet belugas (e.g., Dichlorodiphenyltrichloroethane [DDT], polychlorinated biphenyls [PCBs], polycyclic aromatic hydrocarbons [PAHs], etc.), very little is known about other emerging pollutants of concern and their effects on marine mammals. The emerging pollutants of concern include endocrine disruptors (substances that interfere with the functions of hormones), pharmaceuticals, personal care products (chemicals such as soaps, fragrances, insect repellants, etc.), prions (infectious proteins that cause neurodegenerative disease), and other bacterial and viral agents that are found in wastewater and biosolids.

Exposure to contaminants found in pollution may be the result of marine mammals' direct contact with contaminants found in the water; inhalation of contaminants in the air; or ingestion of contaminants found in prey, mud, or silt. There is little information on the potentially deleterious effects of contaminants on marine mammals; but it is likely that chronic exposure to contaminants may compromise an individual whale's health, with the potential for population-level impacts. A recent study of Cook Inlet beluga whales, the species most at risk in the action area, suggests a potential link between gastrointestinal cancer in belugas to environmental PAH contamination (Poirier et al, 2019). There is also evidence of female marine mammals passing contaminant loads to offspring (Peterson et al, 2018; Andvik et al, 2021) as well as a relationship between contaminant exposure and congenital abnormalities (Burek-Huntington et al. 2022). However, the effects of repeated transfer of contaminant loads to offspring repeatedly across generations is unclear, and additional research on the causes of congenital abnormalities in Cook Inlet beluga whales (including effects of contaminant exposure, genetic diversity, and nutrition) is needed. Of note, while the Recovery Plan for the Cook Inlet Beluga Whale identifies pollution as a threat, it notes that available information indicates that the magnitude of the pollution threat to Cook Inlet beluga whales appears low, though not all pollutants to which Cook Inlet beluga whales are exposed have been studied in that environment.

4.8.3 Fisheries Interaction

Fishing is a major industry in Alaska. Cook Inlet supports several commercial fisheries (e.g, chum, sockeye, coho, Chinnok, and pink salmon) and recreational fisheries (e.g., Chinook and coho salmon, Pacific cod, and halibut). The average annual commercial harvest of salmon in upper Cook Inlet from 1966-2016 was 3.5 million (Shields and Dupuis 2017). The most recent 10-year average annual commercial salmon fishery harvest is 2.5 million fish, and the 2022 harvest of 1.4 million was 44 percent less than the 10-year average. The 2022 upper Cook Inlet commercial harvest compared to the recent 10-year average was down 34% for chum, 43% for sockeye, 44% for coho, 58% for Chinook, and 72% for pink salmon. At this point, it is hard to know if these results are a short-term reflection of natural variation or are an indicator of a more systematic shift and downward trend. Salmon are the primary prey item for Cook Inlet beluga whales and these numbers may be a cause for concern; at best, they indicate there are fewer salmon available for commercial fisheries, recreational, personal and subsistence use, and beluga whales. In 2024, NMFS issued a final rule to implement amendment 16 to the Fishery Management Plan for the Salmon Fisheries in the EEZ off Alaska, which establish Federal fishery management for all salmon fishing that occurs in the Cook Inlet Exclusive Economic Zone, which includes commercial drift gillnet and recreational salmon fishery sectors (89 FR 34718, 30 April 2024).

The 2024 List of Fisheries identifies Cook Inlet beluga whales, humpback whales, Dall's porpoise, harbor porpoise, harbor seal, and Steller sea lion as species likely to interact with salmon fisheries (89 FR 12257; 16 February 2024). Potential impacts from commercial fishing on marine mammals include ship strikes, harassment, gear entanglement, reduction of prey, and displacement from important habitat. For example, the Kenai River is a heavily-fished river in Alaska; belugas no longer use waters near the river during salmon fishing season, despite the fact that it has the largest salmon run in Cook Inlet and was heavily used beluga foraging habitat in the past (Ovitz 2019).

Large whale entanglements in salmon drift gillnet gear appear to be rare in Cook Inlet, they do occur. Manly (2006) reported that a minke whale was observed entangled in the Upper Cook Inlet drift gillnet fishery in 2000. In July 2021, a gray whale became entangled in salmon drift gillnet gear in Cook Inlet. Humpback whales are known to become entangled in gillnet fisheries in Alaska, but the majority of gillnet entanglements occur outside the action area in Southeast Alaska, which is a major summer feeding area for humpbacks (Muto et al. 2020). Documented fin whale entanglements in any Alaska commercial fisheries are extremely uncommon.

Steller sea lion entanglements are rare in any Alaska commercial fishery, with the exception of the salmon troll fishery where they target the bait. There have been no serious injuries or mortalities of Steller sea lions in the salmon drift gillnet fishery in Cook Inlet observed by the Alaska Marine Mammal Observer Program (AMMOP) or reported through the Marine Mammal Authorization Program (MMAP) self-reports, suggesting that either this is a very rare occurrence, or that occurrences are not self-reported. Additionally, Cook Inlet is not an important foraging area for Steller sea lions and they are not usually present in the action area in large numbers.

Between 2005 and 2017, McGuire et al. (2020) documented 14 instances of scars on Cook Inlet belugas, based on stranding and dual-side photo identification, that could be from entanglement. Of these, 11 observations were possible entanglement scars that may have involved monofilament line, netting, or rope/line, and three were confirmed scars from a net injury, a heavy braided line, and a gillnet. However, AMMOP did not observe any serious injuries or mortalities of Cook Inlet beluga whales in salmon drift gillnet gear and none have been reported through the MMAP. It is uncertain where or in which fisheries these entanglements may have occurred.

There is limited overlap between Cook Inlet belugas and the area where fishing occurs during the fishing season. Any overlap that may occur between the fishery and Cook Inlet belugas would be at the end of the fishing season from mid-August to mid-September when belugas start to return to the mouth of the Kenai River. Drift gillnet fishery interactions with Cook Inlet beluga whales during this period of potential overlap are unlikely for several reasons. First, 98 percent of the harvest is usually complete by mid-August and only an estimated 10 vessels remain fishing during the late season. Second, at all times during the season, drift gillnet vessels are restricted from fishing within 1.5 miles (2.4 km) of the mouths of the Kenai and Kasilof rivers, where belugas have been spotted in early September (AKBMP, 2021). Finally, after August 15, the drift gillnet fleet is restricted to the extreme west side of Cook Inlet where belugas have not been documented in late summer. The potential increase in drift gillnet gear in state waters as a result of this action is therefore unlikely to increase the risk of entanglement of Cook Inlet DPS beluga whales.

As long as fish stocks are sustainable, subsistence, personal use, recreational, and commercial fishing would continue in Cook Inlet. As a result, continued prey competition, risk of ship strikes, potential harassment, potential for entanglement in fishing gear, and potential displacement from important foraging habitat would occur for beluga whales and other marine mammals. An important remaining unknown is the extent to which Cook Inlet marine mammal prey is made less available due to commercial, subsistence, personal use, and sport fishing either by direct removal of the prey or by human-caused habitat avoidance. NMFS assumes that ADFG will continue to manage fish stocks and monitor and regulate fishing in Cook Inlet to maintain sustainable stocks.

4.8.4 Vessel Traffic

Cook Inlet is a regional hub of marine transportation throughout the year, and is used by various classes of vessels, including containerships, bulk cargo freighters, tankers, commercial and sport-fishing vessels, and recreational vessels. Vessel traffic in Cook Inlet transits through the Ports of Kodiak, Homer, and Anchorage. Off-shore vessels, tug vessels, and tour boats represent 86% of the total operating days for vessels in Cook Inlet (BOEM 2016). Vessel traffic density is concentrated along the eastern margin of the

Inlet between the southern end of the Kenai Peninsula north to Anchorage. Eighty percent of large ship operations were made by only 15 vessels that regularly called at Homer, Nikiski, or Anchorage (Eley, 2012). Vessel traffic was very consistent throughout the year along the Forelands. Kachemak Bay had the highest level of traffic activity in Cook Inlet with most large ships entering the mouth of the bay to pick up a marine pilot or await USCG inspection. The bay was also a frequent and preferred port of refuge for ships and tugs while waiting out bad weather (Eley 2012). The Drift River Terminal was decommissioned, which eliminated a substantial source of tanker traffic in Cook Inlet.

Major contributors to vessel traffic throughout Cook Inlet include port facilities, oil and gas development, and commercial and recreational fishing. The POA is a major Alaskan port located adjacent to Anchorage in upper Cook Inlet.It handles half of all Alaska inbound fuel and freight (shipped via marine, road, and air), half of which is delivered to final destinations statewide, outside the Municipality of Anchorage. It serves approximately 90 percent of Alaska's population (POA 2019a), providing access to fuel and non-fuel cargo items such as food, consumer goods, building materials, cars, cement, and other goods critical for Alaskans' everyday requirements. Seventy five percent of all non-petroleum marine cargo shipped into Alaska (not including Southeast Alaska, which is served from barges directly from Puget Sound) moves through the POA (POA 2019a). Major vessels calling to the POA include cargo ships, barges, tankers, dredgers, military ships, and tugboats (POA 2009). According to data from 1998 to 2011, an average of approximately 450 vessels call to the POA annually (POA 2014). The POA is outside the area in which Furie is planning to conduct tugging activities; however, the POA yields a high volume of vessel traffic, some of which may pass through or near where Furie's tugging activity would take place. In addition, the POA is currently under construction to modernize its facilities (see Section 4.8.5.2); however, these facility updates are not expected to increase vessel traffic. An increase in vessel traffic could occur, however, from continuing city and state development and growth.

Port MacKenzie is located in upper Cook Inlet and contributes to vessel traffic, some of which may pass through the area that Furie's tug towing activity would take place. It receives approximately two large ships (a landing craft and/or a barge) annually, which is substantially fewer than the POA. The Port MacKenzie Rail Extension Project, when completed, will connect Port MacKenzie to the Alaska Railroad Corporation's existing mainline between Wasilla and Willow, and will provide freight service between Port MacKenzie and Interior Alaska. Currently, no funding is allocated for completion of the rail extension, and no work has been conducted since 2015. Additionally, Port MacKenzie has long-term plans to expand their deep-draft dock; however, no funding is currently allocated for design or construction. If it is expanded, the number of ships calling at Port MacKenzie is anticipated to increase. Increased vessel traffic could result in increased in-water noise and potential ship strikes to marine mammals.

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

The project would increase small vessel and helicopter presence and operation in the project area; however, the increased number of trips is only expected to represent a negligible increase in a developed area near an active shipping lane.

Effects of vessel traffic on marine mammals in the area is largely unknown. Vessel traffic, especially large vessels, are channeled through dedicated shipping lanes so as to limit the footprint of the large vessel traffic, leaving large portions of the Inlet free of large vessels and available for marine mammal use. However, commercial ships are a prominent source of anthropogenic noise across Cook Inlet both in percent of overall anthropogenic noise time and mean duration of events, and sounds produced by commercial shipping are sometimes at levels loud enough to potentially mask beluga hearing and interfere with their communication (Castellote et al., 2018). For example, persistent shipping noise has

been recorded at Trading Bay, despite being away from the main shipping channel to and from Anchorage.

Small vessel use (e.g. personal watercraft) is much more difficult to characterize. Increased vessel traffic may contribute to increased pollution, increase in ambient noise, as well as increased risk of vessel strike. Increased pollution and increased ambient noise level may have long term sub-lethal effects such as increased contaminant load or masking of communication between marine mammals (Duarte et al, 2021). Vessel strike has the potential to result in serious injury or mortality to marine mammals but rarely occurs and when it does occur is usually injurious to a singular marine mammal, limiting the potential of a population-level effect due to rare instances of vessel strike.

Marine mammals may also avoid areas with increased vessel noise (e.g., Malme et al. 1984, Palka and Hammond 2001). Beluga whales in the St. Lawrence Estuary in Canada have been reported to increase levels of avoidance with increased boat presence by way of increased dive durations and swim speeds, decreased surfacing intervals, and by bunching together into groups (Blane and Jaakson, 1994). Avoidance, however, is anticipated to be short-term, with animals returning to the area once the noise has ceased (e.g., Bowles et al., 1994; Goold, 1996; Stone et al., 2000; Morton and Symonds, 2002; Gailey et al., 2007). Given Furie's tugging activities would only occur on 4 days per year (and construction on 2 days per year), any additional impacts to marine mammals resulting from increased vessel presence related to Furie's activities are expected to be minor and are not expected to adversely affect the species or stocks through effects on annual rates of recruitment or survival.

4.8.5 Coastal Zone Development

Coastal zone development in Cook Inlet may result in the loss of habitat, increased vessel traffic, increased pollutants, and increased noise associated with project construction and operation. Potential projects within Cook Inlet area include mining projects, renewable energy projects (Fire Island Wind Project Phase 2 and tidal energy development), and coastal construction (e.g., port expansions and maintenance, roadway construction. Figure 3 shows a representation of the types of projects occurring in Cook Inlet, which remains relevant today.

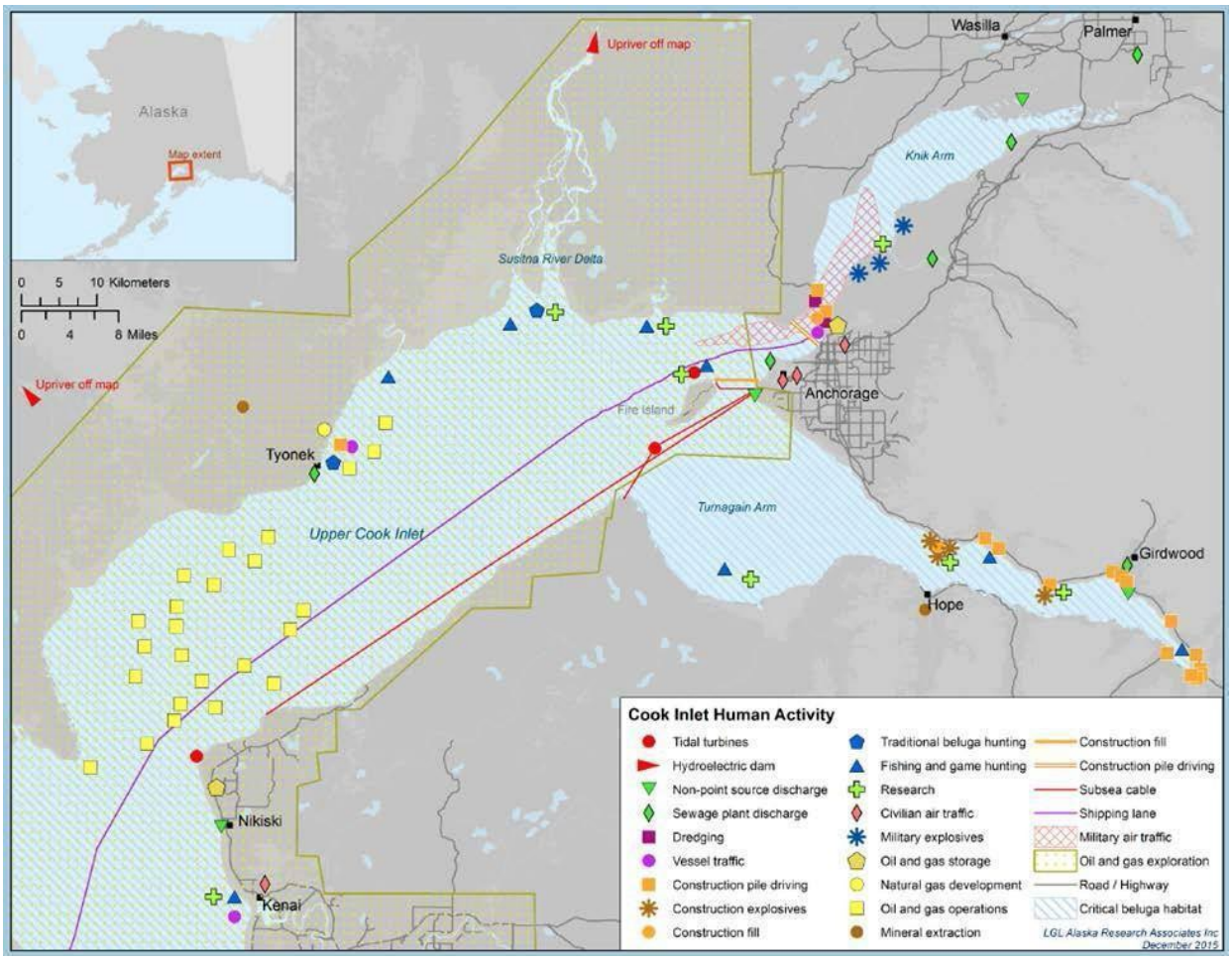

Figure 3. Example Development Activities in Cook Inlet.

Source: LGL unpublished data 2015

Anthropogenic activities related to coastal development may detrimentally affect Cook Inlet beluga critical habitat through loss or degradation of habitat and alterations in the availability of prey in critical habitat areas. Anthropogenic activities in the vicinity of Cook Inlet beluga critical habitat broadly include dredging; oil or gas activities; hard rock quarrying; laying of electrical, communication, or fluid lines; construction of docks, bridges, breakwaters or other structures; and other activities. These activities may cause avoidance or destruction of an area used by prey as a result of anthropogenic disturbance. Permanent structures, such as docks, platforms, or bridges, can alter the habitat by altering local tidal flow. However, because anthropogenic structures may repel some species, but attract others, the net effect on prey species remains unknown.

Cities, villages, ports, airports, wastewater treatment plants, refineries, highways, and railroads are situated adjacent to areas designated as Cook Inlet beluga whale critical habitat. This development has resulted in the alteration of near shore beluga habitat and changes in habitat quality due to vessel traffic, noise, and pollution (NMFS 2008a; NMFS 2016).

4.8.5.1 Road Construction

The Alaska Department of Transportation and Public Facilities (DOT&PF) Seward Highway Milepost 75 to 90 (along Turnagain Arm) Project included geophysical and geotechnical (G&G) testing, onshore blasting, pile removal and installation at stream crossings, and fill placed into Turnagain Arm to facilitate roadway straightening. The project also included resurfacing 15 mi of roadway, straightening curves, installing new passing lanes and parking areas, and replacing eight existing bridges. Replacement of these bridges included vibratory and impact pile installation and removal of both 24- and 48-inch steel pipe piles. In-water work on this project was avoided from 15 May to 15 June to avoid harassment of Cook Inlet beluga whales during the eulachon run, and work that was conducted in-water below mean high water required marine mammal monitoring by PSOs. This project reached substantial completion in October 2023.

DOT&PF's Seward Highway Milepost 98.5 to 118 (Bird Flats to Rabbit Creek) Project proposes safety and capacity improvements to the alignment and road cross section. The upgrades would likely require widening the highway corridor either into the mountainside or toward the marine waters and may include relocating railroad track sections. Activities may include G&G testing, onshore blasting, pile installation and removal at stream crossings for new bridges, and fill placed into Turnagain Arm. The project is still in the early planning phases and no construction schedule is available.[17]

4.8.5.2 Port of Alaska (POA)

The POA is Alaska's largest seaport and provides 90 percent of the consumer goods for about 85 percent of all of Alaska. It currently includes three cargo terminals, two petroleum terminals, one dry barge berth, two railway spurs, a small craft floating dock, and 220 acres of land facility. It is located in the Municipality of Anchorage, and approximately 450 ships call at the POA each year.

Operations began at the POA in 1961 with a single berth. Since then, the POA has expanded to a terminal with five berths that moves more than 4 million tons of material across its docks each year (McDowell 2020). The POA is undertaking expansion and improvement activities to modernize the port's infrastructure as part of the Port of Alaska Modernization Program (PAMP). The PAMP, which includes multiple construction projects (Figure 4) to enable continued port operations, update facilities for operational efficiency, accommodate modern shipping operations, and improve seismic resiliency.[18] . In 2019, the POA completed construction of the South Backlands Stabilization Project, and construction of the Petroleum and Cement Terminal and South Floating Dock was completed in 2022. The next phase of the PAMP includes construction and demolition associated with the North Extension Stabilization (NES) project and replacement of General Cargo Terminal 1 and Terminal 2. Other phases of the PAMP include replacing petroleum oil lubricants (POL) terminal 2 (POL 2), NES Step 2, and demolition of Terminal 3. Future phases of the PAMP will depend upon funding that is not yet secured. The PAMP website describes the funding requests to the State of Alaska and alternative sources of funding such as taxes or cargo tariffs. Additional information is provided below. Other than Hilcorp, the POA is the only other entity that has an active ITA from NMFS for Cook Inlet beluga whales.

[17] HTTPS://SAFERSEWARDHIGHWAY.COM/

[18] HTTPS://MODERNIZATION.PORTOFALASKA.COM/

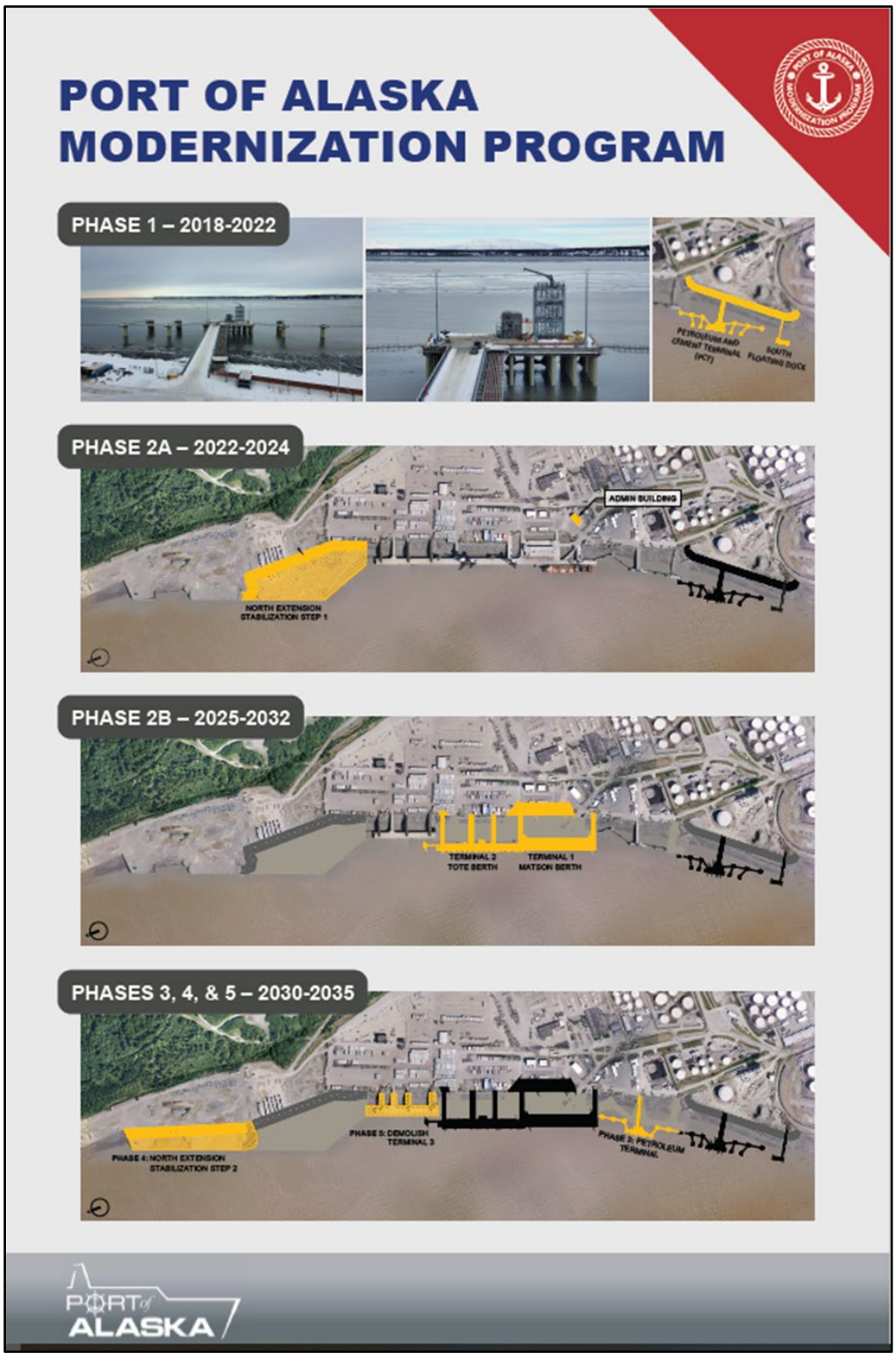

Figure 4. Phases 1 through 5 of the Port of Alaska Modernization Program.

The POA is currently working on the NES1 Project as well as design and permitting for replacement of Terminals 1 and 2 as part of Phase 2 of the PAMP, the Cargo Terminals Replacement Project (CTR Project). The NES project, which began ground improvement work in 2023 and in-water work in 2024, will remove the North Extension, failed sheet pile structure and reconfigure and realign the shoreline within the North Extension, a failed sheet pile structure located north of the existing general cargo docks, and will convert approximately 13 acres of developed land back to intertidal and subtidal habitat within Knik Arm. Terminals 1 and 2 are the existing container and general cargo terminals and are the only deep-water marine cargo terminals in Anchorage. The POA cargo services supply goods for 87 percent of Alaska's population. Replacement of Terminals 1 and 2 is currently estimated to begin in 2025. The likely effects of the NES1 project are limited to Level A harassment (slight permanent threshold shift) and Level B harassment consisting of, at worst, temporary modification in the behavior of individual marine mammals. Specific to Cook Inlet beluga whales, effects are anticipated to be limited to Level B harassment consisting of temporary modifications in behavior such as increased swim speeds, tighter group formations, and cessation of vocalizations, but not through the loss of foraging capabilities or abandonment of habitat.

The CTR Project includes demolition of the two existing marine terminals and construction of two new marine terminals, 140 ft farther seaward than the existing terminals. Each terminal would include a pile-supported platform, pile-supported access trestles, a mooring system, and a fender system. Terminal 1 would support a lift-on/lift-off ship-to-shore rail mounted gantry crane system for the transfer of cargo. Terminal 2 would support a roll-on/roll-off and lift-on/lift-off cargo transfer system. Terminal 2 would also include a single mooring dolphin. Excavation and placement of fill and armor rock would take place adjacent to Terminals 1 and 2 to protect the shoreline. The project would involve impact and vibratory pile driving. The likely effects of the CTR project are consistent with the likely effects described above of the CTR project.

Other future phases of the PAMP include replacing POL Terminal 2 as Part of Phase 3, and further stabilization of NES2 and demolition of Terminal 3 as part of Phases 4 and 5. It should be noted that the NES1 and NES2 Projects will remove existing filled areas and convert them to open marine waters, resulting in beneficial impacts on the marine environment. The construction schedules for Phases 3 through 5 are currently uncertain.

The U.S. Army Corps of Engineers (USACE) has been conducting maintenance dredging annually at the POA since 1965 and continues to do so throughout each year. The POA is dredged to the depth of minus 35 ft MLLW. Dredged materials are dumped 3,000 ft abeam of the POA dock face at the Anchorage Harbor Open Water Disposal Site. NMFS issued a LOC under the ESA for their current USACE permit in 2017. In 2023, the USACE issued a FONSI for the POA to conduct transitional dredging at the terminal facility and dredged material disposal offshore. These activities will provide the needed depths for berthing vessels at the new terminal facility (mentioned above). Once the POA's dredging is complete, the USACE will maintain dredging at this location.

Dredging operations also occur annually at the Ship Creek Boat Ramp, located approximately 2.3 km (1.5 mi) southwest of the POA NES1 Project location. The POA dredging at this site is accomplished in early May during minus 3-ft tides and is usually accomplished in 3 to 4 days using heavy machinery. Dredging at the POA does not seem to be a source of re-suspended contaminants (USACE 2023), and beluga whales often pass near the dredge (USACE 2008, 2023; ICRC 2012).

4.8.5.3 Port MacKenzie

As discussed in Section 4.8.4, Port MacKenzie also has the potential to expand its facilities, depending on future needs associated with large resource development projects. An increase in vessel traffic may have an effect on marine mammals. Construction activities, as well as the placement of piers and abutments, may have an effect on marine mammals, their habitat, and their prey species. However, NMFS is not currently aware of any specific planned and funded projects at Port MacKenzie.

4.8.5.4 Tidal Energy

A tidal energy project is in the preliminary stages of determining if a saltwater generator can be used to power the machine that provides cathodic protection to the Port MacKenzie dock. The saltwater generator could potentially generate 80 kilowatts of power (Poux 2022).

An application for a preliminary permit from the Federal Energy Regulatory Commission has been submitted for a proposed Turnagain Arm tidal electric generation water power project. The project is in the early planning stages and details such as equipment and placement are not currently available. Thus, it is not likely that the project will occur during the effective period of Furie's IHAs.

Ocean Renewable Power Company (ORPC), a developer of renewable power systems that harness energy from free-flowing rivers and tidal currents, submitted a preliminary permit application to FERC in May 2021 for a project in Cook Inlet. ORPC previously conducted site characterization and environmental studies in the region, and intends to develop a five-megawatt pilot project near East Foreland to verify the technical performance and environmental compatibility of its proposed project. Project results will assist in planning a phased build-out of up to a 100-megawatt commercial-scale project.[19] ORPC will collaborate with Homer Electric Association, Inc. to sell the tidal energy produced. Work on this project started in June 2024; tabletop studies and site preparation are expected through March 2025, after which a decision will be made regarding whether to pursue future work. If approved and funded, in-water construction would begin in approximately 2029 and operations would commence shortly thereafter and remain for an indefinite time frame.

ORPC is also partnering with the Matanuska-Susitna Borough to test its RivGen Power System at Port MacKenzie.[20] They plan to evaluate the ability to harness the tidal current of upper Knik Arm to power the cathodic protection systems, which prevent the metal structures from corroding, at the port.

4.8.5.5 Joint Base Elmendorf Richardson

The Department of the Air Force is preparing an environmental impact statement (EIS) to assess the potential social, economic, and environmental impacts associated with modifying the conditions under which indirect live-fire weapons training can be conducted at Joint Base Elmendorf Richardson (JBER).[21] The EIS would evaluate the potential impacts associated with indirect live-fire training during all seasons at the Eagle River Flats Impact Area as well as potential impacts associated with the proposed expansion of the Eagle River Flats by approximately 585 acres on JBER (DAF 2022). A Draft EIS is anticipated to be available in late 2024, with a Final EIS followed by a Record of Decision in 2025 (DAF 2022). This activity occurs farther north in Cook Inlet than Furie's activities so they are not expected to overlap spatially. Additionally this activity is likely to contribute to airborne noise, which may disturb pinnipeds in the area, but does not compound the effects of the underwater noise produced by Furie in an area removed from Eagle River.

JBER recently received approval from the USACE for the establishment of a restricted area within Knik Arm to prevent vessels and individuals from entering the explosive arc area of the Six Mile Munitions Storage Area (88 FR 18051, 27 March 2023). Except for authorized vessels and individuals in support of military training and management activities the restriction is always in effect. The restricted area is located north of the Port.

4.8.6 Oil and Gas Development

Cook Inlet is estimated to have 500 million barrels of oil and over 19 trillion cubic feet of natural gas that are undiscovered and technically recoverable (Wiggin 2017). Schenk (2015) determined that there may

[19] HTTPS://WWW.RENEWABLEENERGYMAGAZINE.COM/OCEAN_ENERGY/ORPC-PLANS-TO-ADVANCE-TIDAL-ENERGY-IN-20210526

[20] HTTPS://WWW.AKBIZMAG.COM/INDUSTRY/ENERGY/TESTING-TIDAL-POWER-IN-KNIK-ARM/

[21] HTTPS://JBER-PMART-EIS.COM/

also be unconventional oil and gas accumulations in Cook Inlet of up to 637 billion cubic feet of gas and 9 million barrels of natural gas liquids. However, a 2022 forecast by the Alaska Division of Oil and Gas estimates that there is 820 bcf of proved gas reserves that is economic to develop (Alaska Department of Natural Resources 2023).

Lease sales for oil and gas development in Cook Inlet began in 1959 (Alaska Department of Natural Resources 2014), and prior to that there were attempts at oil exploration along the west side of Cook Inlet. By the late 1960s, 14 offshore oil production facilities were installed in upper Cook Inlet; today there are 17 offshore oil and gas platforms. Active oil and gas leases in Cook Inlet total 205 leases encompassing approximately 418,974 acres of State leased land of which 324,292 acres are offshore.

The Alaska Department of Natural Resources' Division of Oil and Gas has issued a preliminary best interest finding for proposed Cook Inlet area-wide oil and gas lease sales, 2019 through 2028. The lease sales could lead to increased oil and gas development in Cook Inlet; however, it is uncertain if oil and gas companies will be interested in acquiring these leases given the commodity prices, the state's tax structure, and the sustainable investment required to explore and develop offshore leases. Currently, 17 existing oil and gas drilling platforms are in Cook Inlet, 11 of which are active.

In 2017, BOEM held Lease Sale #244 in Cook Inlet. Hilcorp was the only responding company and submitted bids on 14 of 224 tracts/blocks offered; their successful bids encompass 31,005 acres. In 2019, NMFS issued Incidental Take Regulations for Hilcorp's oil and gas activities in Cook Inlet, including seismic surveys, and other exploration activities within these blocks. Approximately 3.3 million acres were up for bid in the state-owned lease sale in June 2021, and HEX Group and Strong Energy Resources successfully bid on nearly 21,000 acres of oil and gas tracts in Cook Inlet. In December 2022, BOEM held Lease Sale #258 in Cook Inlet. The sale offered 193 blocks toward the northern part of the Cook Inlet Planning Area for leasing. These blocks stretch roughly from Kalgin Island in the north to Augustine Island in the south (BOEM 2022). Hilcorp was the only responding company and submitted a bid on one block and was awarded the lease in March 2023. On July 16, 2024, a federal district court suspended Hilcorp's lease and ordered BOEM to complete a supplemental EIS. Currently, 14 active Outer Continental Shelf Oil and Gas Leases occur in the Cook Inlet region (BOEM 2023), not including the currently suspended Lease #258.

Potential impacts from gas and oil development include temporary increased noise from seismic activity, vessel and air traffic, pile driving, and well drilling; discharge of wastewater; small areas of habitat loss from the construction of oil and gas facilities; and contaminated food sources and/or injury from a natural gas blowout or oil spill. These activities may impact marine mammals by introducing man made noise into the environment, disturbing marine mammals with the presence of people and transportation, altering marine mammal habitat, and potentially injuring or killing individual marine mammals. All activities involving workers in marine environments have potential to temporarily disturb marine mammals; however, the only activities that could alter habitat are those that physically change parts of the marine environment or introduce chronic disturbances from noise or the presence of workers. Activities such as vessel traffic as well as accidental oil spills have occasionally resulted in marine mammal fatalities. The loudest of these oil and gas related activities typically are seismic surveying, pile-driving and other construction activities, and dredging; all of which have potential to compromise a marine mammal's ability to hear and properly interact with their natural environment. Persistent unclassified machinery noise likely related to the high concentration of oil and gas productions (e.g., subsea production machinery, pipelines connecting offshore platforms to land facilities) in Trading Bay have been documented (Castellote, et al. 2018); however the acoustic footprint of this industry is not well documented. Typically, the noise levels from these activities are loud enough to permanently injure marine mammal hearing, but usually only at close range and over extended periods of time.

As described in Section 2.2.2, Furie is towing the jack-up rig to conduct production drilling at an existing platform in middle Cook Inlet. Primary sources of rig-based acoustic energy have been identified as

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

Some Cook Inlet marine mammal habitat has already been altered, primarily by the construction and use of oil and gas facilities in coastal areas, production platforms, and laying pipelines on the seafloor. To a lesser extent the release of drill cuttings and muds, the establishment of consistently used vessel routes to ship oil and gas, oil and gas spills, and release of contaminants into Cook Inlet have also modified marine mammal habitats. Though some habitat has been altered and alterations are expected to continue into the future due to these developments, practices, and accidents, collectively they constitute a small fraction of marine mammal habitats in Cook Inlet. Within a matter of years or perhaps a decade or more, disturbed habitats often return to a state similar to that of unaffected areas (Henry et al. 2017; Manoukian et al. 2010).

Accidental oil and gas releases have occurred in Cook Inlet and are likely to occur in the future, mostly when transporting oil or gas during lease development in state waters, and from infrastructure projects such as port developments. Impacts from contacting oil spills could include elevated stress and physiological reactions to inhalation or ingestion of hydrocarbon toxins and fouling of baleen or fur. The existence of spill response infrastructure, protocols and an active spill response would help minimize effects from large oil spills on marine mammal populations. The overall cumulative effects of an oil spill would include temporary physiological effects among marine mammals and potential mortality depending on the location, size of the spill, and adequacy of response.

NMFS has received applications requesting takes of marine mammals incidental to seismic surveys and drilling operations in this area. For projects where an IHA is requested, marine mammal exposure to seismic activities is mitigated to effect the least practicable adverse impact. It is a common requirement for seismic operations to maintain extensive marine mammal monitoring (e.g., flights) and shutdown if Cook Inlet beluga whales are observed. The risk of these impacts may increase as oil and gas development increases; however, new development will undergo consultation and permitting requirements prior to exploration and development. If authorizations are issued to these applicants, they will be required to implement mitigation and monitoring measures to reduce impacts to marine mammals and their habitat in the area, and will be subject to the same MMPA and, when applicable, ESA standards.

NMFS issued a LOA to the Alaska Gasline Development Corporation for take of marine mammals, by harassment, incidental to construction of a marine terminal near Nikiski and installation of a pipeline in Cook Inlet. NMFS issued the LOA on 21 September 2020, which is valid from 01 January 2021 through 31 December 2025 (85 FR 59291); however, to NMFS' knowledge, construction has not started. Mitigation and monitoring measures include ramp-ups, shutdown zones, and PSO monitoring for the

project, known as the Alaska Liquefied Natural Gas Project. Seismic surveys in Cook Inlet (such as Hilcorp's G&G surveys for which NMFS issued an LOA [84 FR 37442, 31 July 2019] and subsequent IHAs (87 FR 62364, 14 October 2022) that contain required mitigation, monitoring, and reporting measures will continue as the industry seeks a better understanding of available oil and gas deposits.

In 2023, NMFS received a request from Hilcorp Alaska, LLC (Hilcorp) for authorization to take marine mammals incidental to production drilling support activities in Cook Inlet, Alaska. NMFS is currently proposing to issue an IHA to incidentally take marine mammals during Hilcorp's specified activities, which includes tugs towing, holding, and positioning a jack-up rig (similar to Furie's activity). If issued, the IHA would authorize take of 12 species of marine mammals by Level B harassment.

4.8.7 Mining

The Pebble Limited Partnership proposes to develop the Pebble copper-gold-molybdenum porphyry deposit (Pebble Deposit) as a surface mine in Southwest Alaska near Iliamna Lake, approximately 200 mi (321.9 km) southwest of Anchorage and 60 mi (96.6 km) west of Cook Inlet. The project would include development of the open pit mine, with associated infrastructure to include a 270-megawatt power generating plant. A 166-mi (267.2 km) natural gas pipeline from the Kenai Peninsula across Cook Inlet to the mine site is proposed as the energy source for the mine. The USACE identified the Northern Route as the preferred transportation corridor for the mine in the final Environmental Impact Statement for the project, published in July 2020 (USACE 2020a). The transportation corridor includes mine and port access roads, including an 82-mi (132.0 km) gravel access road along the northern edge of Iliamna Lake, and an Amakdedori port facility at Diamond Point in Iliamna Bay, approximately 165 mi (265.5 km) southwest of Anchorage. The construction and operation of the port facility could also impact marine mammals within Cook Inlet; however, the construction method and plans are currently unknown. If impacts, such as behavioral harassment or hearing threshold shifts, would occur for marine mammals from construction of the Pebble Limited Partnership port, any impacts would not occur during the Furie's activities and would be farther removed in space (i.e., lower in the inlet). On 25 November 2020, the USACE issued a Record of Decision that denied The Pebble Limited Partnership a permit to construct the mine (USACE 2020b). The Pebble Limited Partnership filed an appeal of the USACE's decision in January 2021 (Pebble Limited Partnership 2021). The U.S. Environmental Protection Agency blocked the project under the Clean Water Act in January 2023. In March 2024, The Pebble Limited Partnership sued the EPA regarding this decision.[22] The future of the project is unknown.

4.8.8 Marine Mammal Research

Many important aspects of marine mammal biology remain unknown or are incompletely studied. Additionally, management of these species and stocks requires knowledge of their distribution, abundance, migration, population, ecology, physiology, genetics, behavior, and health. Therefore, free-ranging marine mammal species are frequently the subjects of scientific research and studies.

Research activities frequently include one of more of the following methods: close approach by vessel and aircraft for line-transect surveys; behavioral observation; photo-identification and photo-video-grammetry; passive acoustic recording; attachment of scientific instruments (tagging) by both implantable and suction cup tags; biopsy sampling, including skin and blubber biopsy and swabbing; land-based surveys; and live capture for health assessments, blood and tissue sampling, pinniped tooth extraction, and related pinniped anesthesia procedures. All researchers are required to obtain scientific research permits from NMFS OPR under the MMPA and/or ESA (if an ESA-listed species is involved). Permits authorizing research in Cook Inlet on beluga whales, harbor seals, harbor porpoises, Steller sea lions, humpback whales, and killer whales may have cumulative effects on these species and stocks, but they are expected to be negligible to minor based on the specific research methodology. NMFS anticipates that scientific research on marine mammals in Cook Inlet will continue, and possibly expand, due to the

[22] HTTPS://PEBBLEPARTNERSHIP.COM/NEWS-RELEASES/2024/3/15/PLP-CEO-COMMENTS-LITIGATION

increasing need to better understand distribution and abundance relative to temporal (e.g., seasonal, diel, or tidal) and spatial (e.g., geographic, bathymetric) parameters. However, the acoustic research currently conducted on beluga whales is passive in nature (hydrophone-based) and has no impact on marine mammals.

At the time of preparation of this EA, there are seven active scientific research and/or enhancement permits that authorize take of Cook Inlet beluga whales. Two of those permits are for research on one captive individual Cook Inlet beluga whale that was not releasable to the wild after rehabilitation efforts. This means there are five scientific research permits that authorize take of free-ranging Cook Inlet beluga whales. One study, led by the Cook Inlet Beluga Whale Photo-ID Project, is using photo-identification methods to identify individual whales and to provide information about movement patterns, habitat use, survivorship, reproduction, and Cook Inlet beluga whale population size. Other studies, led by the Marine Mammal Laboratory at the NOAA Fisheries Alaska Fisheries Science Center and NMFS Office of Protected Resources, Marine Mammal Health and Stranding Response Program, are designed to monitor cetacean population trends, abundance, distribution, and health in the North Pacific Ocean, Bering, Beaufort, and Chukchi Seas, and Gulf of Alaska (including adjoining bays and inlets) through the following techniques: crewed and uncrewed aerial surveys for counts, observations, photo-id, photogrammetry, and video of cetaceans; vessel surveys for counts, collection (prey remains, sloughed skin, and eDNA), observation, photo-id, video, sampling (exhaled air, feces, skin and blubber), instrumenting (invasive [dart/barb, dorsal fin/ridge, deep-implant] and non-invasive [suction cup] tags), and acoustic playbacks. Similar methods would be used by the Marine Ecology and Telemetry Research group and HDR to assess the biology and ecology of cetaceans in the North Pacific, including in Alaska, particularly within and around Navy training ranges.

Migura and Bollini (2022) assert that an increase in the authorized number of takes of Cook Inlet belugas when projected to occur through 2025 is statistically correlated with the decreasing population size of this population. However, the authors did not evaluate the severity of the potential impacts from the authorized take. For instance, the vast majority of the authorized research takes (which comprise over 99% of the total authorized take in any year) are for remote, non-invasive methods such as photo-identification during aerial and vessel surveys that have the potential to result in only a minor degree of Level B harassment under the MMPA. For example, permitted researchers conducting aerial or vessel based surveys are directed to count each sighting that is closer than the distances of NMFS wildlife viewing guidelines as a take because the activities have the potential to harass animals, regardless of the likely severity of those takes. Given this difference, it is unlikely that the correlation Migura and Bollini (2022) strive to make (between projected future authorized take numbers and the Cook Inlet beluga whale population decline) exists. In addition, long-term trend analysis of authorized take levels is not advisable because there have been changes in how take is interpreted and characterized in research permits. This means that, in some cases, take numbers across permits and across years are not directly comparable and at face value may seem like an increase in authorized take numbers. In recent years, managers have simplified how take numbers in research permits are determined to provide a more consistent approach to counting take across incidental and directed take permitting programs. NMFS will continue to closely analyze the number of takes requested and used by researchers each year.

4.8.9 Climate Change

Climate change is a reasonably foreseeable condition that may result in cumulative effects to marine mammals in Cook Inlet (BOEM 2016). The 2023 Intergovernmental Panel on Climate Change synthesis report concluded that “human activities, principally through emissions of greenhouse gasses have unequivocally caused global warming” (IPCC 2023). A recent special report indicates that human activities are estimated to have caused approximately 1.1 degree Celsius (°C) of global warming above pre-industrial levels, with a likely range of 0.95°C to 1.2°C with larger temperature increases over land than over the ocean. Global warming is likely to reach 1.5°C between 2030 and 2052 if it continues to increase at the current rate (IPCC 2023). This study involved numerous models to predict changes in

temperature, sea level, ice pack dynamics, and other parameters under a variety of future conditions, including different scenarios for how human populations respond to the implications of the study.

Evidence of climate change in the past few decades has accumulated from a variety of geophysical, biological, oceanographic, and atmospheric sources. The scientific evidence indicates that average air, land, and sea temperatures are increasing at an accelerating rate. Although climate changes have been documented over large areas of the world, the changes are not uniform, and they affect different areas in different ways and at differing intensities. Arctic regions have experienced some of the greatest changes, with major implications for the marine environment as well as for coastal communities. In its 2016 EIS for Lease Sale #244 (BOEM, 2016), BOEM used the analysis in the Third National Climate Change Assessment to assist in its analysis of future projected climate change trends. Average annual temperatures in Alaska are expected to rise by an additional 2°F to 4°F by 2050. If global emissions continue to increase throughout this century, temperatures can be expected to rise 10°F to 12°F in the northern part of Alaska, 8°F to 10°F in the interior, and 6°F to 8°F in the rest of the state. Even with substantial emissions reductions, Alaska is projected to warm by 6°F to 8°F in the north and 4°F to 6°F in the rest of the state by 2100 (Chapin et al. 2014). Average annual precipitation in the Cook Inlet area is anticipated to increase about three to four percent over the life of the Lease Sale #244 project as a result of climate change (USACE, 2015). Most of the increased precipitation at the Cook Inlet locations is predicted to occur as snowfall in winter months (November through January) and during breakup in May. These increases would be balanced in part by drier weather in early summer (e.g., June precipitation decreases). In southcentral Alaska, adjacent to the Sale Area, permafrost exposure is less than 10% for both roads and communities, but isolated permafrost patches in southcentral Alaska do exist and will degrade as temperatures increase (Pastick et al. 2015; Smith and Levasseur, 2002).

More specifically, BOEM evaluated life cycle GHG emissions for Lease Sale #244, and estimated that 129,208,568 total metric tons of CO_2e may be produced as a result of Lease Sale 244. Of this total, BOEM estimated 98,530,000 metric tons would result from oil resources, and gas resources would contribute 30,678,000 metric tons of CO_2e (Psarianos, Personal Communication, 10/24/16). NMFS is not aware of comparable calculations conducted for oil and gas activity permitted farther north in Cook Inlet by the State of Alaska or its state agencies.

Marine mammals are classified as sentinel species because they are good indicators of environmental change. Arctic marine mammals are ideal indicator species for climate change, due to their circumpolar distribution and close association with ice formation. NMFS recognizes that warming of the Arctic, which results in diminishing ice thickness and spatial extent, could be a cause for concern for marine mammals. In Cook Inlet, marine mammal distribution is dependent upon ice formation and prey availability, among other factors. For example, beluga whales often travel just along the ice pack and feed on prey beneath it (Richardson et al. 1990, 1991). Any loss of ice and environmental conditions such as rising water temperature could result in prey distribution changes or loss for beluga whales or other marine mammals. Ice, however, is not directly used in Cook Inlet for resting, reproduction, or rearing of young, as is the case for ice-dependent pinnipeds. Research permits discussed in the section above are a helpful tool to understand the uncertainty surrounding the effect of a changing climate on marine mammal species. NMFS' current marine mammal stock assessment reports identified climate change as a threat to marine mammal stocks occurring in Cook Inlet (Muto et al. 2021). Models predict that the climate changes observed in the past 30 years will continue at the same or increasing rates for at least 20 years.

Cook Inlet beluga whales likely rely on the combined escapement from multiple watersheds. Changes in prey availability to belugas may result from changes in the total availability, quality, species composition, and seasonality of prey. The greatest climate change risks may be potential changes in salmon and eulachon abundance. These changes could occur through regime shifts and changes in ocean ecosystems and/or through changes in these species' freshwater habitat. Temperature and hydrology control several critical stages in the life cycle of salmonids in their freshwater habitats. During periods of rapid climate

change, these can have significant effects on anadromous salmonid populations (Bryant 2009). Indirect threats associated with climate change include increased human activity as a result of regional warming. Less ice could mean increased vessel activity or construction activities with an associated increase in noise, pollution, and risk of ship strike. More rapid melting of glaciers might also change the silt deposition in the Susitna Delta, potentially altering habitat for prey (NMFS 2008a). Climate-driven changes in glacial melt are presumed to have profound effects on seasonal streamflow within the Cook Inlet drainage basin, affecting both anadromous fish survival and reproduction in unpredictable ways. Changes in glacial outwash will also likely affect the chemical and physical characteristics of Cook Inlet's estuarine waters, possibly changing the levels of turbidity in the inlet. Whether such a change disproportionately benefits marine mammals, their prey, or their predators is unknown. In summary, the effects of climate change will likely create several challenges to Cook Inlet beluga whales, primarily through impacts to their primary prey species, salmon. Warmer ocean temperatures, warmer stream temperatures, and warmer air temperatures will likely create many challenges and changes to the freshwater and marine ecosystems that salmon depend on. Pre-spawning salmon mortalities, reductions in returns, and shifts in run timing have already been documented. It remains to be seen how adaptable both salmon and belugas can be in the face of rapidly changing conditions.

As described in Gulland et al. (2022), predictions about the impacts of climate change on marine mammal demography and health are unclear at best. For certain species, indirect effects of climate change may exacerbate existing problems or escalate potential problems. However, in other species where climate change is predicted to be detrimental (e.g. bowhead whales) the population appears to be stable and potentially increasing. More targeted research is necessary to further explore and characterize the effects of climate change on marine mammals.

Models predict that the climate changes observed in the past 30 years will continue at the same or increasing rates for at least 20 years. Although NMFS recognizes that concern for climate change in the Project area is warranted, the full extent to which climate change would affect marine mammals in Cook Inlet is unclear. Furie's activities are planned to occur during a 2-year period, during which time the impacts of climate change on marine mammals are likely to remain at baseline levels.

4.8.10 Conclusion

Based on the summation of past, present, and reasonably foreseeable future actions provided in this section, we believe that the incremental impacts to marine mammals and their habitat from issuance of the IHAs to Furie for tug towing and pile driving activities would not result in cumulatively significant impacts to the human environment when added to other past, present, or reasonably foreseeable future activities. Other relevant actions to be considered in evaluating potentially cumulatively significant impacts include subsistence hunting, pollution, commercial and recreational fishing, vessel traffic, coastal construction, oil and gas development activities, mining, marine mammal scientific research, and climate change. While consideration of these activities in sum suggests an increase in industrialization of Cook Inlet, many of these activities are spatially and temporally limited and do not permanently reduce or degrade the habitat available to marine mammals or their prey species. Cook Inlet is also a geographically vast area, and many activities, including the activities proposed by Furie, are geographically distinct to various portions of the inlet, which prevents the continued or permanent disruption of one particular portion of the inlet for extended durations.

Furie's tug towing and impact pile driving activities would add an incremental contribution to the combined environmental impacts of other past, present, and reasonably foreseeable future actions; however, those direct and indirect adverse impacts are expected to be mainly short-term, localized, and minor, as described in this EA. None of the harassment authorized by NMFS in other ITAs would overlap in time or space with impacts from Furie's tug towing and impact pile driving activities. Further, the amount of Level A and Level B harassment authorized is for a small number of animals with respect to large population sizes. Therefore, any cumulative impacts would affect so few individuals that the impact

on the population would not likely be realized. In summary, incremental impacts of NMFS' Proposed Action, in combination with other actions, would be negligible on the populations of species analyzed.

Chapter 5 List of Preparers and Agencies Consulted

Agencies Consulted

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Appendix I

Monitoring and Reporting

Furie would be required by the IHAs to carry out the following monitoring and reporting requirements as described in the proposed notice of IHA issuance (89 FR 51192, 14 June 2024) and Furie's Marine Mammal Monitoring Plan (see Appendix B in Furie's IHA application):

A minimum of two NMFS-approved PSOs would be on-watch during all activities wherein the rig is attached to the tugs for the duration of the project. PSOs would 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 would 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.

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 would 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
    - Name of PSO who sighted the animal(s) and PSO location and activity at time of sighting;
    - Time of sighting;
    - Identification of the animal(s) (e.g., genus/species, lowest possible taxonomic level, or unidentified), PSO confidence in identification, and the composition of the group if there is a mix of species;
    - Distance and location of each observed marine mammal relative to the tug boats for each sighting;
    - Estimated number of animals (min/max/best estimate);
    - Estimated number of animals by cohort (adults, juveniles, neonates, group composition, etc.);
    - Animal's closest point of approach and estimated time spent within the harassment zone;
    - Description of any marine mammal behavioral observations (e.g., observed behaviors such as feeding or traveling), including an assessment of behavioral responses thought to have resulted from the activity (e.g., no response or changes in behavioral state such as ceasing feeding, changing direction, flushing, or breaching);
- Number of marine mammals detected within the harassment zones, by species; and
- Detailed information about implementation of any mitigation (e.g., delays), a description of specific actions that ensued, and resulting changes in behavior of the animal(s), if any.

If no comments are received from NMFS within 30 days, the draft summary report would constitute the final report. If NMFS submits comments, Furie would 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:
- Time, date, and location (latitude and longitude) of the first discovery (and updated location information if known and applicable);
- Species identification (if known) or description of the animal(s) involved;
- Condition of the animal(s) (including carcass condition if the animal is dead);
- Observed behaviors of the animal(s), if alive;
- If available, photographs or video footage of the animal(s); and
- General circumstances under which the animal was discovered.

More details on monitoring and reporting methods relative to the specified activity can be found in the notice of the proposed IHA published in the FR on 14 June, 2024 (89 FR 51102) and in Appendix B of Furie's IHA application.

Mitigation Measures

Furie would carry out a marine mammal mitigation program as described in the proposed FRN of IHA issuance (89 FR 51102, 14 June 2024) and Furie's Marine Mammal Monitoring Plan (see Appendix B in Furie's IHA application). Mitigation measures proposed by Furie for rig tugging activities include the following:

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

The tugs towing a rig are not able to shut down while transiting or positioning the rig. Furie would 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 would 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 non-beluga 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-beluga marine mammal(s) is outside of and on a path away from the clearance zone, 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. If a beluga whale is observed within the relevant clearance zone during those 30 minutes, operations may not commence until the beluga whale(s) is no longer detected at any range and 30 minutes have elapsed without any observations of beluga whales. 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, 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 would monitor and carefully record any reactions observed until the towing or positioning has concluded. PSOs would also collect behavioral information on marine mammals sighted during monitoring efforts.

Furie would 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 would occur during nighttime hours. Furie would 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.

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 would 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.

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 would 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 would 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

Furie would establish a monitoring location on the JRP at the highest possible vantage point to monitor to the maximum extent possible in all directions. proposed monitoring is described below.

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.

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 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.

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.

More details on mitigation methods relative to the specified activity can be found in the notice of the proposed IHA published in the FR on 14 June 2024 (89 FR 51102) and in Appendix B of Furie's IHA application.

Appendix II

Marine Mammals

Twelve species of marine mammals may be harassed incidental to conducting the rig towing and impact pile driving activities. Information about these marine mammal species is included in Appendix II. NMFS has included take for species such as California sea lions, in the rare event they enter the project area, because once under load and operating, the tugs are unable to be stopped, due to safety reasons. Cook Inlet beluga whales, harbor porpoises, and harbor seals are the species most likely to be present during the activities. The likelihood of occurrence of these species factors in scientific research surveys, monitoring reports from previous IHAs authorized for Cook Inlet, and anecdotal evidence from ship captains, local residents, etc.

Table 15 provides a summary of the abundance, occurrence, and status of the marine mammals likely to occur in Furie's Project area based on NMFS' 2022 Stock Assessment Reports (SARs) (Carretta et al. 2023; Young et al. 2023) and 2023 Draft SARs (Carretta et al. 2024; Young et al,. 2024) and, for beluga whales, the recently released update on their abundance (Goetz et al. 2023). Information regarding the distribution, population size, and conservation status for each species is included in the FRN of the proposed IHA (89 FR 51102, 14 June 2024), and NMFS incorporates those descriptions by reference here and summarizes them below. Furie's's IHA application and NMFS' FRN of the proposed IHA (89 FR 51102, 14 June 2024) also contain detailed information regarding life history functions, hearing abilities, and distribution, which is also incorporated by reference and briefly summarized below.

Table 15. Abundance estimates, conservation status, and population trends of the marine mammal species for which take is proposed to be authorized[1].

Common name	Scientific name	Stock	ESA/MMPA status; Strategic (Y/N)[2]	Stock abundance (CV, Nmin, 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 (0.088, 1,007, 2006)	3.4	5.82
Minke Whale	Balaenoptera acutorostrata	AK	-, -, N	N/A[7] (N/A, N/A, N/A)	UND	0
Odontoceti (toothed whales, dolphins, and porpoises)						
Family Delphinidae						
Killer Whale	*Orcinus orca*	Eastern North Pacific Alaska Resident	-, -, N	1,920 (N/A, 1,920, 2019)	19	1.3
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[8] (0.061, 267, 2018)	0.53	0
Family Phocoenidae (porpoises)						
Dall's Porpoise	*Phocoenoides dalli*	AK	-, -, N	UND[9] (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 (N/A, 49,837, 2020)[10]	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 - Endangered Species Act (ESA) status: Endangered (E), Threatened (T)/MMPA status: Depleted (D). A dash (-) indicates that the species is not listed under the ESA or designated as depleted under the MMPA. Under the MMPA, a strategic stock is one for which the level of direct human-caused mortality exceeds PBR or which is determined to be declining and likely to be listed under the ESA within the foreseeable future. Any species or stock listed under the ESA is automatically designated under the MMPA as depleted and as a strategic stock.
3- NMFS marine mammal stock assessment reports online at: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region. CV is coefficient of variation; Nmin 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- Reliable population estimates are not available for this stock. Please see Friday et al. (2013) and Zerbini et al (2006) for additional information on numbers of minke whales in Alaska.
8- 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.
9 - 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.
10 - Nest is best estimate of counts, which have not been corrected for animals at sea during abundance surveys.

ESA-Listed Marine Mammals

For brevity, the details regarding marine mammals in this document are limited to only those needed to evaluate whether a significant environmental impact exists. Additional details and depth of analysis regarding marine mammals can be found in Furie's IHA application and the notice of the proposed IHA (89 FR 51102, 14 June 2024).

Cook Inlet Beluga Whale

Status and Distribution

The Cook Inlet beluga whale Stock and DPS resides year-round in Cook Inlet (Laidre et al. 2000; Castellote et al. 2020) and is the most isolated beluga whale stock in Alaska (Young et al. 2023). No systematic surveys for abundance of Cook Inlet beluga whales were conducted prior to 1994; however, the Alaska Department of Fish and Game (ADF&G) conducted a survey of Cook Inlet beluga whales in August 1979 and estimated 1,293 individuals (Calkins 1989). This survey provides the best available estimate for historical beluga whale abundance in Cook Inlet and was used by NMFS to establish 1,300 beluga whales as the carrying capacity in Cook Inlet (65 FR 34590, 31 May 2020).

NMFS began comprehensive, systematic aerial surveys of beluga whales in Cook Inlet in 1994. These surveys documented a decline in abundance of nearly 50 percent between 1994 and 1998, from an

estimate of 653 to 347 whales (Rugh et al. 2000). Annual abundance surveys were conducted each June from 1999 through 2012, but in 2013, NMFS changed the survey to a biennial schedule.

Analysis of survey data from 1999 to 2016 indicated that the population continued to decline at an annual rate of 0.4 percent (Shelden et al. 2015, 2017). However, using a Bayesian statistical method developed by Boyd et al. (2019), the analysis conducted by Shelden and Wade (2019) indicates that from 2008 to 2010, the Cook Inlet beluga whale population was declining at an annual rate of 2.3 percent (Shelden and Wade 2019). The most recent surveys were conducted in 2021 and 2022 and produced an abundance estimate of 331 beluga whales (Table 16) with a 95 percent probability range of 290 to 386 whales (Goetz et al. 2023). This analysis indicates that from 2012 to 2022, the Cook Inlet beluga whale population was increasing at an annual rate of 0.9 percent (Goetz et al. 2023). Results of a study by Himes Boor et al. (2022) indicate that both low birth rates and low survival rates are likely the causes of Cook Inlet beluga whales' lack of recovery.

Table 16. Annual Cook Inlet Beluga Whale Abundance Estimates

1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2014	2016	2018	2022
367	435	386	313	357	366	278	302	375	375	321	340	284	312	340	328	279	331

Source: Hobbs et al. 2000, 2011, 2012; Rugh et al. 2003, 2004a, 2004b, 2005a, 2005b, 2005c, 2006a, 2006b, 2007; Hobbs and Shelden 2008; Allen and Angliss 2010, 2011; Shelden et al. 2013, 2015, 2017; Shelden and Wade 2019; Boyd et al. 2019; Goetz et al. 2023.
Note: Abundance surveys were not completed in 2013, 2015, 2017, 2019, and 2020. An abundance estimate was not calculated from the 2022 survey data.

In 1999, NMFS received petitions to list the Cook Inlet beluga whale DPS as an endangered species under the ESA (64 FR 17347, 4 April 1999); however, it was not until 17 October 2008, that NMFS announced the listing of the population as endangered under the ESA (73 FR 62919, 22 October 2008) when it failed to recover following a moratorium on subsistence harvest (65 FR 34590, 31 May 2020). The Cook Inlet beluga whale stock was designated as depleted under the MMPA in 2000, indicating that the size of the stock was below its Optimum Sustainable Population (OSP) level (65 FR 34590, 31 May 2020). The population has remained below its OSP level since the designation but would be considered recovered once the population estimate rises above the OSP level. In September 2022, NOAA Fisheries completed the ESA 5-year review for the Cook Inlet beluga whale DPS and determined that the Cook Inlet beluga whale DPS should remain listed as endangered (NMFS 2022a). 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).

Foraging Ecology

Cook Inlet beluga whales feed on a wide variety of prey species, particularly those that are seasonally abundant. In spring, the preferred prey species are eulachon and cod (gadids). Other fish and invertebrate species found in the stomachs of beluga whales include porifera, polychaetes, mysids, amphipods, shrimp, crabs, and marine worms. Some of the species may be found in beluga whale stomachs from secondary ingestion because species such as cod feed on polychaetes, shrimp, amphipods, and mysids, as well as other fish (e.g., walleye pollock [*Gadus chalcogrammus*], and flatfish) and invertebrates (Quakenbush et al. 2015).

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

Presence in Cook Inlet

Beluga whales are year-round residents in Cook Inlet (Rugh et al. 2000; Castellote et al. 2020), though they display seasonal movements throughout the Inlet. Large aggregations of beluga whales occur near the mouths of rivers and streams when anadromous fish are present (Moore et al. 2000; Shelden and Wade 2019; McGuire et al. 2020; Castellote et al. 2020). Depending upon the season, beluga whales can occur in both offshore and coastal waters.

During spring and summer, beluga whales generally aggregate near the warmer waters of river mouths where prey availability is high and predator occurrence is low (Moore et al. 2000; Shelden and Wade 2019; McGuire et al. 2020; Castellote et al. 2020). Since the mid-1990s, most beluga whales (96 to 100 percent) aggregate in shallow areas near river mouths in upper Cook Inlet, and they are rarely sighted in the central or southern portions of Cook Inlet during summer (Hobbs et al. 2008). Important calving grounds are located near the river mouths of upper Cook Inlet, and peak calving occurs between July and October (McGuire et al. 2016). Data regarding fall and winter habitat use by beluga whales is limited, but a few tagging studies have attempted to fill this knowledge gap (Hobbs 2005, 2012, Goetz et al. 2012b).

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).

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).

Presence in the Furie Project Area

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 (note individuals were likely observed more than once; 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).

Two beluga whale carcasses were observed by project vessels during the 2019 fall Hilcorp lower Cook Inlet seismic survey, which were reported to the NMFS Marine Mammal Stranding Network (Fairweather Science 2020). Both carcasses were moderately decomposed when they were sighted by the PSOs. Daily aerial surveys specifically for 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 conducted over the project area, and an additional 22 opportunistic sightings which included approximately 176 to 181 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).

Critical Habitat
On 11 April 2011, NMFS designated two areas of critical habitat for beluga whales in Cook Inlet (76 FR 20180). See Section 3.2.2 for a description of these critical habitat areas.

Steller Sea Lion
Status and Distribution
Two DPSs of Steller sea lion occur in Alaska: the Western DPS and the Eastern DPS. The Western DPS includes animals that occur west of Cape Suckling, Alaska, and therefore includes individuals in the Project area. The Western DPS was listed under the ESA as threatened in 1990, and its continued population decline resulted in a change in listing status to endangered in 1997 (62 FR 24345). Since 2000, studies indicate that the population east of Samalga Pass (i.e., east of the Aleutian Islands) has increased and is potentially stable (Young et al. 2023).

Foraging Ecology
Steller sea lions feed on seasonally abundant prey throughout the year, predominately on species that aggregate in schools or for spawning. They adjust their distribution based on the availability of prey species. Principal prey include eulachon, walleye pollock, capelin (*Mallotus villosus*), mackerel (*Scomber scombrus*), Pacific salmon, Pacific cod, flatfishes, rockfishes, Pacific herring, sand lance, skates, squid, and octopus (Womble and Sigler 2006; Womble et al. 2009).

Presence in Cook Inlet
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. 2005a). 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.

Steller sea lions have been observed in Cook Inlet during marine mammal surveys over the past 10 years. In 2012, during Apache's 3D Seismic surveys, three sightings of approximately four individuals in upper Cook Inlet were recorded (Lomac-MacNair et al. 2013). PSOs associated with Buccaneer's drilling project off Cape Starichkof observed seven Steller sea lions in summer 2013 (Owl Ridge, 2014), and another four Steller sea lions were observed in 2015 in Cook Inlet during SAE's 3D Seismic Program. Of the three 2015 sightings, one sighting occurred between the West and East Forelands, one occurred near Nikiski, and one occurred northeast of the North Foreland in the center of Cook Inlet (Kendall and Cornick, 2015). Five sightings of five Steller sea lions were recorded during Hilcorp's lower Cook Inlet seismic survey in the fall of 2019 (Fairweather Science, 2020). Additionally, one sighting of two individuals occurred during the CIPL Extension Project in 2018 in middle Cook Inlet (Sitkiewicz et al. 2018). At the end of July, 2022, while conducting a waterfowl survey an estimated 25 Steller sea lions were observed hauled-out at low tide in the Lewis River, on the west side of Cook Inlet. (K. Lindberg, personal communication, August 15, 2022). Steller sea lions have also been reported near the Port of Alaska (POA) in Anchorage in 2020, 2021, and 2022 (61N 2021, 2022a, 2022b, 2022c). Hilcorp did not record any sightings of Steller sea lions from their aerial or rig-based monitoring efforts in 2023 (Horsley and Larson, 2023).

Critical Habitat
Portions of the southern reaches of the lower inlet are designated as critical habitat for Steller sea lions (58 FR 45269, 27 August 1993), including a 37-km (20-nmi) buffer around all major haul-outs and rookeries, and associated terrestrial, atmospheric, and aquatic zones, plus three large offshore foraging

areas, none of which occurs in the project area. Rookeries and haulout sites in lower Cook Inlet include those near the mouth of the inlet, which are far south of the project area. There is no designated critical habitat for Steller sea lions in the mid- or upper inlet, nor are there any known biologically important areas for Steller sea lions within the project area.

Humpback Whale

Status and Distribution

Humpback whales worldwide were designated as endangered under the Endangered Species Conservation Act in 1970 and were listed under the ESA at its inception in 1973. However, on 08 September 2016, NMFS published a final decision that changed the status of humpback whales under the ESA (81 FR 62259), effective 11 October 2016. The decision recognized the existence of 14 DPSs based on distinct breeding areas in tropical and temperate waters. Five of the 14 DPSs were classified under the ESA (four endangered and one threatened), while the other nine DPSs were delisted. On 21 April 2021, NMFS published a final rule to designate critical habitat for three of the listed DPSs (86 FR 21082). No critical habitat was designated in or near the NES1 Project area.

The most comprehensive photo-identification data available suggest that approximately 89 percent of all humpback whales in the Gulf of Alaska are members of the Hawaii DPS, 11 percent are from the Mexico DPS, and less than 1 percent are from the Western North Pacific DPS (Wade 2021; Carretta et al. 2023; Young et al. 2023). The Hawaii DPS is not listed under the ESA, the Mexico DPS is listed as threatened, and the Western North Pacific DPS is listed as endangered. Members of different DPSs are known to intermix in feeding grounds; therefore, all waters off the coast of Alaska should be considered to have ESA-listed humpback whales.

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

The Hawaii stock consists of one demographically independent population (DIP) (Hawaii - Southeast Alaska / Northern British Columbia DIP) and the Hawaii - North Pacific unit, which may or may not be composed of multiple DIPs (Wade et al. 2021). The DIP and unit are managed as a single stock at this time, due to the lack of data available to separately assess them and lack of compelling conservation benefit to managing them separately (NMFS 2019, 2022b, 2023a). The DIP is delineated based on two strong lines of evidence: genetics and movement data (Wade et al. 2021). Whales in the Hawaii - Southeast Alaska/Northern British Columbia DIP winter off Hawaii and largely summer in Southeast Alaska and Northern British Columbia (Wade et al. 2021). The group of whales that migrate from Russia, western Alaska (Bering Sea and Aleutian Islands), and central Alaska (Gulf of Alaska excluding Southeast Alaska) to Hawaii have been delineated as the Hawaii-North Pacific unit (Wade et al. 2021). There are a small number of whales that migrate between Hawaii and southern British Columbia/Washington, but current data and analyses do not provide a clear understanding of which unit these whales belong to (Wade et al. 2021, Carretta et al. 2023, Young et al. 2023).

The Mexico-North Pacific stock is likely composed of multiple DIPs, based on movement data (Martien et al. 2021, Wade 2021, Wade et al. 2021). However, because currently available data and analyses are

not sufficient to delineate or assess DIPs within the unit, it was designated as a single stock (NMFS 2019, 2022d, 2023). Whales in this stock winter off Mexico and the Revillagigedo Archipelago and summer primarily in Alaska waters (Martien et al. 2021, Carretta et al. 2023, Young et al. 2023).

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

Humpback whales experienced large population declines due to commercial whaling operations in the early twentieth century. Barlow (2003) estimated the population of humpback whales at approximately 1,200 animals in 1966. The population in the North Pacific grew to between 6,000 and 8,000 by the mid-1990s. Current threats to humpback whales include vessel strikes, releases of chemicals or hydrocarbons into the marine environment, climate change, and commercial fishing operations (Carretta et al. 2023; Young et al. 2023).

Foraging Ecology

Humpback whales target aggregations of krill (*Euphausiidae*; Nemoto 1957) and small schooling fish, including herring (Krieger and Wing 1984), capelin (Witteveen et al. 2008), sand lance (Hazen et al. 2009), and juvenile salmon (Chenoweth et al. 2017). In Alaska waters, the species composition of prey taken by humpback whales varies, likely due to prey availability and individual preference (Witteveen et al. 2011).

Presence in Cook Inlet

Humpback whales are encountered regularly in lower Cook Inlet and occasionally in mid-Cook Inlet; sightings are rare in upper Cook Inlet. During aerial surveys conducted in summers between 2005 and 2012, Shelden et al. (2013) reported dozens of sightings in lower Cook Inlet, a handful of sightings in the vicinity of Anchor Point and in lower Cook Inlet, and no sightings north of 60° North latitude. NMFS changed to a biennial survey schedule starting in 2014 after analysis showed there would be little reduction in the ability to detect a trend given the current growth rate of the population (Hobbs, 2013). No survey took place in 2020. Instead, consecutive surveys took place in 2021 and 2022 (Shelden et al. 2022). During the 2014 to 2022 aerial surveys, sightings of humpback whales were recorded in lower Cook Inlet and mid-Cook Inlet, and none were observed in upper Cook Inlet (Shelden et al. 2015, 2017, 2019, 2022). Observers monitoring waters between Point Campbell and Fire Island during summer and fall 2011 and spring and summer 2012 recorded no humpback whale sightings (Brueggeman et al. 2013). Monitoring of Turnagain Arm during ice-free months between 2006 and 2014 yielded one humpback whale sighting (McGuire, unpublished data; cited in LGL Alaska Research Associates, Inc. and DOWL 2015).

Presence in the Furie Project Area

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 six to 10 unidentified whales, thought to be either humpback or gray whales, was sighted approximately 15 km northeast of the Julius R. Platform. Large cetaceans were visible near the project (i.e., whales or blows were visible), for 2 hours out of the 1,275 hours of observation conducted (Jacobs 2015). During SAExploration's 2015 seismic program,

three humpback whales were observed in Cook Inlet, including two near the Forelands and one in lower Cook Inlet (Kendall et al. 2015 as cited in Weston and SLR 2022). Hilcorp did not record any sightings of humpback whales from their aerial or rig-based monitoring efforts in 2023 (Horsley and Larson, 2023).

Critical Habitat
While critical habitat has been designated for humpback whales (see 86 FR 21092, 21 April 2021), no critical habitat for humpback whales occurs within the proposed action area or within Cook Inlet. In addition, there are not any known biologically important areas for humpback whales within the project area.

Fin Whale
Status and Distribution
Fin whales were listed as endangered under the ESA since 1990 and are depleted under the MMPA. For management purposes, three stocks of fin whales are currently recognized in U.S. Pacific waters: Alaska (Northeast Pacific), California/Washington/Oregon, and Hawaii. Recent analyses provide evidence that the population structure should be reviewed and possibly updated, however substantially new data on the stock structure is lacking (Muto et al. 2019).The Northeast Pacific stock is categorized as a strategic stock. No critical habitat has been designated or proposed for fin whales in the North Pacific.

Foraging Ecology
Fin whales forage in spring and summer in colder high-latitude waters. Their diet consists primarily of euphausiids and large copepods as well as small schooling fish, including herring, capelin, and sand lance (Flinn et al. 2002; Nemoto, 1970). In Alaska, these species are observed feeding in the Gulf of Alaska, Prince William Sound, the Aleutian Islands, and Kodiak Island. Most foraging activity occurs in highly abundant upwelling zones where cold nutrient-rich water supports high levels of productivity (Mizroch et al. 2009). In the winter, fin whales fast while they migrate to warmer waters. Fin whales are usually observed as individuals traveling alone, although they are sometimes observed in small groups. Rarely, large groups of 50 to 300 fin whales can travel together during migrations (NMFS, 2010).

Presence in Cook Inlet
In the U.S. Pacific waters, fin whales are found seasonally in the Gulf of Alaska, Bering Sea, and as far north as the northern Chukchi Sea (Muto et al. 2021). An opportunistic survey conducted on the shelf of the Gulf of Alaska found fin whales concentrated west of Kodiak Island in Shelikof Strait, and in the southern Cook Inlet region (Alaska Fisheries Science Center [AFSC], 2003). In the northeastern Chukchi Sea, visual sightings and acoustic detections have been increasing, which suggests the stock may be re-occupying habitat used prior to large-scale commercial whaling (Muto et al. 2021). Most of these areas are feeding habitat for fin whales. Watkins et al. (2000), and Stafford et al. (2007) documented high rates of calling along the Alaska coast beginning in August/September and lasting through February. Fin whales are regularly observed in the Gulf of Alaska during the summer months, even though calls are seldom detected during this period (Stafford et al. 2007). Instruments moored in the southeast Bering Sea detected calls over the course of a year and found peaks from September to November as well as in February and March (Stafford et al. 2010). Delarue et al. (2013) detected calls in the northeastern Chukchi Sea from instruments moored from July through October from 2007 through 2010.

Presence in the Furie Project Area
Fin whales are rarely observed in Cook Inlet and most sightings occur near the entrance of the inlet. Fin whales in Cook Inlet have only been observed as individuals or in small groups. From 2000 to 2022, 10 sightings of 26 estimated individual fin whales in lower Cook Inlet were observed during NMFS aerial surveys (Shelden et al. 2013, 2015, 2017, 2022; Shelden and Wade 2019). All sightings occurred in lower Cook Inlet or near the entrance to the inlet. None were observed in the area of Hilcorp's proposed project. No fin whales were observed during the 2018 Harvest's Cook Inlet Pipeline (CIPL) Extension Project Acoustic Monitoring Program in middle Cook Inlet (Sitkiewicz et al. 2018).

In September and October 2019, Castellote et al. (2020) also detected fin whales acoustically in lower Cook Inlet during 3D seismic surveys, which coincided with the Hilcorp lower Cook Inlet seismic survey. During this period, 8 sightings of 23 individual fin whales were reported, indicating the offshore waters of lower Cook Inlet may be more heavily used than previously believed, especially during the fall season (Fairweather Science, 2020). Hilcorp did not record any sightings of fin whales from their aerial or rig-based monitoring efforts in the summer of 2023 (Horsley and Larson, 2023).

Non-ESA-Listed Marine Mammals

Harbor Seal

Harbor seals inhabit waters all along the western coast of the U.S., British Columbia, and north through Alaska waters to the Pribilof Islands and Cape Newenham. Twelve recognized stocks of harbor seals occur in Alaska. Harbor seals in the Project area are members of the Cook Inlet/Shelikof stock; no other stock is present in the Project area. Distribution of the Cook Inlet/Shelikof stock extends from Unimak Island, in the Aleutian Islands archipelago, north through all of upper and lower Cook Inlet (Young et al. 2023).

The current abundance estimate for the Cook Inlet/Shelikof stock is based on aerial survey data from 1996 through 2018 and is estimated at 28,411 individuals, with a negative population growth trend of -111 seals per year (Young et al. 2023). The estimated average annual subsistence harvest of the Cook Inlet/Shelikof stock was 233 individuals between 2004 and 2008, and 104 individuals in 2014 (Muto et al. 2022). Harbor seals are not listed under the ESA or designated as depleted or strategic under the MMPA, but like all marine mammals, they are protected under the MMPA.

Harbor seals inhabit the coastal and estuarine waters of Cook Inlet and are observed in both upper and lower Cook Inlet throughout most of the year (Boveng et al. 2012; Shelden et al. 2013). In general, harbor seals are more abundant in lower Cook Inlet than in upper Cook Inlet, but they do occur in the upper inlet throughout most of the year (Rugh et al. 2005a).

Harbor seals are non-migratory; their movements are associated with tides, weather, season, food availability, and reproduction, as well as individual sex and age class (Lowry et al. 2001; Small et al. 2003; Boveng et al. 2012). In the spring and summer, harbor seals display an affinity for coastal haul out 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. 2005a), 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). During beluga whale aerial surveys of upper Cook Inlet from 1993 to 2012, harbor seals were observed 24 to 96 km (15 to 60 mi) south-southwest of Anchorage at the Chickaloon, Little Susitna, Susitna, Ivan, McArthur, and Beluga rivers (Shelden et al. 2013).

Research on satellite-tagged harbor seals observed several movement patterns in Cook Inlet (Boveng et al. 2012). Some seals fitted with satellite tags appeared to move out of Cook Inlet and into Shelikof Strait, northern Kodiak Island, and coastal habitats of the Alaska Peninsula in the fall months. The western coast of Cook Inlet had higher usage by harbor seals than eastern coast habitats, and seals captured in lower Cook Inlet generally exhibited site fidelity by remaining south of the Forelands after release (south of Nikiski; Boveng et al. 2012). The major haul out sites for harbor seals are in lower Cook Inlet; however, a few haulouts are located in upper Cook Inlet, including near the Little and Big Susitna rivers, Beluga River, Theodore River, and Ivan River (Barbara Mahoney, pers. comm., 16 November 2020; Montgomery et al. 2007). Of the 18 haul out sites 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.

Harbor seals are commonly observed in the Project area. 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). In addition, Hilcorp recorded one sighting of a harbor seal in 2021 and three sightings of harbor seals in 2023 from their aerial and rig-based monitoring efforts in the project area (Korsmo et al. 2022; Horsley and Larson, 2023).

Harbor Porpoise

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

The Gulf of Alaska stock, which includes individuals in Cook Inlet, is currently estimated at 31,046 individuals (Young et al. 2023). Dahlheim et al. (2000) estimated abundance and density of harbor porpoises in Cook Inlet from surveys conducted in the early 1990s. The estimated density of animals in Cook Inlet was 7.2 per 1,000 km^2, with an abundance estimate of 136 (Dahlheim et al. 2000), indicating that only a small number use Cook Inlet. Hobbs and Waite (2010) estimated a harbor porpoise density in Cook Inlet of 13 per 1,000 km^2 from beluga whale aerial surveys in the late 1990s. Neither of these surveys included coastlines, which have been documented to be used heavily by harbor porpoises (Shelden et al. 2014).

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 of harbor porpoises comprising 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). A total of 29 sightings (44 individuals) were observed north of the Forelands from May to September during the CIPL Extension Project (Sitkiewicz et al. 2018). Hilcorp also observed two harbor porpoises in 2021 (Korsmo and Larson, 2022) and one harbor porpoise in 2023 (Horsley and Larson, 2023). 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, 2022c). Hilcorp recorded one sighting of a harbor porpoise from their rig-based monitoring efforts in the project area in 2023 (Horsley and Larson, 2023). Passive acoustic research in Cook Inlet by the ADF&G and the NMFS Marine Mammal Laboratory have indicated that harbor porpoises occur more frequently than expected, particularly in the West Foreland area in the spring (Castellote et al. 2016), although overall numbers are still unknown at this time.

Dall's Porpoise

Dall's porpoises are widely distributed across the north Pacific. In Alaska, the Dall's porpoise range includes lower Cook Inlet, but very few sightings have been reported in upper Cook Inlet. Dall's porpoises have been observed in lower Cook Inlet, around Kachemak Bay, and rarely near 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). No Dall's porpoises were observed during the CIPL project monitoring program in middle Cook Inlet in 2018 (Sitkiewicz et al. 2018). 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). Hilcorp recorded three sightings of Dall's porpoises in 2021 and one sighting of a Dall's porpoise in 2023 from their rig-based monitoring efforts in the project area (Korsmo et al. 2022; Horsley and Larson, 2023).

Killer Whale

Three distinct ecotypes of killer whale are found in the northeastern Pacific Ocean: resident, transient, and offshore killer whales. Two stocks have the potential to be in the Project area, the Eastern North Pacific Alaska Residents and the Gulf of Alaska, Aleutian Islands, and Bering Sea Transients. Both ecotypes overlap in the same geographic area; however, they maintain social and reproductive isolation and feed on different prey species. The population of the Eastern North Pacific Alaska Resident stock of killer whales contains an estimated 2,347 animals and the Gulf of Alaska, Aleutian Islands, and Bering Sea Transient stock of killer whales is estimated to contain 587 animals (Muto et al. 2022).

Numbers of killer whales in Cook Inlet are small compared to the overall population and most are recorded in the lower Cook Inlet (Shelden et al. 2013). Killer whales are rare in upper Cook Inlet, where transient killer whales are known to feed on beluga whales, and resident killer whales are known to feed on anadromous fish (Shelden et al. 2003). Killer whales have been sighted near Homer and Port Graham in lower Cook Inlet (Shelden et al. 2003, 2022; Rugh et al. 2005a). 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. 2005a). 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 four 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). Very few killer whales, if any, are expected to approach or be in the vicinity of the operation areas.

Pacific White-Sided Dolphin

Pacific white-sided dolphins are a pelagic species. They are found throughout the temperate North Pacific Ocean, north of the coasts of Japan and Baja California, Mexico (Muto et al. 2018). They are most common between the latitudes of 38° North and 47° North (from California to Washington). The distribution and abundance of Pacific white-sided dolphins may be affected by large-scale oceanographic occurrences, such as El Niño.

Pacific white-sided dolphins are common in the Gulf of Alaska's pelagic waters and Alaska's nearshore areas, British Columbia, and Washington (Ferrero and Walker 1996, as cited in Muto et al. 2022). They do not typically occur in Cook Inlet, but in 2019, Castellote et al. (2020) documented short durations of Pacific white-sided dolphin presence using passive acoustic recorders near Iniskin Bay (6 minutes) and at an offshore mooring located approximately midway between Port Graham and Iniskin Bay (51 minutes). Detections of vocalizations typically lasted on the order of minutes, suggesting the animals did not remain in the area and/or continue vocalizing for extended durations. Visual monitoring conducted during the same period by marine mammal observers on seismic vessels near the offshore recorder did not detect any Pacific white-sided dolphins (Fairweather Science 2020). These observational data, combined with anecdotal information, indicate that there is a small potential for Pacific white-sided dolphins to occur in the Project area. On May 7, 2014, Apache Alaska observed three Pacific white-sided dolphins during an aerial survey near Kenai. This is one of the only recorded visual observations of Pacific white-sided dolphins in Cook Inlet; they have not been reported in groups as large as those estimated in other parts of Alaska (Muto et al. 2022).

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).

Gray Whale

There are two populations of gray whales present in the North Pacific: the Western North Pacific Stock and the Eastern North Pacific Stock (Carretta et al. 2023). The current stock structure for gray whales in the Pacific has been in the process of being re-examined for a number of years and remains uncertain as of the most recent (2022) Pacific SAR (Carretta et al. 2023); gray whales are not addressed in the Alaska SAR (Young 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).

The Western North Pacific Stock of gray whales is listed as endangered, and no critical habitat has been designated for this species. The Eastern North Pacific Stock recovered from whaling exploitation, was delisted under the ESA in 1994 and is not considered depleted (Carretta et al. 2023). Western North Pacific gray whales are not known to feed in or travel to upper Cook Inlet (Conant and Lohe 2023; Weller et al. 2023). Gray whales near the project area are assumed to be from the Eastern North Pacific 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 are infrequent visitors to Cook Inlet, but may be seasonally present during spring and fall in the lower inlet (BOEM 2021). Migrating gray whales pass through the inlet during their spring and fall

migrations to and from their primary summer feeding areas in the Bering, Chukchi, and Beaufort seas (Swartz 2018; Carretta et al. 2019; Silber et al. 2021; BOEM 2021). Several surveys and monitoring programs have sighted gray whales in lower Cook Inlet (Shelden et al. 2013; Owl Ridge 2014; Lomac-MacNair et al. 2013, 2014; Kendall et al. 2015, as cited in Weston and SLR 2022). Gray whales are occasionally seen in mid- and upper Cook Inlet, Alaska, but they are not common. Though most gray whales migrate past Cook Inlet, some gray whales have been observed by fishermen near Kachemak Bay and along the coastline north of Anchor Point (BOEM, 2015). During NMFS aerial surveys conducted in June 1994, 2000, 2001, 2005, and 2009 gray whales were observed in Cook Inlet near Port Graham and Elizabeth Island as well as near Kamishak Bay, with one gray whale observed as far north as the Beluga River (Shelden et al. 2013). Gray whales were also observed offshore of Cape Starichkof in 2013 by marine mammal observers monitoring Buccaneer's Cosmopolitan drilling project (Owl Ridge, 2014) and in middle Cook Inlet in 2014 during the 2014 Apache 2D seismic survey (Lomac-MacNair et al. 2015). Several projects performed in Cook Inlet in recent years reported no observations of gray whales. These project activities included the SAE seismic survey in 2015 (Kendall and Cornick, 2015), the 2018 CIPL Extension Project (Sitkiewicz et al. 2018), the 2019 Hilcorp seismic survey in lower Cook Inlet (Fairweather Science, 2020), and Hilcorp's 2023 aerial and rig-based monitoring efforts.

In 2020, a young male gray whale was stranded in the Twentymile River near Girdwood for over a week before swimming back into Turnagain Arm. The whale did not survive and was found dead in west Cook Inlet later that month (NMFS 2020a). 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. Gray whales are rarely encountered in the project area.

California Sea Lion

California sea lions are distributed along the north Pacific waters from central Mexico to southeast Alaska, with breeding areas restricted primarily to island areas off southern California (the Channel Islands), Baja California, and in the Gulf of California (Wright et al. 2010). The population is comprised of five genetically distinct populations: the United States population that breeds on offshore islands in California; the western Baja California population that breeds offshore along the west coast of Baja California, Mexico; and three populations (southern, central, and northern) that breed in the Gulf of California, Mexico. Males migrate long distances from the colonies during the winter whereas females and juveniles remain close to the breeding areas.

California sea lions are very rare in Cook Inlet and typically are not observed farther north than southeast Alaska. However, NMFS' anecdotal sighting database contains four California sea lion sightings in Seward and Kachemak Bay. In addition, an industry survey report contains a sighting of two California sea lions in lower Cook Inlet; however, it is unclear if these animals were indeed California sea lions or mis-identified Steller sea lions (SAE, 2012). No California sea lions were sighted during the 2019 Hilcorp lower Cook Inlet seismic survey (Fairweather Science 2020), the CIPL project in 2018 (Sitkiewicz et al. 2018), or the 2023 Hilcorp aerial or rig-based monitoring efforts (Horsley and Larson, 2023).