PROPOSED ACTION:	Issuance of an Incidental Harassment Authorization to Furie Operating Alaska LLC (Furie) for the Take of Marine Mammals Incidental to a 3D Seismic Survey in Cook Inlet, Alaska.
TYPE OF STATEMENT:	Environmental Assessment
LEAD AGENCY:	U.S. Department of Commerce National Oceanic and Atmospheric Administration National Marine Fisheries Service
RESPONSIBLE OFFICIAL:	Donna S. Wieting, Director Office of Protected Resources, National Marine Fisheries Service
FOR FURTHER INFORMATION:	Brian D. Hopper National Marine Fisheries Service Office of Protected Resources Permits and Conservation Division 1315 East West Highway Silver Spring, MD 20910 301-427-8401
LOCATION:	Cook Inlet, Alaska.
ABSTRACT:	This Environmental Assessment analyzes the environmental impacts of the National Marine Fisheries Service, Office of Protected Resources proposal to issue an Incidental Harassment Authorization to Furie Operating Alaska LLC, pursuant to section 101(a)(5)(D) of the Marine Mammal Protection Act, for the take of small numbers of marine mammals incidental to conducting a 3D seismic survey in Cook Inlet, Alaska.
DATE:	July 2014

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LIST OF ACRONYMS AND ABBREVIATIONS

3D	three dimensional
ADF&G	Alaska Department of Fish and Game
ADCCE	Alaska Department of Commerce, Community, and Economic
ADNR	Alaska Department of Natural Resources
AKRO	Alaska Regional Office
ANO	Alaska Native Organization
Apache	Apache Alaska Corporation
Authorization	Incidental Harassment Authorization
BOEM	Bureau of Ocean Energy Management
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CIMMC	Cook Inlet Marine Mammal Council
cui	cubic inches
dB re 1 μPa	decibel referenced to one microPascal
EA	Environmental Assessment
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
ESA	Endangered Species Act
EZ	Exclusion Zone
FONSI	Finding of No Significant Impact
ft	feet
FR	Federal Register
Furie	Furie Operating Alaska
Hz	Hertz
JBER	Joint Base Elmendorf-Fort Richardson
KABATA	Knik Arm Bridge and Toll Authority
KLU	Kitchen Lights Unit
km	kilometer
km^2	square kilometer
LOA	Letters of Authorization
m	meter
mi	miles
mi^2	square miles
m^3/sec	cubic meters per second
MHHW	Mean Higher High Water
MMPA	Marine Mammal Protection Act
NAO	NOAA Administrative Order
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service

NMML	National Marine Mammal Laboratory
NOAA	National Oceanic and Atmospheric Administration
OMB	Office of Management and Budget
OPR	Office of Protected Resources
PAM	Passive Acoustic Monitoring
PR1	Permits, Conservation and Educational Division
PRD	Protected Resources Division
PSO	Protected Species Observer
rms	root-mean-squared

Chapter 1 Introduction and Purpose and Need

1.1. Description of Proposed Action

The Marine Mammal Protection Act (MMPA) generally prohibits the taking of marine mammals. The take of a marine mammal falls under three categories: mortality, serious injury, or harassment, which includes injury and behavioral effects. The MMPA defines harassment as any act of pursuit, torment, or annoyance which: (1) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (2) 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). There are exceptions to the MMPA's prohibition on take such as the authority at issue here for us to authorize the incidental taking of small numbers of marine mammals by harassment upon the request of a U.S. citizen, provided we follow certain statutory and regulatory procedures and make determinations. We describe this exception set forth in the MMPA at Section 101(a)(5)(D) in more detail in Section 1.2.

We propose to issue an Incidental Harassment Authorization (Authorization) to Furie Operating Alaska LLC (Furie) under the MMPA for the incidental taking of small numbers of marine mammals, incidental to the conduct of a three dimensional (3D) seismic survey in Cook Inlet, Alaska. We do not have the authority to permit, authorize, or prohibit Furie's seismic survey activities under Section 101(a)(5)(D) of the MMPA, as that authority lies with a different Federal agency.

Our proposed action is a direct outcome of the applicant requesting authorization under Section 101(a)(5)(D) of the MMPA to take marine mammals, by harassment, incidental to conducting a 3D seismic survey because the activity has the potential to take marine mammals by exposing them to noise originating from the seismic airgun arrays used for seismic data acquisition. We anticipate that the acoustic stimuli associated with the activity may result in take otherwise prohibited by the MMPA. Therefore, the applicant requires an Authorization for incidental take and has requested that we provide it through the issuance of an Incidental Harassment Authorization under section 101(a)(5)(D) of the MMPA.

Our issuance of the Authorization to the applicant is a major federal action under the National Environmental Policy Act (NEPA), the Council on Environmental Quality (CEQ) regulations in 40 CFR §§ 1500-1508, and NOAA Administrative Order (NAO) 216-6. Thus, we are required to analyze the effects on the human environment and determine whether they are significant such that preparation of an Environmental Impact Statement (EIS) is necessary.

This Environmental Assessment (EA), titled "*Issuance of Incidental Harassment Authorization to Furie Operating Alaska LLC (Furie) for the Take of Marine Mammals Incidental to a 3D Seismic Survey in Cook Inlet, Alaska*," (hereinafter, Furie EA) addresses the potential environmental impacts of three alternatives available to us under section 101(a)(5)(D) of the MMPA, namely:

- Issue the Authorization for Level B harassment take of marine mammals under the MMPA during the 3D seismic survey, taking into account the prescribed means of take, mitigation measures, and monitoring requirements required in the proposed Authorization;

- Not issue the Authorization. In which case, for the purposes of NEPA analysis only, we assume that the activity would proceed and cause incidental take without the mitigation and monitoring measures prescribed in the proposed Authorization; or
- Issue the Authorization for Level B harassment take of marine mammals under the MMPA during the activity by incorporating additional required mitigation measures.

1.1.1. Background on the Furie MMPA Application

Furie proposes to conduct a 3D seismic survey in Cook Inlet, Alaska. The activity would occur for approximately four months between July and November 2014, although NMFS proposes to issue to Authorization for one year until July 2015 in case Furie needs additional time to complete the survey. 3D Seismic surveys map subsurface geologic structures and stratigraphic features with the intention of locating deposits of oil and gas. This is the first section 101(a)(5)(D) MMPA Authorization request from Furie for takes of marine mammals incidental to seismic surveying in Cook Inlet. Acoustic stimuli generated by the seismic airgun array have the potential to cause behavioral disturbances to marine mammals in the proposed project area.

1.1.2.Marine Mammals in the Action Area

The proposed seismic survey could adversely affect the following marine mammal species under our jurisdiction:

- Cook Inlet beluga whale (*Delphinapterus leucas*)
- Harbor seal (*Phoca vitulina richardsi*)
- Killer whale (*Orcinus orca*)
- Harbor porpoise (*Phocoena phocoena*)
- Steller sea lion (*Eumetopias jubatus*)
- Gray whale (*Eschrichtius robustus*)

1.2. Purpose and Need

The MMPA prohibits "take" of marine mammals, with a number of specific exceptions. The applicable exception in this case is an authorization for incidental take of marine mammals in section 101(a)(5)(D) of the MMPA.

Section 101(a)(5)(D) of the MMPA directs the Secretary of Commerce (Secretary) to authorize, upon request, the incidental, but not intentional, take of small numbers of marine mammals of a species or population stock, by United States citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if we make certain findings and provide a notice of a proposed authorization to the public for review. Entities seeking to obtain authorization for the incidental take of marine mammals under our jurisdiction must submit such a request (in the form of an application) to us.

We have issued regulations to implement the Incidental Take Authorization provisions of the MMPA (50 CFR Part 216) and have produced Office of Management and Budget (OMB)-approved application instructions (OMB Number 0648-0151) that prescribe the procedures necessary to apply for authorizations. All applicants must comply with the regulations at 50 CFR § 216.104 and submit applications requesting incidental take according to the provisions of the MMPA.

Purpose: The primary purpose of our proposed action—the issuance of the Authorization to Furie—is to authorize (pursuant to the MMPA) the take of marine mammals incidental to the proposed activity. The Authorization, if issued, would exempt the applicant from the take prohibitions contained in the MMPA.

To authorize the take of small numbers of marine mammals in accordance with Section 101(a)(5)(D) of the MMPA, we must evaluate the best available scientific information to determine whether the take would have a negligible impact on marine mammals or stocks and not have an unmitigable impact on the availability of affected marine mammal species for certain subsistence uses. We cannot issue an Authorization if it would result in more than a negligible impact on marine mammal species or stocks or if it would result in an unmitigable impact on subsistence.

In addition, we must prescribe, where applicable, the permissible methods of taking and other means of effecting the least practicable impact on the species or stocks of marine mammals and their habitat (i.e., mitigation), paying particular attention to rookeries, mating grounds, and other areas of similar significance. If appropriate, we must prescribe means of effecting the least practicable impact on the availability of the species or stocks of marine mammals for subsistence uses. The Authorization must also include requirements or conditions pertaining to the monitoring and reporting of such taking in large part to better understand the effects of such taking on the species. Also, we must publish a notice of a proposed Authorization in the *Federal Register* for public notice and comment.

The purpose of this action is therefore to determine whether the take resulting from the seismic survey would have a negligible impact on affected marine mammal species or stocks, would not have an unmitigable adverse impact on the availability of marine mammals for taking for subsistence uses, and develop mitigation and monitoring measures to reduce the potential impacts.

Need: NMFS has determined that the applicant has submitted an adequate and complete application demonstrating both the need and potential eligibility for issuance of an Authorization in connection with the activities described in section 1.1.1. We now have a corresponding duty to determine whether and how we can authorize take by Level B harassment incidental to the activities described in the application. Our responsibilities under section 101(a)(5)(D) of the MMPA and its implementing regulations establish and frame the need for this proposed action.

Any alternatives considered under NEPA must meet the agency's statutory and regulatory requirements. Our described purpose and need guide us in developing reasonable alternatives for consideration, including alternative means of mitigating potential adverse effects. This EA presents a no-action alternative and two action alternatives.

1.3. The Environmental Review Process

NEPA compliance is necessary for all "major" federal actions with the potential to significantly affect the quality of the human environment. Major federal actions include activities fully or partially funded, regulated, conducted, authorized, or approved by a federal agency. Because our issuance of the Authorization would allow for the taking of marine mammals consistent with provisions under the MMPA and incidental to the applicant's activity, we consider this as a major federal action subject to NEPA.

Under the requirements of NAO 216-6 section 6.03(f)(2)(b) for incidental harassment authorizations, we prepared this EA to determine whether the direct, indirect and cumulative impacts related to the issuance of the Authorization for incidental take of marine mammals under the MMPA during the conduct of Furie's seismic survey in Cook Inlet, Alaska, could be significant. If we deem the potential impacts to be not significant, this analysis, in combination with other analyses incorporated by reference, will support the issuance of a Finding of No Significant Impact (FONSI) for the proposed Authorization.

1.3.1. Laws, Regulations, or Other NEPA Analyses Influencing the EA's Scope

We have based the scope of the proposed action and nature of the three alternatives (i.e., issue the Authorization including prescribed means of take, mitigation measures, and monitoring requirements; not issue the Authorization; or issue the Authorization with additional mitigation measures) considered in this EA on the relevant requirements in section 101(a)(5)(D) of the MMPA. Thus, our authority under the MMPA bounds the scope of our alternatives. We conclude that this analysis—when combined with the analyses in the following documents—fully describes the impacts associated with the proposed seismic survey with mitigation and monitoring for marine mammals. After conducting an independent review of the information and analyses for sufficiency and adequacy, we incorporate by reference the relevant analyses of the applicants' proposed actions as well as a discussion of the affected environment and environmental consequences within the following documents per 40 CFR 1502.21 and NAO 216-6 § 5.09(d):

- our notice of the proposed Authorization in the *Federal Register* (79 FR 12160, March 4, 2014);
- *Application for Incidental Harassment Authorization for Furie Operating Alaska 3D Seismic Program Cook Inlet Alaska* (Jacobs, 2013);
- *Final Supplemental Environmental Impact Statement—Cook Inlet Beluga Whale Harvest* (NMFS, 2008a);
- *Final Conservation Plan for the Cook Inlet Beluga Whale (Delphinapterus leucas)* (NMFS, 2008b);
- *Recovery Plan for the Steller Sea Lion* (*Eumatopia jubatus*) (NMFS, 2008c);
- *Alaska Marine Mammal Stock Assessments* (Allen and Angliss, 2013); and
- Endangered Species Act Consultation completed July 2014: *Section 7 Biological Opinion for 3D Seismic Surveys off Cook Inlet, Alaska by Furie Operating Alaska* (NMFS, 2014).

MMPA APPLICATION AND NOTICE OF THE PROPOSED AUTHORIZATION

The CEQ regulations (40 CFR §1502.25) encourage federal agencies to integrate NEPA's environmental review process with other environmental review laws. We rely substantially on the public process for developing proposed Authorizations and evaluating relevant environmental information and provide a meaningful opportunity for public participation as we develop corresponding EAs. We fully consider public comments received in response to our publication of the notice of proposed Authorization during the corresponding NEPA process.

On March 4, 2014, we published a notice of proposed Authorization in the *Federal Register* (79 FR 12160), which included the following:

- a detailed description of the proposed action and an assessment of the potential impacts on marine mammals and the availability of marine mammals for subsistence uses; plans for Furie's mitigation and monitoring measures to avoid and minimize potential adverse impacts to marine mammals and their habitat and proposed reporting requirements; and
- our preliminary findings.

We considered Furie's proposed mitigation and monitoring measures that would effect the least practicable impact on marine mammals including: (1) establishing a 160-dB radius disturbance zone for all marine mammals and establishing 180- and 190-dB radii safety zones for cetaceans and pinnipeds, respectively; (2) monitoring by protected species observers (PSOs) for any marine mammals that would enter the disturbance and safety zones; (3) power-down of acoustic sources if any marine mammal is sighted within or is about to enter the applicable disturbance zone; (4) shut down of acoustic sources if any marine mammals is sighted within or is about to enter the applicable safety zone; (5) ramping up sound sources before the survey; and (6) shut-downs whenever concentrations of four or more individual of any whale species or Steller sea lion, or beluga cow/calf pairs are observed approach or within the 160-dB disturbance zone around the proposed activity. Through the MMPA process, we preliminarily determined— provided that Furie implements the required mitigation and monitoring measures —that the impact on marine mammals of conducting the proposed 3D seismic survey in Cook Inlet, Alaska would result, at worst, in a modification in behavior and/or low-level physiological effects (Level B harassment) of some individuals of certain species of marine mammals. Also through that process, we determined that the activity would not have an unmitigable adverse impact on the availability of marine mammals for subsistence uses.

Within our notice, we requested that the public submit comments, information, and suggestions concerning Furie's request, the content of our proposed Authorization, and potential environmental effects related to the proposed issuance of the Authorization.

In summary, our preliminary MMPA analyses concluded that with incorporation of monitoring and mitigation measures proposed by Furie, the authorized take of marine mammals may result in minor, short-term (recoverable) adverse effects on individual marine mammals. The seismic air guns do not operate continuously over a 24-hour period, but operate for a few hours at a time during slack tide totaling about 12 hours per day. As a result, the frequency and duration of the harassment from the seismic survey should allow adequate time for the marine mammals to recover from potentially adverse effects. The area where the survey will take place is not known to be an important location where marine mammals congregate for feeding, calving, or nursing. The seismic survey conducted by Furie will occur in a different location at a later time than the survey being conducted by Apache Alaska Corporation (Apache) under an IHA issued by NMFS in March 2014 (79 FR 13626, March 11, 2014). Both Furie and Apache rely on the same contractor and the same equipment to conduct the seismic survey, so operations will not occur concurrently. Therefore, the preliminary MMPA analysis concluded that NMFS did not expect that additive or cumulative effects of the seismic survey on its own or in combination with other activities would occur. Finally, the preliminary MMPA analyses did not identify any significant environmental issues or impacts.

1.3.2. Scope of Environmental Analysis

Given the limited scope of the decision for which we are responsible (*i.e.*, issue the Authorization including prescribed means of take, mitigation measures, and monitoring requirements; not issue the Authorization; or issue the Authorization with additional mitigation measures) this EA provides focused information on the primary issues and impacts of environmental concern related specifically to our issuance of the Authorization. This EA does not further evaluate effects to the elements of the human environment listed in Table 1 because previous environmental reviews, incorporated by reference (NMFS 2008a,b,c, 2013a,b) have shown that our limited action of issuing an Authorization to Furie or the underlying action of or Furie's proposed operation would not significantly affect those components of the human environment.

Table 1. Components of the human environment not affected by our issuance of the Authorization.

Biological	Physical	Socioeconomic / Cultural
Amphibians	Air Quality	Commercial Fishing
Humans	Essential Fish Habitat	Military Activities
Non-Indigenous Species	Geography	Oil and Gas Activities
Seabirds	Land Use	Recreational Fishing
	Oceanography	Shipping and Boating
	State Marine Protected Areas	National Historic Preservation Sites
	Federal Marine Protected Areas	National Trails and Nationwide Inventory of Rivers
	National Estuarine Research Reserves	Low Income Populations
	National Marine Sanctuaries	Minority Populations
	Park Land	Indigenous Cultural Resources
	Prime Farmlands	Public Health and Safety
	Wetlands	Historic and Cultural Resources
	Wild and Scenic Rivers	
	Ecologically Critical Areas	

1.3.3. NEPA Public Scoping Summary

NAO 216-6 established agency procedures for complying with NEPA and the implementing NEPA regulations issued by the CEQ. Consistent with the intent of NEPA and the clear direction in NAO 216-6 to involve the public in NEPA decision-making, we requested comments on the potential environmental impacts described in the applicant's MMPA application and in the *Federal Register* notice of the proposed Authorization. The CEQ regulations further encourage agencies to integrate the NEPA review process with review under the environmental statutes. Consistent with agency practice we integrated our NEPA review and preparation of this EA with the public process required by the MMPA for the proposed issuance of an Authorization.

The *Federal Register* notice of the proposed Authorization, combined with our preliminary determinations, supporting analyses, and corresponding public comment period are instrumental in providing the public with information on relevant environmental issues and offering the public a

meaningful opportunity to provide comments to us for consideration in both the MMPA and NEPA decision-making processes.

The *Federal Register* notice of the proposed Authorization summarized our proposed action; stated that we would prepare an EA for the proposed action; and invited interested parties to submit written comments concerning the application and our preliminary analyses and findings including those relevant to consideration in the EA. The notice of the proposed Authorization was made available for public review and comment.

1.3.4. Relevant Comments on Our *Federal Register* Notice

During the 30-day public comment period on the notice of the proposed Authorization, we received comment letters from the following: the Natural Resources Defense Council (NRDC); the Marine Mammal Commission (MMC); the Alaska Inter-Tribal Council; and Furie.

We have considered the comments regarding monitoring and mitigation measures within the context of the MMPA requirement to effect the least practicable impact on marine mammals and their habitat and on subsistence uses of marine mammals.

We will provide our response to the public comment letters in the *Federal Register* notice announcing the final determination on whether to issue or deny the Authorization. We fully considered all of the public comments in preparing the final Authorization and this EA. Where appropriate, changes to the proposed Authorization that resulted from public comments have been incorporated into this EA.

1.4. Other Permits, Licenses, or Consultation Requirements

This section summarizes applicable federal, state, and local permits, licenses, approvals, and consultation requirements necessary to implement the proposed action.

1.4.1. Endangered Species Act

Section 7 of the ESA and implementing regulations at 50 CFR §402 require consultation with the appropriate federal agency (either NMFS or the U.S. Fish and Wildlife Service) for federal actions that "may affect" a listed species or critical habitat. NMFS' issuance of an Authorization affecting ESA-listed species or designated critical habitat, directly or indirectly, is a federal action subject to these section 7 consultation requirements. Accordingly, NMFS is required to ensure that its action is not likely to jeopardize the continued existence of any threatened or endangered species or result in destruction or adverse modification of critical habitat for such species.

There are two marine mammal species under NMFS' jurisdiction listed as endangered under the ESA with confirmed or possible occurrence in the proposed project area (i.e., Cook Inlet): the Cook Inlet beluga whale and the Steller sea lion. Additionally, the proposed action falls within designated critical habitat for the Cook Inlet beluga whale. The NMFS Office of Protected Resources (OPR) Permits and Conservation Division (PR1) initiated consultation with the NMFS Alaska Regional Office (AKRO) Protected Resources Division (PRD) on the issuance of this and other similar Authorizations under Section 101(a)(5)(D) of the MMPA, because the action of issuing the Authorization may affect endangered species under NMFS' jurisdiction.

1.4.2. Marine Mammal Protection Act

The MMPA and its provisions that pertain to the proposed action are discussed above in sections 1.1 and 1.2.

1.4.3. Magnuson-Stevens Fishery Conservation and Management Act

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

Chapter 2 Alternatives

2.1. Introduction

The NEPA and the implementing CEQ regulations (40 CFR §§ 1500-1508) require consideration of alternatives to proposed major federal actions and NAO 216-6 provides agency policy and guidance on the consideration of alternatives to our proposed action. An EA must consider all reasonable alternatives, including Alternative 1 (Preferred Alternative). It must also consider the No Action Alternative, even if it that alternative does not meet the stated purpose and need. This provides a baseline analysis against which we can compare the other alternatives.

To warrant detailed evaluation as a reasonable alternative, an alternative must meet our purpose and need. In this case, as we previously explained in Chapter 1 of this EA, an alternative only meets the purpose and need if it satisfies the requirements under section 101(a)(5)(D) the MMPA. We evaluated each potential alternative against these criteria; identified two action alternatives along with the No Action Alternative; and carried these forward for evaluation in this EA.

Alternatives 1 and 3 include a suite of mitigation measures intended to minimize potentially adverse interactions with marine mammals. This chapter describes both alternatives and compares them in terms of their environmental impacts and their achievement of objectives.

As described in Section 1.2.1, we must prescribe the means of effecting the least practicable impact on the species or stocks of marine mammals and their habitat. In order to do so, we must consider Furie's proposed mitigation measures, as well as other potential measures, and assess how such measures could benefit the affected species or stocks and their habitat. Our 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, we expect 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.

Any additional mitigation measure proposed by us beyond what the applicant proposes should be able to or have a reasonable likelihood of accomplishing or contributing to the accomplishment of one or more of the following goals:

- Avoidance or minimization of marine mammal injury, serious injury, or death wherever possible;
- A reduction in the numbers of marine mammals taken (total number or number at biologically important time or location);
- A reduction in the number of times the activity takes individual marine mammals (total number or number at biologically important time or location);
- A reduction in the intensity of the anticipated takes (either total number or number at 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 directly related to mitigation, an increase in the probability of detecting marine mammals, thus allowing for more effective implementation of the mitigation.

2.2. Description of Furie's Proposed Activities

We presented a general overview of Furie's proposed 3D seismic survey operations in our *Federal Register* notice of proposed Authorization (79 FR 12160, March 4, 2014). The descriptions were revised based on public comments received in response to the notice of proposed Authorization. We incorporate those descriptions, as revised, by reference in this EA and briefly summarize them here.

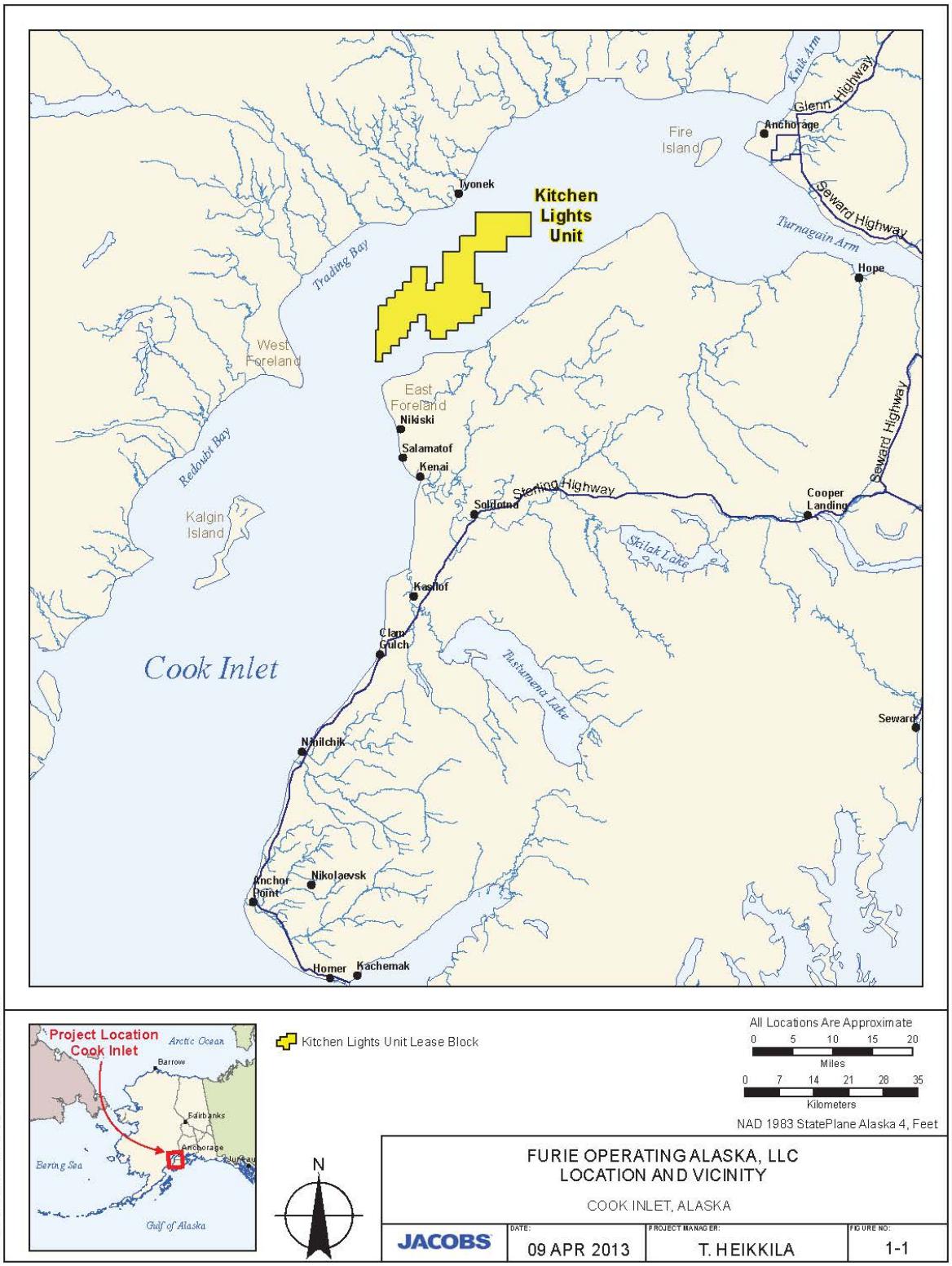
2.2.1. Specified Time and Specified Area

Furie proposes to conduct seismic survey operations for approximately 4 months in intertidal and offshore areas in open water periods from July 2014 through July 2015. During each 24-hour period, seismic support activities may be conducted throughout the entire period; however, in-water airguns would only be active for approximately 2-3 hours during each of the slack tide periods. There are approximately four slack tide periods in a 24-hour period; therefore, airgun operations would be active during approximately 8-12 hours per day, if weather conditions allow.

Furie is the operator of the Kitchen Lights Unit (KLU) oil and gas lease area located in Cook Inlet, Alaska (Figure 1). The KLU encompasses an area of approximately 337 square kilometers (km^2) (130 square miles [mi^2]). The KLU is composed of four contiguous blocks of lease area: the Northern, Corsair (central), Southwestern, and Southeastern blocks. Furie plans to survey the Corsair block first, which has been identified as a priority survey area (Priority Area 1), followed by the Northern block (Priority Area 2), and the Southeastern and Southwestern blocks (Priority Areas 3a and 3b) (Figure 2). To acquire data from the entire KLU area, the proposed 3-D seismic survey will extend beyond the boundaries of the KLU, from approximately Tyonek at the northern extent to the East Foreland and West Foreland in the south, encompassing approximately 868 km^2 (335 mi^2) of intertidal and offshore areas (Figure 2). There are numerous factors relevant to identification of the the survey area, including the geology of the Cook Inlet area, other permitting restrictions (i.e., commercial fishing, Alaska Department of Fish and Game refuges), seismic imaging of leases held by other entities with whom Furie has agreements (e.g., data sharing), overlap of sources and receivers to obtain the necessary seismic imaging data, and general operational restrictions (ice, weather, environmental conditions, marine life activity, etc.). Water depths for the program range from 0-128 m (0-420 ft).

2.2.2. 3D Seismic Survey Operations

During the survey operation, vessels would lay and retrieve nodal sensors on the sea floor in periods of low current, or, in the case of the intertidal area, during high tide over a 24-hour period. Furie proposes to use two synchronized source vessels. Each source vessel would be equipped with compressors and airgun arrays with 2,400 cubic inch (in^3) capacity. Additionally, one of the source vessels would employ a 440 to 1,880 in^3 shallow water source array, which can be deployed at high tide in the intertidal area. The two source vessels would not fire the airguns simultaneously; rather, the vessels would discharge in an alternating pattern, with approximately 10-14 second interval between each discharge. The operation would utilize two source vessels, two to three cable/nodal deployment and retrieval operations vessels, two mitigation/monitoring vessels also used for navigation operations or other support, and one small vessel for personnel transport.



1-3

Figure 1. Kitchen Lights Unit Lease Block for Furie's 3D Seismic Survey Program

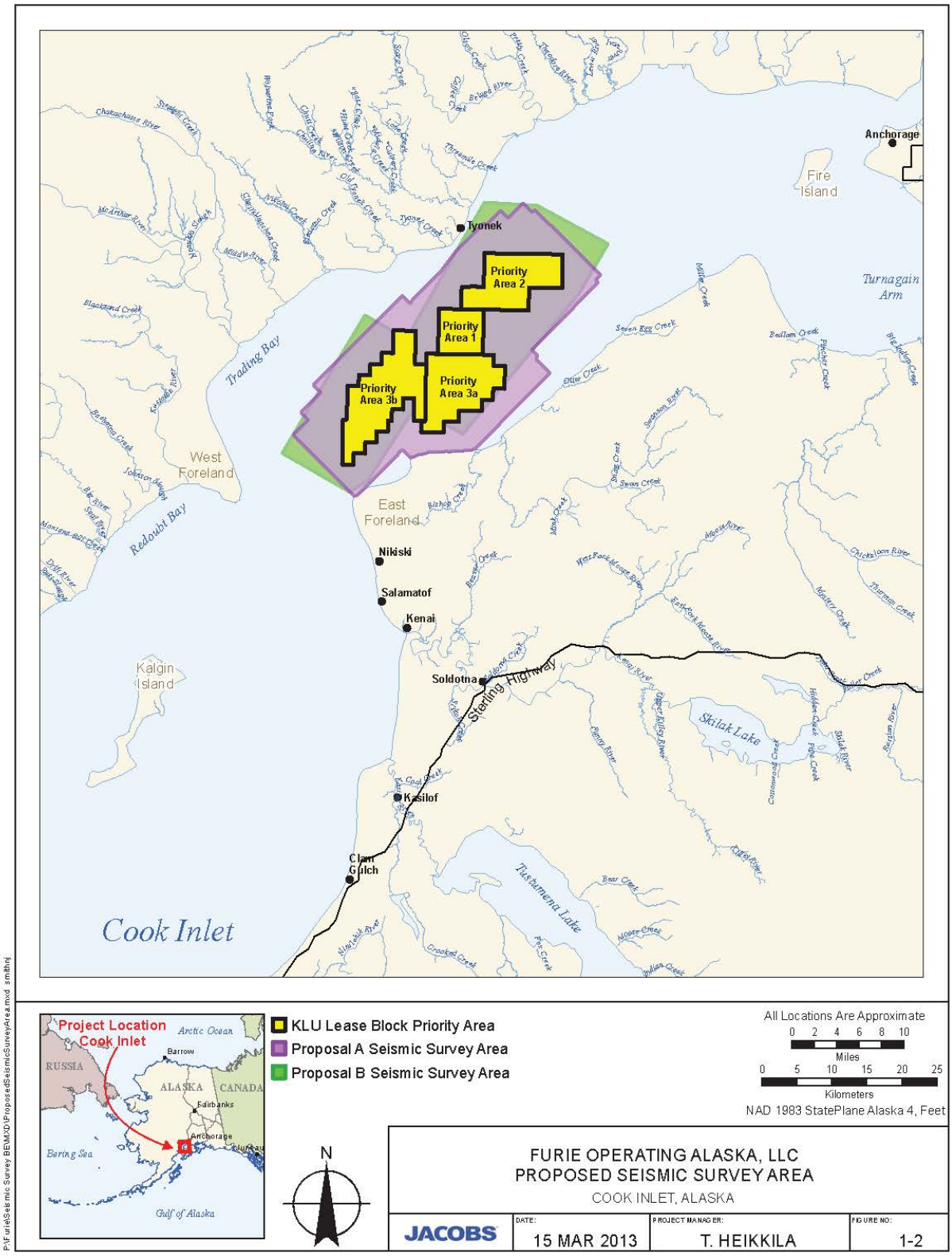


Figure 2. Proposed Project Area for Furie's 3D Seismic Survey Program

2.3. Description of Alternatives

2.3.1. Alternative 1 – Issuance of an Authorization with Mitigation Measures

The Proposed Action constitutes Alternative 1 and is the Preferred Alternative. Under this alternative, we would issue an Authorization (valid from July 2014 to July 2015) to Furie allowing the incidental take, by Level B harassment, of six species of marine mammals subject to the mandatory mitigation and monitoring measures and reporting requirements set forth in the proposed Authorization, as revised, if issued, along with any additions based on consideration of public comments.

Our *Federal Register* notice requesting comments on the proposed Authorization analyzed the potential impacts of this Alternative in detail. We incorporate those analyses by reference in this EA and briefly summarize the mitigation and monitoring measures and reporting requirements that we would incorporate in the final Authorization, if issued, in the following sections.

MITIGATION AND MONITORING MEASURES

To reduce the potential for disturbance from acoustic stimuli associated with the activities, Furie has proposed to implement several monitoring and mitigation measures for marine mammals. NMFS has proposed some additional measures. The proposed monitoring and mitigation measures include:

(1) Utilize a sufficient number of NMFS-qualified, vessel-based Protected Species Observers (PSOs) to visually watch for and monitor marine mammals near the seismic source vessels during daytime operations (from nautical twilight-dawn to nautical twilight-dusk) and before and during start-ups of sound sources day or night. At least one PSO would be on each source vessel, and at least one PSO would be on each support vessel to observe the safety and disturbance zones. When practicable, as an additional means of visual observation, Furie's vessel crew may also assist in detecting marine mammals.

(2) In addition to the vessel-based PSOs, when practicable and necessary, utilize a shore-based station to visually monitor for marine mammals when the 160 dB re 1 μPa (rms) disturbance zone includes the intertidal area within 1.6 km (1 mi) of shore . The shore-based PSOs would scan the area prior to, during, and after the survey operations involving the use of sound sources, and would be in contact with the vessel-based PSOs via radio to communicate sightings of marine mammals approaching or within the project area.

(3) When the 160 dB re 1 μPa (rms) disturbance zone of the full air gun array occurs within 1.6 km (1 mi) of a river mouth, aerial surveys shall be conducted to identify large congregations of beluga whales and harbor seal haul-outs.

(4) When operating north or east of a line from Tyonek across to the eastern side of Number 3 Bay of the Captain Cook State Recreation Area, Cook Inlet, Furie will fly daily aerial surveys (safety and weather permitting). Flight paths shall encompass areas from Anchorage, along the coastline of the Susitna Delta to Tyonek, across the inlet to Point Possession, around the coastline of Chickaloon Bay to Burnt Island, and across to Anchorage (or in reverse order).

(5) Weather and safety permitting, aerial surveys would fly at an altitude of 305 m (1,000 ft). In the event of a marine mammal sighting, aircraft would attempt to maintain a radial distance of 457 m

(1,500 ft) from the marine mammal(s). Aircraft would avoid approaching marine mammals from head-on, flying over or passing the shadow of the aircraft over the marine mammal(s).

(6) Establish a 160 dB re 1 μPa (rms) "disturbance zone," and 180 dB re 1 μPa (rms) and 190 dB re 1 μPa (rms) "safety zone" for marine mammals before the full array (2400 in^3 or less) is in operation; and a160 dB re 1 μPa (rms) "disturbance zone," and 180 dB re 1 μPa (rms) and 190 dB re 1 μPa (rms) "safety zone" before a single airgun (10 in^3) is in operation, respectively.

(7) Visually observe the entire extent of the disturbance zone (160 dB re 1 μPa [rms] for all marine mammals) using NMFS-qualified PSOs, for at least 30 minutes (min) prior to starting the airgun array (permitted only if the entire 160 dB re 1 μPa [rms] disturbance zone is visible). If the PSO detects a marine mammal within the disturbance zone, Furie must delay the seismic survey until the marine mammal(s) has left the area. If the PSO sees a marine mammal that surfaces, then dives below the surface, the PSO shall wait at least 15 minutes for species with shorter dive durations (small odontocetes and pinnipeds) or 30 minutes for species with longer dive durations (killer whales, beluga whales, and gray whales). If the PSO sees no marine mammals during that time, they should assume that the animal has moved beyond the disturbance zone. If for any reason the entire radius cannot be seen for the entire 30 min (i.e., rough seas, fog, darkness), or if marine mammals are near, approaching, or in the disturbance zone, the airguns may not be ramped-up.

(8) Implement a "ramp-up" procedure when starting up at the beginning of seismic operations or any time after the entire array has been shut down for more than 10 min, which means start the smallest sound source first and add sound sources in a sequence such that the source level of the array shall increase in steps not exceeding approximately 6 dB per 5-min period. During ramp-up, the PSOs shall monitor the disturbance zone, and if marine mammals are sighted, a power-down, or shutdown shall be implemented as though the full array were operational. Therefore, initiation of ramp-up procedures from a shutdown of greater than 10 minutes requires that the PSOs be able to visually observe the full disturbance zone as described above.

(9) Alter speed or course during seismic operations if a marine mammal, based on its position and relative motion, appears likely to enter the relevant disturbance zone. If speed or course alteration is not safe or practicable, or if after alteration the marine mammal still appears likely to enter the disturbance zone, further mitigation measures, such as a power-down or shutdown, shall be taken.

(10) Power-down or shutdown the sound source(s) defined. A shutdown means all operating sound sources are shut down (i.e., turned off). A power-down means reducing the number of operating sound sources to reduce the disturbance zone to the degree that the animal(s) is no longer in or about to enter it.

(11) Following a power-down, if the marine mammal approaches the disturbance zone of the smaller array (e.g., the 2.5 km radius of the 440 in^3 array), an additional power down will be implemented to further reduce the number of operational air guns (e.g., to a single 10 in3 air gun). If a marine mammal is sighted approaching or within the disturbance zone of the single 10 in^3 airgun, the sound sources must then be completely shut down. Seismic survey activity shall not resume until the PSO has visually observed the marine mammal(s) clear of the disturbance zone of the full array and is not likely to return, or has not been seen within the disturbance zone for 15 min for species with shorter

dive durations (small odontocetes and pinnipeds) or 30 min for species with longer dive durations (killer whales, beluga whales, and gray whales).

(12) Following a power-down or shutdown and subsequent animal departure, survey operations may resume following ramp-up procedures described above.

(13) Marine geophysical surveys may continue into night and low-light hours if such segment(s) of the survey is initiated when the entire relevant disturbance zone can be effectively monitored visually (i.e., PSO(s) must be able to see the extent of the entire relevant disturbance zone).

(14) No initiation of survey operations involving the use of sound sources is permitted from a shutdown position (lasting more than 10 minutes) at night or during low-light hours (such as in dense fog or heavy rain) unless the entire disturbance zone is visible and observed to be free of marine mammals for a consecutive 30-minute period.

(15) Whenever beluga cow/calf pairs or aggregations or groups of killer whales, beluga whales, gray whales, or Steller sea lions are detected approaching or within the 160-dB disturbance zone, survey activity will not commence or the sound source(s) shall be shut-down until the animals are no longer present within the 160-dB zone. An aggregation or group of whales/porpoises shall consist of four or more individuals of any age/sex class.

(16) If any marine mammals are visually sighted approaching or within the 160-dB disturbance zone, survey activity will not commence or the sound source(s) shall be powered down so the animals are no longer present within the 160-dB zone.

(17) If any marine mammals are visually sighted approaching or within the 180/190-dB safety zone, survey activity will not commence or the sound source(s) shall be shut down.

(18) Seismic survey operations involving the use of air guns and pingers must cease if the authorized number of takes of any marine mammal are met or exceeded.

(19) In cases when the 10 in^3 airgun would be used between active seismic data acquisition periods, the shot interval would be set to one shot per minute.

(20) Furie must not operate airguns within 10 miles (16 km) of the mean higher high water (MHHW) line of the Susitna Delta (Beluga River to the Little Susitna River) between mid-April and mid-October (to avoid any effects to belugas in an important feeding and potential breeding area).

Furie proposes to sponsor marine mammal monitoring during the present project, in order to implement the mitigation measures that require real-time monitoring and to satisfy the monitoring requirements of the Authorization. The PSOs would monitor the area for marine mammals, as described in Furie's application. Monitoring would be conducted from vessels, shore-based stations, and aerial platforms. Monitoring data would include the following:

(1) Species, group size, age/size/sex categories (if determinable), behavior when first sighted and after initial sighting, heading (if consistent), bearing and distance from seismic vessel, sighting cue, apparent reaction to the airguns or vessel (e.g., none, avoidance, approach, paralleling, etc., and including responses to ramp-up), and behavioral pace; and

(2) Time, location, heading, speed, activity of the vessel (including number of airguns operating and whether in state of ramp-up or power-down), Beaufort sea state and wind force, visibility, and sun glare. These data shall also be recorded at the start and end of each observation watch and during a watch whenever there is a change in one or more of the variables.

Passive Acoustic Monitoring

In the IHA NMFS issued in 2012, Apache was required to conduct passive acoustic monitoring (PAM) during survey operations. However, for reasons explained here, PAM was not considered practicable to require under this proposed Authorization. The passive acoustic monitoring plan for Apache's 2012 survey anticipated the use of a bottom-mounted telemetry buoy to broadcast acoustic measurements using a radio-system link back to a monitoring vessel. Although a buoy was deployed during the first week of surveying under the 2012 Authorization, it was not successful. Upon deployment, the buoy immediately turned upside down due to the strong current in Cook Inlet. After retrieval, the buoy was not redeployed and the survey used a single omni-directional hydrophone lowered from the side of the mitigation vessel. During the entire 2012 survey season, Apache's PAM equipment yielded only six confirmed marine mammal detections, one of which was a Cook Inlet beluga whale. The single Cook Inlet beluga whale detection did not, however, result in a shutdown procedure.

Additionally, Joint Base Elmendorf-Fort Richardson (JBER), National Marine Mammal Laboratory (NMML), and Alaska Department of Fish & Game (ADF&G) conducted a 2012 study (Gillespie et al. 2013) to determine if beluga whale observations at the mouth of Eagle River corresponded with acoustic detections received by a PAMBuoy data collection system. The PAMBuoy data collection system was deployed in the mouth of Eagle River from 12-31 August 2012. This study was a trial period conducted with one hydrophone at the mouth of the river. Overall, it was successful in detecting beluga whale echolocation clicks and whistles, but came with several limitations:

- The PAM system was able to reliably detect all whales approaching or entering the river but still performs less well than a human observer;
- Sounds from vessels in Cook Inlet (e.g. vessel noise) have a large chance of interfering with detections from PAM. The mouth of Eagle River has very little vessel traffic, which is likely why the study was successful there and not likely to be successful in Cook Inlet;
- PAM bouys could be a navigational hazard in Cook Inlet for commercial, subsistence, and sport fishing, as well as the commercial vessel traffic traveling thorough Cook Inlet;
- The limited testing in a very small area should not become the new standard of monitoring in the entire Cook Inlet. The tide, vessel traffic, bathymetry, and substrate of Cook Inlet are far more complex than the study area;
- It appears the hydrophone must be hardwired to the shore which is not practical for mobile marine seismic operations;
- Currently, deployment of the system is done by walking tripods onto the mudflats. This is not feasible for the vast majority of the Furie project area. Walking onto the mudflats in parts of Cook Inlet also poses a safety risk;

- The study found considerable investment would be necessary to develop an ice and debris proof mounting system. Other issues with hydrophone configuration include: at extreme low tides, the hydrophone was uncovered and therefore not usable; the hydrophone had to be located in such a position so that it could be occasionally visually inspected; hydrophone battery supply has to constantly be checked; the costs and practicalities of long-term hydrophone mounting and data transmission have not been determined; and only one hydrophone was tested, and Furie would need several hydrophones;
- Observer sightings and acoustic detections of belugas generally corresponded with one another. Thus PAM Buoys would be simply duplicating PSO and aerial efforts;
- The wireless modem that transmits the acoustic data to the "base station" was only tested to 3.2 km; and
- The study did not conclude anything about the detection range of the system, except that it was greater than 400 m.

Therefore, given the limited capability of various PAM methodologies for Furie's project in Cook Inlet (see Austin and Zeddies, 2012 for more information), as compared to visual monitoring methods, including expanded daily aerial surveys, the bottom-mounted telemetry buoy and omni-directional hydrophone are no longer considered practicable, and are not proposed to be a component of the 2014 seismic survey.

REPORTING MEASURES

Furie would submit a weekly field report, no later than close of business each Thursday during the weeks when in-water seismic survey activities take place. The field reports would summarize species detected, in-water activity occurring at the time of the sighting, behavioral reactions to in-water activities, and the number of marine mammals taken. Additionally, Furie would submit a monthly report, no later than the 15th of each month, to NMFS' Permits and Conservation Division for all months during which in-water seismic survey activities occur. These reports must contain and summarize the following information:

(1) Dates, times, locations, heading, speed, weather, sea conditions (including Beaufort sea state and wind force), and associated activities during all seismic operations and marine mammal sightings;
(2) Species, number, location, distance from the vessel, and behavior of any marine mammals, as well as associated seismic activity (number of power-downs and shutdowns), observed throughout all monitoring activities;
(3) An estimate of the number (by species) of: (A) pinnipeds that have been exposed to the seismic activity (based on visual observation) at received levels greater than or equal to 160 dB re 1 μPa (rms) and/or 190 dB re 1 μPa (rms) with a discussion of any specific behaviors those individuals exhibited; and (B) cetaceans that have been exposed to the seismic activity (based on visual observation) at received levels greater than or equal to 160 dB re 1 μPa (rms) and/or 180 dB re 1 μPa (rms) with a discussion of any specific behaviors those individuals exhibited.
(4) A description of the implementation and effectiveness of the: (A) terms and conditions of the Biological Opinion's Incidental Take Statement (ITS); and (B) mitigation measures of the Incidental Harassment Authorization. For the Biological Opinion, the report shall confirm the implementation of each Term and Condition, as well as any conservation recommendations, and

describe their effectiveness, for minimizing the adverse effects of the action on Endangered Species Act-listed marine mammals.

After conclusion of the seismic survey and the effective dates of the Authorization, Furie would submit a draft Technical Report on all activities and monitoring results to NMFS' Permits and Conservation Division within 90 days. The Technical Report would include:

(1) Summaries of monitoring effort (e.g., total hours, total distances, and marine mammal distribution through the study period, accounting for sea state and other factors affecting visibility and detectability of marine mammals);
(2) Analyses of the effects of various factors influencing detectability of marine mammals (e.g., sea state, number of observers, and fog/glare);
(3) Species composition, occurrence, and distribution of marine mammal sightings, including date, water depth, numbers, age/size/gender categories (if determinable), group sizes, and ice cover;
(4) Analyses of the effects of survey operations; and
(5) Sighting rates of marine mammals during periods with and without seismic survey activities (and other variables that could affect detectability), such as: (A) initial sighting distances versus survey activity state; (B) closest point of approach versus survey activity state; (C) observed behaviors and types of movements versus survey activity state; (D) numbers of sightings/individuals seen versus survey activity state; (E) distribution around the source vessels versus survey activity state; and (F) estimates of take by Level B harassment based on presence in the 160 dB disturbance zone.

NMFS would review the draft 90-day Technical Report. Furie must then submit a final report to the Chief, Permits and Conservation Division, Office of Protected Resources, NMFS, within 30 days after receiving comments from NMFS on the draft report. If NMFS decides that the draft report needs no comments, the draft report shall be considered to be the final report. In addition to these formal reports, Furie must immediately report to NMFS if 18 belugas are detected within the 160 dB re 1 μPa (rms) disturbance zone during seismic survey operations to allow NMFS to consider making necessary adjustments to monitoring and mitigation.

In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner not covered by this Authorization, such as an injury (Level A harassment), serious injury or mortality (e.g., ship-strike, gear interaction, and/or entanglement), Furie shall immediately cease the specified activities and immediately report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, her designees, and the Alaska Regional Stranding Coordinators. The report must include the following information:

(1) Time, date, and location (latitude/longitude) of the incident;
(2) The name and type of vessel involved;
(3) The vessel's speed during and leading up to the incident;
(4) Description of the incident;
(5) Status of all sound source use in the 24 hours preceding the incident;
(6) Water depth;
(7) Environmental conditions (e.g., wind speed and direction, Beaufort sea state, cloud cover, and visibility);

(8) Description of marine mammal observations in the 24 hours preceding the incident;
(9) Species identification or description of the animal(s) involved;
(10) The fate of the animal(s); and
(11) Photographs or video footage of the animal (if equipment is available).

Activities shall not resume until NMFS is able to review the circumstances of the prohibited take. NMFS shall work with Furie to determine what is necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. Furie may not resume its activities until notified by NMFS via letter or email, or telephone.

In the event that Furie discovers an injured or dead marine mammal, and the lead PSO determines that the cause of the injury or death is unknown and the death is relatively recent (i.e., in less than a moderate state of decomposition as described in the next paragraph), Furie would immediately report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, her designees, and the NMFS Alaska Stranding Hotline. The report must include the same information identified in the Condition 9(a) above. Activities may continue while NMFS reviews the circumstances of the incident. NMFS would work with Furie to determine whether modifications in the activities are appropriate.

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

In our *Federal Register* notice of proposed Authorization, which we incorporate by reference, we preliminarily determined that the measures included in the proposed Authorization were sufficient to reduce the effects of Furie's activity on marine mammals to the level of least practicable impact. In addition, we described our analysis of impacts and preliminarily determined that the taking of small numbers of marine mammals, incidental to Furie's action would have a negligible impact on the relevant species or stocks and would not have an unmitigable adverse impact on affected species or stocks for taking for subsistence uses. NMFS anticipates that any effects from Furie's proposed seismic survey on marine mammals, especially harbor seals and Cook Inlet beluga whales, which are or have been taken for subsistence uses, would be short-term, site specific, and limited to inconsequential changes in behavior and mild stress responses. 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 the marine mammals and the subsistence hunters; and that cannot be sufficiently mitigated by other measures to increase the availability of marine mammals to allow subsistence needs to be met.

Based on public comments received, we have not received any information that would cause us to change our preliminary determinations under the MMPA. Accordingly, this Preferred Alternative would satisfy the purpose and need of our proposed action under the MMPA–issuance of an Authorization, along with

required mitigation measures and monitoring that meets the standards set forth in section 101(a)(5)(D) of the MMPA and the implementing regulations.

2.3.2. Alternative 2 – No Action Alternative

We are required to evaluate the No Action Alternative per CEQ NEPA regulations. The No Action Alternative serves as a baseline to compare the impacts of the Preferred and other Alternatives.

Under the No Action Alternative, NMFS would not issue the requested Authorization. Furie could choose not to proceed with their proposed activities or to proceed without an Authorization. If they choose the latter, Furie would not be exempt from the MMPA prohibitions against the take of marine mammals and would be in violation of the MMPA if take of marine mammals occurs.

For purposes of this EA, NMFS presumes that if the Authorization is not issued, Furie would conduct the Cook Inlet 3D seismic survey program without the protective measures and reporting requirements required by an Authorization under the MMPA. We take this approach to meaningfully evaluate the primary environmental issues—the impact on marine mammals from these activities in the absence of protective measures.

2.3.3. Alternative 3—Issuance of an Authorization with Additional Mitigation and Monitoring Measures

Under Alternative 3, NMFS would issue an Authorization under section 101(a)(5)(D) of the MMPA to Furie, allowing the incidental take by Level B harassment only of small numbers of marine mammal species incidental to conducting seismic survey activities in the upper Cook Inlet during the effective period of the Authorization. While all of the mitigation, monitoring, and reporting measures that would be required under Alternative 1 would also be required under Alternative 3, the difference under this alternative is that additional mitigation and monitoring measures would be required, beyond what was described in the proposed Authorization. Additional measures that would be required by NMFS under this alternative include: a 120-dB monitoring (and safety) zone for beluga whale cow/calf pairs in Cook Inlet; active acoustic monitoring; and the use of unmanned aerial vehicles to conduct aerial monitoring. At this time, these technologies are still being developed or refined. For example, while there has been some testing of unmanned aerial vehicles conducted recently, the technology has not yet been proven effective for monitoring or mitigation as would be required under an Authorization. However, once the monitoring technologies are either developed or refined, requiring the implementation of these measures would allow for increased effectiveness in implementing mitigation measures (e.g., shutdown), which may further reduce potential impacts to marine mammals even further.

2.4. Alternatives Considered but Eliminated from Further Consideration

NMFS considered whether other alternatives could meet the purpose and need and support Furie's proposed activities. An alternative that would allow for the issuance of an Authorization with no required mitigation or monitoring was considered but eliminated from consideration, as it would not be in compliance with the MMPA and therefore would not meet the purpose and need. For that reason, this alternative is not analyzed further in this document. In addition, an alternative that would have included time/area restrictions beyond the one already considered in Alternatives 1 and 3 in the Susitna Delta was considered but eliminated from consideration because such measures were unnecessary given the timing and location of the seismic survey.

Chapter 3 Affected Environment

This chapter describes existing conditions in the proposed action areas. Complete descriptions of the physical, biological, and social environment of the action area are contained in the documents listed in Section 1.3.1 of this EA. We incorporate those descriptions by reference and briefly summarize or supplement the relevant sections for marine mammals in the following subchapters.

3.1. Physical Environment

We are required to consider impacts to the physical environment under NOAA NAO 216-6. As discussed in Chapter 1, our proposed action and alternatives relate only to the authorization of incidental take of marine mammals and not to the physical environment. Certain aspects of the physical environment are not relevant to our proposed action (see subchapter 1.3.2 - Scope of Environmental Analysis). Because of the requirements of NAO 216-6, we briefly summarize the physical components of the environment here.

3.1.1. Marine Mammal Habitat

We presented information on marine mammal habitat and the potential impacts to marine mammal habitat in the *Federal Register* notice of the proposed Authorization. In summary, beluga whales, harbor porpoise, and harbor seals use the waters of Cook Inlet for foraging, calving, and other important life history functions. The mouths of river streams are important beluga whale feeding habitat. Harbor seals also use coastal haul-outs in Cook Inlet. Killer whales, gray whales, and Steller sea lions more commonly use the lower Cook Inlet area, which is outside the active seismic operation area.

Pursuant to the ESA, critical habitat has been designated for Cook Inlet beluga whales and Steller sea lions. The proposed action falls within critical habitat designated in Cook Inlet for beluga whales but is not within critical habitat designated for Steller sea lions. On April 11, 2011, NMFS announced the two areas of critical habitat (76 FR 20180) 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 of marine and estuarine habitat in Cook Inlet[1]. Designated beluga whale Critical Habitat Area 1 consists of 1,909 km^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 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 proposed study area is approximately 868 km^2, of which only a smaller portion would be surveyed. None of Furie's proposed study area is in the designated beluga whale Critical Habitat Area; the entire study area is within designated beluga whale Critical Habitat Area 2.

[1] For national security reasons, critical habitat excludes all property and waters of JBER and waters adjacent to the Port of Anchorage (Figure 11 Insert)

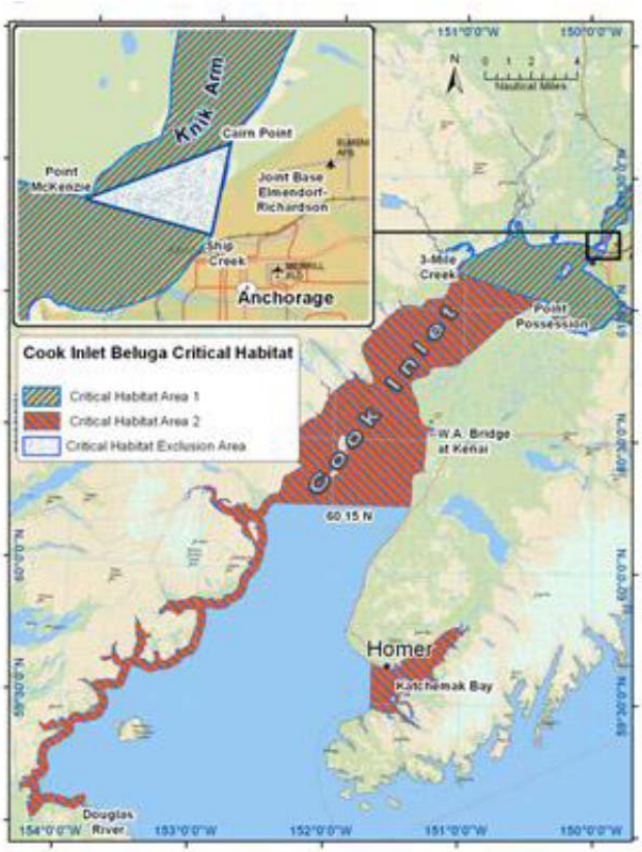


Figure 3. Final critical habitat of Cook Inlet beluga whales (76 FR 20180, April 11, 2011).

3.2. Biological Environment

3.2.1. Marine Mammals

We list the marine mammals most likely present in the proposed seismic survey areas in section 1.1.2 of this EA. The marine mammals most likely to be present during the 3D seismic survey program are: Cook Inlet beluga whale, harbor seal, killer whale, and harbor porpoise (Shelden et al. 2003). While gray whales and Steller sea lions have been sighted in upper Cook Inlet, their occurrence is considered rare. Recent passive acoustic monitoring research has indicated that harbor porpoises occur more frequently in upper Cook Inlet than was previously estimated based solely on visual observations (NMML 2011, personal communication). Table 2 provides a summary of the abundance and status of the species likely to occur in the project area. We provided information on the distribution, population size, and conservation status for each species in the *Federal Register* notice on the proposed Authorization and we incorporate those descriptions by reference here. We briefly summarize this information here. Furie's application (Jacobs 2013) contains detailed information on life history functions, hearing abilities, and distribution, which is also incorporated by reference.

Table 2. Marine Mammal Species Likely to Occur in the Seismic Survey Area

Species	Abundance	Comments
Beluga whale (*Delphinapterus leucas*)	312 [1]	Occurs in the project area. Listed as Depleted under the MMPA, endangered under ESA, critical habitat in project area.
Harbor seal *(Phoca vitulina richardsi)*	22,900 [2]	Occurs in the project area. No special status or ESA listing.
Killer whale *(Orcinus orca)*	1,123 Resident 552 Transient [3]	Occurs rarely in the project area. No special status or ESA listing.
Harbor porpoise *(Phocoena phocoena)*	25,987 [4]	Occurs in the project area. No special status or ESA listing.
Steller sea lion (*Eumetopias jubatus*)	45,916 [5]	Occurs infrequently in the project area. Listed as Depleted under the MMPA, endangered under ESA.
Gray whale (*Eschrichtius robustus)*	19,126[6]	Occurs infrequently in the project area. No special status under the MMPA, delisted under ESA.

Notes: MMPA = Marine Mammal Protection Act, ESA = Endangered Species Act
[1] Abundance estimate for the Cook Inlet stock (Allen and Angliss 2013)
[2] Abundance estimate for the Cook Inlet/Shelikof stock (Allen and Angliss 2013)
[3] Resident estimate from Alaska resident stock; transient estimate from Gulf of Alaska, Aleutian Islands, and Bering Sea transient stock (Allen and Angliss 2013)
[4] Abundance estimate for the Gulf of Alaska stock (Allen and Angliss 2013)
[5] Abundance estimate for the western stock (Allen and Angliss 2013)
[6] 2006/2007 abundance estimate for the Eastern North Pacific stock (Allen and Angliss 2013)

3.2.2.ESA-listed Marine Mammals

3.2.2.1. Cook Inlet Beluga Whale

Beluga whales appear seasonally throughout Alaskan waters, except in the Southeast region and the Aleutian Islands. Five stocks are recognized in Alaska: Beaufort Sea stock, eastern Chukchi Sea stock, eastern Bering Sea stock, Bristol Bay stock, and Cook Inlet stock (Allen and Angliss 2013). The Cook Inlet stock is the most isolated of the five stocks, as it is separated from the others by the Alaska Peninsula and individuals reside year round in Cook Inlet (Laidre et al. 2000). Only the Cook Inlet stock inhabits the project area.

NMFS began comprehensive, systematic aerial surveys on beluga whales in Cook Inlet in 1994. Unlike previous efforts, these surveys included the upper, middle, and lower inlet. 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). In response to this decline, NMFS initiated a status review on the Cook Inlet beluga whale stock pursuant to the MMPA and the ESA in 1998 (63 FR 64228, November 19, 1998). The annual

abundance surveys conducted each June since 1999 provide the following abundance estimates: 357 beluga whales in 1999, 435 beluga whales in 2000, 386 beluga whales in 2001, 313 beluga whales in 2002, 357 beluga whales in 2003, 366 beluga whales in 2004, 278 beluga whales in 2005, 302 beluga whales in 2006, 375 beluga whales in 2007; 321 beluga whales in 2009; 340 beluga whales in 2010; 284 whales in 2011; 312 whales in 2012 (Hobbs et al. 2000; Rugh et al. 2003, 2004a, 2004b, 2005a, 2005b, 2005c, 2006, 2007, 2010; NMFS 2010; Hobbs et al. 2011, Shelden et al. 2012). The overall population trend for the past 10 years for Cook Inlet beluga whales shows them not recovering and still in decline at an annual rate of 0.6 percent (http://www.alaskafisheries.noaa.gov/newsreleases/2013/cibelugapop2012.htm).

Figure 4 depicts the distribution of beluga whales in upper Cook Inlet and is based upon NMML data including NMFS aerial surveys. Additional information on beluga whale distribution is known from NMFS data from satellite-tagged belugas, and opportunistic sightings (NMML 2004); baseline studies of beluga whale occurrence in Knik Arm conducted for the Knik Arm Bridge and Toll Authority (KABATA) (Funk et al. 2005); baseline studies of beluga whale occurrence in Turnagain Arm conducted in preparation for Seward Highway improvements (Markowitz et al. 2007); marine mammal surveys conducted at Ladd Landing to assess a coal shipping project (Prevel Ramos et al. 2008); and marine mammal surveys off Granite Point, the Beluga River, and further down the inlet at North Ninilchik (Brueggeman et al. 2007a, 2007b, 2008).

The collective NMFS aerial survey results show that beluga whales have been consistently found near or in river mouths along the northern shores of upper Cook Inlet (i.e., north of East and West Foreland). In particular, beluga whale groups are seen in the Susitna River Delta, Knik Arm, and along the shores of Chickaloon Bay. Small groups were reported farther south in Kachemak Bay, Redoubt Bay (Big River), and Trading Bay (McArthur River) prior to 1996, but very rarely thereafter. Since the mid-1990s, most (96 to 100 percent) beluga whales in upper Cook Inlet have been concentrated in shallow areas near river mouths, no longer occurring in the central or southern portions of Cook Inlet (Hobbs et al. 2008). Based on these aerial surveys, the concentration of beluga whales in the northernmost portion of Cook Inlet appears to be fairly consistent from June to October (Rugh et al. 2000, 2004a, 2005a, 2006, 2007; Shelden et al. 2008, 2009, 2010).

Other studies and monitoring programs in recent years have revealed additional information about beluga whale distribution in Cook Inlet. Studies for KABATA in 2004 and 2005 confirmed the use of Knik Arm by beluga whales from July to October (Funk et al. 2005). Data from tagged whales (14 tags between July and March 2000 through 2003) show beluga whales use upper Cook Inlet intensively between summer and late autumn (Hobbs et al. 2005). 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). 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 mid-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 in spite of ice cover greater than 90 percent (Hobbs et al. 2005). While they moved widely around Cook Inlet there was no indication from the tagged whales (Hobbs et al. 2005) that beluga whales had a seasonal migration in and out of Cook Inlet.

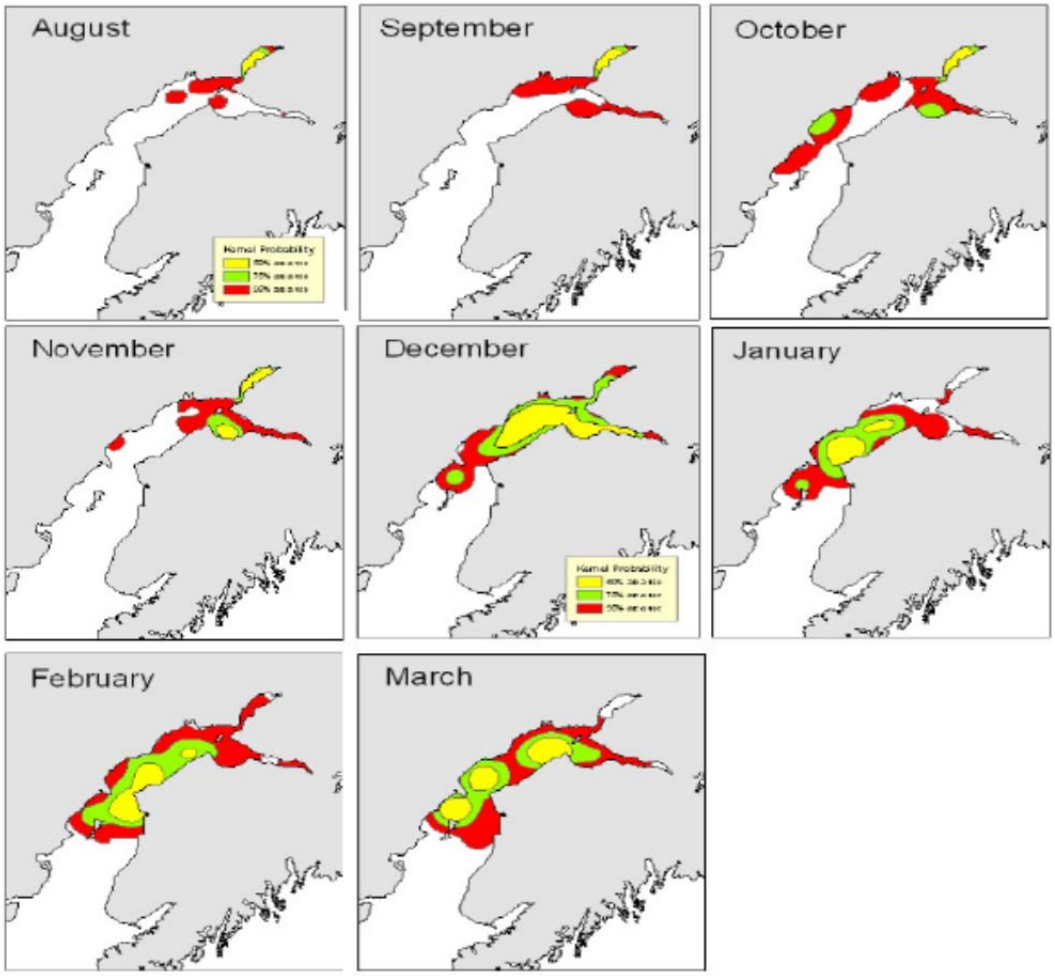


Figure 4. Predicted beluga distribution by month based upon known locations of 14 satellite tagged belugas (predictions derived via kernel probability estimates; Hobbs et al. 2005). Note the large increase in total area use and offshore locations beginning in December and continuing through March. The red area (95 percent probability) encompasses the green (75 percent) and yellow (50 percent) regions. From NMFS 2008b.

Depending upon the season, beluga whales can occur in both offshore and coastal waters. Although they remain in the general Cook Inlet area during the winter, they disperse throughout the upper and mid-inlet areas. 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-April), with animals found between Kalgin Island and Point Possession. Based upon monthly surveys (e.g., Rugh et al. 2000), opportunistic sightings, and satellite-tag data, there are generally fewer observations of these whales in the Anchorage and Knik Arm area from November through April (NMML 2004; Rugh et al. 2004a).

During the spring and summer, beluga whales are generally concentrated near the warmer waters of river mouths where prey availability is high and predator occurrence is low (Moore et al. 2000). Most beluga whale calving in Cook Inlet occurs from mid-May to mid-July in the vicinity of the river mouths, although Alaska Native hunters have described calving as early as April and as late as August (Huntington 2000).

Beluga whale concentrations in upper Cook Inlet during April and May correspond with eulachon migrations to rivers and streams in the northern portion of upper Cook Inlet (NMFS 2003; Angliss and Outlaw 2005). Data from NMFS aerial surveys, opportunistic sightings, and satellite-tagged beluga whales confirm that they are concentrated along the rivers and nearshore areas of upper Cook Inlet (Susitna River Delta, Knik Arm, and Turnagain Arm) from May through October (NMML 2004; Rugh et al. 2004a). Beluga whales are commonly seen from early July to early October at the mouth of Ship Creek where they feed on salmon and other fish, and also in the vicinity of the Port (e.g., alongside docked ships and within 300 ft of the docks) (Blackwell and Greene 2002; NMML 2004). Beluga whales have also been observed feeding immediately offshore of the tidelands north of the Port and south of Cairn Point (NMFS 2004).

3.2.2.2. Steller Sea Lion

Steller sea lions occur in Cook Inlet but south of Anchor Point around the offshore islands and along the west coast of the upper inlet in the bays (Chinitna Bay, Iniskin Bay, etc.) (Rugh et al. 2005a). Portions of the southern reaches of the lower inlet are designated as critical habitat, including a 20-nautical mile buffer around all major haul out sites and rookeries. Rookeries and haulout sites in lower Cook Inlet include those near the mouth of the inlet, which are far south of the project area. Presence of Steller sea lions in the project area is anticipated to be low or rare. The western distinct population segment is the one that occurs in the proposed area and is the only one still listed under the ESA.

3.2.3.Non-ESA Listed Marine Mammals

3.2.3.1. Harbor Seal

Harbor seals inhabit the coastal and estuarine waters of Cook Inlet. 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. 2005). Harbor seals are non-migratory; their movements are associated with tides, weather, season, food availability, and reproduction. The major haulout sites for harbor seals are located in lower Cook Inlet, and their presence in the upper inlet coincides with seasonal runs of prey species. For example, harbor seals are commonly observed along the Susitna River and other tributaries along upper Cook Inlet during the eulachon and salmon migrations (NMFS, 2003). During aerial surveys of upper Cook Inlet in 2001, 2002, and 2003, 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 (Rugh et al., 2005). During Apache's 2D test program in March 2011, two harbor seals were observed by vessel-based PSOs. Harbor seals haul out on rocks, reefs, beaches, and drifting glacial ice, and feed on capelin, eulachon, cod, pollock, flatfish, shrimp, octopus, and squid in marine, estuarine, and occasionally fresh waters.

3.2.3.2. Killer Whale

Numbers of killer whales in Cook Inlet are small compared to the overall population and most are recorded in the lower Cook Inlet. 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). The availability of these prey species largely determines the likeliest times for killer whales to be in the area. Twenty-three sightings of killer whales were reported in the lower Cook Inlet between 1993 and 2004 in aerial surveys by Rugh et al. (2005a). Surveys over 20 years by Shelden et al. (2003) reported 11 sightings in upper Cook Inlet between Turnagain Arm, Susitna Flats, and Knik Arm.

No killer whales were spotted during surveys by Funk et al. (2005), Ireland et al. (2005), Brueggeman et al. (2007a, 2007b, 2008), or Prevel Ramos et al. (2006, 2008). Eleven killer whale strandings have been reported in Turnagain Arm, six in May 1991, and five in August 1993. Very few killer whales, if any, are expected to approach or be in the vicinity of the project area.

3.2.3.3. Harbor Porpoise

Harbor porpoise have been reported in lower Cook Inlet from Cape Douglas to the West Foreland, Kachemak Bay, and offshore (Rugh et al. 2005a). Small numbers of harbor porpoises have been consistently reported in the upper Cook Inlet between April and October, except for a recent survey that recorded higher numbers than typical. Highest monthly counts include 17 harbor porpoises reported for spring through fall 2006 by Prevel Ramos et al. (2008), 14 for spring of 2007 by Brueggeman et al. (2007a), 12 for fall of 2007 by Brueggeman et al. (2008), and 129 for spring through fall in 2007 by Prevel Ramos et al. (2008) between Granite Point and the Susitna River during 2006 and 2007; the reason for the recent spike in numbers (129) of harbor porpoises in the upper Cook Inlet is unclear and quite disparate with results of past surveys, suggesting it may be an anomaly. The spike occurred in July, which was followed by sightings of 79 harbor porpoise in August, 78 in September, and 59 in October in 2007. The number of porpoises counted more than once was unknown. Therefore, because we lack information regarding double counting, it is possible that the actual numbers are smaller than reported. The most recent estimated density of animals in Cook Inlet is 7.2 per 1,000 km^2 (386 mi^2) (Dahlheim et al. 2000) indicating that only a small number use Cook Inlet. On the other hand, recent passive acoustic research in Cook Inlet by ADF&G and NMML have indicated that harbor porpoises occur more frequently than expected, particularly in the West Foreland area in the spring (NMFS 2011, personal communication), although overall numbers are still unknown at this time.

3.2.3.4. Gray Whale

The gray whale is a large baleen whale known to have one of the longest migrations of any mammal. This whale can be found all along the shallow coastal waters of the North Pacific Ocean. The Eastern North Pacific stock, which includes those whales that travel along the coast of Alaska, was delisted from the ESA in 1994 after distinction between the western and eastern populations was made (59 FR 31094). It is estimated that a minimum of approximately 19,000 individuals exist in the eastern stock (Allen and Angliss 2013). Systematic counts of Eastern North Pacific gray whales migrating south along the California coast have been conducted by shore-based observers at Granite Canyon most years since 1967. The most recent abundance estimates are based on counts made during the 1997/98, 2000/01, and 2001/02 southbound migrations, and range from about 18,000 to 30,000 animals. Although observations of this species is rare within Cook Inlet, marine mammal observers noted individual gray whales on seven occasions in the vicinity of this proposed project during 2012 monitoring for seismic survey activities: once in May, three times in June, and three times in July (Apache 2012). Annual surveys conducted by NMFS in Cook Inlet since 1993 have resulted in five gray whale sightings (Rugh et al. 2005). Cook Inlet comprises neither essential feeding nor social grounds, and the species is typically not observed within the upper Cook Inlet (Rugh et al. 2005). Due to the recent sightings, however, Furie included the gray whale within the scope of its IHA application.

3.3. Socioeconomic Environment

3.3.1. Subsistence

Near the proposed activities, Tyonek is a Dena'ina Athabascan village in which the inhabitants practice a subsistence lifestyle. The Village of Tyonek lies on a bluff on the northwest shore of Cook Inlet and has no interconnected road access. According to Census 2010, there were 144 housing units in the community and 70 were occupied. Its population was 88.3 percent American Indian or Alaska Native; 5.3 percent white; 6.4 percent of the local residents had multi-racial backgrounds (ADCCE 2010).

The principal wild foods harvested and consumed by Dena'ina communities are fish, land mammals (moose), and marine mammals. Salmon consistently provides the major portion of the region's subsistence food, and sockeye is the most harvested. Shellfish, plants, and birds and eggs each make up approximately 2% of the total annual harvest (BOEM 2003).

Native hunters historically have hunted beluga whales and harbor seals for food. The subsistence harvest of beluga transcends nutritional and economic value of the whale as the harvest is an integral part of the cultural identity of the region's Alaska Native communities. Inedible parts of the whale provide Native artisans with materials for cultural handicrafts, and the hunting perpetuates Native traditions by transmitting traditional skills and knowledge to younger generations. However, due to dramatic declines in the Cook Inlet beluga whale population, on May 21, 1999, legislation was passed to temporarily prohibit (until October 1, 2000) the taking of Cook Inlet belugas under the subsistence harvest exemption in section 101(b) of the MMPA without a cooperative agreement between NMFS and the affected Alaska Native Organizations (ANOs) (Public Law No. 106-31, section 3022, 113 Stat. 57,100). That prohibition was extended indefinitely on December 21, 2000 (Public Law No. 106-553, section 1(a)(2), 114 Stat. 2762). NMFS subsequently entered into six annual co-management agreements (2000-2003, 2005-2006) with the Cook Inlet Marine Mammal Council, an ANO representing Cook Inlet beluga hunters, which allowed for the harvest of 1-2 belugas. On October 15, 2008, NMFS published a final rule that established long-term harvest limits on the Cook Inlet beluga whales that may be taken by Alaska Natives for subsistence purposes (73 FR 60976). That rule prohibits harvest for a five-year period (2008-2012), if the average abundance for the Cook Inlet beluga whales from the prior five years (2003-2007) is below 350 whales. The next five-year period that could allow for a harvest (2013-2017), would require the previous five-year average (2008-2012) to be above 350 whales.

There is a low level of subsistence hunting for harbor seals in Cook Inlet. Seal hunting occurs opportunistically among Alaska Natives who may be fishing or travelling in the upper Inlet near the mouths of the Susitna River, Beluga River, and Little Susitna River.

Furie concluded, and NMFS agrees, that the size of the affected area, mitigation measures, and input from the Native Organizations should result in the proposed action having no unmitigable adverse impact on the availability of marine mammals for subsistence uses. Furie and NMFS recognize the importance of ensuring that ANOs and federally recognized tribes are informed, engaged, and involved during the permitting process and will continue to work with the ANOs and tribes to discuss their operations and activities.

In May 2013, Furie contacted 28 Alaska Native communities and organizations to meet and present information regarding the proposed survey, and to answer any questions. Following the publication of the

proposed Authorization, NMFS contacted the local Native Villages to inform them of the availability of the *Federal Register* notice and the opening of the public comment period. During the public comment period, NMFS received a letter from the Alaska Inter-Tribal Council, and the issues raised in that letter were addressed in the Comment and Responses Section of the *Federal Register* notice announcing the final determination on the Authorization.

Chapter 4 Environmental Consequences

This chapter of the EA analyzes the impacts of the three alternatives and addresses the potential direct, indirect, and cumulative impacts of our issuance of an Authorization. Furie's application, our notice of a proposed Authorization, and other related environmental analyses identified previously, facilitate an analysis of the direct, indirect, and cumulative effects of our proposed issuance of an Authorization.

Under the MMPA, we have evaluated the potential impacts of Furie's seismic survey activities in order to determine whether to authorize incidental take of marine mammals. Under NEPA, we have determined that an EA is appropriate to evaluate the potential significance of environmental impacts resulting from the issuance of our Authorization.

4.1. Effects of Alternative 1 – Issuance of an Authorization with Mitigation Measures

Alternative 1 is the Preferred Alternative where we would issue an Authorization to Furie allowing the incidental take, by Level B harassment, of six species of marine mammals from May 2014 through May 2015, subject to the mandatory mitigation and monitoring measures and reporting requirements set forth in the Authorization, if issued. We would incorporate the mitigation and monitoring measures and reporting described earlier in this EA into a final Authorization.

4.1.1. Impacts to Marine Mammal Habitat

Our proposed action would have no additive or incremental effect on the physical environment beyond those resulting from the proposed activities. Furie's proposed seismic survey area is not located within a marine sanctuary or a National Park. State wildlife conservation areas have been designated in Cook Inlet; however, those occur mostly on land with some portions along the coasts and would not be impacted by our proposed action of the issuance of an Authorization to take marine mammals. The proposed seismic survey would minimally add to vessel traffic in the region. The proposed activities would not result in substantial damage to ocean and coastal habitats that might constitute marine mammal habitat. Placement and retrieval of the nodes may cause temporary and localized increases in turbidity on the seafloor; however, the turbidity created by placing and removing nodes on the seafloor would settle to background levels within minutes after the cessation of activity. In addition, the lines connecting the nodal system is composed of a rigid, sheathed cable, which has no loops that could present an entanglement risk to marine mammals. The only loops in the system are located in the pinger lanyard, but are typically either very small (3-4 inches or less) or completely closed and would present no entanglement risk to marine mammals. We do not anticipate that the 3D seismic survey operations would physically alter the marine environment or negatively impact the physical environment in the proposed action area. The Authorization would not impact physical habitat features, such as substrates and/or water quality.

NMFS has established critical habitat for both the western distinct population segment of Steller sea lions and Cook Inlet beluga whales (described in section 3.1.1 of this EA). The proposed seismic survey would not occur in locations designated as critical habitat for Steller sea lions, so there would be no effect. None of Furie's proposed study area is in the designated beluga whale Critical Habitat Area 1; the entire study area is within the designated beluga whale Critical Habitat Area 2. The primary impacts are acoustic in nature, which would not result in permanent destruction of any critical habitat. Therefore, impacts to habitat would be minimal. More information on potential impacts to marine mammal habitat is contained in Furie's application (Jacobs 2013) and in our proposed Authorization notice, which are incorporated herein by reference.

4.1.2. Impacts to Marine Mammals

We expect that disturbance from acoustic stimuli associated with the 3D seismic survey program have the potential to impact marine mammals. Acoustic stimuli generated by the airgun arrays (and to a lesser extent the pingers) may affect marine mammals in one or more of the following ways: tolerance, masking of natural sounds, behavioral disturbance, and temporary or permanent hearing impairment, or non-auditory physical effects (Richardson et al. 1995a). Our notice of proposed Authorization and Furie's application (Jacobs 2013) provide detailed descriptions of these potential effects of seismic surveys on marine mammals. That information is incorporated herein by reference and summarized next.

Numerous studies have shown that underwater sounds from industry activities are often readily detectable by marine mammals in the water at distances of many kilometers. Numerous studies have also shown that marine mammals at distances more than a few kilometers away often show no apparent response to industry activities of various types (Miller et al., 2005; Bain and Williams, 2006). This is often true even in cases when the sounds must be readily audible to the animals based on measured received levels and the hearing sensitivity of that mammal group. Although various baleen whales, toothed whales, and (less frequently) pinnipeds have been shown to react behaviorally to underwater sound such as airgun pulses or vessels under some conditions, at other times mammals of all three types have shown no overt reactions (e.g., Malme et al., 1986; Richardson et al., 1995a,b; Madsen and Mohl, 2000; Croll et al., 2001; Jacobs and Terhune, 2002; Madsen et al., 2002; Miller et al., 2005).

Masking is the obscuring of sounds of interest by other sounds, often at similar frequencies. Marine mammals are highly dependent on sound, and their ability to recognize sound signals amid other noise is important in communication, predator and prey detection, and, in the case of toothed whales, echolocation. Although some degree of masking is inevitable when high levels of manmade broadband sounds are introduced into the sea, marine mammals have evolved systems and behavior that function to reduce the impacts of masking. Structured signals, such as the echolocation click sequences of small toothed whales, may be readily detected even in the presence of strong background noise because their frequency content and temporal features usually differ strongly from those of the background noise (Au and Moore, 1988, 1990). The components of background noise that are similar in frequency to the sound signal in question primarily determine the degree of masking of that signal.

Masking effects of underwater sounds from Furie's proposed activities on marine mammal calls and other natural sounds are expected to be limited. For example, beluga whales primarily use high-frequency sounds to communicate and locate prey; therefore, masking by low-frequency sounds associated with survey activities is not expected to occur (Gales, 1982). There is evidence of other marine mammal species continuing to call in the presence of industrial activity. Annual acoustical monitoring near BP's Northstar production facility during the fall bowhead migration westward through the Beaufort Sea has recorded thousands of calls each year (for examples, see Richardson et al., 2007; Aerts and Richardson, 2008). Construction, maintenance, and operational activities have been occurring from this facility for over 10 years. To compensate and reduce masking, some mysticetes may alter the frequencies of their communication sounds (Richardson et al., 1995a; Parks et al., 2007).

There is little concern regarding masking in this case due to the brief duration of these pulses and relatively longer silence between airgun shots (9 – 12 seconds) near the sound source. Therefore,

masking effects are anticipated to be limited, especially in the case of odontocetes, given that they typically communicate at frequencies higher than those of the airguns.

Marine mammals may behaviorally react to sound when exposed to anthropogenic noise. These behavioral reactions are often shown as: changing durations of surfacing and dives, number of blows per surfacing, or 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 noise sources are located; and/or flight responses (e.g., pinnipeds flushing into water from haul-outs or rookeries). The onset of behavioral disturbance from anthropogenic noise depends on both external factors (characteristics of noise sources and their paths) and the receiving animals (hearing, motivation, experience, demography) and is also difficult to predict (Richardson et al. 1995a; Southall et al. 2007).

Little systematic information is available about reactions of beluga whales, killer whales, and harbor porpoise to noise pulses. In general, small toothed whales more often tend to head away, or to maintain a somewhat greater distance from the vessel, when a large airgun array is operating (e.g., Stone and Tasker 2006; Weir 2008; Barry et al. 2010). Beluga whales exhibit changes in behavior when exposed to strong, pulsed sounds similar in duration to those typically used in seismic surveys (Finneran et al. 2000, 2002). However, the animals tolerated high received levels of sound (peak–peak level >200 dB re 1 μPa) before exhibiting aversive behaviors (Richardson et al. 1995b). While there are no published data on seismic effects on sea lions or harbor seals, anecdotal data and data on arctic seals suggest that sea lions and other pinnipeds generally tolerate strong noise pulses due to the similarity in anatomy and physiology (Richardson et al. 1995a). Monitoring studies in the Alaskan and Canadian Beaufort Sea during 1996–2002 provided considerable information regarding behavior of arctic seals exposed to seismic pulses (Miller et al. 2005; Harris et al. 2001; Moulton and Lawson 2002). These seismic projects generally were much larger than the proposed survey and usually involved arrays of 6 to 16 with as many as 24 airguns with total volumes 560 to 1500 cui. The combined results suggest that some seals avoid the immediate area around seismic vessels. Reactions are expected to be very localized and confined to relatively small distances and durations, with no long-term effects on individuals or populations.

We expect that these takes would result, at worst, in a temporary modification in behavior, temporary changes in animal distribution, and/or low-level physiological effects (Level B harassment) of certain species or stocks of marine mammals. At most, we interpret these effects on marine mammals as falling within the MMPA definition of Level B (behavioral) harassment. We expect these impacts to be minor because we do not anticipate measurable changes to the population or impacts to rookeries, mating grounds, and other areas of similar significance.

Under the Preferred Alternative, we would authorize incidental take, by Level B harassment only, of six species of marine mammals. We expect no long-term or substantial adverse effects on marine mammals, their habitats, or their role in the environment. We base our conclusion, in part, on the results of previous monitoring reports submitted by Apache for the 2012 Cook Inlet 3D seismic survey, and the body of research and finding summarized above.

Furie proposed a number of monitoring and mitigation measures for marine mammals, and we included some additional mitigation measures not proposed by Furie, as part of our evaluation for the Preferred Alternative. In consideration of the potential effects of the proposed seismic survey, we determined that

the mitigation and monitoring measures described in Section 2.3.1 of this EA would be appropriate to minimize potential adverse impacts to marine mammals.

Injury: Furie did not request authorization to take marine mammals by injury (Level A harassment), serious injury, or mortality. Based on the results of our analyses, Furie's environmental analyses, and previous monitoring reports for the same activities, there is no evidence that Furie's planned activities could result in injury, serious injury, or mortality within the action area. The required mitigation and monitoring measures would minimize or eliminate any potential risk for marine mammals.

Vessel Strikes: The potential for striking marine mammals is a concern with vessel traffic. Studies have associated ship speed with the probability of a ship strike resulting in an injury or mortality of an animal. However, it is highly unlikely that Furie would strike a marine mammal. Typical vessel speeds of the source vessels while collecting seismic data are between 2-4 knots. Moreover, mitigation measures would be required of Furie to reduce speed or alter course if collisions with marine mammals appear likely.

Estimated Take of Marine Mammals by Level B Incidental Harassment: Furie has requested take by Level B harassment as a result of the acoustic stimuli generated by their proposed seismic survey. We expect that the survey would cause a short-term behavioral disturbance for marine mammals in the proposed areas.

As mentioned previously, we estimate that the activities could potentially affect, by Level B harassment only, six species of marine mammals under our jurisdiction. For each species, these estimates are small numbers (less than three percent for each species, except beluga whales for which estimated takes are approximately six percent) relative to the population sizes. Based on the public comment received on the proposed IHA from the Marine Mammal Commission, NMFS has increased the number of estimated and authorized harbor porpoise takes from 25 (number included in the proposed IHA notice) to 51(the average estimated number of harbor seal takes in Furie's application) and increased the harbor seal takes from 160 (number included in the proposed IHA notice) to 614 (the average estimated number of harbor seal takes in Furie's application). Table 3 outlines the number of Level B harassment takes that we propose to authorize in this Authorization, the regional population estimates for marine mammals in the action area, and the percentage of each population or stock that may be taken as a result of Furie's activities.

Table 3. Proposed Level B harassment take levels, species or stock abundance, and percentage of population proposed to be taken.

Species	Proposed Level B Take	Abundance	Percentage of Population
Beluga Whale	18	312	6
Harbor Seal	614	22,900	2.8
Harbor Porpoise	51	25,987	0.16
Killer Whale	4	1,123 (resident) 552 (transient)	0.35 0.72
Steller Sea Lion	12	45,916	0.02
Gray Whale	2	19,126	0.01

Our proposed Authorization notice and Furie's application (Jacobs 2013) contain complete descriptions of how these take estimates were derived. None of these have changed since those documents except for harbor seals and harbor porpoises. We increased the number of harbor seal and harbor porpoise Level B

takes based on a comment from the Marine Mammal Commission. We do not expect the proposed activities to impact rates of recruitment or survival for any affected species or stock. Further, the activities would not adversely affect marine mammal habitat.

4.1.3. Impacts on Subsistence

Under the Alternative 1 (the Preferred Alternative), Furie's seismic survey in the Cook Inlet is expected to have minor and temporary effects on subsistence wildlife and marine mammals in the area. Sound from seismic activities and array guns might temporarily displace wildlife from the area, but animals are expected to return to the area following the cessation of use of sound sources during survey activities.

Residents of the Native Village of Tyonek are the primary marine mammal subsistence users in Knik Arm area. However, due to dramatic declines in the Cook Inlet beluga whale population, on May 21, 1999, legislation was passed to temporarily prohibit (until October 1, 2000) the taking of Cook Inlet belugas under the subsistence harvest exemption in section 101(b) of the MMPA without a cooperative agreement between NMFS and the affected Alaska Native Organizations (ANOs) (Public Law No. 106-31, section 3022, 113 Stat. 57,100).. That prohibition was extended indefinitely on December 21, 2000 (Public Law No. 106-553, section 1(a)(2), 114 Stat. 2762). NMFS subsequently entered into six annual co-management agreements (2000-2003, 2005-2006) with the Cook Inlet Marine Mammal Council, an ANO representing Cook Inlet beluga hunters, which allowed for the harvest of 1-2 belugas. On October 15, 2008, NMFS published a final rule that established long-term harvest limits on the Cook Inlet beluga whales that may be taken by Alaska Natives for subsistence purposes (73 FR 60976). That rule prohibits harvest for a five-year period (2008-2012), if the average abundance for the Cook Inlet beluga whales from the prior five years (2003-2007) is below 350 whales. The next five-year period that could allow for a harvest (2013-2017), would require the previous five-year average (2008-2012) to be above 350 whales. Tyonek Natives occasionally harvest harbor seals, but their primary source of red meat is moose.

Data on the harvest of other marine mammals in Cook Inlet are lacking. The only data available for subsistence harvest of harbor seals, harbor porpoises, and killer whales in Alaska are in the marine mammal stock assessments. However, these numbers are for the entire Gulf of Alaska not just Cook Inlet, and they are not indicative of the harvest in Cook Inlet. Because of the relatively small proportion of marine mammals occurring in Cook Inlet, the number harvested is expected to be extremely low. For example, there is a low level of subsistence hunting for harbor seals in Cook Inlet. Seal hunting occurs opportunistically among Alaska Natives who may be fishing or travelling in the upper Inlet near the mouths of the Susitna River, Beluga River, and Little Susitna River (B. Smith, NMFS, pers. comm.).

Furie has identified the following features that are intended to reduce impacts to marine mammal subsistence users:

- In-water seismic activities would follow mitigation procedures to minimize effects on the behavior of marine mammals and, therefore, opportunities for harvest by Alaska Native communities; and

- Regional subsistence representatives may support recording marine mammal observations along with marine mammal biologists during the monitoring programs and would be provided with annual reports.

Furie concluded, and NMFS agrees, that the size of the affected area, mitigation measures, and input from the consultations from Alaska Natives should result in the proposed action having no unmitigable adverse impact on the availability of marine mammals for subsistence uses. Furie and NMFS recognize the importance of ensuring that Alaska Native Organizations (ANOs) and federally recognized tribes are informed, engaged, and involved during the permitting process and will continue to work with the ANOs and tribes to discuss their operations and activities.

NMFS anticipates that any effects from Furie's proposed seismic survey on marine mammals, especially harbor seals and Cook Inlet beluga whales, which are or have been taken for subsistence uses, would be short-term, site specific, and limited to inconsequential changes in behavior and mild stress responses. 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 the marine mammals and the subsistence hunters; and that cannot be sufficiently mitigated by other measures to increase the availability of marine mammals to allow subsistence needs to be met.

4.2. Effects of Alternative 2 – No Action Alternative

Under the No Action Alternative, we would not issue an Authorization to Furie. As a result, Furie would not receive an exemption from the MMPA prohibitions against the take of marine mammals and would, if they proceeded with their activities, be in violation of the MMPA if take of marine mammals occurs.

The impacts to elements of the human environment resulting from the No Action alternative—conducting the 3D seismic survey program in the absence of required protective measures for marine mammals under the MMPA—would be greater than those impacts resulting from Alternative 1, the Preferred Alternative.

4.2.1. Impacts to Marine Mammal Habitat

Under the No Action Alternative, the survey would have no additive effects on the physical environment beyond those resulting from Furie's activities, which we evaluated in the referenced documents. This Alternative would result in similar effects on the physical environment as Alternative 1. The only potential difference in impacts to marine mammal habitat under the no action alternative would be additional ensonification of the marine environment during use of 10 in^3 airgun between active survey periods because Furie would not be required to increase the shot interval.

4.2.2. Impacts to Marine Mammals

Under the No Action Alternative, Furie's activities could result in increased amounts of Level B harassment to marine mammals and possibly takes by injury (Level A harassment), serious injury, or mortality—specifically related to acoustic stimuli—due to the absence of required mitigation and monitoring measures under the Authorization. While it is difficult to provide an exact number and severity of takes that might occur under the No Action Alternative, the numbers and severity would be expected to be greater than those presented in Table 3 above because Furie would not be restricted in the total area that could be surveyed and would not be required to abide by seasonal restrictions to reduce the number of takes or engage in ramp-up, power-down, or shut down.

If the activities proceeded without the protective measures and reporting requirements required by a final Authorization under the MMPA, the direct, indirect, or cumulative effects on the human or natural environment of not issuing the Authorization would include the following:

- Marine mammals within the survey area could experience injury (Level A harassment) and potentially serious injury or mortality. The lack of mitigation measures required in the Authorization could lead to vessels not altering course around marine mammals, and not ramping up or powering or shutting down airguns when marine mammals are within applicable injury harassment zones, and no seasonal restrictions on activity locations;
- Increases in the number of behavioral responses and frequency of changes in animal distribution because of the lack of mitigation measures required in the Authorization. Thus, the incidental take of marine mammals may occur at higher levels than we have already identified and evaluated in our *Federal Register* notice on the proposed Authorization; and
- We would not be able to obtain the monitoring and reporting data needed to assess the anticipated impact of the activity upon the species or stock; and increased knowledge of the species as required under the MMPA.

4.2.3. Impacts to Subsistence

Under the No Action Alternative, the survey would have no additive effects on subsistence beyond those resulting from Furie's activities, which we evaluated in the referenced documents. Subsistence hunting of Cook Inlet beluga whales is not allowed at this time, and subsistence hunts of other marine mammal species is limited, as described earlier in this EA. The only potential difference in impacts is that Furie would not be required to ensure availability of marine mammals for subsistence uses and would not be required to implement mitigation measures to that effect.

4.3. Effects of Alternative 3 – Issuance of an Authorization with Additional Mitigation and Monitoring Measures

4.3.1. Impacts to Marine Mammal Habitat

Effects to the physical environment would be the same under Alternative 3 as those described above for Alternative 1. No additional effects beyond those already described would be expected.

4.3.2. Impacts to Marine Mammals

Marine mammals would still be expected to be harassed by the proposed seismic survey in upper Cook Inlet. As described in Alternative 1, anticipated impacts to marine mammals associated with Furie's proposed activities (primarily resulting from noise propagation) are from vessel movements and airgun operations. Potential impacts to marine mammals might include one or more of the following: tolerance, masking of important natural signals, behavioral disturbance, and temporary or permanent hearing impairment or non-auditory effects. These are the same types of reactions that would be anticipated under the Preferred Alternative (Alternative 1).

The primary difference under Alternative 3 is that additional mitigation and monitoring measures for detecting marine mammals would be required. These additional measures include a 120-dB monitoring (safety) zone for beluga whale cow/calf pairs, active acoustic monitoring, and the use of unmanned aerial vehicles to conduct aerial monitoring. While the technologies for these monitoring methods are still being developed and refined, it is expected that they would allow for additional detection of marine mammals beyond visual observations from shipboard observers. These additional monitoring measures

could allow for necessary mitigation measures (i.e., power-downs and shutdowns) to be implemented more quickly and more frequently, thereby potentially reducing further the number of marine mammal takes. However, until these technologies are developed and fully tested, we are unable to provide a reasonable estimate of this reduction in take levels.

4.3.3. Impacts to Subsistence

Under Alternative 3, impacts to marine mammal subsistence are anticipated to be the same as those described for Alternative 1 earlier in this EA.

4.4. Compliance with Necessary Laws – Necessary Federal Permits

We have determined that the issuance of an Authorization is consistent with the applicable requirements of the MMPA, ESA, MSFMCA, and our regulations. Please refer to Section 1.4 of this EA for more information.

4.5. Unavoidable Adverse Impacts

Furie's application, our notice of a proposed Authorization, and other environmental analyses identified previously summarize unavoidable adverse impacts to marine mammals or the populations to which they belong or on their habitats, as well as subsistence uses of marine mammals, occurring in the seismic survey area. We incorporate those documents by reference.

We acknowledge that the incidental take authorized would potentially result in unavoidable adverse impacts. However, we do not expect Furie's activities to have long-term, major adverse consequences on the viability of marine mammals in Cook Inlet or on the availability of marine mammals for subsistence uses, and we do not expect the marine mammal populations in that area to experience reductions in reproduction, numbers, or distribution that might appreciably reduce their likelihood of surviving and recovering in the wild. We expect that the numbers of individuals of all species taken by harassment would be small (relative to species or stock abundance), that the seismic survey and the take resulting from the seismic survey activities would have a negligible impact on the affected species or stocks of marine mammals, and that there would not be an unmitigable adverse impact to subsistence uses of marine mammals in Cook Inlet. NMFS anticipates that any effects from Furie's proposed seismic survey on marine mammals, especially harbor seals and Cook Inlet beluga whales, which are or have been taken for subsistence uses, would be short-term, site specific, and limited to inconsequential changes in behavior and mild stress responses. 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 the marine mammals and the subsistence hunters; and that cannot be sufficiently mitigated by other measures to increase the availability of marine mammals to allow subsistence needs to be met.

4.6. Cumulative Effects

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

The Cook Inlet region is a major population center in the State of Alaska and supports a wide range of activities. The proposed seismic survey would add another, albeit temporary, industrial activity to upper Cook Inlet. This activity would be limited to a small area of the upper Inlet for a relatively short period of time, and there would be no objects or materials permanently released into the water column. This section provides a brief summary of the human-related activities affecting the marine mammal species in the action area.

4.6.1. Subsistence Hunting

In Cook Inlet, Native hunters historically have hunted beluga whales and harbor seals for food. The subsistence harvest of beluga transcends nutritional and economic value of the whale as the harvest is an integral part of the cultural identity of the region's Alaska Native communities. Inedible parts of the whale provide Native artisans with materials for cultural handicrafts, and the hunting perpetuates Native traditions by transmitting traditional skills and knowledge to younger generations. However, due to dramatic declines in the Cook Inlet beluga whale population, on May 21, 1999, legislation was passed to temporarily prohibit (until October 1, 2000) the taking of Cook Inlet belugas under the subsistence harvest exemption in section 101(b) of the MMPA without a cooperative agreement between NMFS and the affected ANOs (Public Law No. 106-31, section 3022, 113 Stat. 57,100). That prohibition was extended indefinitely on December 21, 2000 (Public Law No. 106-553, section 1(a)(2), 114 Stat. 2762). NMFS subsequently entered into six annual co-management agreements (2000-2003, 2005-2006) with the Cook Inlet Marine Mammal Council, an ANO representing Cook Inlet beluga hunters, which allowed for the harvest of 1-2 belugas. On October 15, 2008, NMFS published a final rule that established long-term harvest limits on the Cook Inlet beluga whales that may be taken by Alaska Natives for subsistence purposes (73 FR 60976). That rule prohibits harvest for a five-year period (2008-2012), if the average abundance for the Cook Inlet beluga whales from the prior five years (2003-2007) is below 350 whales. The next five-year period that could allow for a harvest (2013-2017), would require the previous five-year average (2008-2012) to be above 350 whales. Additional information on the Cook Inlet beluga harvest can be found in NMFS (2008a).

There is a low level of subsistence hunting for harbor seals in Cook Inlet. Seal hunting occurs opportunistically among Alaska Natives who may be fishing or travelling in the upper Inlet near the mouths of the Susitna River, Beluga River, and Little Susitna River.

4.6.2. Pollution

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

4.6.3. Fisheries Interaction

Fishing is a major industry in Alaska. As long as fish stocks are sustainable, subsistence, personal use, recreational and commercial fishing will continue to take place in Cook Inlet. As a result there will be continued prey competition, risk of ship strikes, potential harassment, potential for entanglement in fishing gear and potential displacement from important foraging habitat for the Cook Inlet beluga whales. NMFS and the ADF&G will continue to manage fish stocks and monitor and regulate fishing in Cook Inlet to maintain sustainable stocks.

4.6.4. Gas and Oil Development

Oil and gas development has been conducted in Cook Inlet since the 1960s. NMFS began authorizing take of marine mammals incidental to oil and gas development in the region more recently. For example, in 2012, we issued and IHA to Apache for take of marine mammals incidental to a seismic survey in the Trading Bay region. Under the 2012 Authorization, Apache reported a total of 17 Level B harassment takes between May 6 and September 30, 2012, including harbor porpoise (n=4) and harbor seals (n=13). No other marine mammal species were detected in the Level B harassment zone. There were no Level A takes of either cetaceans or pinnipeds during the 2012 seismic survey. An IHA was also issued to Apache in 2013; however, no in-water work was conducted during the effective period of that Authorization. No other projects were operating under an MMPA Authorization at this time, so we do not have monitoring reports outlining potential takes for those activities.

Currently, there are several gas and oil exploration and development projects in the proposed action area, and it is likely that future gas and oil development will continue to take place in the action area. Apache, for example, will be conducting seismic surveys in Cook Inlet for the next three to five years, and NMFS recently issued an Authorization to Apache for a seismic survey in Cook Inlet during 2014 (79 FR 13626, March 11, 2014). However, it is unlikely that Furie's and Apache's seismic survey operations would occur simultaneously. Both companies require the use of survey equipment and vessels owned and operated by a subcontractor and there is only one company in Cook Inlet who can perform this type of work. Therefore, Furie will not be able to initiate their survey until Apache has completed theirs and marine mammals in the area will not be exposed to sound generated from multiple, concurrent seismic surveys. In addition to the request from Furie, NMFS has received an Authorization application from SAExploration requesting takes of marine mammals incidental to conducting a seismic survey. It is likely that a final determination on this IHA application will not be made until the other two seismic surveys have been completed. In consideration of these logistical factors, although the other seismic survey programs are very similar to that proposed by Furie there will likely be some spatial overlap, but no temporal overlap. Impacts from gas and oil development include increased noise from seismic activity, vessel and air traffic and well drilling; discharge of wastewater; 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. 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 an Authorization is issued to the other applicant, it would be required to implement mitigation and monitoring measures to reduce impacts to marine mammals and their habitat in the area and would be subject to the same MMPA and ESA standards.

Support vessels are required for gas and oil development to transport supplies and products to and from the facilities. Not only will the support vessels from increased gas and oil development likely increase

noise in the action area, there is a potential for a slightly increased risk of ship strikes with beluga whales; however, ship strikes have not been definitively confirmed in a Cook Inlet beluga whale death, and monitoring measures should reduce this risk by placing visual monitors on ships to look out for whales and by deploying acoustic monitors to listen for vocalizing marine mammals.

4.6.5. Coastal Zone Development

Coastal zone development may result in the loss of habitat, increased vessel traffic, increased pollutants and increased noise associated with construction and noise associated with the activities of the projects after construction. In the action area, two main projects are being considered, the Chuitna Coal Mine and the Ocean Renewable Power Company (ORPC) Tidal Energy Project. The Port of Anchorage (POA) is currently expanding their facilities and Port MacKenzie is scheduled to expand their facilities. Both port facilities may have an effect on beluga whales in the action area due to increased vessel traffic passing through the area on their way to both facilities.

Port of Anchorage and Port MacKenzie Expansions

The POA and Port MacKenzie in upper Cook Inlet are either currently expanding or scheduled to expand their facilities. These ports will contribute to increased vessel traffic throughout Cook Inlet. The POA is expanding its facilities to accommodate increased growth in Alaska and to support military services at JBER. At Port MacKenzie, the Rail Extension is under construction, and a deep water draft dock expansion and several million gallon fuel tank farm are scheduled for construction. The Rail Extension would connect Port MacKenzie to the Alaska Railroad Corporation's existing mainline between Wasilla and Willow, providing freight service between Port MacKenzie and Interior Alaska. Port MacKenzie will be exporting coal from Healy, Alaska with the construction of the Rail Extension. The fuel tank farm is scheduled for construction in the next couple years and the Rail Extension should be completed by 2017. Additionally, Port MacKenzie is currently preparing permits to expand its deep water draft dock with a second trestle. As a result, number of ships calling to port at Port MacKenzie is expected to increase over the next three to five years. Increased vessel traffic may result in increased in water noise and potential ship strikes with beluga whales.

Chuitna Coal Project

The Chuitna Coal Project is located within the project area of the proposed Cook Inlet 3D Seismic Program. PanRim Coal, LP is proposing to develop, construct and operate a coal mine and export facility 19 km (12 mi) northwest of the Village of Tyonek. Potential impacts on the Cook Inlet beluga whale from the Chuitna Coal Project would include the construction of the coal export facility within Cook Inlet and surface water discharge. The coal export facility that includes an overland coal conveyer and ship loading berth would extend from shore into Cook Inlet. The conveyer and ship berth would incorporate tower sites approximately 335 m (1,100 ft) apart to allow for uninhibited movement of marine life (PamRim Coal, LP 2011). No chemical or water-based processing of the coal would take place; therefore, the expected sources of discharge from the project would include rainfall, snowmelt and groundwater (PamRim Coal, LP 2011). Prior to discharging water into Cook Inlet, the water would be directed to sediment control structures and meet the water quality criteria described by the APDES permit (PamRim Coal, LP 2011).

ORPC Alaska Tidal Energy Projects

ORPC is proposing two tidal energy projects in Cook Inlet. The first tidal energy project would be located on the west side of Fire Island near Anchorage and the second project would be located adjacent to the

East Foreland in the vicinity of Nikiski on the Kenai Peninsula (ORPC 2011). The tidal energy projects would require the installation of an array of turbine generator units and transmission cables on the seafloor to harness the tidal energy. The tidal energy will be converted to electrical energy at stations on land. These projects are still in preliminary testing and environmental monitoring phases (ORPC 2010, ORPC 2011).

4.6.6. Marine Mammal Research

Because many important aspects of marine mammal biology remain unknown, or are incompletely studied, and because management of these species and stocks requires knowledge of their distribution, abundance, migration, population, ecology, physiology, genetics, behavior, and health, free-ranging marine mammal species are frequently targeted for scientific research and studies. Research activities normally include close approach by vessel and aircraft for line-transect surveys; behavioral observation; photo-identification and photo-video-grammetry; passive acoustic recording; attachment of scientific instruments (tagging), both by implantable and suction cup tags; biopsy sampling, including skin and blubber biopsy and swabbing; land-based surveys; live capture for health assessments, and blood and tissue sampling, pinniped tooth extraction, and related pinniped anesthesia procedures. All researchers are required to obtain a scientific research permit from NMFS Office of Protected Resources under the MMPA and/or ESA (if an ESA-listed species is involved). Currently, the permits authorizing research on beluga whales in Cook Inlet, as wells as permits authorizing research on harbor seals, harbor porpoises, Steller sea lions, and killer whales in Alaskan waters may have cumulative effects on these species and stocks. NMFS anticipates that scientific research on marine mammals in Cook Inlet will continue, and possibly expand, due to the increasing need to better understand distribution and abundance relative to temporal (seasonal, diel, or tidal) and spatial (geographic or bathymetric) parameters.

4.6.7. Climate Change

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

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

- Average arctic temperatures increased at almost twice the global average rate in the last 100 years.

- Satellite data since 1978 show that perennial arctic sea ice extent has shrunk by 2.7 percent per decade, with larger decreases in sea ice extent in summer of 7.4 percent per decade.
- Arctic sea ice thickness has declined by about 40 percent during the late summer and early autumn in the last three decades of the 20th century.

Marine mammals are classified as sentinel species because they are good indicators of environmental change. Arctic marine mammals are ideal indicator species for climate change, due to their circumpolar distribution and close association with ice formation. NMFS recognizes that warming of the Arctic, which results in the diminishing of ice, could be a cause for concern to marine mammals. In Cook Inlet, marine mammal distribution is dependent upon ice formation and prey availability, among other factors. For example, belugas often travel just along the ice pack and feed on prey beneath it (Richardson et al., 1990, 1991). Any loss of ice could result in prey distribution changes or loss; however, beluga whales do not use ice for resting, reproduction, or rearing of young like pinnipeds.

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

4.6.8. Conclusion

Based on the summation of activity in the area provided in this section, NMFS believes that the incremental impact of an Authorization for the proposed Furie seismic survey in Cook Inlet would not be expected to result in a cumulative significant impact to the human environment from past, present, and future activities. The potential impacts to marine mammals, their habitats, and the human environment in general are expected to be minimal based on the limited and temporary noise footprint and mitigation and monitoring requirements of the Authorization.

Chapter 5 List of Preparers and Agencies Consulted

Agencies Consulted

No other persons or agencies were consulted in preparation of this EA.

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