UNITED STATES DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION NATIONAL MARINE FISHERIES SERVICE
Office of Protected Resources

PETITION FOR PROMULGATION OF REGULATIONS AND REQUEST FOR LETTER OF AUTHORIZATION PURSUANT TO SECTION 101 (a) (5) (A) OF THE MARINE MAMMAL PROTECTION ACT FOR

the

Taking of Marine Mammals Incidental to Construction, Maintenance and Use of Sea Ice Roads and Trails Associated with Hilcorp, Alaska Inc. and Eni US Operating Co. Inc. North Slope Operations, Alaska

50 C.F.R. Part 216, Subpart R

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ACRONYMS AND ABBREVIATIONS

ADF&G ..... Alaska Department of Fish and Game
AKR ..... Alaska Regional Office
ASAMM ..... Aerial Surveys of Arctic Marine Mammals
BMP ..... Best Management Practice
BPXA ..... British Petroleum Alaska
CFR ..... Code of Federal Regulations
cm ..... centimeter
dB ..... decibels
DPS ..... Distinct Population Segment
EEZ ..... Exclusive Economic Zone
ESA ..... Endangered Species Act
Eni ..... Eni US Operating Co. Inc.
FR ..... Federal Register
ft ..... feet
GPS ..... Global Positioning System
Hilcorp ..... Hilcorp Alaska, LLC
IHA ..... Incidental Harassment Authorization
in. ..... inch
ITA ..... Incidental Take Authorization
km ..... kilometers
km^2 ..... square kilometers
LOA ..... Letter of Authorization
m ..... meters
mi ..... miles
MLLW ..... Mean low lower water
mi^2 ..... square miles
MMPA ..... Marine Mammal Protection Act
NGO ..... Non-Governmental Organization
NMFS ..... National Marine Fisheries Service
NMML ..... National Marine Mammal Laboratory
NID ..... Negligible Impact Determination
ODS ..... Oooguruk Drill Site
OPP ..... Oliktok Production Pad
OPR ..... Office of Protected Resources
PBF ..... Primary Biological Feature
PBR ..... Potential Biological Removal
PTS ..... Permanent Threshold Shift
Secretary ..... US Secretary of Commerce
SID ..... Spy Island Drillsite
TTS ..... Temporary Threshold Shift
U.S. ..... United States

1. DESCRIPTION OF ACTIVITIES

1.1. Nature of Request

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 Sea waters, Alaska (Figure 1-3). During the ice-covered season, Hilcorp constructs annual ice roads and trails to connect and allow access between West Dock and Northstar (Figure 1-4). Similarly, Eni builds and utilizes an ice road connecting the Oliktok Production Pad (OPP) and SID (Figure 1-5). Eni also builds an annual ice road from shore to the Oooguruk Drill Site (ODS) (Figures 1-6 and 1-7).

On April 24, 2018, Hilcorp work crews encountered a ringed seal (*Phoca hispida hispida*) along the sea ice trail about half way between West Dock and Northstar (Figure 1-1). A few days later on April 28, 2018, Eni work crews encountered a ringed seal along the ice road between OPP and SID (Figure 1-2).

Subsequent to these encounters, both Hilcorp and Eni have been coordinating closely with the National Marine Fisheries Service (NMFS), Alaska Regional Office (AKR), and NMFS Office of Protected Resources (OPR) in Silver Spring, Maryland, to discuss compliance with the Marine Mammal Protection Act[1] (MMPA) and the Endangered Species Act (ESA). During a meeting with NMFS AKR and OPR on May 2, 2018, NMFS advised both companies to develop a set of best management practices (BMPs) to be followed to reduce the potential for additional seal encounters during construction, maintenance and operation of ice roads and trails on Alaska's North Slope. Given the information available at that time, NMFS staff commented that through mitigation and monitoring measures, a determination might be made that ice road/trail activities would "not likely adversely affect" ringed seals or their habitat. Implementation of the BMPs was expected to result in no "take[2]" of seals during ice road and trail activities. This would eliminate the need to apply for an incidental take authorization (ITA) under the Section 101 (a)(5) of the MMPA. Therefore, on June 18, 2018, based on available information, rather than petition NMFS for incidental take regulations (i.e., seek an ITA), NMFS recommended that Hilcorp and Eni draft a letter detailing the agreed-upon BMPs for future ice road/trail seasons beginning in late 2018. NMFS planned to respond with a letter of concurrence based on the assumption that no takes of ringed seals would occur if BMPs were implemented.

Figure 1-1. Seal Pup Along Sea Ice Trail

Subsequent, ongoing discussions and coordination between NMFS and the two companies focused on ensuring that compliance requirements under the MMPA and the ESA regarding the prohibition of take of marine mammals in waters or on lands under the jurisdiction of the United States (U.S.) were met. However, during development of the BMPs, information provided by industry field personnel who construct, maintain and

[1] 16 United States Code [UCS] 1362
[2] "Take" is defined under the MMPA (16 USC 1362) and further defined by regulation (at 50 CFR 216.3) as "to harass, hunt, capture, collect, or kill, or attempt to harass, hunt, capture, collect, or kill any marine mammal." Take is further defined under the ESA as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."

operate ice roads and trails indicated that some disturbance of ringed seals (and potential takes) during ice road activities is likely to be unavoidable.

Therefore, the purpose of this request by Hilcorp and Eni is for NMFS to develop regulations and issue a 5-year Letter of Authorization (LOA), effective approximately December 2019 through December 2024, allowing for the potential incidental taking of small numbers of ringed seals specifically associated with ice road and trail activities.

Figure 1-2. Seal Pup Along Ice Road From OPP-SID

In 2000, 2006, 2011 and 2013 ITRs were issued by NMFS for Northstar construction and operation activities as described in detail in the final rules published in the Federal Register (FR) (65 FR 34014; 71 FR 11314; 76 FR 39705; and 78 FR 75488). These LOAs required marine mammal and acoustic monitoring studies that have been ongoing at Northstar since 2000. The U.S. Army Corps of Engineers (USACE) and the North Slope Borough (NSB) Planning Department adopted these monitoring requirements into, respectively, the USACE Permit (N-950372, special conditions 12 and 13) and the NSB ordinances for Northstar Construction and Operations (NSBMC §1970050(B)(I) and NSBCMP 243(b)). Acoustic monitoring was primarily related to concerns over the disturbance of bowhead whales due to Northstar activities. As described in Kim and Richardson (2016), in 2005–2007 and in 2010–2014, with the concurrence of NMFS, peer reviewers and stakeholders, the bowhead monitoring effort included fewer recording stations than in 2000–2004 or 2008–2009 (Richardson 2011, Richardson and Kim 2012, Richardson and Kim 2013, Richardson and Kim 2014, Richardson and Kim 2015).

Kim and Richardson (2016) provide a summary of underwater sounds near Northstar in 2015 recorded at a near-island site approximately 0.3 mi (450 m) and offshore site approximately 9 mi (15 km) northeast of the island. Acoustic data collected at these sites was generally consistent with previous years 2001 – 2014. Richardson and Kim (2012, 2013, 2014, 2015), concluded that results of monitoring in 2011–2014 suggest that: 1) ongoing activities at Northstar Island have no measurable effects on seals; and 2) there were limited but statistically detectable changes in the distribution of localized bowhead whale calls near Northstar as a function of fluctuating levels of underwater sound during the five seasons of most detailed study[3]. The most readily detected effects on distribution of bowhead whale calls may be limited to the southernmost part of the migration corridor during periods with vessel activities, such as boat and barge operations. A change in whale distribution does not necessarily mean a take under the MMPA has occurred. For these reasons, takes of whales and seals are not expected to result from ongoing island operations and therefore, this petition focuses solely on ice road and trail activities.

[3] The change in call detection could be the result of whales deflecting away from the island, the nearest whales merely reducing their calling rates (and not deflecting) in response to increased sounds, or both in combination. The effect might also be at least partly related to changes in whale headings, given newfound evidence of directionality in bowhead whale calls (Kim and Richardson 2016).

Hilcorp and Eni understand that authorizations would not be in effect until December 2019. Therefore, in the interim until LOAs are issued, the companies currently follow the detailed BMPs described in Sections 11 (Mitigation Measures) and 13 (Monitoring and Reporting) for the 2018-19 season. As described in Sections 11 and 13, Hilcorp and Eni would maintain a record of any ringed seals or seal structures (such as breathing holes or lairs) observed within 500 feet (ft) (152 meters [m]) of the ice road centerline during the 2018-2019 ice road/trail season and provide that information to NMFS in an end-of-season report as described.

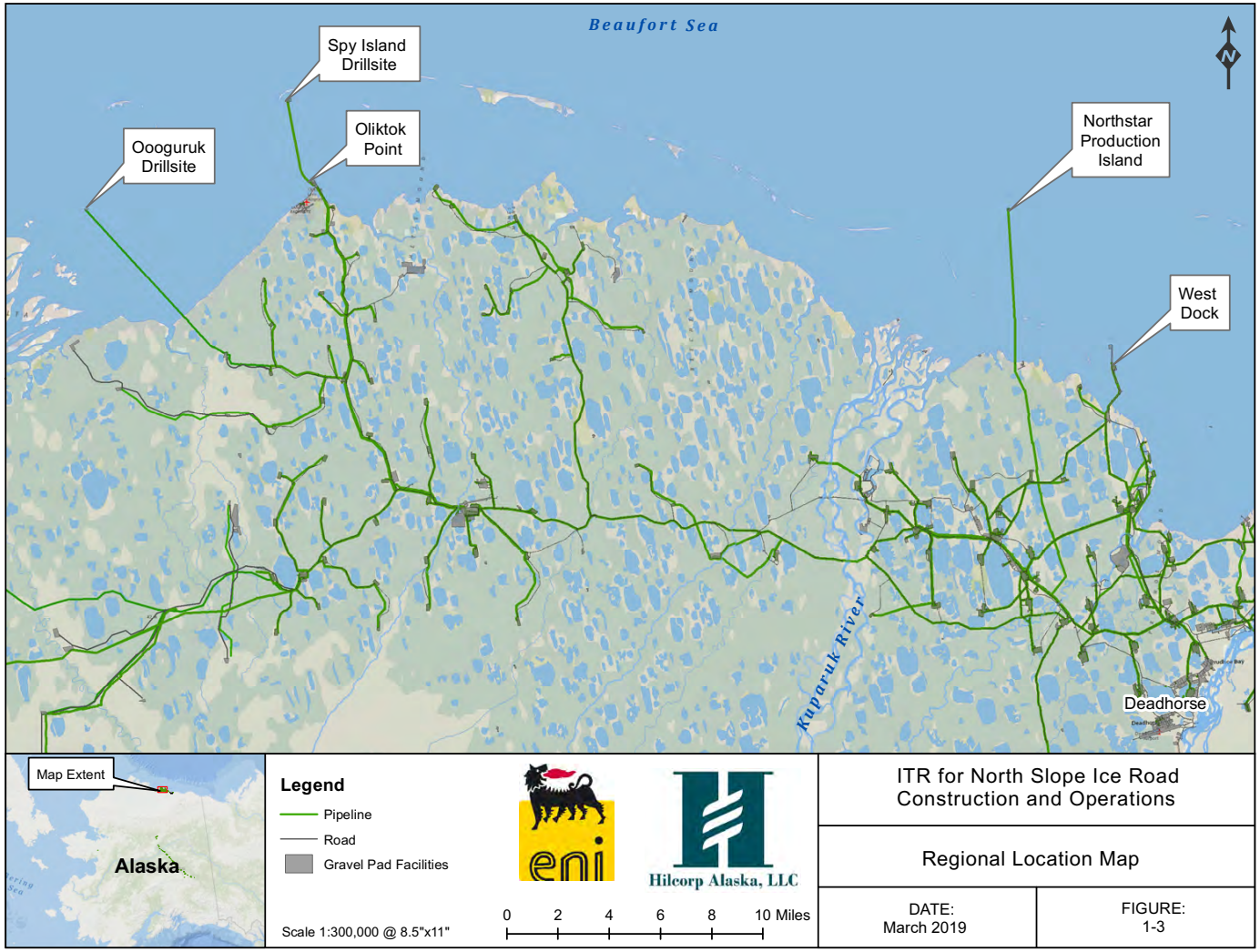


Figure 1-3. Regional Location Map

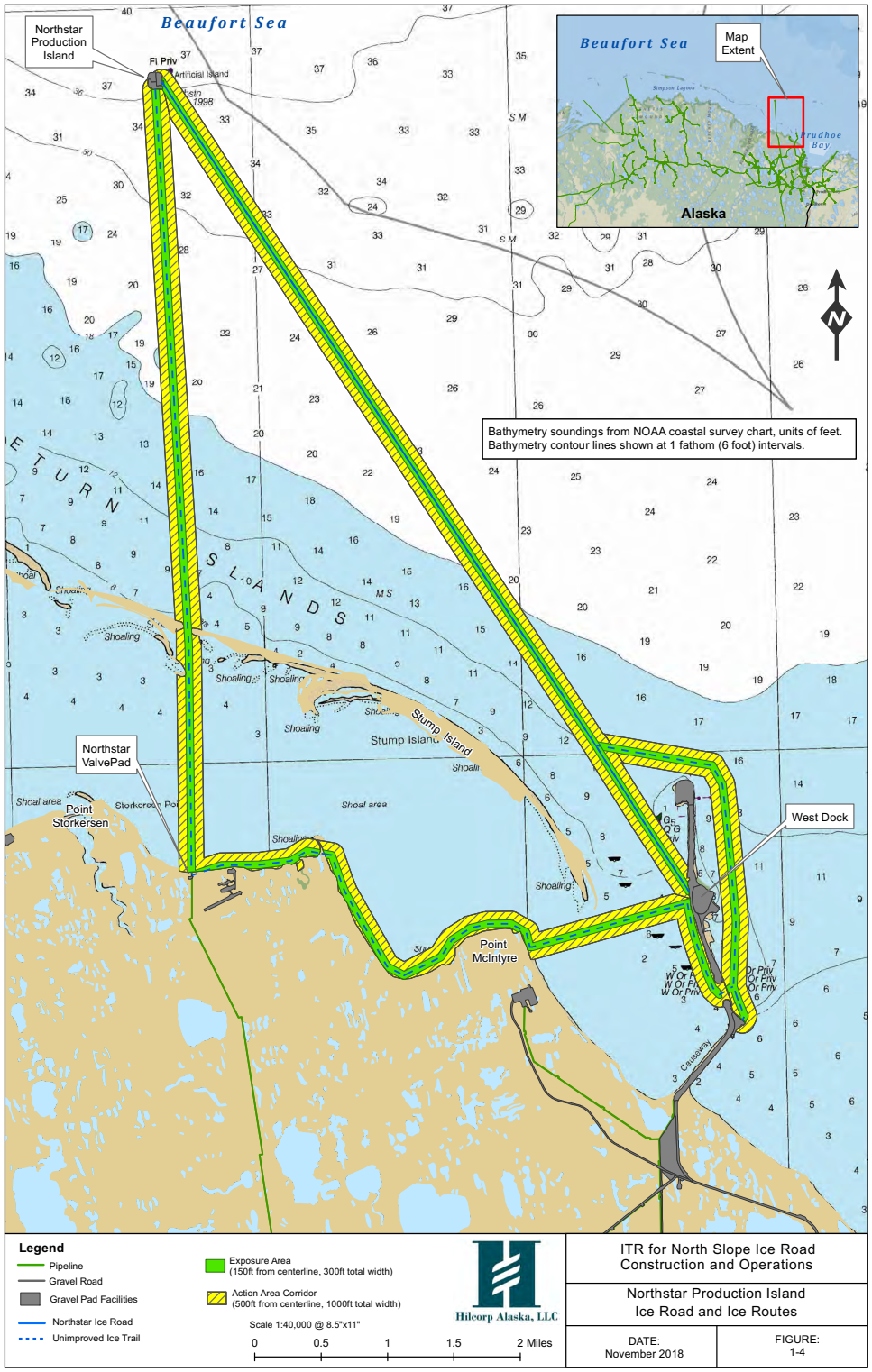


Figure 1-4. Northstar Production Island Ice Road and Ice Trails

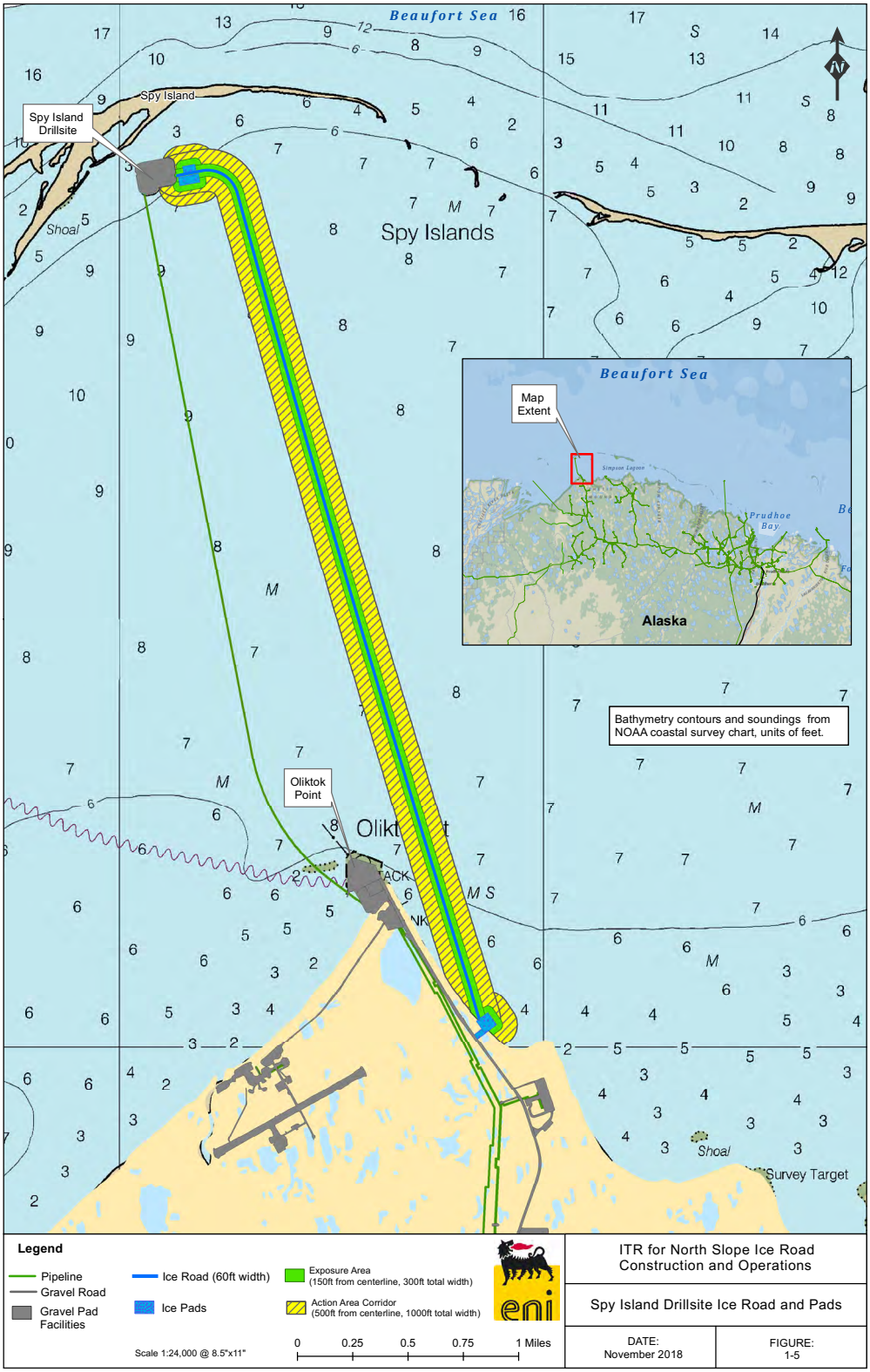


Figure 1-5. SID Ice Road/Trail and Ice Pads

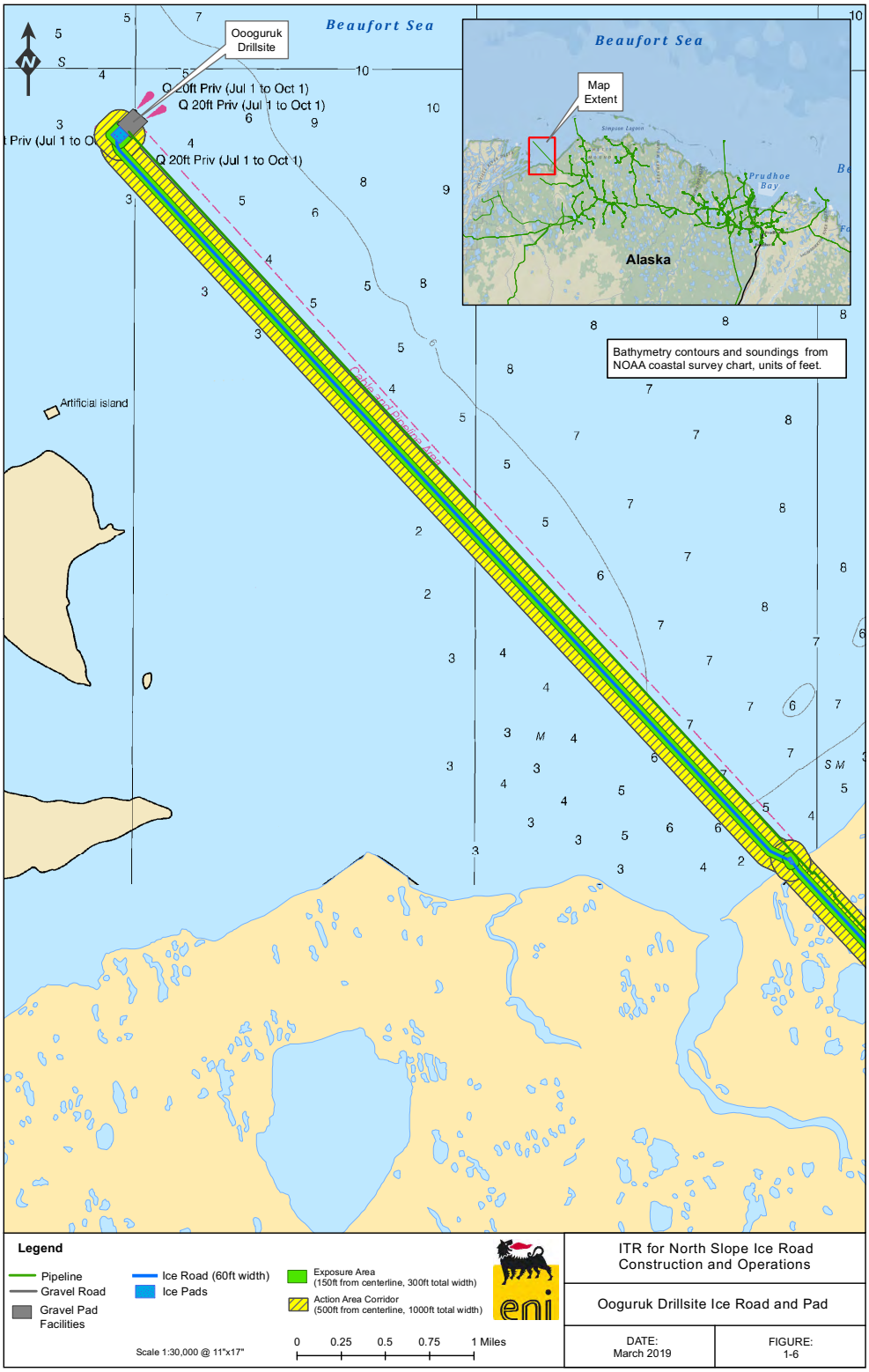


Figure 1-6. Ooguruk Ice Road

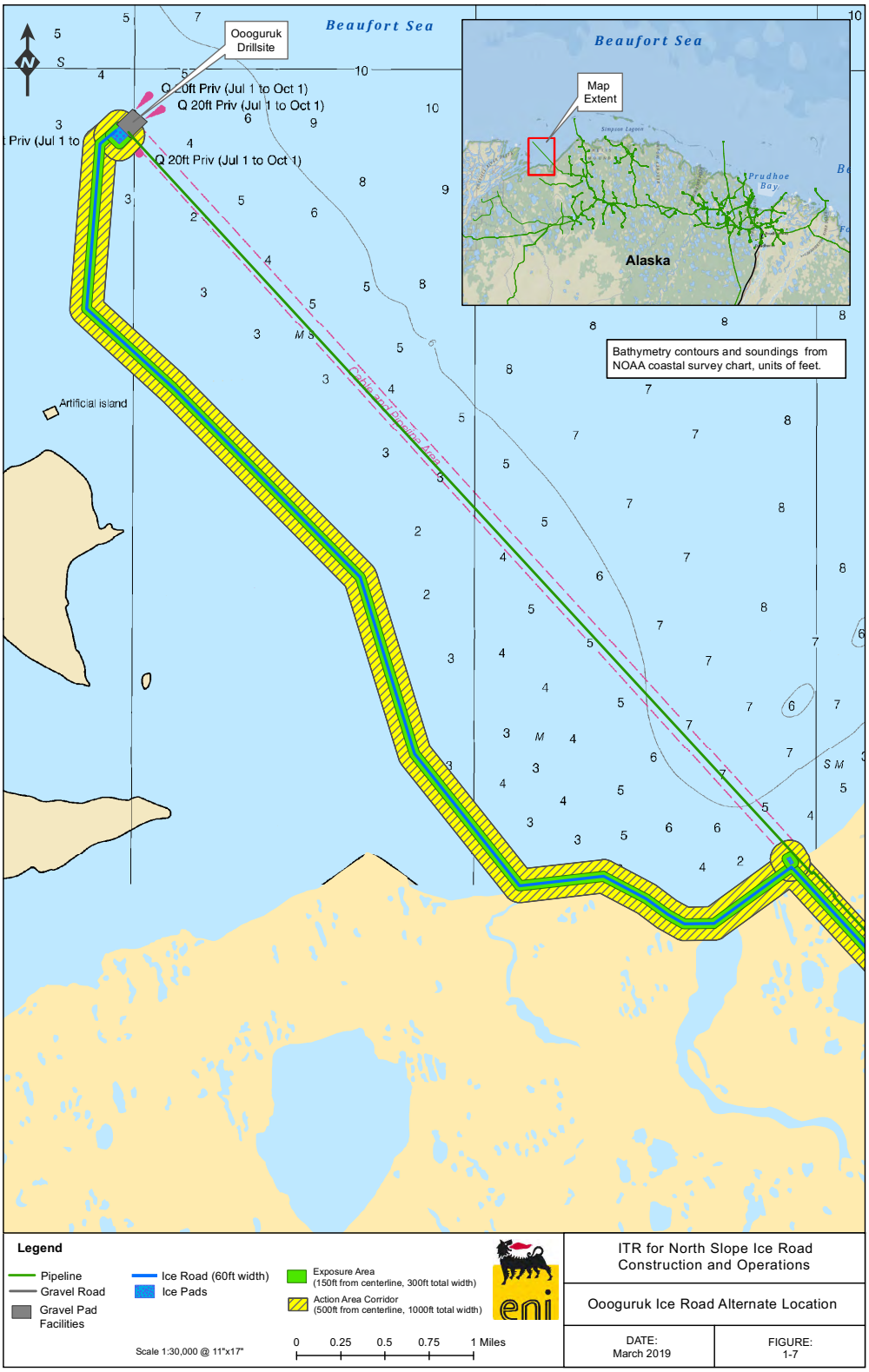


Figure 1-7. Oogurk Ice Road Alternate Location

1.2. Regulatory Context

The MMPA, Section 101(a)(5) directs the Secretary of Commerce (Secretary) to allow, upon request, the incidental, but not intentional taking of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing), if certain findings are made.

There are two types of ITAs that can be issued by NMFS: an LOA under Section 101(a)(5)(A) and an Incidental Harassment Authorization (IHA) under Section 101(a)(5)(D) of the MMPA. Under Section 101(a)(5)(A), for multi-year activities NMFS must issue regulations through an LOA. The activities must be well planned with enough detailed information provided to allow for an analysis of potential takes over the duration of the activity. Incidental Take Regulations (ITRs) can be valid for up to five consecutive years and an LOA can be issued each of those years; NMFS recommends following the rulemaking/LOA process for multiple-year projects (such as annual ice roads and trails) even when serious injury or mortality is not anticipated. IHAs are generally only requested when the project is short-term in nature (l2 months or less) and expected to result in harassment, and serious injury or mortality is not expected. Table 1-1 provides guidelines used to determine which ITA is appropriate.

Table 1-1. Guidelines for Determining Appropriate ITA Process

If your action has potential to:	Then you should:
Result in **"harassment"** only (i.e., injury or disturbance)	Apply for an IHA (effective up to 1 year)
Result in harassment only (i.e., injury or disturbance) AND is planned for multiple years	Request rulemaking and apply for multiple LOAs (effective up to 5 years)
Result in **"serious injury"** or mortality	Request rulemaking and apply for multiple LOAs (effective up to 5 years)

The construction and maintenance of offshore ice roads/trails associated with Northstar, SID and ODS operations (see Figures 1-4, 1-5, 1-6, and 1-7) could result in taking of small numbers of ringed seals by harassment. Serious injury or mortality of ringed seals[4] could occur due to ice road activity although such an event has not been documented. Therefore, Hilcorp and Eni are submitting this petition for promulgation of an ITR and LOAs, effective approximately December 2019, that would allow the potential taking of small numbers of ringed seals by serious injury or mortality as well as harassment incidental to the proposed activities that would be conducted during construction, maintenance and operation of ice roads and trails at these facilities.

1.3. Description of the Activity

1.3.1. Definition of Action Areas

NMFS defines the outer boundary of an Action Area for a project as the point where no detectable or measurable effect from the project would occur. Therefore, for purposes of this request for rulemaking, the Action Area is defined consistent with ESA regulations as the area within which all relevant direct and indirect effects of ice road/trail activities would occur. For this petition, the Action Areas are defined

[4]The ringed seal is the only marine mammal species under the jurisdiction of NMFS that is likely to be encountered during winter sea ice activities within the Action Areas (see Section 3).

as corridors extending 500 ft from each side of the centerline of ice road/trail operations[5] at each development site (Northstar, SID, and ODS) (see Figures 1-4 through 1-7).

1.3.2. Proposed Action

A sea ice road is defined as a route across the sea ice created by clearing and grading snow and then pumping seawater through drilled holes in the ice until the desired thickness is achieved. The top layer is often strengthened by a fresh water cap of ice. The ice road corridors (disturbed area) generally range between 160 to 200 ft (49 to 61 meters[m]) wide, consisting of a 60 to 100 ft (18 to 30 m) roadway with 50 to 60 ft (15 to 18 m) shoulders on each side (Figure 1-8). Delineators are used to mark the roadway at set intervals. These improved ice roads can be used by trucks, vans, and any other wheeled vehicles.

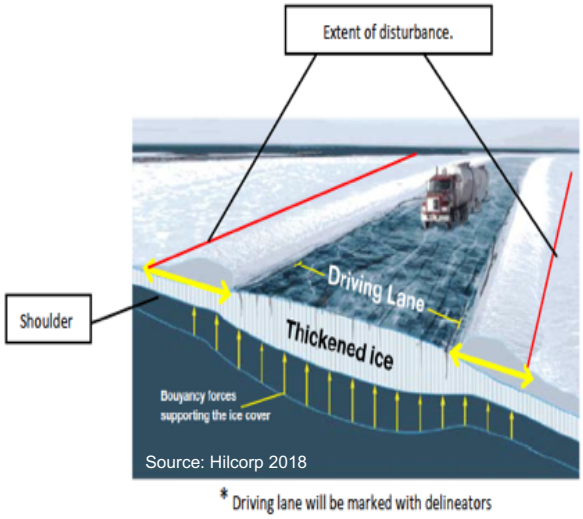


Figure 1-8. Ice Road Schematic

A sea ice trail is a route across sea ice created, used and maintained by equipment such as Tuckers (Figure 1-9), PistenBullys®, snow machines or similar tracked equipment. These roads cannot be used by regular wheeled vehicles. Sea ice trails do not require seawater flooding and the width of the disturbed area is similar to or may be narrower than that for ice roads.

Ice roads for offshore access to North Slope facilities are typically constructed beginning in late December or January and are used through approximately mid-May. All ice road and trail construction by both Hilcorp and Eni would be initiated prior to March 1st to minimize potential impacts to ringed seals. Specific details regarding each company's ice roads are provided in the following subsections.

1.3.2.1. Hilcorp: Northstar to West Dock

Figure 1-9. Tucker Tracked Vehicle

Details regarding ice road and trail construction were obtained from the *Project Description for Northstar Ice Road Winter 2016-2017* (Hilcorp 2016), the 2018 North Slope Borough Land Management Regulations Permit Application for Northstar (Hilcorp 2018), and discussions with Hilcorp personnel. As described in detail in Section 2, Northstar is located about 6 miles (mi) (9.7 kilometer [km]) offshore in water approximately 39 ft (12 m) deep.

[5] This is the distance recommended for monitoring in Section 13.2.

Ice Road Construction, Use, and Maintenance

Each year during the ice-covered season an approximately 7.3-mi (11.7 km) long ice road is constructed between Northstar and the Prudhoe Bay facilities at West Dock to transport personnel, equipment, materials, and supplies (see Figures 1-4 and 1-10). 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.

Figure 1-10. Ice Road Approaching Northstar Island

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 1-4. However, to cover all scenarios, this ITR petition assumes that an ice road would be built in all years covered by the LOA.

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 occur 24 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 (see Section 2.1 for additional details). The ice roads are typically constructed by specially designed pumps with ice augers (Figure 1-11). 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.

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 (Figure 1-12). 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 50 ft (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.

Figure 1-11. Pump and Ice Auger

The following steps are used to build the Northstar ice road:

- Clear snow using lighter-weight tracked vehicles (Figure 1-13).
- Grade or drag the ice to smooth the surface, incorporating rubble ice into the road or moving it outside of the expected road surface.
- Drill holes through floating ice along the planned ice road route using rolligons equipped with ice augers and pumps (see Figure 1-11).
- Pump seawater from drilled holes over floating ice.
- Flood the ice road. Flooding techniques are dependent on the conditions of the sea ice (i.e., grounded vs. floating).

Figure 1-12. Snow Blowing on Ice Trails

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® (Figures 1-9 and 1-14), 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.

Figure 1-13. Bobcat for Clearing Snow

Hilcorp usually builds the following unimproved ice trails to Northstar as shown in Figure 1-4:

- 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 – 4.82 mi, 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.

Source: arcticmarinesolutions.com

Figure 1-14. Example of a PistenBully®

1.3.2.2. Eni: Oliktok Production Pad to SID

Ice Road Construction, Use, and Maintenance

Details regarding construction of this ice road were obtained from the *Eni Nikaitchuq Ice Road Design, 2017-2018 Oliktok to Spy Island* (Peak Oilfield Services 2017) and discussion with Eni personnel.

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 (see Figures 1-5 and 1-15). 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.

Source: Eni 2018

Figure 1-15. Ice Road from OPP to SID

Small rolligon vehicles with augers and pumps are used for augering and flooding. Hand augers can be used to check the ice thickness (Figure 1-16). 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 (Figure 1-17). 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 1-16. Hand Auger

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

Following the 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 trail is 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.

Figure 1-17. Vacuum Truck

1.3.2.3. 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 1-6, the typical or proposed ice road extends 5.5 mi (8.9 km) offshore to the ODS. An alternative ice road as shown on Figure 1-7 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 are 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 Figures 1-6 and 1-7). 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 1-6 and 1-7 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.

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 February 1st.

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. DATES, DURATION, AND REGION OF ACTIVITY

2.1. Dates and Durations of Activities

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.

2.2. Region of Activity

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 (see Figures 1-3 and 1-4). 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 (see Figures 1-3 and 1-5). 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. Due to the open water in the ice at this location, seals may appear near this site as evident from the observation of a ringed seal pup in April 2018 (see Section 1.1).

The ODS consists of a 6-acre gravel drill site approximately 5 mi (8 km) offshore in 4.5 ft (1.4 m) of water (Figures 1-6 and 1-7). 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. Similar to SID, the location of ODS has water depths considered unsuitable for ringed seals; however, to be precautionary and due potential changes in ice conditions and ringed seal habitat, Eni is including the ODS in this petition to ensure compliance with the MMPA.

3. SPECIES AND NUMBERS OF MARINE MAMMALS IN THE BEAUFORT SEA

3.1. Species in the Beaufort Sea

The marine mammal species under NMFS jurisdiction that may occur in the Beaufort Sea, at least seasonally, include eight whale species and four species of seals (see Table 3-1). 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 offshore near the proposed Action Areas. The NMFS Stock Assessment Reports (SAR)[6] 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)[7] or the threatened Mexico DPS (Wade, Quin *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.

3.2. Species Considered but Dismissed

The proposed action occurs during ice-covered conditions, which could be present for about 7 months from approximately December 1st until July 1st, depending on weather each year. Most bearded seals in 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 shorefast ice throughout the winter and early spring. Bearded seals prefer

[6] https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-species-stock
[7] A "distinct population segment" or DPS is the smallest division of a taxonomic species permitted to be protected under the ESA recognized as a taxonomic species or subspecies of plant or animal, or in the case of vertebrate species (61 FR 4722: February 7, 1996).

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 nearshore 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 request for rulemaking.

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 petition.

Table 3-1. Abundance, Habitat, and Status of Beaufort Sea Marine Mammals

SPECIES	ABUNDANCE[1]	HABITAT	ESA	IUCN[2]
SEALS				
Ringed seal (Beaufort Sea Stock)	300,000[3]	Landfast (but not bottom fast) and pack ice, open water	Threatened	LC
Bearded seal (Bering and Chukchi Sea)	299,174[4]	Pack ice, open water	Threatened	LC
Spotted seal (eastern and central Bering Sea)	461,625[5]	Pack ice, open water, coastal haulouts	Not listed	DD
Ribbon seal (eastern and central Bering Sea)	184,000	Pack ice, open water	Not listed	DD
WHALES				
Bowhead whale (Bering-Chukchi-Beaufort Stock)	16,820	Pack ice, open water coastal and offshore	Endangered	LC
Gray whale (eastern Pacific population)	20,125	Coastal, lagoons	Not listed	LC
Beluga (Beaufort Sea Stock) Beluga (Eastern Chukchi Stock)	32,453 20,752	Offshore, ice edge, coastal, lagoons	Not listed Not listed	NT NT
Minke whale	Rare/Extralimital	Shelf, coastal	Not listed	LC
Humpback whale (WNP DPS)	Rare/Extralimital	Shelf, coastal	Endangered	EN
Humpback whale (Mex DPS)	Rare/Extralimital	Shelf, coastal	Threatened	NT
Narwhal	Rare/Extralimital	Offshore, ice edge	Not listed	NT
Killer whale	Rare/Extralimital	Variable habitats	Not listed	DD
Harbor Porpoise	Rare/Extralimital[6]	Variable habitats	Not listed	--

[1]Abundance estimates are derived from the following: Givens, Edmondson *et al.* (2016) for bowhead whales, Lowry, Kingsley *et al*. (2017) for the ECS stock of beluga whales; the most recent Stock Assessment Reports (Allen and Angliss 2015, Carretta, Oleson *et al.* 2016, Muto, Helker *et al.* 2017, Muto, Helker *et al.* 2018); and Laake, Punt *et al.* (2012) for gray whales, and are considered minimum estimates unless otherwise noted. Abundance estimates are not provided for species that are rare or extralimital to the Beaufort Sea.

[2]IUCN 2013. IUCN Red List of Threatened Species. Version 2013.1. <www.iucnredlist.org>. Codes for IUCN classifications version 3.1: EN = Endangered; NT = Near Threatened; LC = Least Concern; DD = Data Deficient, and -- = not yet assessed. http://www.iucnredlist.org/apps/redlist/static/categories_criteria_3_1#categories.

[3]The estimate presented in Kelly, Bengtson *et al*. (2010) is based on estimates from surveys by Bengtson, Hiruki-Raring *et al.* (2005) and Frost, Lowry *et al.* (2004) in the late 1990s and 2000. This is likely an underestimate and is based on surveys of a portion of the range and is greater than 8 years old. A reliable minimum population estimate (N_{min}) for the total population in the Alaskan Chukchi and Beaufort Sea regions is not available (Muto, Helker *et al.* 2018).

[4]Reliable abundance estimates are currently not available (Allen and Angliss 2014). Estimates are based on studies by Conn, Ver Hoef *et al.* (2014), using a very limited sub-sample of the data collected from the U.S. portion of the Bering Sea in 2012.

[5] Frequencies of sightings data from the 2007 surveys and information on ice distribution and the timings of seal haulout behavior were analyzed to develop a population estimate in the areas surveyed however, N_{min} cannot presently be determined (Muto, Helker *et al.* 2018).

[6] During the 2017 ASAMM surveys, there were 2 sightings of single harbor porpoises in the central Alaskan Beaufort (sighting number 530 during Flight No. 1 on 19 July; sighting number 993 during Flight No. 40 on 7 October), (Megan Ferguson, NMFS, MML, pers. comm. May 15, 2018).

4. AFFECTED SPECIES STATUS AND DISTRIBUTION

This section provides detailed information on the status, abundance, distribution, and life history of ringed seals, the only marine mammal species under NMFS jurisdiction that is likely to be encountered during the period when ice roads and trails would be constructed, operated and maintained.

4.1. Status

NMFS listed the Arctic subspecies of ringed seals and the Beringia DPS of bearded seals as threatened under the ESA and depleted under the MMPA on December 28, 2012, effective 26 February 2013[8], due to expected impacts on the population from declines in sea and snow cover stemming from climate change within the foreseeable future. In two separate decisions, the U.S. District Court for the District of Alaska vacated the Beringia DPS bearded seal listing and the Arctic subspecies of ringed seal listing (Alaska Oil and Gas Association v. Pritzker, Case No. 4:13-cv-00018-RPB; Alaska Oil and Gas Association v. NMFS, Case No. 4:14-cv-00029-RRB). NMFS appealed both decisions to the Ninth Circuit. On October 24, 2016, the Ninth Circuit reversed the district court's decision with regard to the bearded seal listing. The plaintiffs requested a rehearing by the Ninth Circuit. On February 12, 2018, the 9th Circuit Court of Appeals upheld the listing of ringed seals as threatened under the ESA.

Under the MMPA, NMFS recognizes one stock of Arctic ringed seals, the Alaska stock, in U.S. waters (and the Action Areas). Because of its threatened status under the ESA, this stock is also designated as depleted under the MMPA. As a result, the stock is also considered a strategic stock under the MMPA (Angliss and Outlaw 2005).

4.2. Abundance and Distribution

4.2.1. Abundance

The Alaska stock of ringed seals are the most abundant marine mammal in the Beaufort, Chukchi, and Bering seas (Kelly, Badajos *et al.* 2010, Kelly, Bengtson *et al.* 2010). Currently a complete population estimate is not available for the entire Alaska stock (Allen and Angliss 2014, Muto, Helker *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 2018). 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, Lowry *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.

[8] 77 Federal Register 76706.

Based on the most recent estimates from surveys conducted in the 1990s and 2000s by Bengtson, Hiruki-Raring *et al.* (2005) and Frost, Lowry *et al*. (2004), the total estimated ringed seal population in the Alaska Chukchi and Beaufort seas is at least 300,000 (Kelly, Bengtson *et al.* 2010). 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, Helker *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 (3 m) 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 (see Section 5.1.3, Life History). Therefore, the minimum depth generally recognized as being required by ringed seals for successful lair construction is 10 ft (3 m[9]).

4.2.2. Distribution

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, Helker *et al.* 2017*,* Muto, Helker *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, Blees *et al.* 2008, Smultea, Lomac-McNair *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 shorefast 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, Hiruki-Raring *et al.* 2003*,* Kelly, Badajos *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, Badajos *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, Helker *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, Coltrane *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) as summarized in Section 6.

[9] 79 *FR* 71714, 3 December 2014.

4.3. Life History

The life history stages of ringed seals important for this request 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, *Boreogadus saida*). 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, Bengtson *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 (Kelly 1988), the depth of the water strongly dictates whether ringed seals overwinter in a given area as 10 ft (3 m) is the minimum depth required for successful lair construction (79 *FR* 71714, 3 December 2014). 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, as stated in Section 2.2, 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 (see Section 1.1). 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. An estimate of the number of ringed seals/lairs along the corridors based on previous density estimates is provided in Section 6.

Ringed seals feed year round (NMFS 2018). 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, Frost *et al*. 1980).

4.4. 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[10]. 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 may be modified by the warming climate and projections that suggest continued or accelerated warming in the future (Kelly, Bengtson *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.

[10] 79 FR 71714, 3 December 2014

5. TYPE OF INCIDENTAL TAKE AUTHORIZATION REQUESTED

The MMPA (16 USC 1372 Section 102 (a) prohibits takes of marine mammals by any person or vessel, within certain exceptions, in waters or on lands under U.S. jurisdiction. Certain exceptions under Section 101(a)(5) include the authorization of take incidental to activities other than commercial fishing (see Section 1.2). This section describes the types of incidental take requested by Eni and Hilcorp for ice road and trail activities.

Hilcorp and Eni are petitioning NMFS for regulations pursuant to Section 101(a) (5) (A) of the MMPA, 16 USC Section 1371.101 (a) (5), and 50 CFR Section 216, Subpart I, effective approximately December 2019 through December 2024 to allow the potential incidental taking of small numbers of ringed seals incidental to the proposed activities that would be conducted during ice road/trail construction, operation and maintenance activities each year during this period. While the companies have developed specific ice road mitigation measures to ensure the least practicable impact on ringed seals and their habitat, to be precautionary Hilcorp and Eni are requesting takes as described in more detail in Section 6.

The types of incidental taking[11] requested in this petition for rulemaking include:

- Level B harassment (i.e., behavioral disturbance or temporary [hearing] threshold shift); and
- Serious injury or mortality.

The primary method of incidental take associated with proposed ice road and trail activities would likely be due to behavioral harassment during construction activities as well as low level noise from construction, operation and maintenance equipment described in Section 2. The most likely effects of these early winter activities would be minor, temporary and localized changes in behavior to a small number of adult and subadult ringed seals. The MMPA and its implementing regulations have not provided a clear operational definition of "take by harassment" especially for minor and temporary behavioral disturbance. As a result, there has been much debate concerning how substantial and prolonged a change in behavior must be before it constitutes a "take by harassment". There is general recognition that minor and brief changes in behavior generally do not have biologically significant consequences for marine mammals and do not "rise to the level of taking" (NMFS 2000, NRC 2005). Criteria and procedures for assessing the impact of behavioral disturbance on marine mammals are still being refined (Southall, Bowles *et al.* 2007, Ellison, Southall *et al.* 2012). To be precautionary, Hilcorp and Eni are requesting takes for potential behavioral disturbance as described in detail in Section 6.

The potential for serious injury or mortality of a seal due to ice road/trail construction, operation, and maintenance is low, however does still exist given the potential for seals to occur in the Action Areas. There has been one documented seal mortality associated with vibroseis activities in 1998 (MacLean 1998) and one dead ringed seal pup discovered near Northstar in 1999 whose cause of death could not be determined (Richardson and Williams 2000). Therefore, to be precautionary, Hilcorp and Eni are requesting two takes for serious injury or mortality for each development during each of the five years; this equates to a total of thirty takes over the 5-year period for potential serious injury or mortality (see Section 6).

[11] Level A take associated with auditory injury or permanent threshold shift is not possible from ice road activity (see Section 6.2) and therefore is not part of this request.

6. TAKE ESTIMATES FOR MARINE MAMMALS

Authorization for incidental takes is requested for activities described in Section 2. 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 activities.

6.1. 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 (but not bottomfast) ice during the ice-covered season. During this ice-covered season, ringed seals' home ranges are generally less than 2 mi^2 (5 km^2) in area (Frost, Lowry *et al.* 2002, Kelly, Harding *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.

6.1.1. Ringed Seal Surveys Pre- and Post-Development

Aerial surveys of ringed seals in the central Alaskan Beaufort Sea by Alaska Department of Fish and Game (ADF&G) began in the early 1970s (Burns and Harbo 1972). ADF&G defined an area from Oliktok Point (149º 51' W) to Flaxman Island (146º 03' W), referred to as Sector B3. Sector B3 was sub-divided by ADF&G into an "industrial prospect area" and a "non-industrial area". The industrial prospect area includes the proposed Northstar development area.

Ringed seal surveys became more focused just prior to the development of Northstar in the 1980s and late 1990s. Construction of Seal Island northwest of Prudhoe Bay (70° 29.5 N 148° 41.6 W) occurred during the same time in 1982 when aerial surveys were conducted for ringed seals during seismic exploration east of Prudhoe. Flooding and thickening of the ice road to Seal Island occurred prior to February 21, 1982 while island construction occurred between about February 23 and April 8, 1982 (P. Woodson, Shell Oil Company, personal communication as cited in Frost and Burns (1989). A study around Seal Island found average seal densities of 0.74 seals/km^2 in June 1982, following island construction activities during February-April 1982 (Green and Johnson 1983). Densities averaged 0.66 seals/km^2 in a control area approximately 14 mi (23 km) west of the Seal Island survey grid.

Based on ADF&G surveys, densities of seals on fast ice in Sector B3 varied by about a factor of five over several years. As reported in Link, Olson *et al.* (1999), ringed seal densities reported only in fast ice habitats of Sector B3 1985-87 and 1996-98 ranged from 0.57 to 2.94 seals/km^2. Seals were sighted both at holes and at cracks in the ice. Both the industrial and control areas were in the landfast ice zone, and the density calculations excluded areas of predominantly rough ice, areas inside the barrier islands, and areas with water less than 18 ft (5.5 m) deep (Link, Olson *et al.* 1999).

Site-specific aerial surveys for seals were also conducted during in early June 1999 in landfast ice surrounding Northstar and Liberty offshore oil developments. Liberty is a future oil development located in Foggy Island Bay, 30 mi (48 km) southeast of Northstar. These surveys were designed to assess possible changes in seal density before and after oil development. In the spring of 1997 and 1998, surveys

had been undertaken as reported in (Miller, Elliott *et al.* 1998) (Link, Olson *et al.* 1999) to understand seal densities in the area prior to construction. The 1999 spring survey was intended to provide data on seal use of the area following the first winter of construction of ice roads at Northstar. Liberty is not yet constructed. In 1999, the surveys covered 1,535 mi^2 (3,980 km^2) of fast ice habitat. A total of 1,129 sightings of 2,251 ringed seals were recorded on-transect in fast ice habitat during two survey replicates.

Densities were highest in water depths ranging from 16 to 49 ft (5 to 15 m) (Link, Olson *et al.* 1999). Miller, Elliott *et al.* (1998) also reported the highest ringed seal density in depths of 16 to 33 ft (5 to 10 m) (0.51 seals/km^2) during surveys conducted late May through early June 1997. Similar results were reported by Link, Olson *et al.* (1999) with ringed seal densities for late May 1998, varying significantly with water depth; the highest densities were found in water depths of 33 to 50 ft (10 to 15 m) (0.59 seals/km^2). Areas less than 10 ft (3 m) deep are typically frozen to the bottom by late winter and the remainder of this area has very little water below the ice. While the 1997 and 1998 Northstar seal surveys reported very low densities of ringed seals in areas less than 10 ft deep (Miller, Elliott *et al.* 1998, Link, Olson *et al.* 1999), certain habitat characteristics including cracks or leads with open water may still attract seals to these areas despite shallow average depths. For this reason, and to be precautionary, density estimates for the area around the OPP-SID ice road are the same as estimated for deeper water (i.e., greater than 10 ft).

6.1.2. Winter Densities

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, Quakenbush *et al*. 1986, Frost and Burns 1989). These reports, in addition to data associated with the Northstar development and the abandoned Seal Island (Williams, Coltrane *et al.* 2001, Frost, Lowry *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 6-1).

Table 6-1. Seal Structure Density along the Beaufort Sea Coast Near the Project Area.

Year	Seal Structure Density /km^2	Source
1982	3.6	(Frost and Burns 1989)
1983	0.81	(Kelly, Quakenbush *et al.* 1986)
Dec 1999	0.71	(Williams, Coltrane *et al.* 2001)
May 2000	1.2	(Williams, Coltrane *et al.* 2001)
Average structure density/km^2	**1.58**	

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, Quakenbush *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 2.5 mi (4 km) with numerous breathing holes in between *(*Kelly, Quakenbush *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.

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 166 mi (267 km) of seismic and control lines as well as 17 mi (28 km) of non-systematic search lines (183 linear mi [295 linear km] total). A total of 157 structures were found resulting in an average estimate of 0.53/km seal structures (Kelly, Quakenbush *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 50 mi (81km) 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, Quakenbush *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, Quakenbush *et al*. 1986).

Average ice structure density / Average number of structures per seal = Estimated Average Winter Seal Density

$$1.58 / 2.85 = 0.55 \text{ seals/km}^2$$

6.1.3. Spring Densities

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, Lowry *et al*. 2002, Moulton, Elliott *et al.* 2002, Richardson and Williams 2003) when the greatest percentage of seals have abandoned their lairs and are hauled out on the ice (Kelly, Badajos *et al.* 2010, Kelly, Bengtson *et al.* 2010) (Figure 6-1).

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, Elliott *et al*. 2002, Moulton, Richardson *et al*. 2002), Richardson and Williams 2003). Frost, Lowry *et al.* (2002) and Frost, Lowry *et al.* (2004) reported slightly higher densities based on surveys conducted during this same time period between 1997 and 1999 as shown in Table 6-2. The average uncorrected densities calculated based on these separate datasets (1997 – 1999) are provided in Table 6-2. 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 petition. However, for consistency and as a precautionary measure, the same density estimates are used throughout this petition.

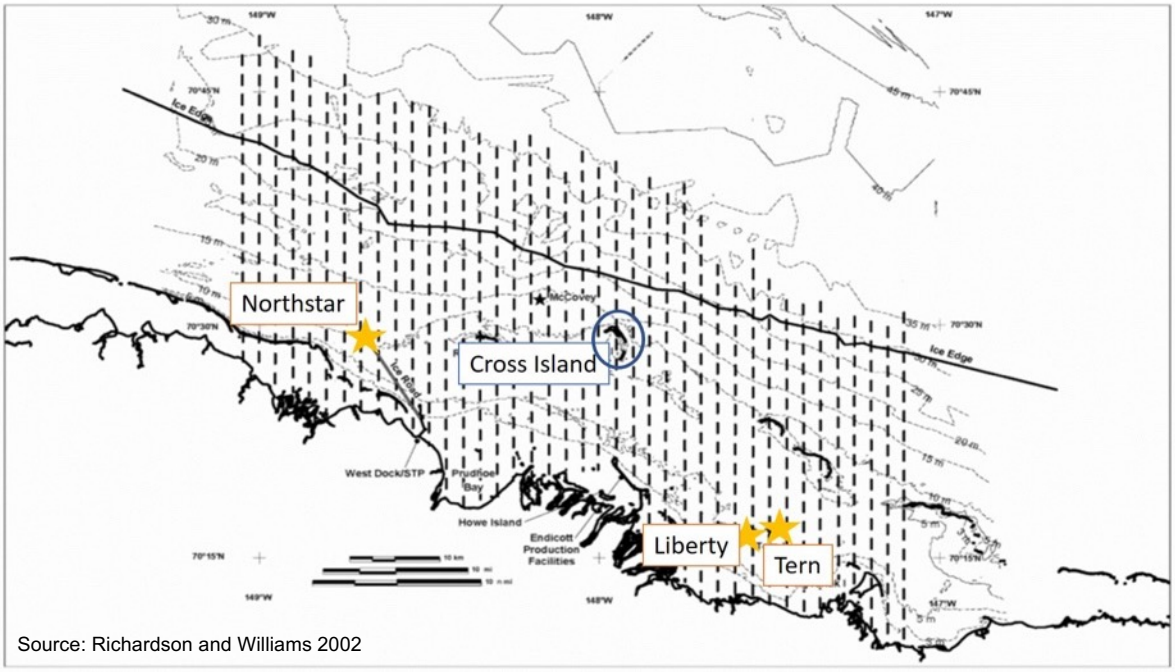


Figure 6-1. Northstar and LPDI Locations in Relation to Aerial Survey May-June 2002

Table 6-2. 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, Richardson *et al.* 2002, 2005***	**Frost, Lowry *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, Richardson *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, Lowry *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, Richardson *et al.* (2003) and Moulton, Richardson *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.

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 6-3.

Table 6-3. Ringed Seal Densities

Species	Winter Average Density (seal/km^2)	Spring Average Density (seal/km^2)
Ringed seals	0.55	0.61

6.2. Sources of Disturbance Due to Human Activity and Noise

The potential sources of disturbance to ringed seals from ice road/trail activities are associated with the physical presence of human activities (i.e., vehicles or equipment) and noise (in ice-covered conditions and in air). Underwater noise in open water conditions is not considered in this petition as those conditions will not occur during the ice road/trail season which occurs approximately December – May.

6.2.1. Disturbance Due to Human Activity

Disturbance of an animal to noise or physical presence of vehicles or equipment does not automatically imply that harassment has occurred. The MMPA and its implementing regulations do not have a clear operational definition of "take by harassment". There is recognition that minor and brief changes in behavior generally do not have biologically significant consequences for marine mammals and do not "rise to the level of taking" (NRC 2005). Also, Southall, Bowles *et al.* (2007) emphasized the need to distinguish minor, short-term changes in behavior with no lasting biological consequences from biologically significant effects on critical life functions such as growth, survival, and reproduction. The biological relevance of a behavioral response to noise exposure depends, at least in part, on how long the response persists. Southall, Bowles *et al.* (2007) noted that "a reaction lasting less than 24 hours is not regarded as particularly severe unless it could directly affect survival or reproduction."

Research from Northstar (Williams, Nations *et al.* 2006) reported that ringed seals exposed to disturbance due to vehicle or human presence maintained breathing holes and lairs for up to 163 days despite the presence of low-frequency industrial noise and vehicular use of ice roads. These structures were established within a few meters of the Northstar Development in the landfast ice before and during construction activities.

Based on these considerations, it is highly unlikely that the potential behavioral effects from this Project would result in anything more than minor, biologically insignificant consequences for any individual animal or for the population. There is compelling evidence that factors other than received sound level,

including the activity state of animals exposed to different sounds, the nature and novelty of a sound, and spatial relations between the sound source and receiving animals (i.e., the exposure context) strongly affect the probability of a behavioral response (Ellison, Southall *et al.* 2012).

The Northstar studies have shown that any disturbance and displacement effects on seals that do occur are subtle and localized (Richardson and Williams 2002, Moulton, Richardson *et al.* 2003, Richardson and Williams 2003, Blackwell, Greene *et al.* 2004, Blackwell, Lawson *et al.* 2004, Williams, Nations *et al*. 2006, Richardson 2008, McDonald, Richardson *et al*. 2012, Richardson and Kim 2015).

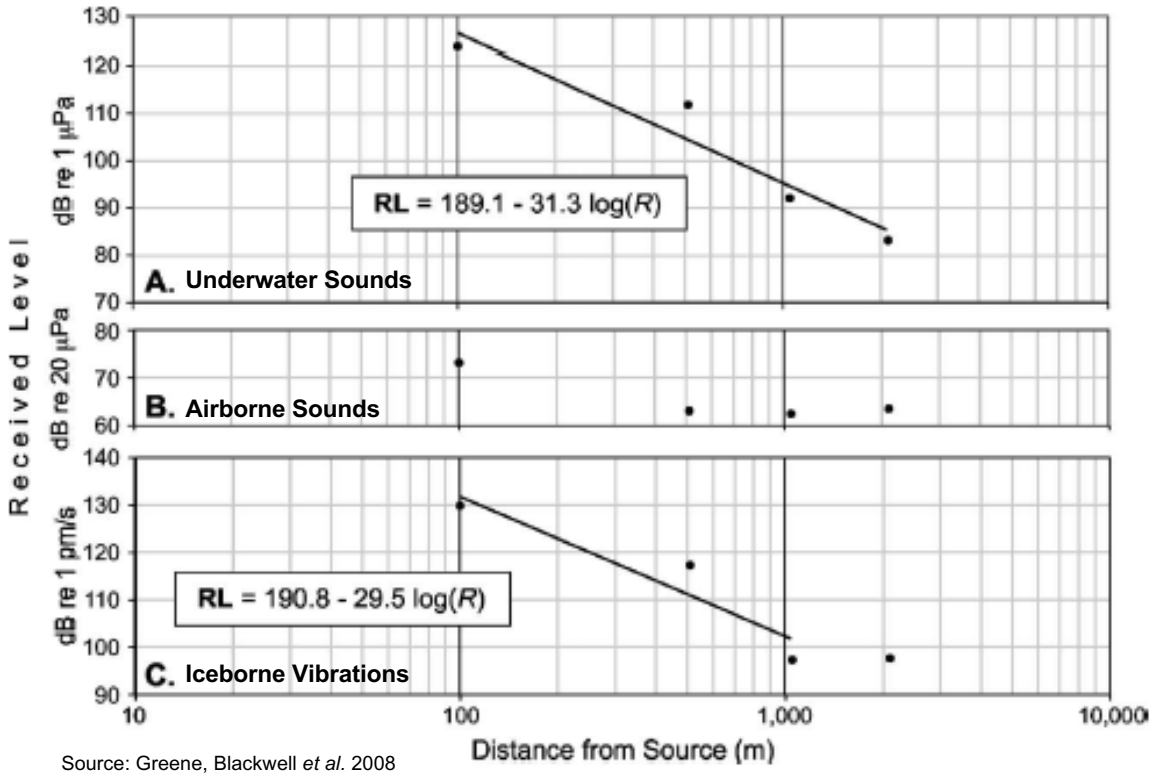
These limited effects have not resulted in any documented biologically significant consequences for individual seals and have had no documented population consequences. However, to be precautionary, Eni and Hilcorp are requesting takes due to the potential for ringed seals to occur in the Action Area.

6.2.2. Disturbance Due to Noise

Historical measurements collected during Northstar construction, and specifically ice road construction, provide an understanding of the potential propagation of noise underwater (in ice conditions) and in air during such activities. As described in Greene, Blackwell *et al.* (2008) underwater and airborne sounds were recorded in sea ice during construction of Northstar February through May 2000. Construction sounds and vibration recorded that are relevant to this petition included ice augering, pumping sea water to flood the ice and build an ice road, a bulldozer plowing snow, a Ditchwitch cutting ice and trucks hauling gravel over the ice road. Recordings were made over a range of distances (approximately 131 to 17,340 ft [40 to 5,300 m]) along transects that extended out across landfast ice from the sound source of interest such as the heavy equipment. Each recording station was about twice as far from the sound source as the previous location but pressure ridges often prevented transects being straight lines. Field recordings during ice road construction were collected between 328 to 6,890 ft (100 to 2,100 m) on February 1st and again February 2nd between 318 to 3,937 feet (97 to 1,200 m). Propagation loss equations for broadband levels of construction sounds are presented in Table 6-4. Based on these measurements, Greene, Blackwell *et al*. (2008) reported received levels of 120 dB re 1 µPa (Level B threshold) for overall ice road construction at approximately 558 ft (170 m) as shown in Figure 6.2.

Table 6-4. Propagation Loss Equations for Sounds Near Northstar Island During Construction in 2000

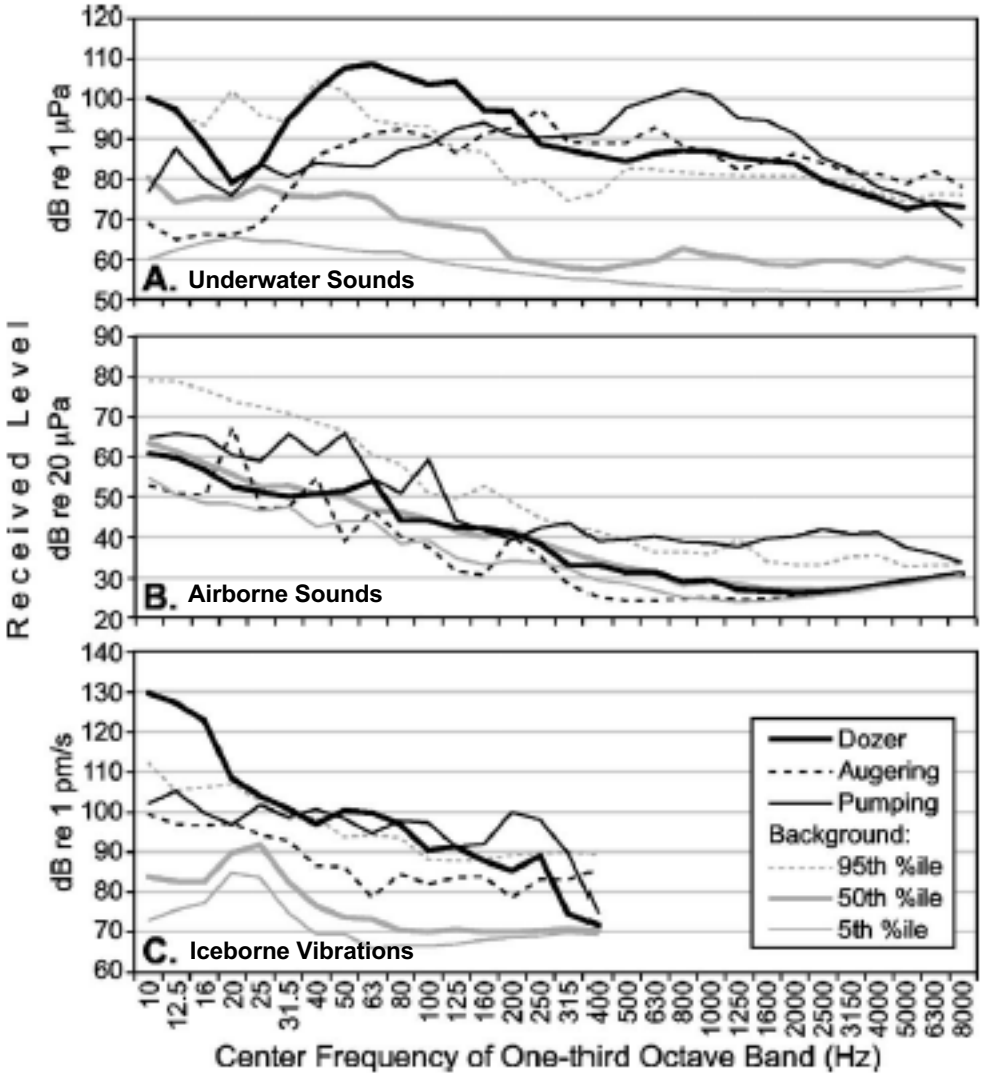
Sound source	Sensor	Equation
Trucks on ice road	Hydrophone	RL=179.1−30.1 log(R)
	Microphone	RL=109.9−21.5 log(R)
	Geophone	RL=164.8−22.8 log(R)
Backhoe digging trench	Hydrophone	RL=177.7−26.4 log(R)
	Geophone	RL=230.1−42.2 log(R)
Ditchwitch sawing ice	Hydrophone	RL=169.6−22.4 log(R)
	Microphone	RL=102.2−13.1 log(R)
	Geophone	RL=159.9−17.9 log(R)



Source: Greene, Blackwell *et al.* 2008

Figure 6-2. Broadband Received Levels vs. Distance for General Ice Road Construction Activities

Background noise recorded during this study ranged from 77 to 116 dB re 1 μPa underwater and 59 to 84 dB re 1 μPa in air for 10 – 10,000 Hertz (Hz) bandwidth; the lowest noise coincided with lowest wind speeds, minimal industrial activity and the greatest recording distances (Greene, Blackwell *et al.* 2008). As shown in Figure 6-2 the highest recorded sound underwater (specific to ice road activities) was 189 dB re 1 μPa (using 31.3 logR) for all ice road activities. The highest recorded sound was associated with the bulldozer. Distance from sound sources was 328 ft (100 m). Item C in Figure 6-3 shows vibrations for each sound source. While Item C shows that vibrations may approach 130 dB, this number is the result of data collected using three recording devices as reported in Table IV of Greene *et al.* (2008). The results for bulldozers from three devices (hydrophone, microphone and geophone) were quite variable and reported as 114.2dB, 64.7dB and 129.8dB respectively. Ice road construction activity was difficult to separate into individual components given that one or more machines may be working at the same time. Other activities including the use of ice augers and pumping also shown in Figure 6-3 and were below 115 dB. Of sounds recorded during the 2000 study, ice road construction produces the least sound both underwater and in air (Greene, Blackwell *et al.* 2008).



Source: Greene, Blackwell *et al.* 2008

Figure 6-3. One-Third Octave Band Levels for Three Activities During Ice Road Construction

6.2.3. 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).

6.3. Take Requests

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 is defined as 558 ft (85 m) on either side of the road/trail centerline; a total width of 558 ft (170 m). This distance is chosen based the information presented in the Greene, Blackwell *et al*. (2008) report described in Section 6.2 and shown in Figure 6-2. It should be noted that the 1999 ringed seal surveys conducted by Dr. Kelly's trained dogs at Northstar located two seal structures within 33-164 ft (10-50 m) of the ice road after it was constructed, indicating that seals may occur in this exposure area despite the activities (Richardson and Williams 2000). Thus, the exposure area calculated using a distance of 558 ft (170 m) is a precautionary approach to calculating potential incidental takes associated with ice road/trail activities.

The total width of the exposure area is 558 ft (170 m) is 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 accounted for in the total area calculated. The total area of exposure is then multiplied by the seasonal ringed seal density (see Section 6.2) 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/trail activity (winter and spring), the exposure estimates for winter and spring are added together to calculate the total number of seals exposed per year. For example, the following calculation was used.

$$TAE \times D = TES$$

$$TES\ (winter) + TES\ (spring) = TEY$$

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:

$$1.26\ km^2\ (TAE) \times 0.55\ (winter\ density\ per\ km^2) = 0.70\ seals/winter$$

$$1.26\ km^2\ (TAE) \times 0.61\ (spring\ density\ per\ km^2) = 0.78\ seals/spring$$

$$0.70\ seals/winter + 0.78\ seals/spring = 1.48\ seals/year$$

As described in Section 1.3.2.2, an ice trail is constructed at SID each year and is located approximately 50-100 feet west of the ice road (see Figure 1-5) which is within the exposure area of the ice road centerline (558 ft; 170 m). Therefore, any exposure of ringed seals to SID ice trail activity is accounted for in this calculation.

Based on the exposure estimates, Eni and Hilcorp request takes for Level B harassment for the 5-year period as shown in Table 6-5. 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 covered in this request.

Table 6-5. 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 Takes Req. Per Year	Total Est. Takes Over 5 Years
Eni SID	6.76	0[3]	7.43	0.17	1.26	0.70	0.78	1.48	2	10
Eni ODS	11.26[4]	0	12.39	0.17	2.11	1.17	1.29	2.46	3	15
Hilcorp Northstar	11.71	8.86	22.63	0.17	3.85	2.13	2.36	4.50	5	25

[1]To account for variability
[2]Density: Winter = 0.55 seals/sq. km; Spring = 0.61 seals/sq. km
[3]Note that Eni constructs an ice trail each year that is approximately 50-100 feet west of the ice road. The trail is located within the exposure area of 558 total feet and is accounted for in estimated takes. Please see Section 1.3.2.2 for additional details.
[4]Length of alternate route used as worst case.

While the only recorded mortality of a seal occurred in 1998[12], to be precautionary, 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. These takes could occur during any year of the 5-year period shown in Tables 6-6 through 6-7 for each company.

Table 6-6. Eni SID and ODS: Total Estimated Ringed Seal Takes Annually and Over the 5-Year Authorization Period

	Eni Total Estimated Takes Per Year	Eni Total Estimated Takes Requested Over 5 Years
Level B	5	25
Serious Injury or Mortality	4[1]	20
TOTAL	9	45

[1] This accounts for the potential for 2 serious injury or mortality takes at each development (SID and ODS).

Table 6-7. Hilcorp Northstar: Total Estimated Ringed Seal Takes Annually and Over the 5-Year Authorization Period

	Hilcorp Total Estimated Takes Per Year	Hilcorp Total Estimated Level B Takes Requested Over 5 Years
Level B	5	25
Serious Injury or Mortality	2	10
TOTAL	7	35

[12]McLean (1988) reported one seal mortality associated with a vibroseis program outside the barrier islands east of Bullen Point in the eastern Beaufort Sea in 1998. While a mortality of a pup was reported during Northstar surveys in 1999 (Richardson and Williams 2000), data are not available to determine the timing or cause of death; therefore, whether the pup's death was associated with ice road activity cannot be determined.

The total number of takes for serious injury or mortality are presented in Table 6-8. The total number of takes requested represents a small portion of the estimated stock abundance (300,000 seals) as shown in Table 6-9.

Table 6-8. Total Estimated Serious Injury/Mortality Takes Requested for Each Development

	Total Serious Injury/Mortality Requested Per Year	Total Estimated Serious Injury/Mortality Takes Over 5 Years
Eni SID	2	10
Eni ODS	2	10
Northstar	2	10
TOTAL	6	30

Table 6-9. Total Estimated Level B and Serious Injury/Mortality Takes as a Portion of Ringed Seal Stock Abundance (300,000 Seals)

	Total Estimated Takes Per Year	Total Estimated Takes Requested Over 5 Years
SID, ODS and Northstar (combined)	16	80
Percentage of Stock (%)	0.0053	0.026

7. ANTICIPATED IMPACT OF THE ACTIVITY ON SPECIES AND STOCKS

The following sections provide information on the types of impacts that could occur to ringed seals as a result of ice road/trail construction, operation and maintenance. For the purposes of this impacts discussion it is assumed that:

- As described in Section 3.2, during winter and early spring ice road/trail activities, ringed seals are the only marine mammal species under the jurisdiction of NMFS that is likely to be encountered;
- All impacts discussed in this petition would occur during the ice road/trail season when ice conditions are safe for travel (approximately early December through mid-May) each year. Importantly, the specific dates for ice road/trail use vary each year due to local conditions.
- As defined in Section 6, the potential exposure zone in which seals might be affected by ice road/trail construction, operation and maintenance is defined as 279 ft (85 m) on either side of the road/trail centerline; a total width of 558 ft (170 m).; and
- Mitigation measures in place at the time of the ice road construction would minimize the likelihood of a take occurring while a seal is in a lair or using a breathing hole (see Section 11).

7.1. Disturbance Reactions

Potential sources of disturbance to marine mammals from ice road/trail 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 2.5 mi^2 (6.6 km^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 0.6 mi (1 km) 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 0.4 mi (0.64km) of ice roads (Richardson and Williams 2000). These six seals were not assumed to be the only seals located within that 0.4 mi (0.64 km) area. Using seal densities in similar water depths

approximately 2.5-6.2 mi (4-10 km) from the ice roads, about 12 ringed seals would be expected to occur within 0.4 mi (0.64 km), and 110 ringed seals within 2.5 mi (4 km), during 1999. Seal behavior within 0-0.4 mi (0-0.64 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, Nations *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 36 ft - 2.1 mi (11 - 3,500 m) of Northstar during surveys conducted in 2001, 118 (65%) were still actively used in late May (the end of ice road season). Mitigation measures proposed in Section 11 are expected to minimize disturbance to seals and have been accounted for in the estimate of takes (see Section 6).

7.1.1. 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 2016) uses marine mammal hearing groups defined by (Southall, Bowles *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, Greene Jr. *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, Suydam *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, Southall *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 2016). Sounds associated with construction of ice roads during Northstar were summarized in Greene, Blackwell *et al*. (2008) (see Section 6.2). 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, Blackwell *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 thresholds for ringed seals. There is no potential for the project activities to result in PTS or a Level A take 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.

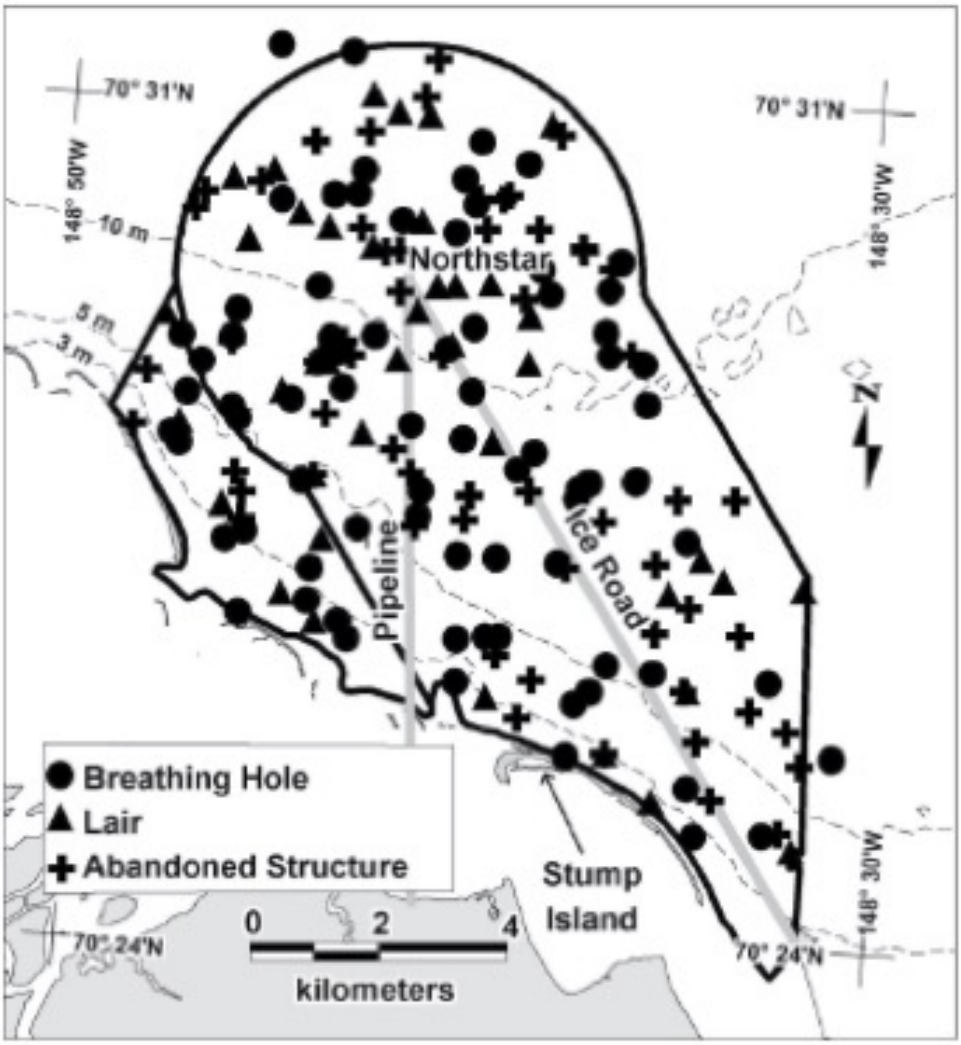
The current interim threshold for Level B harassment (non-impulsive source) is 120 dB re 1 μPa (NMFS 2016). Southall, Bowles *et al.* (2007) assessed relevant studies, found considerable variability among pinnipeds, and determined exposures between approximately 90 and 140 dB generally do not induce 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 328 ft (100 m). At closer distances to the ice road or trail, Level B

thresholds could be exceeded by construction equipment such as a bulldozer. This exposure is considered in the take request presented in Table 6-6. 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, Quakenbush *et al.* (1986) report that some ringed seals temporarily departed their lairs when sound sources were within 0.06 to 1.9 mi (97 to 3,000 m) 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 20µPa, and noted the background noise level was related to wind speed (Greene, Blackwell *et al.* 2008). Similar levels were reported during the winter of 2001 and 2002 by Blackwell, Greene *et al*. (2004) 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 from Northstar in Prudhoe Bay. The NMFS in air threshold for disturbance of phocids (i.e., ringed seals) is 100 dB re 20µPa (NMFS 2016). 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, Nations *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 7-1). 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. As described in Section 11, the companies have committed to beginning ice road construction and activities prior to pupping in March. The exposure to noise has been accounted for in the take request (Table 6-6).



Source: Williams, Nations *et al.* 2006

Figure 7-1. Status and distribution of Ringed Seal Structures as of May 22, 2001 for all Search Periods (Nov/Dec, March, May)

7.1.2. 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 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, Nations *et al.* (2006) reported no widespread evidence that ringed seal use of the landfast ice less than 1.2 mi (2 km) from Northstar or the ice roads was different than their use of the ice 1.2 to 2.2 mi (2 to 3.5 km) 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, Nations *et al.* 2006, Richardson 2008). Any disturbance to ringed seals during the ice road and trail activities would be negligible to the population.

7.2. Small Numbers Consideration

Frost (1985) estimated there to be about 1 to 1.5 million ringed seals in Alaska waters, 250,000 of which were assumed to be in shore-fast ice. The minimum abundance estimate of 300,000 ringed seals (Table 3-1) was presented in Kelly, Bengtson *et al.* (2010) and is based on estimates from surveys by Bengtson, Hiruki-Raring *et al.* (2005) and Frost, Lowry *et al.* (2004) in the late 1990s and 2000. This estimate is considered an underestimate, as it is based on surveys of a portion of the range (the Beaufort surveys were within 40 km of shore and did not include offshore ice), and is more than 8 years old (Muto, Helker *et al.* 2016). It is very consistent with the estimate of Kelly, Bengtson *et al.* (2010) for nearshore waters but does not include the offshore ice where ringed seals are most abundant. Therefore, a reliable estimate of N_{min} for the total population in the Alaska Chukchi and Beaufort Sea regions is not available (Muto, Helker *et al.* 2016).

The projected number of animals that may be taken due to ice road/trail activities would be just under 0.02 percent of the estimated stock and therefore considered "small". It is likely that this calculated estimate of Level B ringed seal "takes", when compared to N_{min} (N_{min} equals the best population estimate for this species [N_{best}]) are inflated. The 300,000 number is used as an estimate of N_{best} recognizing it is an underestimate and results in an over-estimate of the potential percentage of the population that may be affected from disturbance that may result in takes. Even if the total requested number of seals taken by serious injury or mortality occurred (see Table 6-6), the population would not be affected. Therefore, the take levels considered are insignificant, or "small" from a biological perspective, and would have no effect on population recruitment or survival.

7.3. Negligible Impact Considerations

In 1999 NMFS adopted criteria for making a Negligible Impact Determination (NID) for MMPA 101(a)(5)(E) permits[13]. Negligible impact is defined as "an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock

[13] At Federal Register 64 FR 28800

through effects on annual rates of recruitment or survival"[14]. The results of studies of impacts on ringed seals from industrial activities at Northstar, including ice road construction have demonstrated that the potential effects of project construction activities would have only short-term effects on individual seals (Richardson and Thomson 2002, Richardson and Williams 2002, Williams, Nations *et al.* 2006, Richardson 2008, Richardson 2011). Williams, Nations *et al.* (2006) also showed that effects of the Northstar development on the local distribution of ringed seals are small relative to the effects of natural environmental factors. Therefore, the construction of ice roads/trails during this authorization period would not alter recruitment or survival and would result in no more than a negligible effect on ringed seals.

[14] Definition at 50 CFR 216.103

8. ANTICIPATED IMPACTS ON SUBSISTENCE USES

8.1. Subsistence Harvest Areas Potentially Impacted

Nuiqsut is the closest Native Alaskan community to the Northstar, ODS and SID facilities; located approximately 57 mi (91 km) southwest from Northstar, 25 mi (40 km) from ODS, and 35 mi (56 km) from SID (Figure 8-1). Primary subsistence users in the area between Oliktok Point and West Dock are residents from the village of Nuiqsut. People from Utqiagvik (about 192 mi and 164 mi [309 and 264 km] west of Northstar and SID, respectively) and Kaktovik harvest marine mammals that pass through the area but generally do not hunt there. Kaktovik is 122 mi (196 km) east of Northstar and 150 mi (264 km) 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 17 mi (27 km) 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).

8.2. Impacts of the Activities on Subsistence Species and their Availability for Subsistence Use

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 1-4 through 1-7. 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 petition negligible to no impact on winter subsistence hunting of ringed seals.

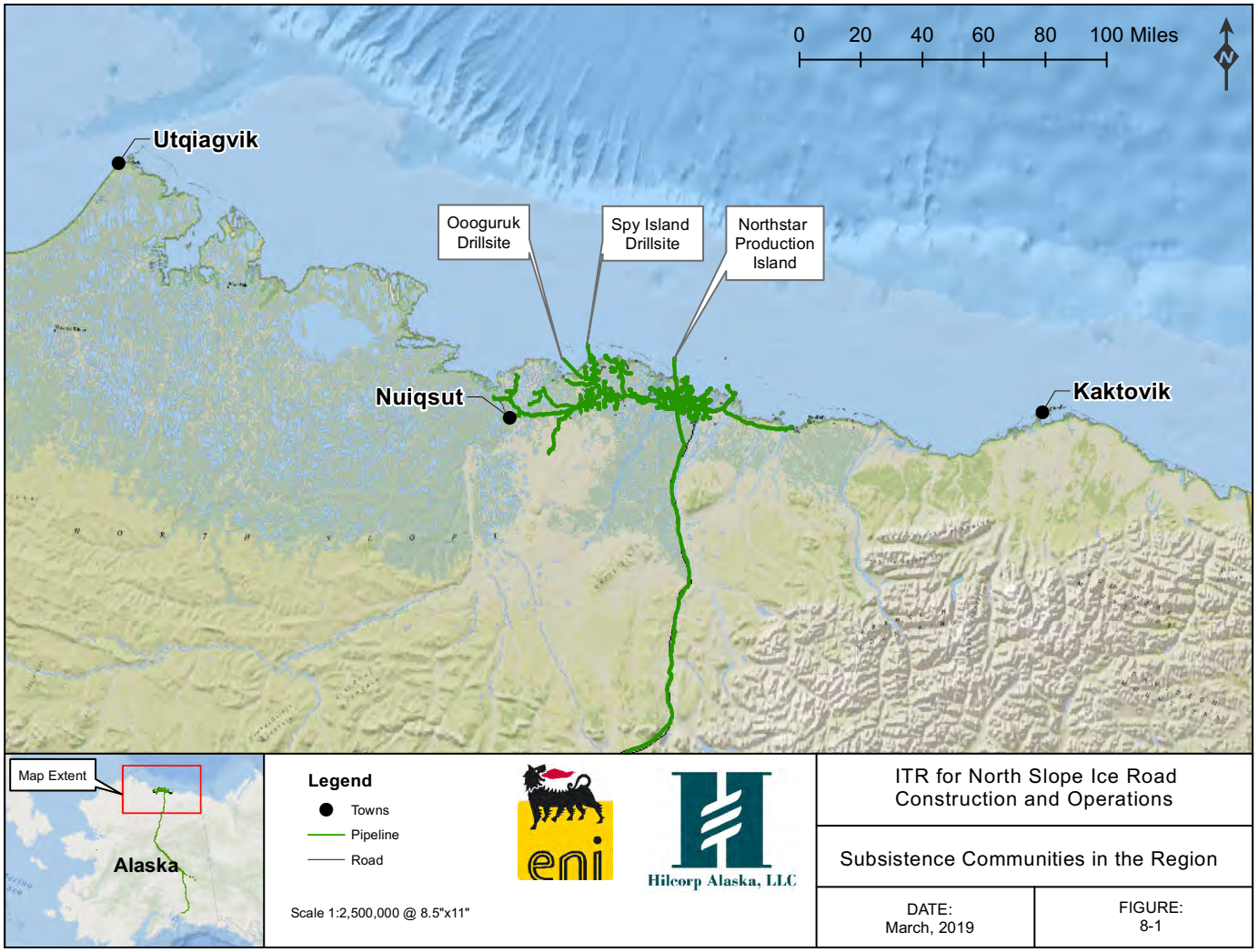


Figure 8-1. Subsistence Communities in the Region

9. ANTICIPATED IMPACTS ON 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 10 ft (3 m) are typically the minimum depth required for successful lair construction (79 FR 71714, 3 December 2014) although more shallow areas with open leads or cracks can be attractive to seals as described for the road between OPP and SID (see Section 1).

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.

9.1. Impacts to Ringed Seal Critical Habitat

NMFS proposed rule designating critical habitat for ringed seals[15] identified three physical and biological features (PBFs) essential to the conservation of the species including:

1. 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 6.5 ft (2 m) deep, or dense, stable pack ice, that has undergone deformation and contains snowdrifts at least 21 in. (54 cm) deep;
2. 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 6.5 ft deep; and
3. 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. In order to avoid ringed seal critical habitat to the maximum extent possible and to reduce the taking of ringed seals to the lowest level practicable, Hilcorp and Eni have developed specific ice road mitigation measures (see Chapter 11) which will ensure the least practicable impact on ringed seals and their habitat.

[15] 79 FR 71714, 3 December 2014.

10. ANTICIPATED EFFECTS OF HABITAT IMPACTS ON MARINE MAMMALS

The small area of ringed seal habitat potentially impacted by the ice roads and trails addressed in this petition is not likely to have any effects on overall marine mammal use of the region. Northstar, ODS and SID ice roads/trails cover approximately 3.25 mi^2 (8.44 km^2) spread over three locations along the coast. With the exception of the open lead that has developed each year, the ice road between OPP and SID is generally not suitable habitat for ringed seals because it is too shallow. While ODS is located in an area of bottomfast ice where interactions with ringed seal are unlikely, Eni has requested takes for the period 2019-2024 to be precautionary.

The ice road to Northstar does extend into waters suitable for overwintering by ringed seals. However, the amount of habitat altered by Northstar ice road construction is minimal compared to the overall habitat available in the region. The evidence presented in Williams, Nations *et al*. (2006) that ringed seal use of landfast ice near Northstar did not appear to be much different than that of ice 1.24 to 2.12 mi (2–3.5 km) away, and other studies summarized in Sections 6 and 7, have shown that densities of ringed seals on the ice near Northstar during late spring are similar to those elsewhere in the region (Moulton, Richardson *et al.* 2002, Moulton, Richardson *et al.* 2005). Ringed seals use multiple breathing holes (Kelly and Quakenbush 1990) and are not expected to be adversely affected by the construction of the ice road. Ice road and trail construction is not expected to have long-term impacts on seal habitat as benthic organisms and fish that could be prey for the seals would not be affected by surface ice clearing and flooding. As a result, ice road and trail construction is not expected to have long-term impacts on seal habitat, prey or habitat for their prey.

11.MITIGATION MEASURES

Figure 11-1. Adult Ringed Seal

Hilcorp and Eni perform ice road and ice trail construction in accordance with the best guidance available to avoid and minimize (to the greatest extent possible) impacts on the environment, species protected under the MMPA and ESA, and designated critical habitats. In order to avoid ringed seal breathing holes and lairs, and to reduce the taking of ringed seals to the lowest level practicable, the following specific ice road mitigation measures (also referred to as BMPs) will ensure the least practicable impact on ringed seals (Figures 11-1 and 11-2) and their habitat. These measures are proposed for the construction and maintenance of sea ice roads and sea ice trails in areas where water depth is greater than 10 feet (ft) (the minimum depth required to establish ringed seal lairs) as well as any open leads in the sea ice requiring a temporary bridge during the ice road season. While the location of ODS has water depths considered unsuitable for ringed seals, to be precautionary and due potential changes in ice conditions and ringed seal habitat, Eni is including the ODS in this petition to ensure compliance with the MMPA. Ice road and ice trail activities are described in Section 1.3. These measures were developed through close coordination with NMFS OPR and AKR. In a letter to Eni dated October 11, 2018, NMFS confirmed agreement with implementation of the measures described in this Section as well as monitoring and reporting described in Section 13 and Appendix A.

Mitigation measures include consideration of the following factors: 1) the degree to which the successful implementation of the measure is expected to minimize adverse impacts to ringed seals and other marine mammals, as necessary; 2) the proven efficacy of the specific measure to minimize adverse impacts as planned based on monitoring plans from previous, similar activities; and 3) the practicability of the measure for implementation. Based on these factors, the mitigation measures together with monitoring described in Section 13 (see also Appendix A) accomplish the following objectives:

- Avoid or minimize serious injury to or death of ringed seals;
- Minimize the likelihood that impacts would occur to the species, stocks and subsistence use of ringed seals that might occur along the ice roads/trails in Action Areas;
- Shut down and/or monitor activities when seals are observed in or approaching a monitoring zone defined as 150 ft (46 m) on either side of the centerline of the road/trail (i.e., 300 ft total width);
- Avoid overlap of ice road/trail activities with traditional subsistence hunting locations and events; and
- Quantify and potentially reduce the number of marine mammals exposed to or taken by harassment (Level B).

While the exposure area used to calculate potential takes is a total width of 558 ft (170m) from the centerline of the road (see Section 6.3), the monitoring zone of 150 ft is a reasonable distance within

which ringed seals or structures may be observed given the winter conditions. The mitigation measures are organized into the following categories: 1) Wildlife Training; 2) General Mitigation Measures (implemented throughout the ice road/trail season generally December through May); 3) mitigation measures to be implemented after March 1st; and 4) Reporting Requirements.

11.1. Wildlife Training

Prior to initiation of sea ice road and trail construction activities, project personnel associated with ice road construction, maintenance, or use (i.e., construction workers, surveyors, vehicle operators, security personnel, and the environmental team) will receive annual training[16] on seal avoidance mitigation measures (BMPs) that is appropriate for the work that they will perform. The annual training for all such personnel will include reviewing applicable portions of the company's Wildlife Interaction Plan[17], which include the following measures:

- Approaching or interacting with any wildlife is prohibited.
- When traveling the ice road, follow directions of Security and posted signs.
- Notifications required if a seal is observed within 150 ft (46 m) of the ice road centerline.
- Stay in the vehicle and continue safely on if a seal is observed near the road.

In addition to company-specific information and review of the BMPs, additional wildlife training for personnel involved in ice road construction/maintenance or seal monitoring will include:

- How to identify ringed seal adults and pups (see Figures 11-1 and 11-2);
- Seal life history;
- Habitat and diet;
- Presence in project area;
- Importance of lairs, breathing holes and basking;
- Potential effects of disturbance; and
- Applicable laws and regulatory requirements.

Figure 11-2. Ringed Seal Pup

11.2. General Mitigation Measures

These mitigation measures will be followed throughout the ice road/trail season. They are based on the following assumptions:

- Ice road/trail construction occurs from approximately December 1st to mid-February (or as soon as sea ice conditions allow safe access and permit such activity);
- Operations and maintenance generally occur from approximately mid-February through mid- to late May. Ringed seals begin to establish lairs in late March. Therefore, NMFS is requiring that ice road construction be initiated no later than March 1st to reduce the potential for disturbance to ringed seal birth lairs or dens; and

[16] Training rosters can be made available to audit if requested.
[17] May also be referred to as a Wildlife Management Plan.

- Disturbance associated with construction prior to March 1st is believed to prevent pregnant seals from establishing lairs in the disturbed areas.

Winter sea ice road/trail construction and use will begin prior to March 1st of each year (typically December through mid-February), which is before female ringed seals establish birthing lairs. Initiating on-ice activities early allows ringed seals to establish breathing holes and birthing lairs in undisturbed areas. Prior to establishing lairs, ringed seals are mobile and are expected to avoid the ice roads/trails and construction activities.

The following mitigation measures will be implemented throughout the entire ice road/trail season, including during construction, maintenance, active daily use[18], 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[19] 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 may also be used to mark the centerline of the roadway.
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. Personnel will be instructed that approaching or interacting with ringed seals is prohibited.
5. If they encounter a ringed seal while driving on the road, personnel will be instructed to remain in the vehicle and safely continue.
6. If a ringed seal is observed within 150 ft (46 m) of the center of an ice road or trail, the company's Security personnel or staff member who observed the seal contacts the Environmental Specialist in accordance with the Wildlife Management Plan with the information requested in Section 13.3 *Data Collection*. The location of the seal will be physically marked with a visible marker while maintaining a distance of at least 50 ft (15 m) from the seal.
    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 150 ft away from the center of the road/trail or is no longer observed.

[18] There are periods during which ice road travel does not occur. During these periods, no activity would occur along the road and therefore, implementation of measures would not be necessary.
[19] The interval between delineators is specific to existing ice road safety measures and relates to how drivers assess and report weather and roadway conditions.

c. The Environmental Specialist or designated person will contact appropriate state and federal agencies as required[20] (see company-specific Wildlife Plans for notification details).

Other on-ice activities occurring prior to March 1st could include spill training exercises, pipeline surveys, snow clearing, and work conducted by vehicles such as PistenBullys®, snow machines, or rolligons. Prior to March 1st, these activities could occur outside of the delineated ice road/trail and shoulder areas. Also, during this period all general mitigation measures will be implemented.

11.3. Mitigation Measures After March 1st

After March 1st and continuing until decommissioning of ice roads/trails in late May or early June, on-ice activities can occur anywhere on sea ice where water depth is less than 10 ft (3 m) (i.e., habitat is not suitable for ringed seal lairs and breathing holes). However, after March 1st on those sections of the ice roads or tails where water depth is greater than 10 ft, all activities must occur within the boundaries of the driving lane or shoulder area of the ice road/trail (see Figure 1-8) and other previously disturbed areas (e.g., spill and emergency response areas, snow push areas), as long as personnel safety is ensured.

In addition to the general BMPs, the following BMPs will also be implemented after March 1st:

1. 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. Equipment travel will be limited to within the driving lane and shoulder areas to the extent practicable and when safety of personnel can be ensured.
2. 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 may be plowed or blown from the ice road surface.
3. In the event snow is accumulating on a road within a 150 ft (46 m) 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 150 ft of identified seals or within 500 ft[21] (152 m) of known seal lairs.
4. Tracked vehicle operation will be limited to the previously disturbed ice trail areas to the extent practicable and when safety of personnel can be ensured. 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 150 ft (46 m) during ice testing and new trail construction. Any observed ringed seal structures will be reported as described in Sections 13.3 and 13.4. 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.

[20] As detailed in the Wildlife Management Plan.
[21] These are the Action Areas as defined in Section 1.3.1.

12. MITIGATION MEASURES TO PROTECT SUBSISTENCE USES

12.1. Subsistence Hunting of Ringed Seals in the Region

The two communities closest to the Action Area that hunt ringed seals are Utqiagvik and Nuiqsut. A report published in 2016 by the Ice Seal Committee (2016), acknowledged that while data collection (using household surveys) on ice seal harvest on the North Slope has been consistent since 1994, these data have not been compiled. According to the 2016 report, based on limited household surveys, 25 ringed seals were harvested by Nuiqsut hunters in 2000 and 413 ringed seals by Utqiagvik hunters in 2003, the most recent data available for these communities.

As described below, Hilcorp and Eni have a history of engaging Utqiagvik and Nuiqsut to share information about planned exploration/development activities and to maintain dialogue about measures to minimize potential impacts on the subsistence harvest of seals or whales.

12.2. Hilcorp

To help minimize disturbances to marine mammal subsistence resources, Hilcorp has signed a Conflict Avoidance Agreement (CAA) with the Alaska Eskimo Whaling Commission (AEWC) and Whaling Captains' Associations of nearby North Slope communities. The CAA describes measures to minimize any adverse effects on the availability of bowhead whales for subsistence use. Hilcorp also conducts the Cross Island whaling survey every year to document any conflicts and ensure that operations continue to be compatible with the hunt.

The CAA and much of the coordination focus on whales and whaling activities. To date, the Native community has not expressed concerns over interactions with seals, particularly during the ice-covered seasons. However, Hilcorp will continue to address questions and concerns from community members, and continue to provide them with contact information of project management to which they can direct concerns related to Northstar operations.

In addition, Hilcorp has adopted the "Good Neighbor Policy" originally put in place for Northstar by BPXA. The policy is a commitment to the eleven whaling villages, the Inupiat Community and the Siberian Yupik Community to establish financial assurance in the event of an oil spill. While the focus is on bowhead whales, the policy does include other Arctic marine resources including ringed seals. The Good Neighbor Policy also outlines how Hilcorp would provide transportation for the subsistence community to alternate hunting areas in the event that a spill prevents the use of Cross Island or other hunting areas. It also has provisions for providing interim alternative food supplies to community members, along with counselling and cultural assistance. Hilcorp is committed to adhering to the CAA and Good Neighbor Policy for the duration of North Slope operations as necessary.

12.3. Eni

To help minimize disturbances to marine mammal subsistence resources, Eni also signs a CAA each year with the AEWC and Whaling Captains' Associations of nearby North Slope communities. The CAA describes measures to minimize any adverse effects on the availability of bowhead whales for subsistence use. Eni's stakeholder engagement plan establishes strong and positive relationships in those communities (Nuiqsut and Utqiagvik) potentially affected by the company's activities. Community meetings and

meetings with subsistence organizations such as the AEWC and NWCA help to establish and maintain positive relationships with locals that rely on subsistence resources in the area. Eni recognizes its stakeholders need to be informed at all phases of Eni's projects (Nikaitchuq and Nikaitchuq North) including details about potential effects to their communities and the schedule of activities. Eni's engagement activities are based on company values and the intention to maintain an open and transparent process will all stakeholders throughout projects and related activities.

13.MONITORING AND REPORTING

The following monitoring and reporting activities will be implemented by Eni and Hilcorp, along with the mitigation measures described in Section 11, to avoid and minimize potential impacts to ringed seals during ice road/trail construction, operation and maintenance each year. See also Appendix A.

13.1. Ringed Seal Surveys

If an ice road or trail is being actively used[22], a dedicated observer will conduct a survey along the sea ice road/trail during daylight conditions with good visibility to observe if any ringed seals are within 500 ft (152 m) of the roadway corridor. These protocols will be followed:

1. Surveys will be conducted every other day during daylight hours. Survey protocol consists of driving the ice road every six hours and stopping every ½ mile to observe the exposure area for approximately 5 minutes on either side of the corridor to check for the presence of seals.
2. Observers for ice road activities need not be trained Protected Species Observers (PSOs), but they must have received the training described in Section 11 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.
3. When performing observations, observers will have no other primary duty than to watch for and report observations related to ringed seals during this survey. If the observer is driving a vehicle, then the survey must be performed when the driver stops, at periodic intervals sufficient to complete a thorough assessment of the area, given visibility conditions. If weather conditions become unsafe, the monitoring activity will be discontinued.

13.2. Communication and Monitoring Procedures for Seal and Seal Structure Sightings

If a ringed seal or seal structure (i.e., breathing hole or lair) is observed within 150 ft (46 m) of the centerline of the ice road/trail, the location of the structure will be reported to the Environmental Specialist[23], who will then relay the sighting location information to all ice road personnel. In addition, the company's office personnel responsible for wildlife interaction will be notified following protocols described in each company's specific Wildlife Interaction Plan and as described in Section 13.4 *Reporting*. The following procedures will be followed, consistent with the BMPs:

1. Construction, maintenance or decommissioning activities associated with ice roads and trails will not occur within 150 ft (46 m) of the observed ringed seal, but may proceed as soon as the animal moves on its own more than 150 ft (46 m) 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.

[22] Any days when there is no traffic on an ice road, monitoring for ringed seals will not occur in order to minimize potential for interactions with seals.
[23] Also referred to as an Environmental Advisor in Wildlife Management / Interaction Plans.

2. As soon as practicable after the initial sighting, the Environmental Specialist or designated person will observe the ringed seal for approximately 15 minutes to document the animal's location relative to the road/trail. All work that is occurring and the behavior of the seal during this observation period will be documented until the animal moves more than 150 ft (46 m) from the center of the road/trail or is no longer observed. If the seal remains in the area after the 15-minute observation period, monitoring will continue every six hours during daylight conditions as described in Section 13.1.
3. If a ringed seal structure (i.e., breathing hole or lair) is observed within 150 ft (46 m) of the ice road/trail, the location of the structure will be reported to the Environmental Specialist who will then carry out notification protocol described above and in Section 13.4.
    a. The seal structure will be physically marked with a visible marker while maintaining a distance of at least 50 ft (15 m).
    b. Monitoring will continue every six hours during daylight conditions on the day of the initial sighting to determine whether a ringed seal is present. Monitoring will consist of observing the structure from a distance of at least 150 ft for approximately 15 minutes each time. After the first 24 hours, monitoring for the seal will occur every other day the ice road/trail 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.
    c. During this monitoring period, maintenance work will proceed cautiously as to minimize impacts or disturbance to area.

13.3. Data Collection

The Environment Specialist, or designated person, will record the following information during survey efforts and sighting events:

1. The date and start/stop time for each survey including effort in total number of hours of observation. This will include a summary of environmental conditions such as visibility that can affect ringed seal or lair detection;
2. Date and time of each significant event (e.g., seal or seal structure sighting) and subsequent monitoring;
3. Date, time, and duration for each sighting event;
4. Number of animals per sighting event; and number of adults/juveniles/pups per sighting event;
5. Primary, and, if observed, secondary behaviors of seals in each sighting event;
6. Geographic coordinates for the observed animals or structure (breathing hole or lair), with the position recorded by using the most precise coordinates practicable (coordinates must be recorded in decimal degrees, or similar standard, and defined coordinate system); and
7. Mitigation measures implemented to minimize impacts.

13.4. Reporting

Hilcorp and Eni propose to each submit an annual monitoring report after the end of the ice road/trail season to summarize the activities during ice road construction, maintenance, use and decommissioning that occurred approximately December through May of that year. Records associated with any ringed seal observations and monitoring will be transmitted to NMFS prior to each subsequent ice road/trail season (i.e., generally by late summer, prior to the subsequent ice road/trail season).

If a specific mitigation or monitoring measure is implemented during the ice road/trail activities (e.g., a breathing hole is monitored for seal presence), then a preliminary report of the activity will be submitted within 14 days after the cessation of that activity.

If a seal is observed within 150 ft (46 m) of the roadway during ice road/trail activities, then notification to the Environmental Specialist and other staff and agency personnel will be undertaken as described above.

13.4.1. Annual Monitoring Report

Annual and final reports will be submitted via electronic mail to Greg Balogh, NMFS AKR Protected Resources Division Supervisor, at Greg.Balogh@noaa.gov and OPR, Permits and Conservation Division, NMFS, Gray Redding, at Gray.Redding@noaa.gov.

Digital, queryable documents containing all observations and records, and digital, queryable reports will be submitted to: NMFS AKR Protected Resources Division Supervisor, Greg Balogh, at greg.balogh@noaa.gov and to OPR, Permits and Conservation Division, NMFS, and Gray Redding, at Gray.Redding@noaa.gov. In the event that this contact information becomes obsolete, call 907-271-5006 for updated reporting contact information.

13.4.2. Reporting of Unforeseen Events

In the unanticipated event that the specified activities along the ice road construction clearly causes the take of a marine mammal in a manner prohibited by the LOA, such as an unforeseen injury or mortality to a pinniped, the observer will report the incident to the Environmental Specialist, in accordance with their Wildlife Interaction/Management Plan, who would then relay that information to the OPR, Permits and Conservation Division, NMFS , and NMFS AKR Protected Resources Division (contact information provided above). This communication would occur as soon as practicable. A report documenting the incident would include:

- Time, date, and location (latitude/longitude) of the incident;
- Description of the incident;
- Water depth;
- Environmental conditions (e.g., wind speed and direction, and visibility);
- Species identification or description of the animal(s) involved;
- Fate of the animal(s); and
- Photographs or video footage of the animal(s) (if equipment is available).

In the event that an observer discovers an injured or dead marine mammal, the cause of the injury or death is unknown, and the death is relatively recent (i.e., in less than a moderate state of decomposition), the incident would be reported to the OPR, Chief of the Permits and Conservation Division, NMFS in Silver Spring, Maryland (301-427-8401) and the Marine Mammal Network Alaska Stranding Coordinator in Alaska (Phone number 1-877-925-7773 or 1-877-9-AKR-PRD), as soon as practicably possible. The report would include the same information identified in the paragraph above. Activities would be allowed to continue while NMFS reviews the circumstances of the incident. NMFS would work with Hilcorp or Eni to determine whether modifications in the activities are appropriate.

Under such circumstances that the injury or death is not associated with or related to the activities authorized in the LOA (e.g., previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), the incident would be reported to the OPR, Chief of the Permits and Conservation Division, NMFS or by email to the Alaska Stranding Coordinator within 24 hours of the discovery. Photographs, video footage (if available), and any other documentation of the stranded animal sighting will be provided to NMFS and the Marine Mammal Stranding Network.

A Marine Mammal Monitoring and Mitigation Plan (4MP) containing the elements from Sections 11 and 13 of the ITR petition is provided as a standalone document in Appendix A.

14.SUGGESTED MEANS OF COORDINATION

The MMPA encourages the coordination of research and data sharing related to marine mammal research, mitigation and monitoring programs. The results of these efforts will be incorporated into subsequent authorizations and industry activities in order to reduce the potential for incidental takes of ringed seals. Previous marine mammal monitoring programs described in Section 6 for the open-water and ice-covered seasons during operation of Northstar were coordinated between BPXA and other entities including BOEM (formerly MMS), NMFS, ADF&G, University of Alaska, and other groups conducting related research. Hilcorp and Eni would continue to work with any number of external entities, including federal and state agencies, universities, and Non-Governmental Organizations (NGOs) in their efforts to manage, understand, and communicate information about potential impacts related to ice road/trail activities as related to ringed seals.

Data collected during monitoring programs would help improve understanding of the impacts on ringed seal distributions and behavior during ice road and trail construction, operation and maintenance. Hilcorp and Eni would coordinate any data sharing with other research entities or industry in the region to contribute to a broader regional understanding of potential effects of ice roads/trails on ringed seal ecology.

During the authorization period for the 5-year LOA, Hilcorp and Eni would provide copies of monitoring reports to any interested parties including federal and state agencies, North Slope Borough, Alaska Eskimo Whaling Commission, or Marine Mammal Commission for their review. Substantive comments received would be reviewed and consideration of existing mitigation and monitoring measures would be undertaken in light of relevant information or new research provided.

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APPENDIX A

MARINE MAMMAL MONITORING AND MITIGATION PLAN

Marine Mammal Monitoring and Mitigation Plan for Joint Incidental Take Request for Alaska North Slope Ice Road and Trail Activities

May 2019

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ACRONYMS AND ABBREVIATIONS

AKR ..... Alaska Regional Office
BMP ..... Best Management Practice
CFR ..... Code of Federal Regulations
ESA ..... Endangered Species Act
Eni ..... Eni US Operating Co. Inc.
ft ..... feet
GPS ..... Global Positioning System
Hilcorp ..... Hilcorp Alaska, LLC
ITA ..... Incidental Take Authorization
km ..... kilometers
km^2 ..... square kilometers
LOA ..... Letter of Authorization
m ..... meters
mi ..... miles
mi^2 ..... square miles
MMPA ..... Marine Mammal Protection Act
NMFS ..... National Marine Fisheries Service
ODS ..... Oooguruk Drill Site
OPP ..... Oliktok Production Pad
OPR ..... Office of Protected Resources
SID ..... Spy Island Drillsite
U.S. ..... United States

1. INTRODUCTION

Hilcorp Alaska, LLC (Hilcorp) and Eni Petroleum Co., Inc. (Eni) have submitted a request to the National Marine Fisheries Service (NMFS), Office of Protected Resources (OPR), to develop regulations and issue 5-year Letters of Authorization (LOAs) under the Marine Mammal Protection Act (MMPA), Section 101(a)(5)(A), effective approximately December 2019, allowing potential incidental taking of small numbers of ringed seals (*Phoca hispida*) during construction, maintenance and operation of ice roads and trails on Alaska's North Slope for the 5-year period 2019-2024. Ringed seals are resident in the Beaufort Sea, and during the ice-covered season from approximately early December through early July, they are the only marine mammal species under the jurisdiction of NMFS that is likely to be encountered during these activites.

A sea ice road is defined as a route across the sea ice created by clearing and grading snow and then pumping seawater through drilled holes in the ice until the desired thickness is achieved. The top layer is often strengthened by a fresh water cap of ice. The ice road corridors (disturbed area) generally range between 160 to 200 feet (ft) (49 to 61 meters [m]) wide, consisting of a 60 to 100 ft (18 to 30 m) roadway with 50 to 60 ft (15 to 18 m) shoulders on each side. Delineators are used to mark the roadway at set intervals. These improved ice roads can be used by trucks, vans, and any other wheeled vehicles.

A sea ice trail is a route across sea ice created, used and maintained by equipment such as Tuckers, PistenBullys, snow machines or similar tracked equipment. These roads cannot be used by regular wheeled vehicles. Sea ice trails do not require seawater flooding and the width of the disturbed area is similar to or may be more narrow than for ice roads.

Ice roads for offshore access to North Slope facilities are typically constructed beginning in late December or January and are used through approximately mid-May, depending on weather. All ice road and trail construction by both Hilcorp and Eni would be initiated prior to March 1st to minimize potential impacts to ringed seals. Specific details regarding each company's ice roads are provided in Section 1.2.

1.1. Purpose of the Plan

In order to issue an LOA for an activity, Section 101(a)(5) of the MMPA states that NMFS must set forth "requirements pertaining to the monitoring and reporting of such taking." This marine mammal mitigation and monitoring plan (4MP) is a component of the request for rulemaking.

The MMPA implementing regulations at 50 CFR 216.104 (a)(13) indicate that requests for Incidental Take Authorizations (ITAs) must include the suggested means of accomplishing the necessary monitoring and reporting that would result in an increased knowledge of the species and the level of taking or impacts on populations of marine mammals that are expected to be present in the Action Area.

Hilcorp and Eni recognize that monitoring requirements should be designed to improve the understanding of one or more of the following:

- Occurrence of marine mammal species in the Action Area (e.g., presence, abundance, distribution, density);
- Nature, scope, or context of likely marine mammal exposure to potential stressors/impacts (individual or cumulative, acute or chronic), through better understanding of: 1) action or

environment; 2) affected species (e.g., life history, dive patterns); 3) co-occurrence of marine mammal species with the action; or 4) biological or behavioral context of exposure (e.g., age, birthing or foraging areas);

- Individual responses to acute stressors, or impacts of chronic exposures (behavioral or physiological);
- How anticipated responses to stressors impact either: 1) long-term fitness and survival of an individual; or 2) population, species, or stock;
- Effects on marine mammal habitat and resultant impacts to marine mammals; and
- Mitigation and monitoring effectiveness.

In keeping with guidance provided by NMFS, Hilcorp and Eni have considered a number of monitoring and reporting opportunities that could contribute to the collective knowledge of the ringed seals and their habitat during the ice-covered season. However, during construction and maintenance of the ice roads, the potential to conduct meaningful research on potential impacts of these activities on ringed seals is limited for two reasons: 1) low densities and overall small numbers of ringed seals are anticipated to be in the region during ice-covered conditions; and 2) portions of the Action Areas are unsuitable for ringed seal lairs due to shallow depth or bottomfast ice. Generally, ringed seals require water greater than 10 ft (3 m) in depth sufficient to allow underwater access to lairs and breathing holes.

1.2. Project Location and Description of Activities

Seasonal ice roads and trails are required to operate facilities at Northstar Island for Hilcorp, and at the Spy Island Drillsite (SID) and Oooguruk Drillsite (ODS) for Eni. The locations of these facilities in the Beaufort Sea are shown on Figure 1-1. Additional details on ice roads and trails constructed and maintained at the Northstar, SID and ODS facilities can be found is Sections 1.3 and 2.1 of the ITR petition.

Northstar, an artificial gravel island, is located in State of Alaska coastal waters about 6 miles (mi) (9.7 kilometers [km]) offshore from Point Storkersen in the Beaufort Sea (see Figures 1-1 and 1-2). Each year during the ice-covered season an approximately 7.3-mi (11.7 km) long ice road is constructed between Northstar and the Prudhoe Bay facilities at West Dock to transport personnel, equipment, materials, and supplies. 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 1-4. Hilcorp usually builds the following unimproved ice trails to Northstar as shown in Figure 1-4:

- 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 – 4.82 mi, 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).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 (see Figures 1-1 and 1-3). Each year Eni builds an ice road extending 4.2 mi (6.8 km) offshore from Oliktok Production Pad (OPP) to SID. Following the same general construction methods used at Northstar, Eni also builds an unimproved ice trail just west of and parallel to the sea ice road corridor near SID. The ice trail is typically approximately 50 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. Two floating ice pad parking areas are also built 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). 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. Due to the open water in the ice at this location, seals may appear near this site as evident from the observation of a ringed seal pup in April 2018 (see Section 1.1 of the petition).

A single ice road and staging area ice pad are required each year to operate the ODS, which is situated in 4 to 6 ft (1.2 to 1.8 m) of water. As shown in Figure 1-4, the typical or proposed ice road extends 5.5 mi (8.9 km) offshore to the ODS. An alternative ice road as shown on Figure 1-5 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 are 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 Figures 1-4 and 1-5). The dimensions of the staging area are approximately 600 by 450 ft (180 by 140 m).

Similar to SID, the location of ODS has water depths considered unsuitable for ringed seals; however, to be precautionary and due to the potential for changes in ice conditions associated with changes in climate, Eni is including the ODS in the ITR petition and this associated mitigation and monitoring plan.

In addition to the ice trails described above, Hilcorp and Eni 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. 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.

Figure 1-1. Regional Map

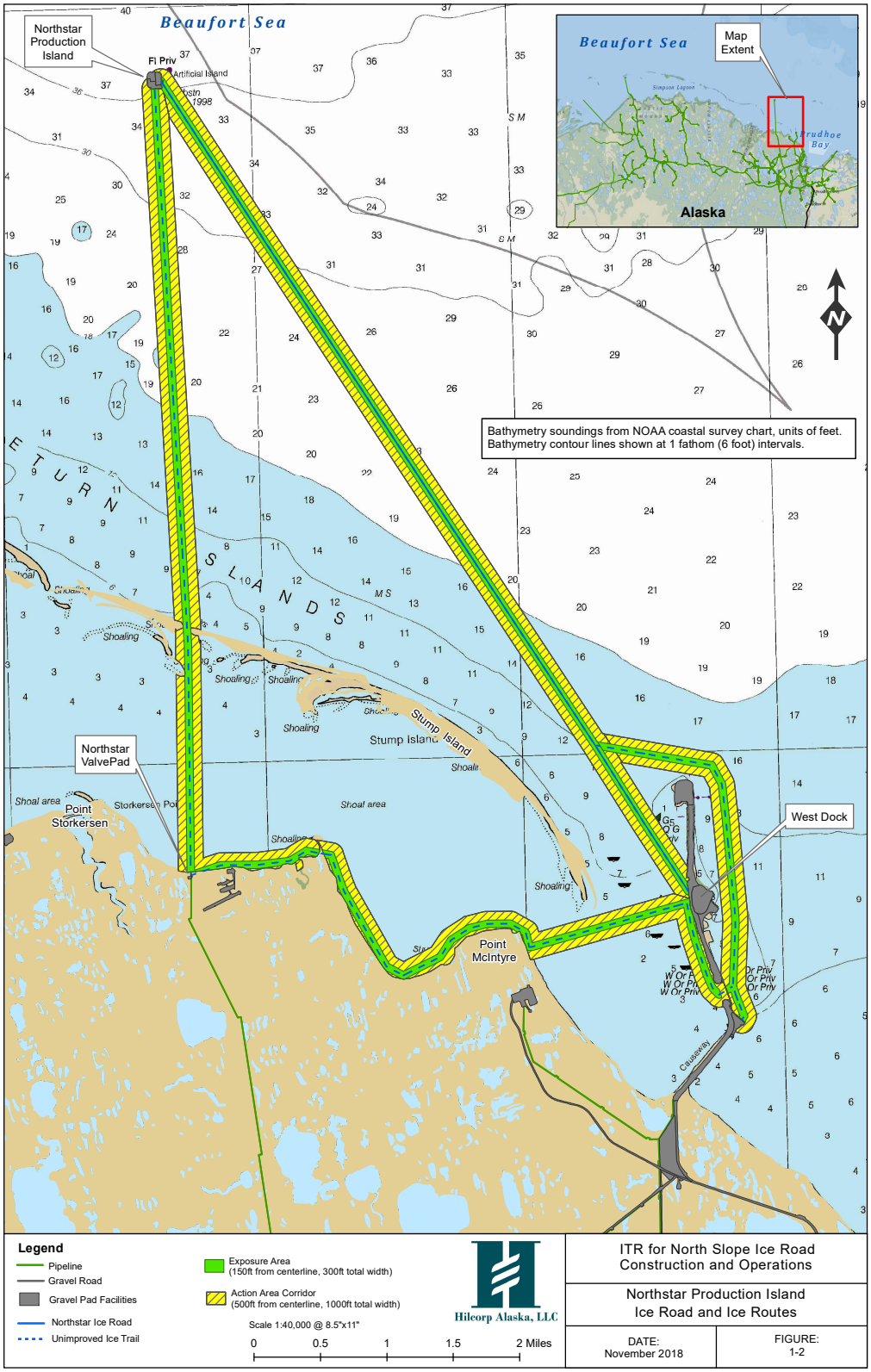

Figure 1-2. Northstar Production Island Ice Roads and Trails

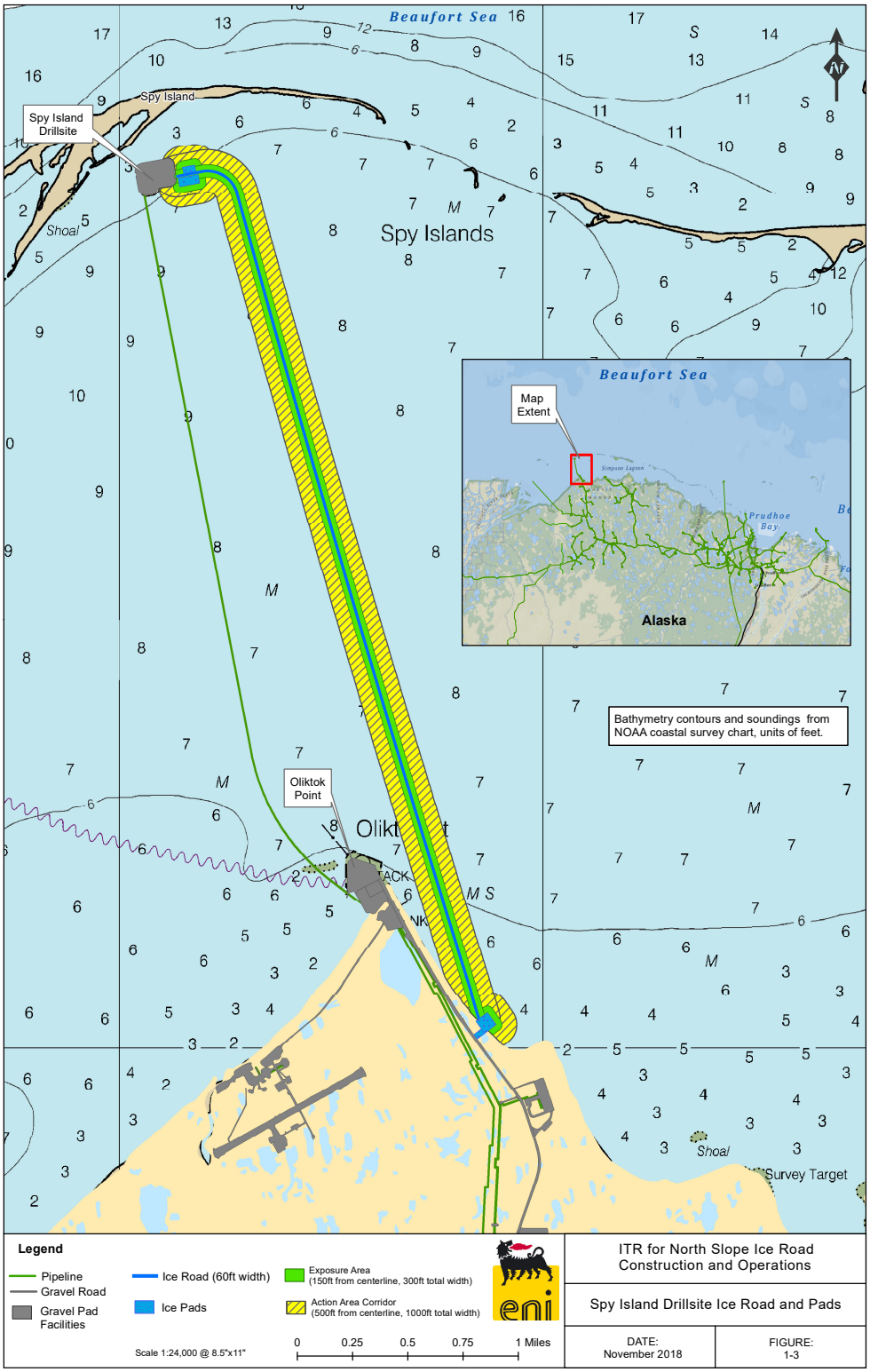

Figure 1-3. SID Ice Road/Trail and Ice Pads

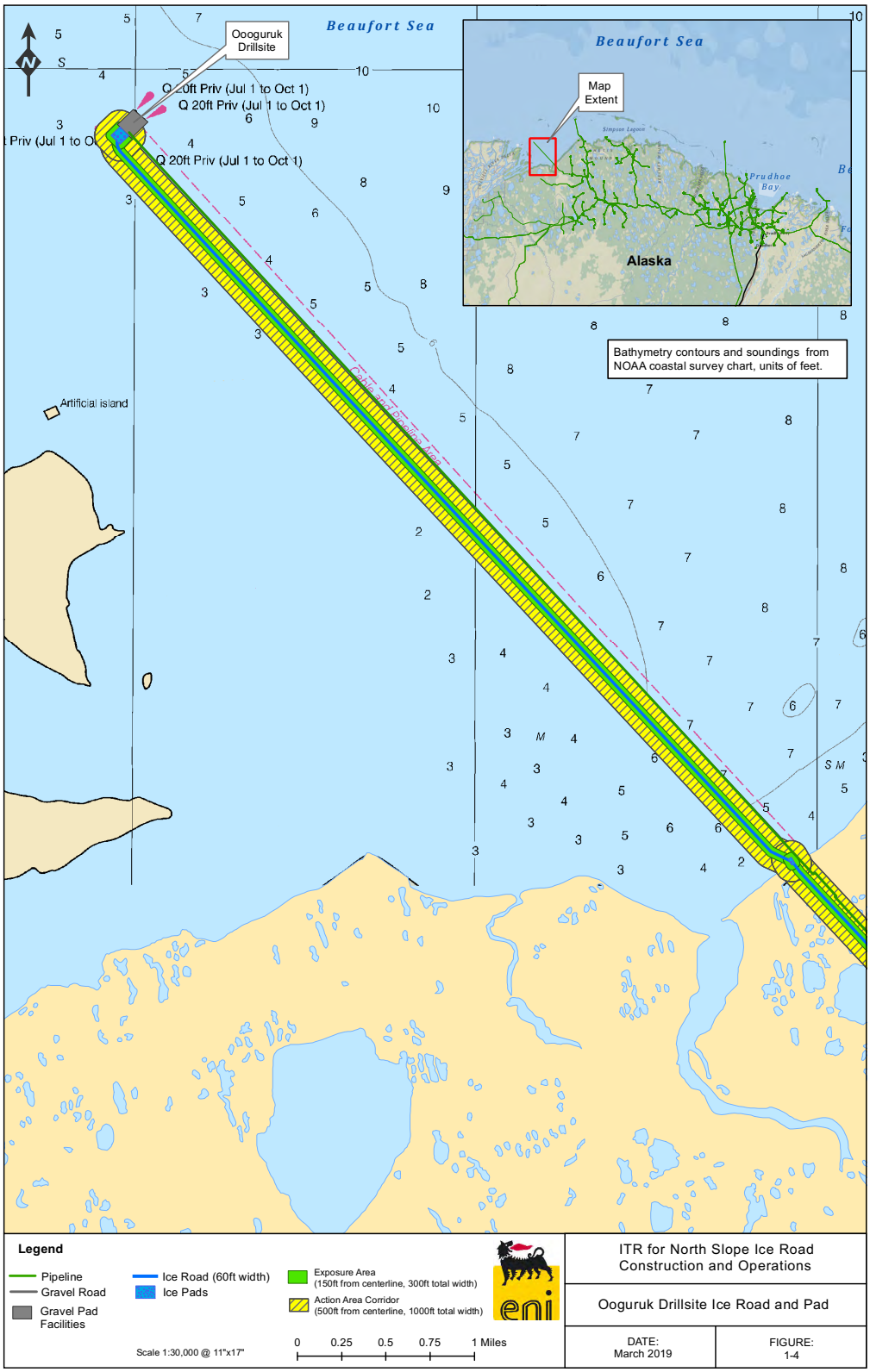

Figure 1-4. Oooguruk Drillsite Ice Road and Ice Pad

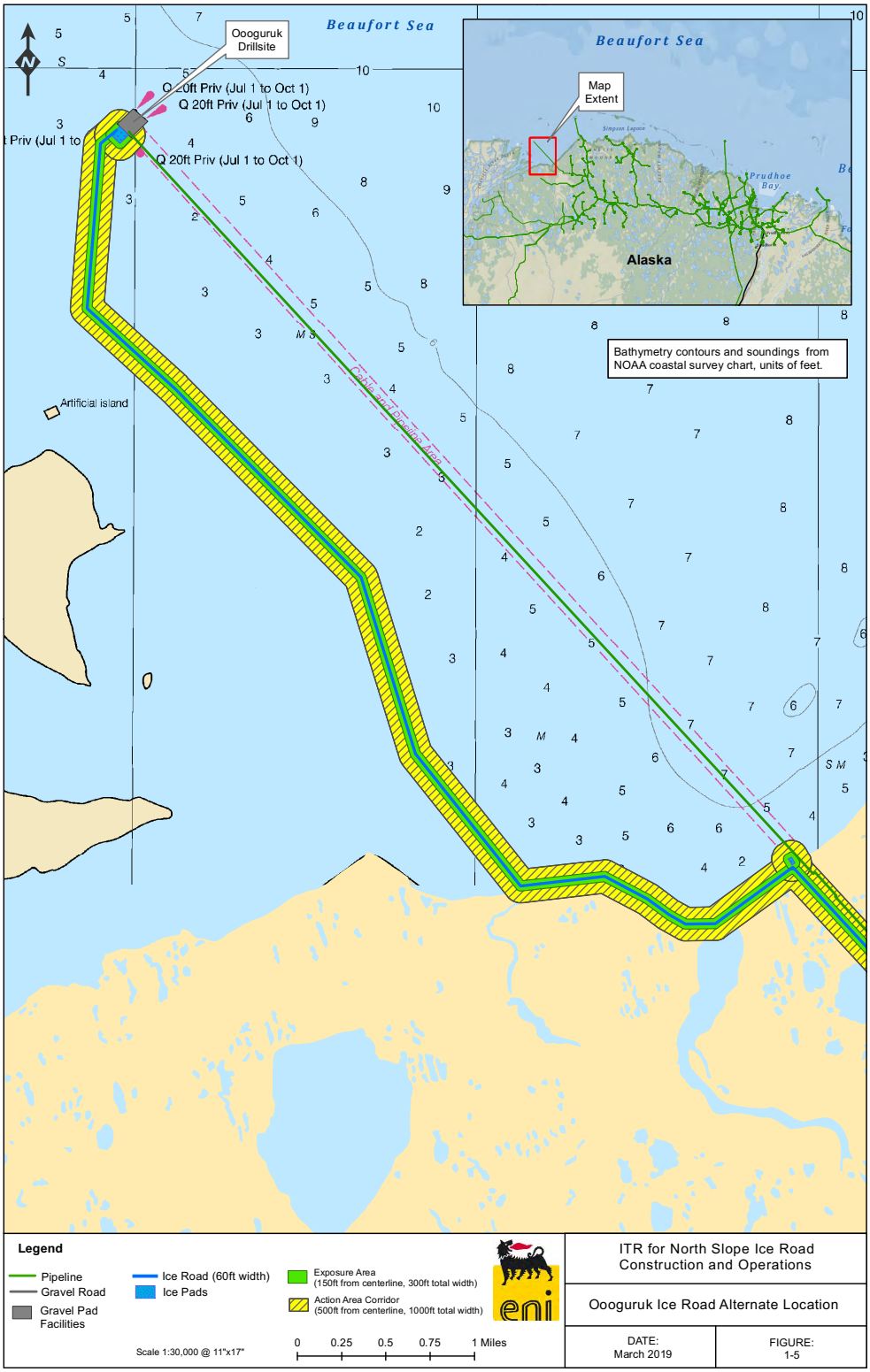

Figure 1-5. Oooguruk Ice Road Alternate Location

2. MITIGATION AND MONITORING

Hilcorp and Eni perform ice road construction in accordance with the best guidance available to avoid and minimize (to the greatest extent possible) impacts on the environment, ESA species, designated critical habitats and species protected under the MMPA. In order to avoid ringed seal dens or lairs, and to reduce the taking of ringed seals to the lowest level practicable, the following specific ice road/trail mitigation and monitoring measures will ensure the least practicable impact on ringed seals and their habitat.

Potential measures include consideration of the following factors: 1) the degree to which the successful implementation of the measure is expected to minimize adverse impacts to ringed seals and other marine mammals, as necessary; 2) the proven efficacy of the specific measure to minimize adverse impacts as planned based on monitoring plans from previous, similar activities; and 3) the practicability of the measure for implementation. Based on these factors, the mitigation and monitoring measures described in this plan accomplish the following objectives:

- Avoid or minimize injury to or death of ringed seals or any marine mammals;
- Minimize the likelihood that impacts will occur to ringed seals that might occur along the ice roads or the overall Action Areas;
- Shut down and/or monitor activities when seals are observed in or approaching the exposure area defined as 150 ft (46 m) on either side of the centerline of the road/trail (i.e., 300 ft total width) (see Section 6); and
- Avoid overlap of ice road/trail activities with traditional subsistence hunting locations and events; and
- Quantify and potentially reduce the number of ringed seals exposed to or taken by harassment (Level B).

2.1. Mitigation Measures

Hilcorp and Eni perform ice road and trail construction in accordance with the best guidance available to avoid and minimize (to the greatest extent possible) impacts on the environment, species protected under the MMPA and ESA, and designated critical habitats. In order to avoid ringed seal breathing holes and lairs, and to reduce the taking of ringed seals to the lowest level practicable, the following specific mitigation measures (also referred to as BMPs) will ensure the least practicable impact on ringed seals and their habitat. These measures are proposed for the construction and maintenance of sea ice roads and trails in areas where water depth is greater than 10 ft (the minimum depth required to establish ringed seal lairs) as well as any open leads in the sea ice requiring a temporary bridge during the ice road season. While the location of ODS has water depths considered unsuitable for ringed seals, to be precautionary and due potential changes in ice conditions and ringed seal habitat, Eni is including the ODS in this petition to ensure compliance with the MMPA. Ice road and ice trail activities are described in Section 1.3. These measures were developed through close coordination with NMFS OPR and AKR. In a letter to Eni dated October 11, 2018, NMFS confirmed agreement with implementation of the measures described in this section as well as monitoring and reporting described in Section 2.5 of this Plan.

The mitigation measures are organized into the following categories: 1) Wildlife Training; 2) General Mitigation Measures (implemented throughout the ice road/trail season December through May); 3) mitigation measures to be implemented after March 1st; and 4) Reporting Requirements.

2.2. Wildlife Training

Prior to initiation of sea ice road and trail construction activities, project personnel associated with ice road construction, maintenance, or use (i.e., construction workers, surveyors, vehicle operators, security personnel, and the environmental team) will receive annual training[1] on seal avoidance mitigation measures (BMPs) that is appropriate for the work that they will perform. The annual training for all such personnel will include reviewing applicable portions of the company's Wildlife Interaction Plan[2], which include the following measures:

- Approaching or interacting with any wildlife is prohibited.
- When traveling the ice road, follow directions of Security and posted signs.
- Notifications required if a seal is observed within 150 ft of the ice road centerline.
- Stay in the vehicle and continue safely on if a seal is observed near the road.

In addition to company-specific information and review of the BMPs, additional wildlife training for personnel involved in ice road construction/maintenance or seal monitoring will include:

- How to identify ringed seal adults and pups;
- Seal life history;
- Habitat and diet;
- Ringed seal presence in project area;
- Importance of lairs, breathing holes and basking;
- Potential effects of disturbance; and
- Applicable laws and regulatory requirements.

2.3. General Mitigation Measures

These mitigation measures will be followed throughout the ice road/trail season and are based on the following assumptions:

- Ice road/trail construction occurs from approximately December 1st to mid-February (or as soon as sea ice conditions allow safe access and permit such activity);
- Operations and maintenance generally occur from approximately mid-February through mid- to late May. Ringed seals begin to establish lairs in late March. Therefore, NMFS is requiring that ice road construction be initiated no later than March 1st to reduce the potential for disturbance to ringed seal birth lairs or dens; and
- Disturbance associated with construction prior to March 1st is believed to prevent pregnant seals from establishing lairs in the disturbed areas.

[1] Training rosters can be made available to audit if requested.
[2] May also be referred to as a Wildlife Management Plan.

Winter sea ice road/trail construction and use will begin prior to March 1st of each year (typically December through mid-February), which is before female ringed seals establish birthing lairs. Initiating on-ice activities early allows ringed seals to establish breathing holes and birthing lairs in undisturbed areas. Prior to establishing lairs, ringed seals are mobile and are expected to avoid the ice roads/trails and construction activities.

The following mitigation measures will be implemented throughout the entire ice road/trail season, including during construction, maintenance, active daily use[3], 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[4] 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 may also be used to mark the centerline of the roadway.
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. Personnel will be instructed that approaching or interacting with ringed seals is prohibited.
5. If personnel encounter a ringed seal while driving on the road, they will be instructed to remain in the vehicle and safely continue.
6. If a ringed seal is observed within 150 ft (46 m) of the center of an ice road or trail, the company's Security personnel or staff member who observed the seal contacts the Environmental Specialist in accordance with the Wildlife Management Plan to provide the information requested in Section 2.8 *Data Collection*.
    a. The location of the seal will be physically marked with a visible marker while maintaining a distance of at least 50 ft (15 m) from the seal.
    b. 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.
    c. 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 150 ft away from the center of the road/trail or is no longer observed.

[3] There are periods during which ice road travel does not occur. During these periods, no activity would occur along the road and therefore, implementation of measures would not be necessary.
[4] The interval between delineators is specific to existing ice road safety measures and relates to how drivers assess and report weather and roadway conditions.

d. The Environmental Specialist or designated person will contact appropriate state and federal agencies as required[5] (see company-specific Wildlife Plans for notification details).

Other on-ice activities occurring prior to March 1st could include spill training exercises, pipeline surveys, snow clearing, and work conducted by vehicles such as PistenBullys®, snow machines, or rolligons. Prior to March 1st, these activities could occur outside of the delineated ice road/trail and shoulder areas. Also during this period, all general mitigation measures will be implemented.

2.4. Mitigation Measures After March 1st

After March 1st and continuing until decommissioning of ice roads/trails in late May or early June, on-ice activities can occur anywhere on sea ice where water depth is less than 10 ft (3 m) (i.e., habitat is not suitable for ringed seal lairs and breathing holes). However, after March 1st on those sections of the ice roads or tails where water depth is greater than 10 ft, all activities must occur within the boundaries of the driving lane or shoulder area of the ice road/trail (see Figure 2-1) and other previously disturbed areas (e.g., spill and emergency response areas, snow push areas), as long as personnel safety is ensured. In addition to the general BMPs, the following BMPs will also be implemented after March 1st:

1. 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. Equipment travel will be limited to within the driving lane and shoulder areas to the extent practicable and when safety of personnel can be ensured (see Figure 2-1).
2. 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 may be plowed or blown from the ice road surface.
3. In the event snow is accumulating on a road within a 150 ft (46 m) 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 150 ft of identified seals or within 500 ft[6] (152 m) of known seal lairs.
4. Tracked vehicle operation will be limited to the previously disturbed ice trail areas to the extent practicable and when safety of personnel can be ensured. 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

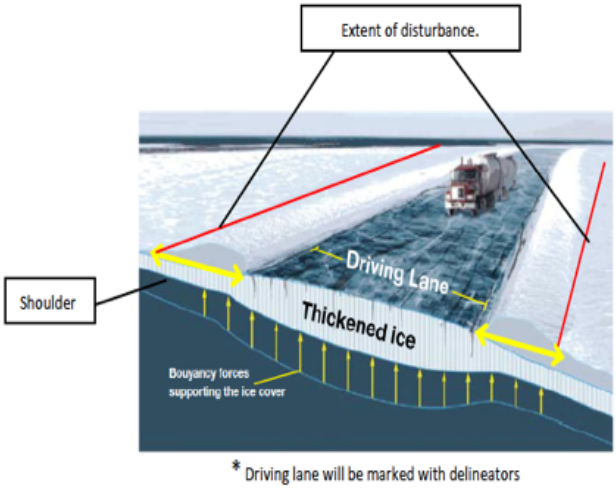

Figure 2-1. Ice Road Schematic

[5] As detailed in the Wildlife Management Plan.
[6] These are the Action Areas as defined in Section 1.

minimum of 150 ft (46 m) during ice testing and new trail construction. Any observed ringed seal structures will be reported and marked as described in Section 2.7. 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.

2.5. Monitoring Measures

The following monitoring and reporting activities will be implemented by Eni and Hilcorp, along with the mitigation measures described in Sections 2.3 and 2.4, to avoid and minimize potential impacts to ringed seals during ice road/trail construction, operation and maintenance each year.

2.6. Ringed Seal Surveys

If an ice road or trail is being actively used[7], a dedicated observer will conduct a survey along the sea ice road/trail during daylight conditions with good visibility to observe if any ringed seals are within 500 ft (152 m) of the roadway corridor. These protocols will be followed:

1. Surveys will be conducted every other day during daylight hours. Survey protocol consists of driving the ice road and stopping every ½ mile to observe the exposure area for approximately 5 minutes on either side of the corridor to check for the presence of seals.
2. Observers for ice road activities need not be trained Protected Species Observers (PSOs), but they must have received the training described in Section 1 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.
3. When performing observations, observers will have no other primary duty than to watch for and report observations related to ringed seals during this survey. If the observer is driving a vehicle, then the survey must be performed when the driver stops, at periodic intervals sufficient to complete a thorough assessment of the area, given visibility conditions. If weather conditions become unsafe, the monitoring activity will be discontinued.

2.7. Communication and Monitoring Procedures for Seal and Seal Structure Sightings

If a ringed seal or seal structure (i.e., breathing hole or lair) is observed within 150 ft (46 m) of the centerline of the ice road/trail, the location of the seal or structure will be reported to the Environmental Specialist[8] , who will then relay the sighting location information to all ice road personnel. The seal or structure will be physically marked with a visible marker while maintaining a distance of at least 50 ft (15 m). In addition, the company's office personnel responsible for wildlife interaction would be notified following protocols described in each company's specific Wildlife Interaction Plan and as described in Section 2.9 *Reporting*. The following procedures will also be followed:

1. Construction, maintenance or decommissioning activities associated with ice roads and trails will not occur within 150 ft (46 m) of the observed ringed seal, but may proceed as soon as

[7] Any days when there is no traffic on an ice road, monitoring for ringed seals will not occur in order to minimize potential for interactions with seals.
[8] Also referred to as an Environmental Advisor in Wildlife Management / Interaction Plans.

the animal moves on its own more than 150 ft (46 m) 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.

2. As soon as practicable after the initial sighting, the Environmental Specialist or designated person will observe the ringed seal for approximately 15 minutes 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 this observation period will be documented until the animal moves more than 150 ft (46 m) from the center of the road/trail or is no longer observed. If the seal remains in the area after the 15-minute observation period, monitoring will continue every six hours during daylight conditions.
3. If a ringed seal structure (i.e., breathing hole or lair) is observed within 150 ft (46 m) of the ice road/trail, the location of the structure will be reported to the Environmental Specialist who will then carry out notification protocol described above.
    a. Monitoring will continue every six hours during daylight conditions on the day of the initial sighting to determine whether a ringed seal is present. Monitoring will consist of observing the structure from a distance of at least 150 ft for approximately 15 minutes each time. After the first 24 hours, monitoring for the seal will occur every other day the ice road/trail 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. During this monitoring period, maintenance work will proceed cautiously as to minimize impacts or disturbance to area.

2.8. Data Collection

The Environment Specialist, or designated person, will record the following information during survey efforts and sighting events:

1. The date and start/stop time for each survey including effort in total number of hours of observation. This will include a summary of environmental conditions such as visibility that can affect ringed seal or lair detection;
2. Date and time of each significant event (e.g., seal or seal structure sighting) and subsequent monitoring;
3. Date, time, and duration for each sighting event;
4. Number of animals per sighting event; and number of adults/juveniles/pups per sighting event;
5. Primary, and, if observed, secondary behaviors of seals in each sighting event;
6. Geographic coordinates for the observed animals or structure (breathing hole or lair), with the position recorded by using the most precise coordinates practicable (coordinates must be recorded in decimal degrees, or similar standard, and defined coordinate system); and
7. Mitigation measures implemented to minimize impacts.

2.9. Reporting

Hilcorp and Eni propose to each submit an annual monitoring report after the end of the ice road/trail season to summarize the activities during ice road construction, maintenance, use and decommissioning that occurred approximately December through May of that year. Records associated with any ringed seal observations and monitoring will be transmitted to NMFS prior to each subsequent ice road/trail season (i.e., generally by late summer, prior to the subsequent ice road/trail season).

If a specific mitigation or monitoring measure is implemented during the ice road/trail activities (e.g., a breathing hole is monitored for seal presence), then a preliminary report of the activity will be submitted within 14 days after the cessation of that activity.

If a seal is observed within 150 ft (46 m) of the roadway during ice road/trail activities, then notification to the Environmental Specialist and other staff and agency personnel will be undertaken as described above.

2.9.1. Annual Monitoring Report

Annual and final reports will be submitted via electronic mail to Greg Balogh, NMFS AKR Protected Resources Division Supervisor, at Greg.Balogh@noaa.gov and OPR, Permits and Conservation Division, NMFS, Gray Redding, at Gray.Redding@noaa.gov.

Digital, queryable documents containing all observations and records, and digital, queryable reports will be submitted to: NMFS AKR Protected Resources Division Supervisor, Greg Balogh, at greg.balogh@noaa.gov and to OPR, Permits and Conservation Division, NMFS, and Gray Redding, at Gray.Redding@noaa.gov. In the event that this contact information becomes obsolete, call 907-271-5006 for updated reporting contact information.

2.9.2. Reporting of Unforeseen Events

In the unanticipated event that the specified activities along the ice road construction clearly causes the take of a marine mammal in a manner prohibited by the LOA, such as an unforeseen injury or mortality to a pinniped, the observer will report the incident to the Environmental Specialist, in accordance with their Wildlife Interaction/Management Plan, who would then relay that information to the OPR, Permits and Conservation Division, NMFS , and NMFS AKR Protected Resources Division (contact information provided above). This communication would occur as soon as practicable. A report documenting the incident would include:

- Time, date, and location (latitude/longitude) of the incident;
- Description of the incident;
- Water depth;
- Environmental conditions (e.g., wind speed and direction, and visibility);
- Species identification or description of the animal(s) involved;
- Fate of the animal(s); and
- Photographs or video footage of the animal(s) (if equipment is available).

In the event that an observer discovers an injured or dead marine mammal, the cause of the injury or death is unknown, and the death is relatively recent (i.e., in less than a moderate state of decomposition), the incident would be reported to the OPR, Chief of the Permits and Conservation Division, NMFS in Silver Spring, Maryland (301-427-8401) and the Marine Mammal Network Alaska Stranding Coordinator in Alaska (Phone number 1-877-925-7773 or 1-877-9-AKR-PRD), as soon as practicably possible. The report would include the same information identified in the paragraph above. Activities would be allowed to continue while NMFS reviews the circumstances of the incident. NMFS would work with Hilcorp or Eni to determine whether modifications in the activities are appropriate.

Under such circumstances that the injury or death is not associated with or related to the activities authorized in the LOA (e.g., previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), the incident would be reported to the OPR, Chief of the Permits and Conservation Division, NMFS or by email to the Alaska Stranding Coordinator within 24 hours of the discovery. Photographs, video footage (if available), and any other documentation of the stranded animal sighting will be provided to NMFS and the Marine Mammal Stranding Network.

3. REFERENCES

NMFS (National Marine Fisheries Service). 2000. Final Rule: Taking Marine mammals Incidental to Construction and Operations of Offshore Oil and Gas Facilities in the Beaufort Sea. *Federal Register*, Vol. 65, No. 102, Thursday May 25, 2000.