Proposed Action:	Issuance of Regulations and Letter of Authorizations for Ice Roads and Ice Trails Construction on North Slope, Alaska.
Type of Statement:	Final 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:	Shane Guan Office of Protected Resources Permits and Conservation Division 1315 East West Highway Silver Spring, MD 20910 301-427-8401
Location:	North Slope, Alaska
Abstract:	This Environmental Assessment analyzes the environmental impacts of the National Marine Fisheries Service, Office of Protected Resources' proposal to issue two Letter of Authorizations, pursuant to section 101(a)(5)(A) of the Marine Mammal Protection Act, to Hilcorp Alaska, LLC and Eni US Operating Co. Inc., for the take of small numbers of marine mammals incidental to conducting ice road and ice trail construction on North Slope, Alaska.
DATE:	June 2020

Table of Contents

CHAPTER 1 INTRODUCTION AND PURPOSE AND NEED **5**
1.1 Establishment and Overview of the Marine Mammal Protection Act 5
1.2 Summary of Applicant's Incidental Take Authorization Request 6
1.3 Purpose and Need 7
1.3.1 Description of Proposed Action 7
1.3.2 Purpose 7
1.3.3 Need 7
1.4 Environmental Review Process 8
1.4.1 Public Involvement 8
1.5 Scope of Environmental Analysis 10

Chapter 2 Alternatives **12**
2.1 Criteria and Considerations for Selecting Alternatives 12
2.2 Description of Hilcorp and Eni's Proposed Activities 14
2.3 Dates and Duration 14
2.4 Specified Geographic Region 14
2.5 Detailed Description of Activities 14
2.5.1 Hilcorp: Northstar to West Dock 15
2.5.2 Eni: Oliktok Production Pad to SID 18
2.5.3 Eni: Oooguruk Ice Road 20
2.6 Description of Alternatives 23
2.6.1 Alternative 1 – Issuance of an Authorization with Mitigation Measures 23
2.6.2 Alternative 2 – No Action Alternative 27

Chapter 3 Affected Environment **28**
3.1 Physical Environment 28
3.2 Biological Environment 28
3.2.1 Overview of Marine Mammals in Beaufort Sea 28
3.2.2 Ringed Seals 29
3.2.3 Socioeconomic Environment 32

Chapter 4 Environmental Consequences **34**
4.1 Effects of Alternative 1 – Issuance of an IHA with Mitigation Measures 34
4.1.1 Impacts to Marine Mammal Habitat 34
4.1.2 Impacts to Ringed Seal Critical Habitat 34
4.1.3 Impacts to Marine Mammals 35
4.1.4 Impacts Summary 38
4.1.5 Estimated Take of Marine Mammals 38
4.1.6 Ringed Seal Densities 39
4.1.7 Take Estimates 41
4.1.8 Effects on Subsistence Use 44
4.2 Effects of Alternative 2 – No Action Alternative 44
4.3 Cumulative Effects 45
4.3.1 Oil and Gas Exploration and Development 45
4.3.2 Vessel Traffic 46
4.3.3 Recreation and Tourism 47
4.3.4 Subsistence Activities 47

4.3.5 Military / Homeland Security Activities 47
4.3.6 Scientific Research Activities 48
4.3.7 Climate Change 48
4.3.8 Conclusion 49

Chapter 5 List of Preparers and Agencies Consulted 50

Chapter 6 Literature Cited 51

LIST OF ACRONYMS AND ABBREVIATIONS

CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
dB	decibel
EA	Environmental Assessment
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
Eni	Eni US Operating Co. Inc.
FONSI	Finding of No Significant Impact
ft	feet
FR	Federal Register
Hilcorp	Hilcorp Alaska, LLC
LOA	Letter of Authorization
m	meter
mi	miles
MMPA	Marine Mammal Protection Act
MSFCMA	Magnuson-Stevens Fishery Conservation Management Act
NAO	NOAA Administrative Order
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
ODS	Oooguruk Drill Site
OMB	Office of Management and Budget
OPP	Oliktok Production Pad
PSO	Protected Species Observer
PTS	Permanent hearing threshold shift
SAR	NMFS Marine Mammal Stock Assessment Report
SID	Spy Island Drillsite
TTS	Temporary hearing threshold shift
USFWS	US Fish and Wildlife Service

Chapter 1 INTRODUCTION AND PURPOSE AND NEED

The National Marine Fisheries Service (NMFS) received a joint application requesting incidental take of marine mammals from Hilcorp Alaska, LLC (Hilcorp) and Eni US Operating Co. Inc. (Eni) who is proposing to construct ice roads and ice trails in North Slope, Alaska. NMFS is required to review applications and, if appropriate, issue Incidental Take Authorizations (ITAs) pursuant to the Marine Mammal Protection Act of 1972, as amended (MMPA; 16 U.S.C. 1361 et seq.). In addition, the National Environmental Policy Act (NEPA), the Council on Environmental Quality Regulations (40 Code of Federal Regulations (CFR) Parts 1500 -1508) and National Oceanic and Atmospheric Administration (NOAA) policy and procedures[1] require all proposals for major federal actions to be reviewed with respect to environmental consequences on the human environment.

This Chapter presents a summary of NMFS authority to authorize incidental take of marine mammals (Section 1.1), a summary of the applicant requests (Section 1.2) and identifies NMFS proposed action and purpose and need (Section 1.3). This Chapter also explains the background and environmental review process associated with the development of this EA (Sections 1.4) and provides other information relevant to the analysis in this EA, such as the scope of the analysis (Section 1.5). The remainder of this EA is organized as follows:

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

1.1 Establishment and Overview of the Marine Mammal Protection Act

When the MMPA was enacted in 1972, Congress made several findings concerning the protection and preservation of marine mammals. This includes, but is not limited to, indicating that "certain species and population stocks of marine mammals are or may be in danger of extinction or depletion as a result of man's activities" (16 U.S.C. 1361(1)) [and] "such species and population stocks should not be permitted to diminish beyond the point at which they cease to be a significant functioning element in the ecosystem of which they are a part […]" (16 U.S.C. 1361(2)) [and that] "marine mammals…[are] resources of great international significance… [that] should be protected and encouraged to develop to the greatest extent feasible

[1] NOAA Administrative Order (NAO) 216-6A "*Compliance with the National Environmental Policy Act, Executive Orders 12114, Environmental Effects Abroad of Major Federal Actions; l 1988 and 13690, Floodplain Management; and 11990, Protection of Wetlands*" issued April 22, 2016 and the Companion Manual for NAO 216-6A "*Policy and Procedures for Implementing the National Environmental Policy Act and Related Authorities*" issued January 13,2017

commensurate with sound policies of resource management and the primary objective of their management should be to maintain the health and stability of the marine ecosystem […]" (16 U.S.C. 1361(6)). These and other findings in Section 2 of the MMPA speak to the need to maintain a broad scope in marine mammal protection that considers species and ecosystem level impacts.

To serve these broader goals, Section 101(a) of the MMPA prohibits the incidental taking of marine mammals. The incidental take[2] of a marine mammal falls under three categories: mortality, serious injury, or harassment (i.e., injury and behavioral effects). Harassment[3] is any act of pursuit, torment, or annoyance that has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment) or has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns (Level B harassment). Disruption of behavioral patterns includes, but is not limited to, migration, breathing, nursing, breeding, feeding or sheltering. However, there are exceptions to the prohibition on take in Sections 101(a)(5)(A) and (D) of the MMPA that gives NMFS the authority to authorize the incidental but not intentional take of small numbers of marine mammals, provided certain determinations are made and statutory and regulatory procedures are met. ITAs may be issued as either (1) regulations and associated Letters of Authorization (LOA) or (2) IHAs when a proposed action will not result in a potential for serious injury and/or mortality or where any such potential can be negated through required mitigation measures, and the activity must be confined to one year or less. The full text of the MMPA is available for review on NOAA Fisheries website: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act.

NMFS also promulgated regulations to implement the provisions of the MMPA governing the taking and importing of marine mammals, 50 Code of Federal Regulations (CFR) Part 216 and produced Office of Management and Budget (OMB)-approved application instructions (OMB Number 0648-0151) that prescribe the procedures necessary to apply for permits. All applicants must comply with these regulations and application instructions in addition to the provisions of the MMPA. The implementing regulations and application information are available for review on NOAA Fisheries website: https://www.fisheries.noaa.gov/topic/laws-policies#marine-mammal-protection-act.

1.2 Summary of Applicant's Incidental Take Authorization Request

On December 2, 2018, NMFS received the initial joint application from Hilcorp and Eni requesting authorizations for take of marine mammals incidental to construction activities related to ice roads and ice trails in North Slope, Alaska. NMFS provided questions and comments to Hilcorp and Eni after receiving the initial application regarding the scope of the project and impact analysis. Hilcorp and Eni submitted a modified request on May 21, 2019, which NMFS deemed adequate and complete on May 31, 2019. Hilcorp and Eni are proposing to construct ice roads and trails to connect and allow access between West Dock and Northstar by Hilcorp, and

[2] The term "take" means "to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal." (16 U.S.C. §1362(13))
[3] As defined in the MMPA for non-military readiness activities (Section 3(18)(A))

to connect and allow access between the Oliktok Production Pad (OPP) and Spy Island Drillsite (SID), and between shore to the Oooguruk Drill Site (ODS) by Eni. These ice roads and trails will be constructed during ice-covered season annually. Additional explanations about the applicant's activities is explained in Chapter 2 and is also described in the notice of the proposed rule under "Summary of Requests" and "Description of Specified Activities".

1.3 Purpose and Need

1.3.1 Description of Proposed Action

NMFS proposes to issue regulations and separate Letters of Authorization to Hilcorp and Eni pursuant to Section 101(a)(5)(A) of the MMPA and 50 CFR Part 216. The regulations and LOAs would be valid for five years from date the final rule is issued. The regulations and LOAs will authorize takes of marine mammals, by Level B harassment and serious injury or mortality, incidental to the applicants proposed construction of ice roads and ice trails on North Slope, Alaska. NMFS's proposed action is a direct outcome of Hilcorp and Eni request for authorization to take marine mammals incidental to their proposed ice roads and ice trails construction activities. NMFS does not have the authority to authorize or prohibit Hilcorp and Eni's construction activities.

1.3.2 Purpose

The purpose of NMFS's proposed action is to authorize take of marine mammals incidental to the applicants proposed activity. The proposed action may incidentally expose marine mammals occurring near the ice road and ice trail construction activities to elevated levels of sound, human presence on ice habitat, and interactions with heavy machinery, thus the activity warrants regulations and LOAs from NMFS. The regulations and LOAs, if issued, would provide an exemption to Hilcorp and Eni from the take prohibitions of the MMPA.

To authorize the incidental take of small numbers of marine mammals, NMFS evaluates the best available scientific information to determine whether the take would have a negligible impact on marine mammals or stocks and whether the activity would have an unmitigable impact on the availability of affected marine mammal species for subsistence use. NMFS cannot issue the regulations and LOAs if it would result in more than a negligible impact on marine mammals or stocks or would result in an unmitigable impact on subsistence uses. In addition, NMFS must prescribe the permissible methods of taking and other means of effecting the least practicable impact on the species or stocks of marine mammals and their habitat, paying particular attention to rookeries, mating grounds, and other areas of similar significance. 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. NMFS also includes requirements or conditions pertaining to monitoring and reporting.

1.3.3 Need

U.S. citizens seeking to obtain authorization for the incidental take of marine mammals under NMFS's jurisdiction must submit such a request (in the form of an application). On May 31, 2019, Hilcorp and Eni submitted an application demonstrating the need and potential eligibility for regulations and LOAs under the MMPA. Therefore, NMFS has a corresponding duty to determine whether and how to authorize take of marine mammals incidental to the activities

described in the applicant's request. NMFS's responsibilities under Section 101(a)(5)(A) of the MMPA and its implementing regulations establish and frame the need for NMFS proposed action.

1.4 Environmental Review Process

Under NEPA, federal agencies are required to examine the environmental impacts of their proposed actions within the United States and its territories. A NEPA analysis is a concise public document that provides an assessment of the potential effects a major federal action may have on the human environment. Major federal actions include activities that federal agencies fully or partially fund, regulate, conduct or approve. Because NMFS issuance of an ITA (i.e., the regulations and LOAs for Hilcorp and Eni) will allow for the taking of marine mammals, consistent with provisions under the MMPA and incidental to the applicant's lawful activities, NMFS considers this as a major federal action subject to NEPA. Therefore, NMFS analyzes the environmental effects associated with authorizing incidental takes of protected marine mammal species and prepares the appropriate NEPA documentation. In addition, NMFS, to the fullest extent possible, integrates the requirements of NEPA with other regulatory processes required by law or by agency practice so that all procedures run concurrently, rather than consecutively. This includes coordination within NOAA, (e.g., the Office of the National Marine Sanctuaries) and with other regulatory agencies (e.g., the U.S. Fish and Wildlife Service), as appropriate, during NEPA reviews prior to implementation of a proposed action to ensure that requirements are met. Regarding the issuance of ITAs, NMFS relies substantially on the public process required by the MMPA for proposed ITAs to develop and evaluate relevant environmental information and provide a meaningful opportunity for public participation when NMFS prepares NEPA documents. NMFS considers public comments received in response to the publication of proposed ITA during the NEPA review process.

1.4.1 Public Involvement

The NEPA process is intended to enable NMFS to make decisions based on an understanding of the environmental consequences to a proposed action and public involvement is an essential part of this process under NEPA. Regarding NMFS's consideration whether to issue regulations and LOAs to Hilcorp and Eni, NMFS relied substantially on the public process pursuant to the MMPA to develop and evaluate environmental information relevant to an analysis under NEPA. NMFS makes the application available for public review and comment and separately, publishes the proposed rule for review and comment. In the propose rule, NMFS alerted the public it intended to use the MMPA public review process to solicit relevant environmental information and provide the public an opportunity to submit comments on the draft EA. This draft EA was made available on the internet along with the proposed rulemaking.

NMFS published a Notice of Receipt (84 FR 32726; July 9, 2019) and a proposed rule (85 FR 2988; January 17, 2020) in the Federal Register to initiate public review period associated with Hilcorp and Eni's request for an authorization. The Federal Register notice for the proposed rule included a detailed description of the proposed action resulting from the MMPA process, consideration of environmental issues and impacts of relevance related to the proposed rulemaking and potential mitigation and monitoring measures to avoid and minimize potential adverse impacts to marine mammals and their habitat. The Federal Register notices (i.e., Notice

of Receipt of the application and proposed rulemaking), the draft EA and the corresponding public comment periods were are instrumental in providing the public with information on relevant environmental issues and offering the public a meaningful opportunity to provide comments for our consideration in both the MMPA and NEPA decision-making processes.

During the 30-day public comment period on the proposed rule, NMFS received seven comments from the Marine Mammal Commission (MMC), a consulting firm, ECO49, and the public. Although a few private citizens indicated opposition to NMFS granting the applicants requests for LOAs, the majority of the comments were about were focused subsistence uses, specifically on promoting communication between the companies and the subsistence users, reducing potential impacts on subsistence use of ringed seals in the action area, and increasing involvement from subsistence hunters to improve ringed seal detection during the construction activity. However, these comments pertaining to subsistence uses are common whenever this issue is a factor are not controversial or indicative of controversial issues. In the final rule, NMFS addressed these comments and other comments, as appropriate.1.4.2 Other Environmental Laws or Consultations

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

1.4.2.1 Endangered Species Act

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

NMFS' issuance of regulations is a federal action that is also subject to the requirements of Section 7 of the ESA. As a result, we are required to ensure that the issuance of regulations to Hilcorp and Eni is not likely to jeopardize the continued existence of any T&E species or result

in the destruction or adverse modification of designated critical habitat for these species. Because ringed seal is an ESA-listed species with confirmed or possible occurrence near North Slope, Alaska, NMFS OPR Permits and Conservation Division initiated Section 7 consultation with the NMFS' Alaska Regional Protected Resources Division on the proposed issuance of regulations to Hilcorp and Eni, pursuant to section 7 of the ESA, on September 30, 2019. On March 26, 2020, the Alaska Region issued a Biological Opinion concluding that NMFS' action is not likely to result in jeopardy to the ringed seal or adversely modify their critical habitat.

1.4.2.2 Magnuson-Stevens Fishery Conservation and Management Act

Under the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), Federal agencies are required to consult with the Secretary of Commerce with respect to any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken, by such agency which may adversely affect essential fish habitat (EFH) identified under the MSFCMA. Since the issuance of an regulations and LOAs is not anticipated to result in adverse impacts to EFH, we determined a separate consultation per Section 305(B)(2) of the MSFCMA as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267) is not required.

1.5 Scope of Environmental Analysis

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

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

Biological	Physical	Socioeconomic / Cultural
Amphibians	Air Quality	Commercial Fishing
Humans		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	

Chapter 2 Alternatives

The National Marine Fisheries Service (NMFS) Proposed Action is to issue regulations and a Letters of Authorization (LOAs) to Hilcorp and Eni to authorize the take of small numbers of marine mammals incidental to the oil and gas exploration and development activities. NMFS's Proposed Action is triggered by Hilcorp's and Eni's request for regulations per the Marine Mammal Protection Act (MMPA) of 1972, as amended (MMPA; 16 U.S.C. 1361 et seq.). In accordance with the National Environmental Policy Act (NEPA) and Council on Environmental Quality (CEQ) Regulations, NMFS is required to consider a reasonable range of alternatives to a Proposed Action as well as the No action Alternative. The evaluation of alternatives under NEPA assists NMFS with ensuring that any unnecessary impacts are avoided through an assessment of alternative ways to achieve the purpose and need for our Proposed Action that may result in less environmental harm. For the purposes of this EA, an alternative will only meet the purpose and need if it satisfies the requirements under section 101(a)(5)(A) of the MMPA. Therefore, NMFS applied the screening criteria and considerations outlined in Section 2.1 to the alternatives to identify which alternatives to carry forward for analysis.

2.1 Criteria and Considerations for Selecting Alternatives

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

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

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

While the language of the least practicable adverse impact standard calls for minimizing impacts to affected species or stocks, we recognize that the reduction of impacts to those species or stocks accrues through the application of mitigation measures that limit impacts to individual

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

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

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

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

- limiting degradation of habitat.

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

2.2 Description of Hilcorp and Eni's Proposed Activities

Hilcorp Alaska, LLC (Hilcorp) and Eni US Operating Co. Inc. (Eni) conduct oil and gas operations at Northstar Production Facility (Northstar) and Spy Island Drillsite (SID), respectively, in coastal Beaufort Seawaters, Alaska. During the ice-covered season, Hilcorp constructs annual ice roads and trails to connect and allow access between West Dock and Northstar (Figure 1-1). Similarly, Eni builds and utilizes an ice road connecting the Oliktok Production Pad (OPP) and SID (Figure 1-2). Enialso builds an annual ice road from shore to the Oooguruk Drill Site (ODS) (Figures 1-3 and 1-4). The proposed action may incidentally expose marine mammals occurring in the vicinity to elevated levels of sound, human presence on ice habitat, and interactions with heavy machinery, thereby resulting in incidental take, by Level B harassment and serious injury or mortality.

2.3 Dates and Duration

Both Hilcorp and Eni generally begin constructing sea ice roads and ice trails as early as possible, usually by late December depending on weather. Maintenance and use of the ice roads and trails continue generally through mid-May when the ice becomes too unstable to access. Depending on weather, from the initial surveying until the ice is thick enough to allow travel by wheeled vehicles, ice road construction takes about six weeks.

2.4 Specified Geographic Region

Northstar, an artificial gravel island, is located in State of Alaska coastal waters about 6 mi (9.7 km) offshore from Point Storkersen in the Beaufort Sea (Figure 1-1). Water depth at the island is about 39 ft (12 m). This region is covered by landfast ice in winter and with water depths greater than 10 ft (3 m). It is considered to be important overwintering and spring breeding habitat for ringed seals. The 11-acre (0.05 square kilometer [km^2]) SID is also an artificial, gravel island constructed in shallow (6-8 ft, 1.8-2.4 m), State of Alaska coastal waters approximately 3 mi (4.8 km) north of Oliktok Point and just south of the Spy Island barrier island (Figure 1-2). While SID is situated in water depths considered unsuitable for ringed seals, each year a crack or lead has developed in the road between OPP and SID. The ODS consists of a 6-acre gravel drillsite approximately 5 mi (8 km) offshore in 4.5 ft (1.4 m) of water (Figures 1-3 and 1-4). The site is connected to an onshore facility by a flowline system consisting of a 5.7-mi (9.2-km) subsea buried flowline bundle which transitions onshore to a 2.3-mi (3.7-km) traditional North Slope aboveground flowline support system.

2.5 Detailed Description of Activities

2.5.1 Hilcorp: Northstar to West Dock

Ice Road Construction, Use, and Maintenance

Each year during the ice-covered season an approximately 7.3-mi (11.7km) long ice road is constructed between Northstar and the Prudhoe Bay facilities at West Dock to transport personnel, equipment, materials, and supplies (Figures 1-1). Ice roads allow standard vehicles such as pick-up trucks, SUVs, buses and other trucks to be used to transport personnel and equipment to and from the island during the ice-covered period.

In some years depending on operational needs and weather conditions, Hilcorp may elect to not build the main improved ice road. In this case, a primary ice trail that can support only tracked, lighter-weight vehicles would be built in the location of the improved ice road shown on Figure 1-1. However, to cover all scenarios, this Hilcorp assumes that an ice road would be built in each year for in the next five years.

In water deeper than 10 ft (3 m), the ice must be approximately 8 ft (2.4 m) thick to support construction equipment. Ice road construction activities occur24 hours a day, 7 days a week during the construction phase, and are only halted in unsafe conditions such as high winds or extremely low temperatures. The ice roads are typically constructed by specially designed pumps with ice augers. Seawater for creating the offshore ice road is obtained by drilling holes through the existing sea ice using augers and pumping salt water to flood the ice surface. The rolligons move along the road alignment while flooding the surface. Water trucks are used to spray a freshwater cap over the thickened sea ice to provide durability.

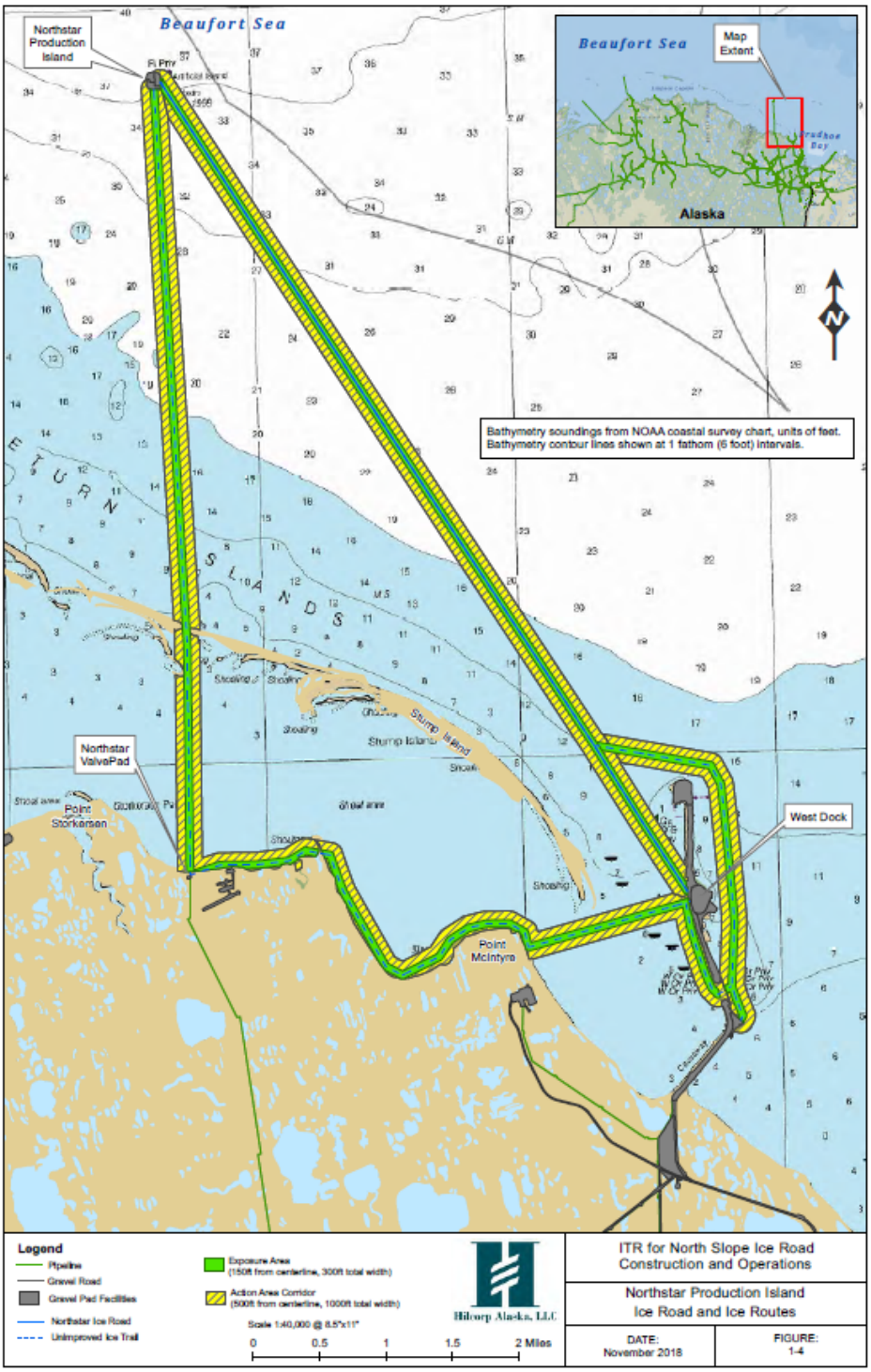

Figure 1-1. Northstar Production Island Ice Road and Ice Trails

Following construction, ice road surfaces are maintained using graders with snow wings and blowers, or front-end loaders with snow blower attachments. Snow can also be cleared by personnel with snow blowers. Care is taken so that large berms or large piles of snow are not created adjacent to the road or on the shoulders. When snow blowing, wind direction is used to

assist in dispersing the blown snow over a large area so that large berms or piles are not created. Delineators may be used to mark the roadway in 50ft (15 m) increments down the centerline of the road, and at no more than 1/4 mi (0.4 km) increments on both sides of the ice road to delineate the path of vehicle travel and areas to be maintained. Corners of rig mats, steel plates, and other materials used to bridge sections of hazardous ice, are clearly marked or mapped using Global Positioning System (GPS) coordinates of the locations. The following steps are used to build the Northstar ice road:

1) Clear snow using lighter-weight tracked vehicles.
2) Grade or drag the ice to smooth the surface, incorporating rubble ice into the road or moving it outside of the expected road surface.
3) Drill holes through floating ice along the planned ice road route using rolligons equipped with ice augers and pumps.
4) Pump seawater from drilled holes over floating ice.
5) Flood the ice road. Flooding techniques are dependent on the conditions of the sea ice (i.e., grounded vs. floating).
6) Grounded ice requires minimal freshwater flooding to either cap or repair cracks. Floating ice requires flooding with seawater until a desired thickness is achieved. Thickness of floating ice would be determined by the required strength and integrity of the ice. After achieving desired thickness, floating ice areas may then be flooded with fresh water to either cap or repair cracks. This technique minimizes the amount of freshwater used to obtain the desired thickness of the ice road. Hilcorp would use permitted freshwater sources if fresh water is needed to construct the Northstar ice roads. Water would be transported by truck from permitted freshwater sources via existing roads.

Ice Trails

Ice trails are unimproved access corridors used by Tuckers, PistenBullys®, snow machines, or similar tracked equipment. Seawater flooding of the entire trail and freshwater caps are not used. However, small rough areas of a trail may require minimal seawater flooding to allow tracked vehicles, rolligons, and the hovercraft (if needed) to travel along the corridor.

To construct the trail, snow machines and light-weight tracked vehicles are used to initially mark the corridor as soon as it is determined to be safe for access. Sea ice in the unimproved roads would be allowed to thicken through natural freeze up as the ice and snow is packed down by larger tracked vehicles. Generally, snow removal or large surface modifications are not required for ice trails. Hilcorp usually builds the following unimproved ice trails to Northstar:

- Along the pipeline corridor from the valve pad near the Dew Line site to Northstar (5.93 mi, 9.5 km),
- From West Dock to the pipeline shore crossing (grounded ice along the coastline (4.82mi, 7.8 km)
- Two unimproved ice road paths from the hovercraft tent at Dockhead 2. One would go under the West Dock causeway bridge to Dockhead 3 (0.86 mi, 1.4 km) and the other would go around West Dock and intersect the main ice road north of the Seawater Treatment Plant (2.85 mi,4.6 km).

In addition to these trails, Hilcorp may need to construct several shorter length trails into undisturbed areas to work around unstable and unsafe areas of ice as the season progresses. Due to safety considerations these work-around or detour trails may need to be constructed after March 1st. They are constructed similarly to the planned ice trails and are not flooded or capped with seawater or freshwater. Typically, these detours deviate approximately 75 to 150 ft (23 to 46 m) from the original road or trail to allow crews to safely go around soft spots or cracks.

2.5.2 Eni: Oliktok Production Pad to SID

Ice Road Construction, Use, and Maintenance

Each year Eni builds a single ice road and three ice pads. The ice road extends 4.2 mi (6.8 km) offshore from OPP to SID (Figures1.2). This ice road has both supported on water (floating) and grounded ice sections; the first 800 ft (244 m) of the road from shore is grounded ice (i.e., frozen to the bottom). In addition, Eni typically also builds two floating ice pad parking areas at SID: a 500 ft by 200 ft (152 m by 6 m) area located on the southeast side of SID; and a 300 ft by 150 ft (91 m by 46 m) area on the northeast side, as well as one grounded ice pad at the Oliktok Point end of the ice road.

Initial construction of the sea ice road begins with surveying and staking the route as soon as the ice is thick enough to support snow machines. The floating sections of the road are constructed using the free flood method; low pressure pumps flood the ice surface with seawater. A 3-inch (in.) (7.6 centimeter [cm]) layer of water is applied, some of which may move to lower parts of the roadway. After the water has frozen, the next flood can be applied.

Small rolligon vehicles with augers and pumps are used for augering and flooding. Hand augers can be used to check the ice thickness. Ice needs to be 16 to 20 in. (41 to 51 cm) thick to support these vehicles. Rolligon tires distribute the load over a larger tire print. Flooding operations occur 24 hours a day, 7 days a week during this phase. Once the ice is about 72 in. (183 cm) thick and determined to be able to support full loads, vehicles such as passenger trucks, vacuum trucks, drill trucks and other tractor plus trailer loads can use the ice road. Up until that time, only rolligon vehicles and tracked vehicles are used on the road. The maintained ice road width (including the shoulder areas) is 160 ft (49 m).

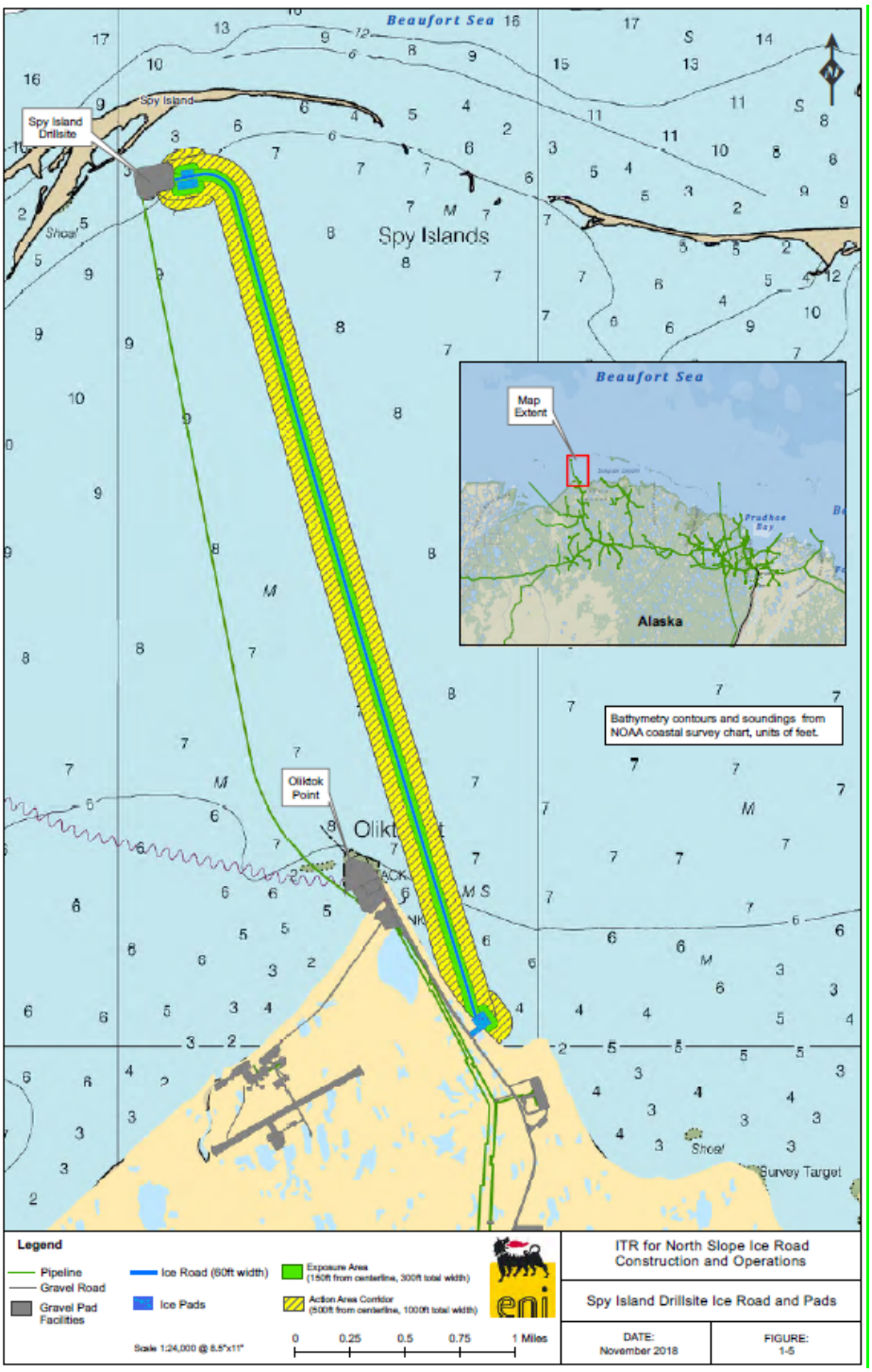

Figure 1-2. SID Ice Road/Trail and Ice Pads

Rig mats are used to bridge small leads and wet cracks during construction and maintenance. During maintenance activities, fresh water is used for road surfacing and repair. Once fully flooded and open to traffic, snow loads on the ice road must be managed. Snow on the ice road is cleared frequently and the width of the ice road (including the shoulder areas) is maintained at

160 ft. At the end of the ice road season, as temperatures and sun exposure increase, snow may be spread over the road surface to insulate and shade the ice surface, helping to preserve ice road integrity.

Ice Trails

Followingthe same general construction methods used at Northstar, Eni plans to build an unimproved ice trail just west of and parallel to the sea ice road corridor near SID. The ice trailis typically approximately 50-100 ft west of the western edge of the ice road shoulder and is used when the ice road is being constructed. Once the ice road is open to regular traffic, the ice trail is not used. After March 1st, due to safety considerations, Eni may also need to use several shorter length trails in undisturbed areas to work around unstable and unsafe areas of ice as the season progresses. As described above, these work-around or detour trails allow PistenBullys® and other tracked vehicles to safely go around soft spots or cracks.

2.5.3 Eni: Oooguruk Ice Road

Ice Road Construction, Use, and Maintenance

A single ice road and staging area ice pad are required each year to operate the ODS. As shown in Figure 1-3, the typical or proposed ice road extends 5.5mi (8.9 km) offshore to the ODS. An alternative ice road as shown on Figure 1-4 would be located in shallower water and, therefore, can be grounded and used earlier in the season. The alternative route extends 7 mi (11.2 km) offshore and is used in years when an early road completion is required or when extra heavy loads, such as a drilling rig is expected. Either ice road is up to approximately 50 ft (10.7 m) wide with a similar width shoulder area on each side. The shoulders of the road are used when traffic must periodically detour around equipment or in areas where ice road maintenance is occurring. In addition, a grounded ice pad staging area is constructed on the southwest edge of the ODS (see Figures1-3 and 1-4). The dimensions of the staging area are approximately 600 by 450 ft (180 by 140 m).

The ODS is located in 4 to 6 ft (1.2 to 1.8 m) of water and the area from the site to the shore generally becomes grounded landfast ice in winter; therefore, the typical and alternate ice road routes shown in Figures 1-3 and 1-4 would be located in grounded rather than floating ice. There is one small area near the Colville River that has an open lead for a short duration in December but freezes solid within in a few weeks. The road is clearly marked with delineators and monitored routinely by Alaska Clean Seas and industry environmental coordinators. Ice bridges or rig mats are not required for construction or maintenance of the ice road or ice pad staging area.

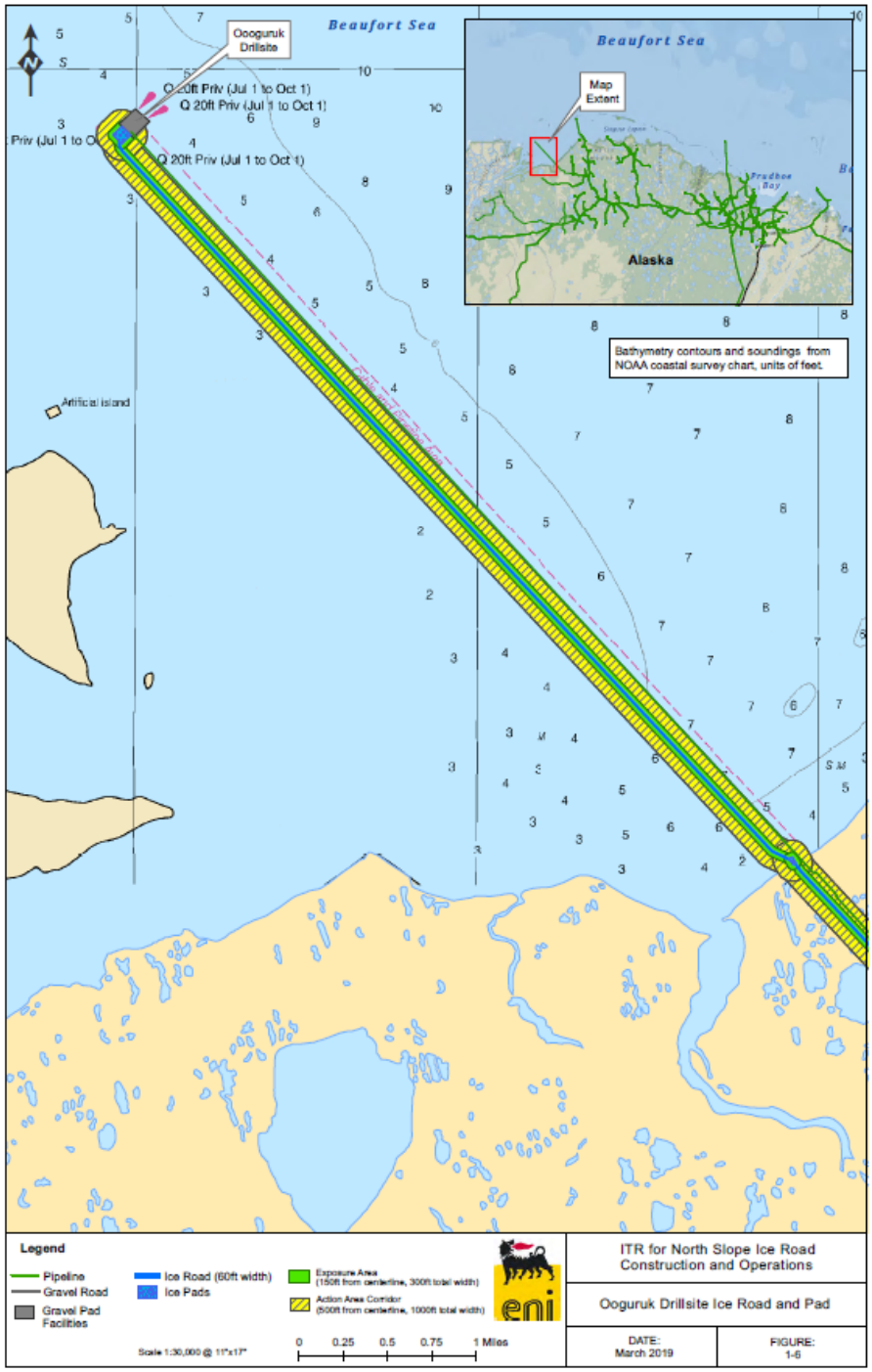

Figure 1-3. Oooguruk Ice Road

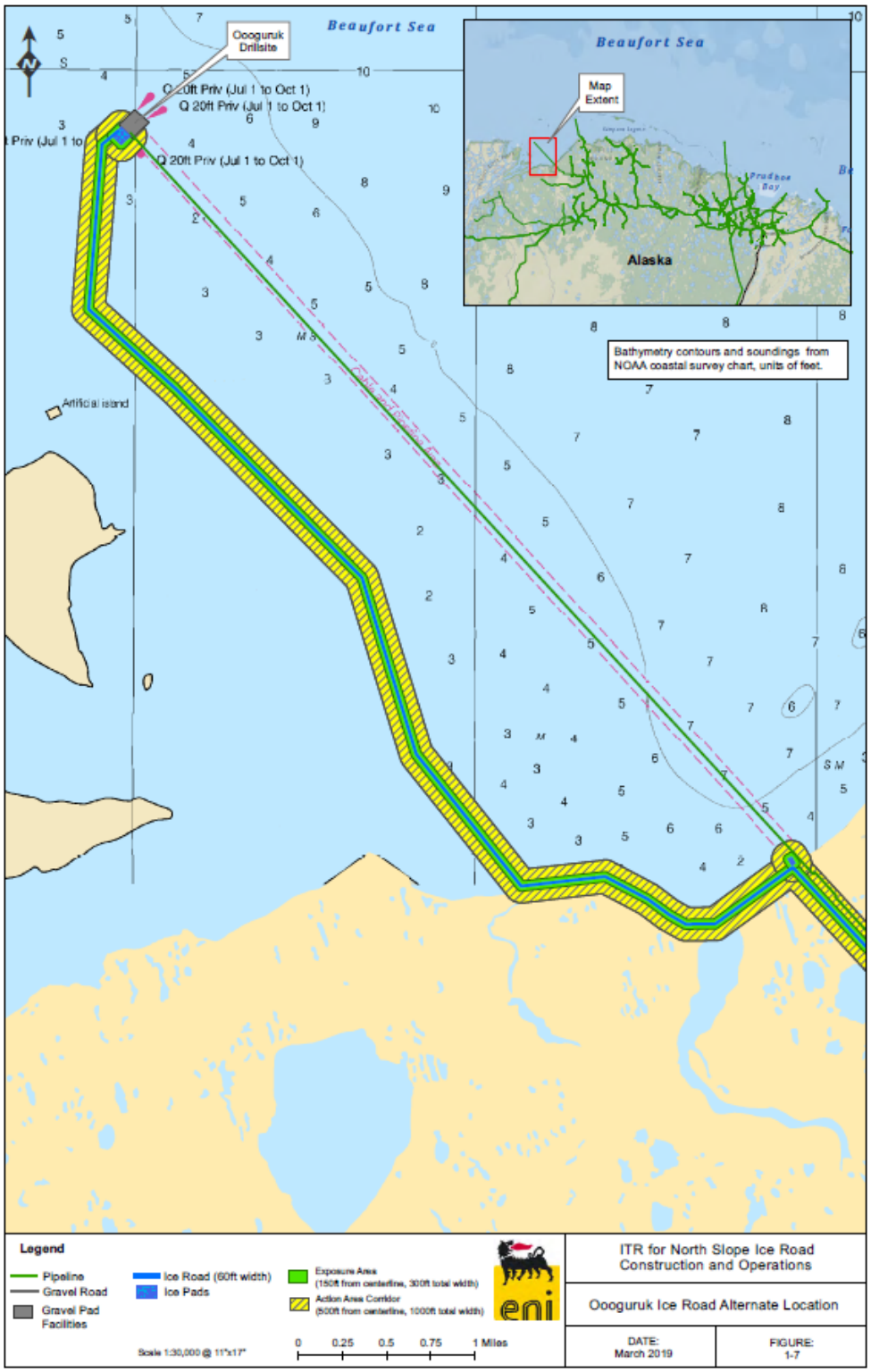

Figure 1-4. Oogurk Ice Road Alternate Location

Initial construction of the sea ice road begins with surveying and staking the route as soon as the ice is thick enough to support snow machines. Low pressure pumps are used to flood the ice surface with seawater. Small tractor vehicles with augers and pumps are used for augering and flooding. An initial layer of water is applied, some of which may move to lower parts of the roadway. After the water has frozen, the next flood can be applied. Flooding operations occur 24 hours a day, 7 days a week during this phase. Depending on weather and sea ice conditions, construction of the ice road typically begins in early December and is complete by February1st. The ODS operations do not require offshore ice trails. However, a coastal trail in very shallow water right off of the beach is occasionally needed between Oliktok and the ODS ice road to demobilize equipment after tundra travel has been closed.

2.6 Description of Alternatives

2.6.1 Alternative 1 – Issuance of an Authorization with Mitigation Measures

The proposed action constitutes Alternative 1 and is the Preferred Alternative. Under this alternative, NMFS would issue regulations and two LOAs, one to Hilcorp and one to Eni, allowing the incidental take of small numbers of marine mammals, consistent with the activities described in their application and subject to the mandatory mitigation and monitoring measures and reporting requirements set forth in the regulations and LOAs.

Proposed Mitigation and Monitoring Measures

For Hilcorp and Eni's proposed ice roads and trails construction project, Hilcorp and Eni worked with NMFS and proposed the following mitigation measures to minimize the potential impacts to marine mammals in the project vicinity. The primary purposes of these mitigation measures are to minimize human-seal interactions and to avoid takes by serious injury/mortality from the activities, to monitor marine mammals within designated zones of influence in the project vicinity and, if seals with the designated shutdown zone after March 1, to initiate immediate pause of construction activities, making it very unlikely potential injury or serious injury/mortality to seals would occur and ensuring that Level B behavioral harassment of seals would be reduced to the lowest level practicable.

<u>Wildlife Training</u>

Prior to initiation of sea ice road- and ice trail-related activities, project personnel associated with ice road construction, maintenance, use or decommissioning (i.e., ice road construction workers, surveyors, security personnel, and the environmental team) will receive annual training on implementing mitigation and monitoring measures. Personnel are advised that interactions with, or approaching, any wildlife is prohibited. Annual training also includes reviewing the company's Wildlife Management Plan. In addition to the mitigation and monitoring plans, other topics in the training will include:

- Ringed Seal Identification and Brief Life History
- Physical Environment (habitat characteristics and how to potentially identify habitat)
- Ringed Seal Use in the Ice Road Region (timing, location, habitat use, birthing lairs, breathing holes, basking, etc.)
- Potential Effects of Disturbance

- Importance of Lairs, Breathing Holes and Basking to Ringed Seals
- Brief Summary of Applicable Laws and Regulatory Requirements
- Marine Mammal Protection Act
- Endangered Species Act

General Mitigation and Monitoring Measures Implemented Throughout the Ice Road/Trail Season

General mitigation and monitoring measures will be implemented through the entire ice road/trail season including during construction, maintenance, and use and decommissioning.

1. Ice road/trail speed limits will be no greater than 45 miles per hour (mph); speed limits will be determined on a case-by-case basis based on environmental, road conditions and ice road/trail longevity considerations. Travel on ice roads and trails is restricted to industry staff.

2. Following existing safety measures, delineators will mark the roadway in a minimum of ¼-mile increments on both sides of the ice road to delineate the path of vehicle travel and areas of planned on-ice activities (e.g., emergency response exercises). Following existing safety measures currently used for ice trails, delineators will mark one side of an ice trail a minimum of every ¼ mile. Delineators will be color-coded, following existing safety protocol, to indicate the direction of travel and location of the ice road or trail.

3. Corners of rig mats, steel plates, and other materials used to bridge sections of hazardous ice, will be clearly marked or mapped using GPS coordinates of the locations.

4. Project personnel will be instructed that approaching or interacting with ringed seals is prohibited.

5. Personnel will be instructed to remain in the vehicle and safely continue, if they encounter a ringed seal while driving on the road.

6. If a ringed seal is observed within 50 m (164 ft) of the center of an ice road or trail, the operator's Environmental Specialist will be immediately notified with the information provided in the Reporting section below.

a. The Environmental Specialist will relay the seal sighting location information to all ice road personnel and the company's office personnel responsible for wildlife interaction, following notification protocols described in the company-specific Wildlife Management Plan. All other data will be recorded and logged.

b. The Environmental Specialist or designated person will monitor the ringed seal to document the animal's location relative to the road/trail. All work that is occurring when the ringed seal is observed and the behavior of the seal during those activities will be documented until the animal is at least 50 m (164 ft) away from the center of the road/trail or is no longer observed.

c. The Environmental Specialist or designated person will contact appropriate state and federal agencies as required.

Mitigation and Monitoring Measures Prior to March 1st

Winter sea ice road/trail construction and use will begin as early as possible (typically December 1st through mid-February). It is anticipated that all ice road construction activities will be initiated prior to March 1st, before the time when female ringed seals establish birth lairs.

Other on-ice activities occurring prior to March 1st could also include spill training exercises, pipeline surveys, snow clearing, and work conducted by other snow vehicles such as a PistenBullys, snow machines, or rollagons. Prior to March 1st, these activities could occur outside of the delineated ice road/trail and shoulder areas. During this period, General Mitigation and Monitoring Measures (listed above) will be implemented.

Mitigation and Monitoring Measures after March 1st

After March 1st and continuing until decommissioning of ice roads/trails in late May or early June, the on-ice activities can occur anywhere on sea ice where water depth is less than 3 m (10 ft) (i.e., habitat is not suitable for ringed seal lairs). However, if the water is greater than 3 m (10 ft) in depth, these activities should only occur within the boundaries of the driving lane or shoulder area of the ice road/trail and other areas previously disturbed (e.g., spill and emergency response areas, snow push areas) when the safety of personnel is ensured.

7. Ice road/trail construction, maintenance and decommissioning will be performed within the boundaries of the road/trail and shoulders, with most work occurring within the driving lane. To the extent practicable and when safety of personnel is ensured, equipment will travel within the driving lane and shoulder areas.

8. Blading and snow blowing of ice roads will be limited to the previously disturbed ice road/shoulder areas to the extent safe and practicable. Snow will be plowed or blown from the ice road surface.

9. In the event snow is accumulating on a road within a 50-m (164-ft) radius of an identified downwind seal or seal lair, operational measures will be used to avoid seal impacts, such as pushing snow further down the road before blowing it off the roadway. Vehicles will not stop within 50 m (164 ft) of identified seals or within 150 m (500 ft) of known seal lairs.

10. To the extent practicable and when safety of personnel is ensured, tracked vehicle operation will be limited to the previously disturbed ice trail areas. When safety requires a new ice trail to be constructed after March 1st, construction activities such as drilling holes in the ice to determine ice quality and thickness, will be conducted only during daylight hours with good visibility. Ringed seal structures will be avoided by a minimum of 50 m (164 ft) during ice testing and new trail construction. Any observed ringed seal structures will be reported following Mitigation and Monitoring Measure #6. Once the new ice trail is established,

tracked vehicle operation will be limited to the disturbed area to the extent practicable and when safety of personnel is ensured.

11. If an ice road or trail is being actively used, under daylight conditions with good visibility, a dedicated observer (not the vehicle operator) will conduct a survey along the sea ice road/trail to observe if any ringed seals are within 150 m (500 ft) of the roadway corridor. The following survey protocol will be implemented:

    a. Surveys will be conducted every other day during daylight hours.

    b. Observers for ice road activities need not be trained Protected Species Observers (PSOs), but they must have received the training described above and understand the applicable sections of the Wildlife Management Plan. In addition, they must be capable of detecting, observing and monitoring ringed seal presence and behaviors, and accurately and completely recording data.

    c. Observers will have no other primary duty than to watch for and report observations related to ringed seals during this survey. If weather conditions become unsafe, the observer may be removed from the monitoring activity.

12. If a seal is observed on ice within 50 m (164 feet) of the centerline of the ice road/trail, Mitigation and Monitoring Measure #6 shall be initiated and:

    a. Construction, maintenance or decommissioning activities associated with ice roads and trails will not occur within 50 m (164 ft) of the observed ringed seal, but may proceed as soon as the ringed seal, of its own accord, moves farther than 50 m (164 ft) distance away from the activities or has not been observed within that area for at least 24 hours. Transport vehicles (i.e., vehicles not associated with construction, maintenance or decommissioning) may continue their route within the designated road/trail without stopping.

13. If a ringed seal structure (i.e., breathing hole or lair) is observed within 50 m (164 ft) of the ice road/trail, the location of the structure will be reported to the Environmental Specialist who will then carry out notification protocol identified in Mitigation and Monitoring Measure #7 above and:

    a. A qualified observer (Mitigation and Monitoring Measure #11) will monitor the structure every six hours on the day of the initial sighting to determine whether a ringed seal is present. Monitoring for the seal will occur every other day the ice road is being used unless it is determined the structure is not actively being used (i.e., a seal is not sighted at that location during monitoring). A lair or breathing hole does not automatically imply that a ringed seal is present.

    b. Construction, maintenance or decommissioning work will proceed following all other Mitigation and Monitoring Measures to minimize impacts or disturbance in the area.

Reporting

A final end-of-season report compiling all ringed seal observations will be submitted to NMFS Alaska Region Protected Resources Division and NMFS Office of Protected Resources Permits Division within 90 days of decommissioning the ice road/trail. The report will include:

a. Date, time, location of observation.

b. Ringed seal characteristics (i.e., adult or pup, behavior [avoidance, resting, etc.]).

c. Activities occurring during observation including equipment being used and its purpose, and approximate distance to ringed seal(s).

d. Actions taken to mitigate effects of interaction emphasizing: 1) which mitigation and/or monitoring measures were successful; 2) which mitigation and/or monitoring measures may need to be improved to reduce interactions with ringed seals; 3) the effectiveness and practicality of implementing mitigation and monitoring measures; 4) any issues or concerns regarding implementation of mitigation and/or monitoring measures; and 5) potential effects of interactions based on observation data.

e. Proposed updates (if any) to Wildlife Management Plan(s) or Mitigation and Monitoring Measures.

f. Reports should be able to be queried for information.

In the unanticipated event a seal is killed or seriously injured by ice road/trail activities, NMFS will be notified immediately. In the event ice road/trail personnel discover a dead or injured seal but the cause of injury or death is unknown or believed not to be related to ice road/trail activities, NMFS will be notified within 48 hours of discovery.

2.6.2 Alternative 2 – No Action Alternative

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

Chapter 3 Affected Environment

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

3.1 Physical Environment

As indicated in Chapter 2, Hilcorps and Enis proposed ice road and ice trail construction activities will occur in areas of the Beaufort Sea that covers the relatively shallow, broad, continental shelf adjacent to the Arctic Ocean. Water depths within the proposed ice roads/trails construction areas in the Beaufort range from 1.4 – 3 m.

3.2 Biological Environment

The primary component of the biological environment that would be impacted by the proposed action and alternatives would be marine mammals, which would be directly impacted by the authorization of incidental take.

3.2.1 Overview of Marine Mammals in Beaufort Sea

The marine mammal species that may occur in the Beaufort Sea, at least seasonally, include eight whale species and four species of seals. Three pinniped species, the ringed (*Phoca hispida*), bearded (*Erignathus barbatus*) and spotted seal (*Phoca largha*), are the most commonly occurring seal species in the Beaufort Sea. Ringed and bearded seals are listed as threatened under the ESA. Ribbon seals (*Histriophoca fasciata*) occur mainly in the Chukchi Sea and western part of the Beaufort Sea. While all three pinniped species are present in the Beaufort Sea during the open-water season, only ringed seals are likely to be in the nearshore environment during the ice-covered months. Ringed seals are resident in the Beaufort Sea and are expected to be the most frequently encountered pinniped in the action areas during any season. During winter and spring activities on nearshore sea ice (landfast ice), the ringed seal is the only marine mammal species under NMFS jurisdiction that is likely to be encountered.

Bowhead, gray and beluga whales are the only cetaceans likely to occur in the Beaufort Sea off shore near the proposed action areas. The NMFS Stock Assessment Reports (SAR) (Muto et al. 2016; 2017; 2018) and species-specific web sites contain up-to-date information on the status, distribution, abundance, and life history of species discussed in this document. The bowhead whale (*Balaena mysticetus*) is listed as endangered under the ESA. The Bering-Chukchi-Beaufort stock of bowhead whale and the Beaufort Sea (BS) stock and Eastern Bering Sea (EBS)

stock of beluga whales (*Delphinapterus leucas*) are the most commonly occurring cetaceans in the Beaufort Sea.

Individual gray whales (*Eschrichtius robustus*) from the eastern North Pacific stock have been observed in the central and eastern Beaufort Sea but are not very common. Any humpback whales (*Megaptera novaengliae*) encountered in the Chukchi or Beaufort seas could be from either the endangered Western North Pacific (WNP) Distinct Population Segment (DPS) or the threatened Mexico DPS (Wade et al. 2016). Also, the narwhal (*Monodon monoceras*), killer whale (*Orcinus orca*), harbor porpoise (*Phocoena phocoena*), and the minke whale (*Balaenoptera acutorostrata*) are considered uncommon or extralimital in the central to eastern Beaufort Sea and therefore extremely unlikely to be encountered in the action area.

The proposed action occurs during ice-covered conditions, which could be present for about months from approximately December 1st until July 1st, depending on weather each year. Most bearded seal sin Alaska occur in the Bering Sea during winter (BOEM 2018). Suitable habitat and benthic prey is more limited in the Beaufort Sea during winter than in the Bering Sea. Moreover, ice road/trail activities typically occur on nearshore or shore fast ice throughout the winter and early spring. Bearded seals prefer areas of moving ice and open water with depths up to 656 ft (200 m) (Burns and Harbo 1972). Therefore, bearded seals are not expected to be encountered in or near the action areas when ice road/trail activities are occurring.

Likewise, spotted seals are not known to remain in the Beaufort Sea during the late fall and winter (BOEM 2018). Given their seasonal occurrence and distribution (they are absent from the Beaufort Sea in winter) and low numbers in the near shore waters of the central Alaskan Beaufort Sea during other seasons, no spotted seals are expected in the Action Areas in late winter and spring during ice road/trail activities.

None of the cetacean species listed above is expected to enter the ice-covered action areas during the winter months when ice road activities would be occurring. Therefore, the potential for encounters with cetaceans during ice road/trail construction and maintenance is extremely unlikely. As a result, cetacean species will not be discussed further in this document.
Ringed seals are the only species likely to be encountered in the action areas during the winter season when ice road/trail construction, operation and maintenance activities occur. For this reason, ringed seals are the only species for which takes are requested. All other marine mammal species have been dismissed from further discussion in this EA.

3.2.2 Ringed Seals

<u>Abundance and Distribution</u>

The Alaska stock of ringed seals are the most abundant marine mammal in the Beaufort, Chukchi, and Bering seas (Kelly et al. 2010a, Kelly et al. 2010b). Currently a complete population estimate is not available for the entire Alaska stock (Allen and Angliss 2014, Muto *et al*. 2018). This is because abundance surveys of ringed seals in Alaska have used various methods and assumptions, and were conducted more than a decade ago; therefore, current and comprehensive abundance estimates or trends for the Alaska stock are not available (NMFS

2018a). Historic ringed seal population estimates in the Arctic ranged from 1 to 1.5 million seals (Frost 1985) to 3.3 to 3.6 million (Frost *et al*. 1988).

Because ice road/trail activities occur during the ice-covered winter and spring months (typically December through May), abundance of seals during winter and spring is of greater concern for this action than during summer or fall when open water conditions are present. Most ringed seals in the Beaufort and Chukchi seas follow the sea ice front south into the Bering Sea during fall where they remain throughout winter. Therefore, while they are still within the Beaufort Sea during winter, a much smaller portion of the Alaska ringed seal stock is present in the Beaufort Sea during winter as compared to the remainder of the year. Frost and Lowry (1984) estimated that approximately half of the population moves out of the Beaufort Sea, and into the Chukchi and Bering seas in winter.

Based on the most recent estimates from surveys conducted in the 1990s and 2000s by Bengtson *et al*. (2005) and Frost et al. (2004), the total estimated ringed seal population in the Alaska Chukchi and Beaufort seas is at least 300,000 (Kelly *et al*. 2010a). This likely underestimates actual population size because the Beaufort Sea surveys were limited to within 25 mi (40 km) from shore. Due to the unreliability of the current population estimates, Muto et al. (2018) indicated that a minimum population estimate for the entire stock of ringed seals cannot presently be determined for the Chukchi and Beaufort seas.

The number of seals in the action areas during winter is reduced because some of the proposed ice road/trail activities occur over marine waters that are less than 10 ft (3m) in depth. Ringed seals are not able to establish breathing holes or lairs in waters shallower than 10-16 ft (3-5 m) because ice freezes to the seafloor. Additionally, in these shallower waters, availability of prey is poor due to a limited water supply. Therefore, the minimum depth generally recognized as being required by ringed seals for successful lair construction is 10 ft (3 m).

Ringed seals are circumpolar in distribution; the subspecies (Phoca hispida hispida) is present year-round in the Bering, Chukchi, and Beaufort seas off the coast of western and northern Alaska (Muto *et al*. 2017, Muto *et al*. 2018). Results of previous monitoring from Northstar (Aerts and Richardson 2009) and nearshore surveys in Foggy Island Bay east of the action areas (Aerts *et al*. 2008, Smultea *et al*. 2014) support the assumption that they are expected to be the most commonly occurring pinniped in the action areas during the ice road/trail season.

Throughout their range, ringed seals have an affinity for ice-covered waters and are well adapted to occupying both shore fast and pack ice (Kelly 1988). They remain with the ice most of the year and use it as a platform for pupping and nursing in late winter to early spring, for molting in late spring to early summer, and for resting at other times of the year (Simpkins et al. 2003, Kelly *et al*. 2010). In the Beaufort, Chukchi, and Bering seas ringed seals move seasonally coinciding with ice melting and retreating (Frost and Lowry 1984, Frost 1985, Kelly *et al*. 2010). Ringed seals are closely associated with sea ice during breeding, pupping, and molting as are all ice seals. With the onset of freeze-up in the fall, ringed seal movements become increasingly restricted. Seals that have summered in the Beaufort Sea are thought to move west and south with the advancing ice pack, with many seals dispersing throughout the Chukchi and Bering seas

where they remain throughout winter, and some staying in the Beaufort Sea (Frost and Lowry 1984, Muto *et al*. 2018).

Ringed seal winter ecology studies conducted in the 1980s (Frost and Burns 1989, Kelly and Quakenbush 1990) and surveys associated with the Northstar development (Williams *et al*. 2001) provided information on both seal ice structure density and use where ice structures include both breathing holes and subnivean lairs. Ringed seal density estimates are based on these historical surveys (both on-ice and aerial).

Life History

The life history stages of ringed seals relevant to this NEPA analysis occur during winter and early spring ice-covered conditions when seals may occur in landfast ice where ice roads and trails may be constructed. During winter, ringed seals excavate and maintain several breathing holes to allow access to air while hunting prey species (e.g., Arctic cod). The breathing holes also provide escape routes from polar bears and other predators such as foxes. Ringed seals in the action areas spend much of their time out of sight in their lairs or under the sea ice (BOEM 2018). Ringed seal movements during winter and spring are typically quite limited, especially where ice cover is extensive (Kelly *et al*. 2010).

In the spring (typically beginning in March), female ringed seals give birth to and nurse a single pup in a subnivean lair. The peak of pupping occurs in early April (Frost and Lowry 1981). Subnivean lairs are especially important for protecting pups, providing protection from predators and thermal protection from cold temperatures and wind.

Arctic ringed seals generally prefer landfast ice along the shoreline for pupping. Seal mothers continue to forage throughout lactation and move young pups between a network of four to six lairs. The pups spend time learning diving skills, using multiple breathing holes, and nursing and resting in lairs (BOEM 2018). After a 5- to 8-week lactation period, pups are weaned (Lydersen and Hammill 1993, Lydersen and Kovacs 1999). While landfast ice is the best habitat for pupping (Kelly1988), the depth of the water strongly dictates whether ringed seals overwinter in a given area as 10 ft (3m) is the minimum depth required for successful lair construction. Optimal overwintering areas for ringed seals in the Beaufort Sea occur in waters between 33 and 115 ft (10 and 35 m) deep, preferably in the landfast ice along the shoreline close to lead systems. The proposed action calls for winter ice roads and trails to be constructed from the mainland to offshore islands in waters that are approximately 7 to 10 ft (2-3 m) in depth and entirely within the landfast ice zone along the shoreline.

While some sections of the action areas are considered poor habitat for lair construction, there are sections where ice roads/trails are located in depths suitable for seal lairs and breathing holes. Also, while SID is situated in water depths typically not preferred by ringed seals, each year a crack or lead exists in the road between OPP and SID. Due to the open water in the ice at this location, seals may occur near this site as evident from the observation of a ringed seal pup in April 2018 (Eco49, 2018). While ringed seals maybe present in the proposed action areas during winter, the number of seals is generally expected to be relatively low during ice road/trail

activities. An estimate of the number of ringed seals/lairs along the corridors based on previous density estimates is provided in Chapter 4.

Ringed seals feed year round (NMFS 2018a). Most ringed seal prey is small, and preferred prey tends to be schooling species that form dense aggregations. Fish of the cod family tend to dominate the diet from late autumn through early spring in many areas (Kovacs 2007). Arctic cod is often reported to be the most important prey species for ringed seals, especially during the ice-covered periods of the year (Lowry *et al*. 1980).

Critical Habitat

NMFS proposed critical habitat for the Arctic ringed seal in the northern Bering, Chukchi, and Beaufort seas off of Alaska on December 3, 2014. The proposed critical habitat in U.S. waters includes all the contiguous marine waters from the "coastline" of Alaska to an offshore limit within the U.S. Exclusive Economic Zone (EEZ) and effectively include all marine waters within the EEZ where sea ice regularly forms during winter. The final rule is pending.

Generally, there is increasing concern about the future of the ringed seal populations due to receding ice conditions and potential habitat loss. Ringed seal habitat maybe modified by the warming climate and projections that suggest continued or accelerated warming in the future (Kelly *et al*. 2010). Climate models project ice and snow cover losses throughout the 21st century, with some variations, and increasing atmospheric concentrations of greenhouse gases that drive climate warming and increase ocean acidification (BOEM 2018), thereby affecting ringed seal habitat. The greatest impacts to ringed seals from climate change would manifest in less snow cover (BOEM 2018). Also, the duration of ice cover could be reduced leading to lower snow accumulation on ice (BOEM 2018), particularly over ringed seal subnivean lairs. Such changes would also threaten prey communities on which ringed seals depend.

3.2.3 Socioeconomic Environment

Subsistence

Subsistence hunting continues to be an essential aspect of Inupiat Native life, especially in rural coastal villages. The Inupiat participate in subsistence hunting activities in and around the Beaufort Sea. The animals taken for subsistence provide a significant portion of the food that will last the community through the year. Marine mammals represent on the order of 60-80% of the total subsistence harvest. Along with the nourishment necessary for survival, the subsistence activities strengthen bonds within the culture, provide a means for educating the younger generation, provide supplies for artistic expression, and allow for important celebratory events. The proposed ice roads/trails construction projects are general remote from subsistence use areas. Nuiqsut is the closest Native Alaskan community to the Northstar, ODS and SID facilities; located approximately 91 km (about 57 mi) southwest from Northstar, 40 km (about 25 mi) from ODS, and 56 km (about 35 mi) from SID. Primary subsistence users in the area between Oliktok Point and West Dock are residents from the village of Nuiqsut. People from Utqiagvik (about 309 and 264 km [192 and 164 mi] west of Northstar and SID, respectively) and Kaktovik harvest marine mammals that pass through the area but generally do not hunt there. Kaktovik is 196 km (122 mi) east of Northstar and 241 km (150 mi) east of SID.

Nuiqsut hunters harvest ringed seals primarily during open water periods in July through August. In summer, boat crews hunt ringed, spotted and bearded seals. The most important seal hunting area for Nuiqsut hunters is off the Colville Delta, as far east as Pingok Island. The closest edge of the main sealing area at Pingok Island, is about 27 km (17 mi) west of Northstar (SRBA 2010, Galginaitis 2014). While less frequent than open water hunting, seals are taken by hunters on snow machines before break-up. The dietary significance of seals for North Slope Borough residents comes from seal oil. While seal meat is eaten, seal oil is an important condiment for all subsistence foods (BOEM 2018). Seal skins are used for clothes, boats and crafts, and are important in maintaining Alaska Native culture and heritage (Ice Seal Committee 2017).

Chapter 4 Environmental Consequences

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

4.1 Effects of Alternative 1 – Issuance of an IHA with Mitigation Measures

Alternative 1 is the Preferred Alternative, under which we would issue two LOAs to Hilcorp and Eni allowing the incidental take, by Level B harassment and mortality/serious injury, of ringed seal from December 1, 2019, through November 30, 2020, subject to the mandatory mitigation and monitoring measures and reporting requirements set forth in the LOAs, if issued. We would incorporate the mitigation and monitoring measures and reporting described earlier in this EA into a rule and final LOAs.

4.1.1 Impacts to Marine Mammal Habitat

Overall, the construction and maintenance of ice roads and trails is not expected to cause significant impacts on habitat used by ringed seals or on their food sources. Landfast ice near the shoreline is the best habitat for ringed seal pupping (Kelly 1988), with water depth strongly dictating whether ringed seals overwinter in a given area. Depths greater than about 3 m (10 ft) are typically the minimum depth suitable for successful lair construction (Miller *et al*. 1998, Link *et al*. 1999) although more shallow areas with open leads or cracks can be attractive to seals as described for the road between OPP and SID. While ringed seals may be present in the proposed Action Areas during winter, the number of seals is generally expected to be relatively low during ice road/trail activities. Ice road construction is a short-term activity with minor disruptions to the natural habitat. Ringed seals feed on fish and a variety of benthic species including crabs and shrimp. There should be no impact on the distribution of fish or zooplankton as a result of ice road/trail construction within the Action Areas. The roads and trails melt each year and do not affect water circulation, substrate, fish presence or use of the area, or benthic populations.

4.1.2 Impacts to Ringed Seal Critical Habitat

NMFS proposed rule designating critical habitat for ringed seals identified three physical and biological features (PBFs) essential to the conservation of the species including:

- Suitable sea ice habitat for the formation and maintenance of subnivean birth lairs used for sheltering pups during whelping and nursing, which is defined as seasonal landfast (shorefast) ice, except for any bottom-fast ice extending seaward from the coast line in waters less than 2 m (6.5 ft) deep, or dense, stable pack ice, that has undergone deformation and contains snowdrifts at least 54 cm (21 in.) deep;
- Sea ice habitat suitable as a platform for basking and molting, which is defined as sea ice of 15 percent or more concentration, except for any bottom-fast ice extending seaward from the coast line in waters less than 2 m (6.5 ft) deep; and
- Primary prey resources to support Arctic ringed seals, which are defined to be Arctic cod, saffron cod, shrimps, and amphipods.

Disturbance associated with construction, operation and maintenance of ice roads and trails is unlikely to have long-term effects on the availability of sea ice habitat identified in PBFs 1 and 2. Disturbances due to ice road and trail construction and maintenance activities are not expected to have any effect on PBF3.

4.1.3 Impacts to Marine Mammals

Behavioral disturbance or displacement to marine mammals resulting from the activities associated with the ice road and ice trail construction is expected. The majority of impacts associated with these effects are likely to occur from visual and noise exposure by machinery and vehicles used for ice roads and ice trails construction. The presence of human and construction activities and the associated noise could cause pinniped behavioral modification and temporary displacement within the vicinity of the action area through. In a few unlikely cases, these activities could result in serious injury or mortality if an animal is crushed by a construction machinery or vehicle while in its subnivean lair.

<u>Disturbance Reactions</u>

Potential sources of disturbance to marine mammals from ice road/trail/pad activities during the ice-covered period consist primarily of the low-level noise and the presence of construction equipment (i.e., bulldozers and augers) and vehicle traffic along the routes.

A series of reports from the Northstar development provide evidence of ringed seal reactions to human activity during ice road construction beginning in 1999. As summarized in Richardson and Williams (2000), approximately 6.6 km^2 (2.5 mi^2) were surveyed for ringed seals prior to initiation of ice road construction activities. Though much of the ice was flat and not optimal for seal lairs, surveys were conducted by biologists and Inupiat hunters who used avalanche probes to identify potential breathing holes and lairs. No breathing holes or lairs were documented during this January 1999 survey. A follow-up survey for ringed seal breathing holes and lairs was conducted in May 1999 using trained dogs. The May survey did locate at least two, possibly three, open breathing holes within the area previously surveyed in January.

The following year, a subsequent survey was undertaken using dog-based searches which found numerous seal structures within about 1 km (0.6 mi) of Northstar facilities before and after intensive construction activities in early and late winter. This may indicate that the survey method using avalanche probes and Inupiat hunters was not effective or that ringed seals were unaffected by ice road/trail construction to such extent that it prevented them from establishing breathing holes in the project area (Richardson and Williams 2000).

During two replicate aerial surveys conducted in 1999, ringed seals were observed within approximately 0.64 km (0.4 mi) of ice roads (Richardson and Williams 2000). These six seals were not assumed to be the only seals located within that 0.64 km (0.4 mi) area. Using seal densities in similar water depths approximately 4 to 10 km (about 2 to -6.2 mi) from the ice roads, about 12 ringed seals would be expected to occur within 0.64 km (0.4 mi), and 110 ringed seals within 4 km (2.5 mi), during 1999. Seal behavior within 0 to 0.64 km of the road may have been affected in some subtle way, however, the observation of seals within that area suggests that effects of the ice roads were minor and localized. As summarized in (Williams *et al*. 2006),

several factors influence the rate of abandonment of seal lairs, making it challenging to attribute abandonment to any specific factor. Of 181 seal structures located within 11 to 3,500 m (36 ft to 2.1 mi) of Northstar during surveys conducted in 2001, 118 (65%) were still actively used in late May (the end of ice road season).

Acoustic Disturbance

The effect of underwater noise on ringed seals is dependent on the ability of the seal to perceive or hear the sounds. The Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (NMFS 2018b) uses marine mammal hearing groups defined by (Southall *et al*. 2007) with some modifications to identify noise thresholds above which takes might occur. Temporary short-term changes in behavior or avoidance of the affected area as a result of disturbance is the most common response of marine mammals to increased noise levels (Richardson *et al*. 1995). Nonetheless, some minor disturbance due to in-air or underwater (ice-covered conditions) may occur as a result of ice road/trail activities. The types of impacts to ringed seals exposed to low-level noise may include masking and temporary displacement. Increased levels of natural and artificial sounds can disrupt behavior by masking. The masking of communication signals by anthropogenic noise may reduce the communication space of animals (Clark *et al*. 2009). Factors other than received sound level such as the activity state of animals exposed can affect the probability of a behavioral response (Ellison *et al*. 2012).

The NMFS thresholds for Level A harassment ranges between 185 and 201 dB re 1 μPa depending on whether the sound source is impulsive or non-impulsive. Level A harassment may include permanent [hearing] threshold shift or other types of non-serious injury. The peak pressure level threshold for ringed seals is 218 dB re 1 μPa (NMFS 2018). Sounds associated with construction of ice roads during Northstar were summarized in Greene *et al*. (2008). During the ice-covered season the principal noise producing activities recorded were continuous and included ice augering, pumping sea water to flood the ice and build an ice road, a bulldozer plowing snow, and the use of a Ditchwitch to cut ice (Greene *et al*. 2008). The type of equipment used by Hilcorp and Eni is comparable to that recorded in the Northstar studies. Thus, it follows that sounds produced by ice road construction are not expected to exceed the Level A harassment thresholds for ringed seals. There is no potential for the project activities to result in PTS or a Level A harassment to ringed seals due to noise production associated with the ice road construction, operation and maintenance. Therefore, no takes are requested for Level A harassment.

The current interim threshold for Level B harassment (non-impulsive source) is 120 dB re 1 μPa (NMFS 2018). Southall *et al*. (2007) assessed relevant studies, found considerable variability among pinnipeds, and determined exposures between approximately 90 and 140 dB generally do not induce strong behavioral responses of pinnipeds in water, but an increasing probability of avoidance and other behavioral effects exists in the 120 to 160 dB range. The use of the Ditchwitch to cut ice or from pumping at Northstar did not exceed 120 dB at 100 m (328 ft). At closer distances to the ice road or trail, Level B thresholds could be exceeded by construction equipment such as a bulldozer. Despite the potential exposure to such noise levels, it is highly unlikely the disturbance would result in biologically significant effects on the seals (individually

or to the population) as evident from Northstar research (Richardson and Williams 2000). In addition, Kelly *et al*. (1986) report that some ringed seals temporarily departed their lairs when sound sources were within 97 to 3,000 m (0.06 to 1.9 mi) but did return to their lairs later. Haul outs with and without disturbance were not significantly different and time spent in the water versus hauled out was not significantly different.

In air noise associated with ice road/trail activities is not expected to cause disturbance to ringed seals. During the winter of 2000, background unweighted in air noise levels measured in the vicinity of Northstar ranged from 59 to 84 dB re 20 µPa, and noted the background noise level was related to wind speed (Greene *et al*. 2008). Similar levels were reported during the winter of 2001 and 2002 by Blackwell et al. (2004a, b) with minimum background unweighted in air noise levels of 44 to 52 dB re 20µPa measured in ice-covered conditions with low wind up to 10 km (6 mi) from Northstar in Prudhoe Bay. The NMFS in air threshold for disturbance of phocids (i.e., ringed seals) is 100 dB re 20 µPa (NMFS 2018b). For this reason, in air noise is not expected to result in harassment of seals.

The probability that acoustic noise associated with ice road and trail construction would result in masking any acoustic signals of ringed seals during construction is very low. Ice road and trail construction activities would be initiated prior to March 1st when animals begin constructing dens prior to pupping, and during pupping seals are minimally vocal in the dens to prevent predation. Also, in order for the effects of masking to occur, a seal would have to be within close proximity to the specific sound source to result in a Level B impact. The probability that the noise producing activities associated with the proposed Project would result in masking acoustic signals important to the behavior and survival of marine mammal species in the Action Areas is low.

Displacement of seals from ice road construction is considered unlikely but could occur. As described in Williams *et al*. (2006), during three surveys conducted in November/December, March and May of 2001 during Northstar construction activities, 181 ringed seal structures were located and 118 (65%) were still actively used by late May 2001. Active ringed seal structures appeared to be evenly distributed across the Northstar study area in relation to the facility (Figure 4-1). The noise heard through snow and ice, and into the subnivean lair or den location of the animal should be considerably weaker than at source due to sound being attenuated in the ice and snow. In March 2002, sounds and vibrations from vehicles traveling along an ice road along Flaxman Island (a barrier Island east of Prudhoe Bay) were recorded in artificially constructed polar bear dens. Sounds were attenuated strongly by the snow cover of the artificial dens; broadband vehicle traffic noise was reduced by 30–42 dB. Due to attenuation of noise through ice and snow, it is less likely that seals in lairs would be exposed to levels exceeding 120 dB and that such exposure would result in displacement.

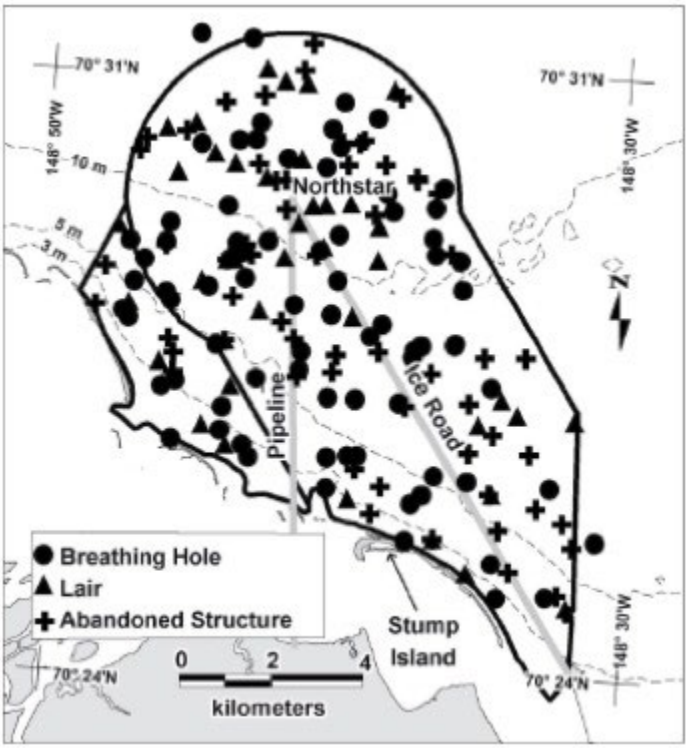

Figure 4-1. Status and distribution of Ringed Seal Structures as of May 22, 2001 for all Search Periods (Nov/Dec, March, May) (Source: Williams et al. 2006)

4.1.4 Impacts Summary

The most likely effects of these early winter activities would be temporary and localized disturbance to a small number of adult and subadult ringed seals. This disturbance would likely result from moving snow and ice during ice road or trail construction, and although unlikely low-level, temporary acoustic disturbance. The distribution of ringed seals is influenced by a wide variety of environmental factors (i.e., changes in sea ice and snow conditions, time of day, cloud cover, or temperature) which may be difficult to measures accurately. Williams *et al*. (2006) reported no widespread evidence that ringed seal use of the landfast ice less than 2 km (about 1.2 mi) from Northstar or the ice roads was different than their use of the ice 2 to 3.5 km (1.2 to 2.2 mi) away. Abandonment of seal structures seems more closely tied to ice deformation or the time of year when surveys are undertaken. For this reason, potential displacement of ringed seals at Northstar have been more closely related to physical alteration of sea ice by industry than to disturbance from the physical presence of humans or exposure to low levels of industrial sound during winter and spring (Williams *et al*. 2006, Richardson 2008). Any disturbance to ringed seals during the ice road and trail activities would be negligible to the population.

4.1.5 Estimated Take of Marine Mammals

This section provides an estimate of the number of incidental takes that would occur under the Alternative 1 of this action. Level B harassment is the most likely type of take expected to result from Hilcorp and Eni's proposed ice roads and ice trails construction activities, though in rare cases serious injury and/or mortality of individual ringed seals could occur.

Generally speaking, we estimate take by considering: (1) marine mammals (ringed seals) likely to be exposed to visual and acoustic disturbances from ice roads and ice trails constructions; (2) the density or occurrence of marine mammals within the areas likely to be disturbed; and, (3) the number of days of activities. We note that while these basic factors can contribute to a basic calculation to provide an initial prediction of takes, additional information that can qualitatively inform take estimates is also sometimes available (e.g., previous monitoring results or average group size). Below, we describe the factors considered here in more detail and present the proposed take estimate. This section includes an overview of estimated ringed seal density in the area, a description of the area of potential disturbance, estimates for noise sources (under ice-covered conditions and in air), and a discussion of the potential for behavioral responses or serious injury or mortality due to ice road/trail/pad activities.

4.1.6 Ringed Seal Densities

Ringed seals are present in the nearshore Beaufort Sea waters and sea ice year round, maintaining breathing holes and excavating subnivean lairs in the landfast ice during the ice-covered season. During this ice-covered season, ringed seals' home ranges are generally less than 5 km^2 (2 mi^2) in area (Frost *et al*. 2002, Kelly *et al*. 2005). While older datasets from the 1970s and 80s provide important context for understanding seal presence in the region, only more recent surveys beginning in 1997 have been used to calculate density for this petition as described in the following sections.

<u>Winter Densities</u>

Ringed seals overwinter in the landfast ice in and around the project area. Relatively few data are available for ringed seal density in the southern Beaufort Sea during the winter months, but several studies on ringed seal winter ecology were undertaken during the 1980s (Kelly *et al*. 1986, Frost and Burns 1989). These reports, in addition to data associated with the Northstar development and the abandoned Seal Island (Williams *et al*. 2001, Frost *et al*. 2002) provide information on both seal ice structure use (where ice structures include both breathing holes and subnivean lairs) and the density of ice structures (Table 4-1).

Both male and female ringed seals maintain a number of breathing holes and haul out in more than one subnivean lair during the ice-covered season. Kelly *et al*. (1986) found that of their tagged seals, the animals would haul out between one and multiple subnivean lairs. The distances between each lair could be as great as 4 km (2.5 mi) with numerous breathing holes in between (Kelly *et al*. 1986). While these authors calculated the average number of lairs used by an individual seal to be 2.85 (SD=2.51) per animal, they also suggest that this is likely to be an underestimate.

Table 4-1. Seal Structure Density along the Beaufort Sea Coast Near the Project Area.

Year	Sea structure density/km^2	Source
1982	3.6	Frost and Burns 1989
1983	0.81	Kelly *et al*. 1986
Dec. 1999	0.71	Williams *et al*. 2001
May 2000	1.2	Williams *et al*. 2001

Average structure density/km^2	1.58	

In 1982, aerial surveys were conducted near Reindeer Island, just east of the project area (Northstar and SID), where seismic exploration activities were occurring. Seal structures were located by searching with a dog along 267 km (166 mi) of seismic and control lines as well as 28 km (17 mi) of non-systematic search lines (295 linear km [183 linear mi] total). A total of 157 structures were found resulting in an average estimate of 0.53/km seal structures (Kelly *et al*. 1986) or 3.6 structures/km^2 (Frost and Burns 1989).

In 1983, the vicinity of Reindeer Island was surveyed again and the average number of seal structures recorded was 0.70/km over approximately 81 km (50 mi) of linear survey lines resulting in an average number of total structures of 0.81/km^2.

In 1999, a total of 26 seal structures were located within a 36.5 km^2 area encompassing the Northstar Development resulting in an estimated 0.71 structures/km^2 in December 1999 and 1.2 structures/km^2 in May 2000 (Richardson and Williams 2001).

To estimate ringed seal density during the winter, an average structure density was divided by the average number of structures used by seals (Kelly *et al*. 1986). Thus, for the winter season ringed seal density has been estimated as the average ice structure density (1.58/km^2) divided by the average number of ice structures used by an individual seal (2.85, SD = 2.51). This results in an estimated density of 0.55 ringed seals/km^2 (for example, 1.58/2.85 = 0.55). However, this density is likely to be an overestimate because the equation denominator of 2.85 is assumed to be an underestimate (Kelly *et al*. 1986).

Average ice structure density / Average number of structures per seal = Estimated Average Winter Seal Density: 1.58 / 2.85 = 0.55 seals/km^2

<u>Spring Densities</u>

In 1997, prior to Northstar construction, British Petroleum Exploration Alaska (BPXA) conducted aerial surveys for seals as part of the industry monitoring programs for the Northstar facility. These datasets provide the best available information on spring ringed seal density for the project area. As shown in Aerial surveys were flown around Northstar and west of Prudhoe Bay during late May and early June (Frost *et al*. 2002, Moulton *et al*. 2002a, b, Richardson and Williams 2003) when the greatest percentage of seals have abandoned their lairs and are hauled out on the ice (Kelly *et al*. 2010).

Because densities were consistently very low where water depth was <3m (and these areas are generally frozen solid during the ice-covered season) densities were calculated where water depth was >3m deep; (Moulton *et al*. 2002a, b), Richardson and Williams 2003). Frost *et al*. (2002) and Frost *et al*. (2004) reported slightly higher densities based on surveys conducted during this same time period between 1997 and 1999 as shown in Table 4-2. The average uncorrected densities calculated based on these separate datasets (1997 – 1999) are provided in Table 4-2. It is acknowledged that densities of seals near the Eni SID Action Area are likely to

be lower than densities calculated for the purposes of estimating take in this analysis. However, for consistency and as a precautionary measure, the same density estimates are used throughout this analysis.

Table 4-2. Estimated Ringed Seal Densities (uncorrected) based on Spring Aerial Surveys During Ice-Covered Conditions, 1997-2002

	Uncorrected seal density (no/km^2)		Average uncorrected ringed seal density (no/km^2)
Year	Moulton *et al*. 2002, 2005*	Frost *et al*. 2002, 2004	
1997	0.43	0.73	0.58
1998	0.39	0.64	0.52
1999	0.63	0.87	0.75
2000	0.47		0.47
2001	0.54		0.54
2002	0.83		0.83
Average density (no/km^2)			0.61

*Water depths > 10 ft

For the period 2000, 2001, and 2002, (Moulton *et al*. 2005) reported ringed seal densities (uncorrected) on landfast ice during Northstar construction as 0.47, 0.54, and 0.83 seals/km^2. Based on the average density of surveys flown 1997 to 2002 the uncorrected density of ringed seals during the spring is expected to be 0.61 ringed seals/km^2.

As reported in Frost *et al*. (2002) habitat-related variables including water depth, location relative to the fast ice edge, and ice deformation has shown to result in substantial and consistent effects on the distribution and abundance of seals. Moulton *et al*. (2003) and Moulton *et al*. (2005) also reported that environmental factors such as date, water depth, degree of ice deformation, presence of meltwater, and percent cloud cover had more conspicuous and statistically-significant effects on seal sighting rates than did any human-related factors. Thus, the intra- and interannual variability in survey conditions and ice characteristics is unavoidable and identifying trends in seal abundance or estimating density is challenging. As with all aerial surveys, animal densities are underestimated because animals are missed, or not counted. This is generally because they are not hauled out where they can be seen or are missed by the observer. Therefore, these density estimates represent minimum estimates during the time and location of the surveys.

Table 4-3. Ringed Seal Densities

Winter average density (seal/km^2)	Spring average density (seal/km^2)
0.55	0.61

In summary, for the purposes of estimating take associated with ice road/trail activities, winter and spring densities are assumed to be 0.55 and 0.61 seals/km^2 (respectively) as shown in Table 4-3.

4.1.7 Take Estimates

Level B Harassment

To estimate exposures of ringed seals to disturbance that may result in a take, the total area of potential disturbance (i.e., exposure area) associated with construction and maintenance of the roads/trails/pads is defined as 170 m (approximately 558 ft) on either side of the road/trail/pad centerline; a total width of 340 m (approximately 1,115 ft). This distance is chosen for two reasons: (1) this is the approximate width of disturbance for ice road/trail/pad construction plus a buffer; and (2) the 1999 ringed seal surveys conducted by Dr. Kelly's trained dogs at Northstar located two seal structures within 10-50 m (33-164 ft) of the ice road after it was constructed, indicating that seals may occur in this exposure area despite the activities (Richardson and Williams 2000). Again, the total width of the exposure area is 340 m (558 ft). This width is then multiplied by the total length of roads/trails likely to be constructed each year to calculate the exposure area in km^2. Due to the variability in the length of ice roads/trails that may be needed from year to year, a 10 percent buffer is also added to the total length and is accounted for in the total area calculated. The total area of exposure is then multiplied by the seasonal ringed seal density to calculate the total estimated ringed seals exposed each season. Since there are two seasons during which ringed seals may be exposed to ice road activity (winter and spring), the exposure estimates for winter and spring are then added together to calculate the total number of seals exposed per year. For example, the following calculation was used for Northstar ice roads and trails:

$$TAE \times D = TES$$
$$TES\ (winter) + TES\ (spring) = TEY$$

where

TAE = Total Area of Exposure
D = Species Density (variable by season)
TES = Total Estimated Seals Exposed Per Season
TEY – Total Estimated Seals Exposed Per Year

For example:

12.96 km^2 (TAE) x 0.55 (winter density per km^2) = 7.13 seals/winter
12.96 km^2 (TAE) x 0.61 (spring density per km^2) = 7.91 seals/spring
7.13 seals/winter + 7.91 seals/spring = 15.03 seals/year

As indicated in Chapter 2, an ice trail is constructed at SID each year and is located approximately 15 to 30 m (50 to 100 ft) west of the ice road. The ice trail is located within the exposure area of the ice road centerline (420 m). Therefore, the same formula shown above is applied for calculating potential takes at SID. Based on the exposure estimates, Eni and Hilcorp request takes for Level B harassment for the 5-year period as shown in Table 4-4. Takes are presented annually for each company and are requested for ice road and ice trail construction, operation and maintenance expected to occur between December and May of each year, depending on local conditions. Potential Level B takes could occur in all five years.

Table 4-4. Ringed Seal Level B Take Estimate Associated with Ice Road/Trail Activities

	Total ice road length (km)	Total ice trail length (km)	Total length plus 10% buffer[1]	Total width (km)	Total area of exposure (km^2)	Est. no. seals exposed during winter (density[2] x area)	Est. no. seals exposed during spring (density[2] x area)	Total est. takes per year	Total Level B take estimates	Total est. takes over 5 years
Eni SID	6.76	03	7.43	0.42	3.12	1.72	1.90	3.62	4	20
Eni ODS	11.26[4]	0	12.39	0.34	4.21	2.32	2.57	4.89	5	25
Hilcorp Northstar	11.71	22.94	38.12	0.34	12.96	7.13	7.91	15.03	16	80

[1] To account for variability
[2] Density: Winter=0.55 seals/km^2; Spring=0.61 seals/km^2
[3] Note that Eni constructs an ice trail each year that is approximately 15 to 30 m west of the ice road. The trail is located within the exposure area of 170m and is accounted for in estimated takes.
[4] Length of alternate route used as worst case.

Potential Serious Injury or Mortality

Based on a review of literature and monitoring reports from Northstar and other North Slope projects, there is documentation of one seal mortality associated with a vibroseis program outside the barrier islands east of Bullen Point in the eastern Beaufort Sea (MacLean 1998). During a 1999 NMFS workshop to review on-ice monitoring and research, Dr. Brendan Kelly (then of the University of Alaska), also indicated that a dead ringed seal pup was found during his research using trained dogs to locate seal structures in the ice. The dead ringed seal pup was located approximately 1.5 km (0.9 mi) from the Northstar ice road. No data on the age of the pup, date of death, necropsy results, or cause of death are available. Therefore, whether ice road construction at Northstar could have contributed to the death of this pup, or if its death was coincidental to Northstar activities cannot be determined (Richardson and Williams 2000).

While the only recorded mortality of a seal occurred in 1998, Eni and Hilcorp are also requesting ten takes for each development over the 5-year period for potential ringed seal serious injury or mortality during construction, operation and maintenance of ice roads and trails. However, without some compelling justification for 30 possible mortalities, NMFS considers this request is not supportable. NMFS Office Protected Resources and Alaska Regional Office jointly analyzed the potential ringed seal serious injury and mortality that could raise from Hilcopr and Eni's proposed ice roads/trails construction, and is concerned that the requested mortality in this proposed action is much higher than other similar actions.

For instance, in the 2019 Hilcorp Liberty reinitiation, for the ice road construction and maintenance activities, there are two lethal takes proposed over the first 5 years (and eight over the following 20 years, for 10 total moralities over 25 years). In that action, four ice roads, totaling 51.5 km in length would be constructed: in Years 1 through three, all four roads would be constructed; in Years 4 and 5, only Road #1 would be constructed (11.3 km in length). By

comparing the two proposed actions, Hilcorp and Eni are constructing 1.5 times the ice roads/trails than Hilcorp is at the Liberty site over a five-year period.

If, over five years, Hilcorp and Eni are proposing to construct 1.5 times the ice roads/trails as at the Hilcorp Liberty site, the proposed mortality can be 1.5 times the Hilcorp Liberty amount over the same time. Therefore, two mortality/serious injury takes times 1.5 is three takes over 5 years. In terms of portioning take to the two companies, Hilcorp is constructing 1.9 times as many ice road/trail kilometers as Eni (round up to 2). Since Hilcorp is engaging in more activity than Eni, it is reasonable to expect that there is a higher likelihood of ringed seal interaction for their activities. Therefore, our analysis led us to propose authorizing three serious injury/mortalities for ice road/trail activities at each of Eni's sites (Spy Island and Oooguruk), and six authorized serious injury/mortalities for Hilcorp's Northstar site, all over five years. A summary of serious injury/mortality for Hilcorp and Eni over the five-year period is provided in Table 4.5.

Table 4-5. Eni SID and ODS: Total Estimated Ringed Seal Takes Annually and Over the 5-Year Proposed LOA Period

	Serious injury/mortality for 5 years
Eni SID	3
Eni ODS	3
Hilcorp Northstar	6
Total	12

4.1.8 Effects on Subsistence Use

Hilcorp and Eni's proposed ice roads and ice trails construction projects would occur far away from subsistence activities, and would be conducted during the time few subsistence activities occur. In winter and spring, small numbers of ringed seals may be disturbed and possibly displaced from the immediate locations of the ice roads and trails shown on Figures 1-1 through 1-4. Seal hunters would likely avoid the areas near SID, Northstar and ODS in favor of less developed more productive areas closer to the main sealing areas near the Colville River delta. Therefore, construction and maintenance of the ice roads and trails described in the analysis is negligible to no impact on winter subsistence hunting of ringed seals.

4.2 Effects of Alternative 2 – No Action Alternative

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

4.3 Cumulative Effects

Potential impacts of actions that affect marine mammals includes mortality, injury, behavioral disturbance, and reduced fitness, which includes reproductive, foraging, and predator avoidance success. The susceptibility of marine mammals to these outcomes often depends on proximity, severity or vulnerability to the stressor and vulnerability can increase as multiple stressors compound on an individual. The abundance of a species in large part determines whether a fatality from any stressor would have population-level impacts on that species, and for species with small populations, individual fatalities could have considerable population-level impacts (Laist *et al.* 2001). This cumulative effects analysis considers these potential impacts and in reviewing the definition of cumulative effects, per 40 CFR 1508.7[4] and the information provided in the application about the project area, we determined that activities that have the potential to permanently remove a resource would be expected to have additively or synergistic impacts if they affect the same population, even if the effects were separated geographically or temporally. However, based on the action area, that the incidental take by Level B harassment of the ringed seal is the primary affect associated with the issuance of the proposed rule and associated LOAs, and that individuals found in the action area may be affected by activities anywhere within the ringed seals range, we focused on activities that may temporally or geographically overlap with the proposed rule for the ice road and trail construction activities such that repeated exposure to anthropogenic stressors warrant consideration for potential cumulative impacts to the potentially affected ringed seals. For example, we identified number of natural and human activities that have contributed to the status of the ringed seals in this area, including vessel traffic, oil and gas exploration and development, scientific research, subsistence harvest activities, military activities, recreation and tourism activities and climate change.

4.3.1 Oil and Gas Exploration and Development

Onshore oil development has been the main agent of industrial change on the North Slope and throughout the Arctic Outer Continental Shelf (OCS) in the twentieth and twenty-first centuries. Oil and gas exploration activities have occurred on the North Slope since the early 1900s, and oil production started at Prudhoe Bay in 1977. Oil production has occurred for over 40 years in the region, and presently spans from Alpine in the west to Point Thomson in the east. Onshore gas production from the Barrow gas field began over 60 years ago. Associated industrial development has included the creation of industry-supported community airfields at Deadhorse and Kuparuk, and an interconnected industrial infrastructure that includes roadways, pipelines, production and processing facilities, gravel mines, and docks.

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[4] "Cumulative effects is 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. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time".

In addition to Hilcorp and Eni's ice roads and trails construction activities at Northstar facilities and SID and ODS facilities, Hilcorp also submitted an ITA application to construct and operate the Liberty Drilling and Production Island (LDPI), a self-contained offshore drilling and production facility located on an artificial gravel island on the North Slope. Infrastructure and facilities necessary to drill wells and process and export approximately 60,000 to 70,000 barrels of oil per day to shore would be installed on the island. To transport oil, a pipeline from the island would be installed, tying into the existing Bandami pipeline located on shore between the Sagavanirktok and Kadleroshilik Rivers on Alaska's North Slope. To access the island and move vehicles and equipment, ice roads would be constructed annually. Hilcorp would commence and continue drilling and production for approximately 20 to 25 years at which time the island would be decommissioned.

In addition, the Alaska Gasline Development Corporation (AGDC) submitted an IHA application to construct one integrated liquefied natural gas (LNG) Project with interdependent facilities for the purpose of liquefying supplies of natural gas from Alaska, in particular from the Point Thomson Unit and Prudhoe Bay Unit production fields on the North Slope, for export in foreign commerce and for in-state deliveries of natural gas.

Several recent ancillary activities have also been conducted in the Beaufort Sea OCS. BP Exploration Alaska, Inc. (BPXA) completed a 3D Ocean Bottom Node (OBN) Seismic Survey in the North Prudhoe Bay area during the open-water season of 2014. Earlier that year, SAExploration, Inc. also completed an on-ice 3-D Seismic Survey extending from onshore Alaska across nearshore State waters into the Beaufort Sea OCS. In 2012, Ion Geophysical Corporation completed a 2-D Seismic Survey across a large swath of the Beaufort Sea OCS and extending into the Chukchi Sea OCS. Other less recent Beaufort Sea OCS surveys include one 3-D survey each by Shell and BPXA in 2008 and three surveys by Shell in 2007 (one 3-D marine seismic, one 3-D on-ice seismic, and one high resolution shallow seismic survey).

4.3.2 Vessel Traffic

Marine vessel traffic in the past has been associated with subsistence hunting, oil exploration, research, and military activities in the Chukchi and Beaufort seas. Weather and ice have typically limited marine vessel traffic in these areas to July through September. Future marine traffic patterns may change due to the influence of a longer ice-free period and overall decreased ice cover, potentially increasing the number of vessels associated with industrial transportation, tourism, and non-subsistence fishing. The U.S. Coast Guard (USCG) recently completed a Port Access Route Study to increase the efficiency of vessel traffic in the Chukchi Sea, Bering Strait, and Bering Sea. Most vessels engaged in OCS activity in the Beaufort and Chukchi seas would follow these shipping lanes as they transit through the Bering Strait, unless environmental conditions such as heavy ice cover make following those routes impracticable. Transits of the Northern Sea Route, used by vessels carrying oil and gas products from Russian oilfields to the Far East, are usually draft limited to 39.4 to 42.7 feet, which limits the maximum size of these vessels.

Marine vessels are the greatest contributors of anthropogenic sound introduced to the Beaufort Sea. Sound levels and frequency characteristics of vessel sound are generally related to vessel

size and speed. Larger vessels generally emit more sound than do smaller vessels. Same size class vessels travelling at higher rates of speed generally emit more sound than the same vessels travelling at lesser speeds. Vessels underway with a full load, or vessels pushing or towing loaded non-powered vessels, generate more sound than unladen vessels in a similar size class. The most common sources of marine vessel noise are propulsion engines, generators, bearings, pumps, and other similar components. Operations and navigation equipment, including fathometers and sonar equipment, also contain mechanical components that create and propagate sound into the marine environment.

The number of marine vessels in both the Beaufort and Chukchi seas has increased in recent years due to advances in the technology of ice strengthening and ice breaking capacities, changes in ice cover and classifications of ice, increases in use of both the Northern Sea Route over Russia and the Northwest Passage through Canada for commercial and tourist voyages, and increased interest in scientific and economic pursuits in the area. Reasonably foreseeable future traffic in the region includes small craft involved in the fall whaling hunts; USCG vessels; cargo vessels; other supply ships, tugs, and barges; cruise ships; and vessels associated with scientific endeavors. There are also several newly built ice strengthened LNG carriers and more on order that are expected to carry an increasing volume of Russian LNG Cargoes across the Northern Sea Route and through the Bering Strait to markets in the Far East. As more development takes place on the North Slope and in other coastal areas in Western Alaska (e.g., Donlin Mine) vessel traffic in Dutch Harbor may increase.

4.3.3 Recreation and Tourism

The shallow waters and industrial activity and development near the Hilcorp and Eni's ice roads and trails construction areas and connected industrial sites preclude visitations by cruise ships and make private access to the area difficult. Thus, neither recreation nor tourism is expected to occur in appreciable levels in the immediate vicinity of the proposed project area. Recreation and tourism activities have, however, historically occurred in northern Alaska and are expected to continue and possibly increase in the foreseeable future. Therefore, these activities are considered as a minor factor in this analysis.

4.3.4 Subsistence Activities

Two major subsistence resource categories occur on the North Slope: coastal/marine and terrestrial/aquatic. Coastal/marine food resources include whales, seals, walruses, waterfowl, and fish. Terrestrial/aquatic resources include caribou, freshwater fish, moose, Dall sheep, edible roots and berries, and furbearing animals. Generally, communities harvest resources most available to them. The distribution, migration, seasonal, and more extended cyclical variation of animal populations drive decisions on what, where, and when to harvest a subsistence resource. Many areas might be used infrequently, but they can be quite important harvest areas when they are used. Subsistence activities tend to be concentrated along rivers, lakes, and coastlines, near communities, and where resources are at high abundance levels.

4.3.5 Military / Homeland Security Activities

Military activity in the Arctic is thought to have increased in recent years, and it is reasonable to expect military activities should increase in the foreseeable future. Military activities in the Arctic include movements of military vessels and submarines, and aircraft, as well as ground operations. Military vessel, submarine, aircraft traffic, and the potential for spills could contribute to cumulative effects through the disturbance of marine mammals and effects to the subsistence harvest.

4.3.6 Scientific Research Activities

Numerous offshore scientific research programs in the Beaufort and Chukchi seas are conducted annually. These activities involve vessel, air, and over-ice support, which may contribute to cumulative effects through disturbance of marine animals and impacts to subsistence harvest through marine vessel and aircraft traffic, and disturbance of bottom sediments through sampling for biological and chemical studies.

The Office of Naval Research's (ONR) Arctic Research Activities began in August 2018 with deployment of autonomous gliders in the Beaufort and Chukchi Seas and subsequent deployment of moored acoustic sources in September 2018 (84 FR 37240; July 31, 2019). The ONR's research projects include the Stratified Ocean Dynamics of the Arctic, Arctic Mobile Observing System, Ocean Acoustics field work (including the Coordinated Arctic Active Tomography Experiment), and Naval Research Laboratory experiments in the Beaufort and Chukchi Seas. These experiments involve deployment of moored and ice-tethered active acoustic sources, primarily from the U.S Coast Guard Cutter (CGC) HEALY. CGC HEALY may also be required to perform icebreaking to deploy the acoustic sources in deep water. In addition, ONR is proposing the Ice Exercise 2020 (ICEX20) research project, which includes the construction of a temporary camp situated on an ice floe, submarine training and testing, and the execution of research activities (ONR 2019). The proposed research project would occur primarily over an approximately six-week period from February through April 2020. An IHA was issued on January 30, 2020 (85 FR 6518; February 5, 2020).

In addition, there are currently 14 marine mammal scientific research permits issued to scientists and researchers to conduct marine mammal studies in the Arctic Ocean. These studies include tissue sampling, aerial and vessel surveys, and live capture and handling of marine mammals.

4.3.7 Climate Change

Research evaluated by organizations such as the Intergovernmental Panel on Climate Change (IPCC) found that "rising global emissions of greenhouse gases (GHG) are significantly affecting the earth's climate" (IPCC 2013). As a result of these GHG emissions and subsequent environmental effects, Alaska has warmed more than twice as rapidly as the rest of the United States, with state-wide average annual air temperature increasing by 3°F and average winter temperature by 6°F over the past 60 years. Average annual temperatures in Alaska are projected to rise by an additional 2°F to 4°F by 2050. If global emissions continue to increase during this century, temperatures can be expected to rise 10°F to 12°F in the north, 8°F to 10°F in the interior, and 6°F to 8°F in the rest of the state. Even with substantial emissions reductions,

Alaska is projected to warm by 6°F to 8°F in the north and 4°F to 6°F in the rest of the state by the end of the century.

Due to these influences, climate change is an ongoing factor in the consideration of cumulative impacts in the Arctic region. Climate change has been implicated in changing weather patterns, changes in the classification and seasonality of ice cover, ocean surface temperature regimes, and the timing and duration of phytoplankton blooms in the Arctic. These changes have been attributed to rising carbon dioxide (CO_2) levels in the atmosphere and corresponding increases in the CO_2 levels of the waters of the world's oceans, which have led to the phenomena of ocean acidification (IPCC 2007). This phenomena is often called a sister problem to climate change because they are both attributed to human activities that have resulted in increased CO_2 levels in the atmosphere. Ocean acidification in high latitude seas is happening at a more advanced rate compared to other areas of the ocean. The capacity of the Arctic Ocean to uptake CO_2 should increase in response to predicted increase in atmospheric CO_2 levels. Sea ice losses increase the open water surface area of Arctic seas, and exposed surface water lowers calcium carbonate solubility, or saturation, leading to lower levels of available minerals for shell-producing organisms. In addition, climate change could affect the natural cycles occurring in the Arctic. Many of the organisms present in the Arctic during the summer breeding season are migratory. The regions used during other life stages of their annual cycle may not be experiencing climate change at the same rate as in the Arctic. This could lead to phenological mismatches of organisms with their habitats or prey species where time-sensitive relationships, such as breeding, could be changed to the detriment or benefit of some species.

4.3.8 Conclusion

All these past, present or reasonably foreseeable future activities described above contribute to additional exposure to anthropogenic stressors to some degree that have potential to affect ringed seals in Hilcorp and Eni's proposed ice roads and trails construction areas on the North Slope. However, these activities are separated spatially and temporarily, thus it's highly unlikely that the same individual animals would be exposed to the stressors simultaneously. In addition, most of these anthropogenic stressors are short-term and low-level that would only reach to the degree of brief behavioral disturbances in the form of avoidance or change of behaviors. Therefore, none of these anthropogenic stressors is expected to cause injury or mortality to ringed seals. Finally, it is expected that in all cases individual animals that are exposed to these stressors will recover once the stressors are removed.

Based on the analyses provided in this section, NMFS has determined that the Hilcorp and Eni's proposed ice roads and ice trails construction activities on the Alaska North Slope would not be expected to add significant impacts to overall cumulative effects on marine mammals from past, present, and future activities. The potential impacts to marine mammals and their habitat are expected to be minimal based on the limited noise footprint, and temporal or spatial separation from the activities analyzed above. In addition, mitigation and monitoring measures described in Chapter 2 are expected to further reduce any potential adverse effects.

Chapter 5 List of Preparers and Agencies Consulted

Prepared By
Shane Guan, Ph.D.
Fishery Biologist
Permits and Conservation Division
Office of Protected Resources, NOAA/National Marine Fisheries Service

Agencies Consulted
Protected Resources Division, NMFS Alaska Regional Office

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