U.S. Department of the Interior
Bureau of Land Management

ConocoPhillips Seismic Exploration, Exploration Drilling, and Existing Well Plugging

November 2025

Draft Environmental Assessment **DOI-BLM-AK-R000-2026-0002-EA**

AKAK106747490, AKAK106752652, AA081795, AA094403, AA094407, AA087896, AA094166 and AA095290

I have considered the factors mandated by the National Environmental Policy Act (NEPA). This environmental assessment represents the Bureau of Land Management's (BLM's) good-faith effort to fulfill NEPA's requirements by prioritizing documentation of the most important relevant considerations within the statutorily mandated page limits and timeline. This prioritization reflects the BLM's expert judgment; and any considerations addressed briefly or left unaddressed are, in the BLM's judgment, comparatively non-substantive and would not meaningfully inform the BLM's consideration of environmental effects and the decision to be made. The EA is substantially complete, considers the factors mandated by NEPA, and, in my judgment, contains analysis adequate to inform the BLM's decision regarding the proposed action.

Responsible Official: _____ Date: _____

Stephanie L. Kuhns, District Manager

Responsible Official: _____ Date: _____

Wayne Svejnoha, Energy and Minerals Branch Chief

U.S. Department of the Interior
Bureau of Land Management
Arctic District Office
222 University Avenue
Fairbanks, Alaska, 99709

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CHAPTER 1. INTRODUCTION

1.1. Background

ConocoPhillips Alaska Inc. (CPAI) has applied to conduct a one-year program, which would include seismic exploration, exploration drilling, and well plugging on land managed by the Bureau of Land Management (BLM) within the National Petroleum Reserve in Alaska (NPR-A). The submitted applications are as follows:

- One Oil and Gas Geophysical Exploration permit request for proposed seismic exploration work
- Four Applications for Permit to Drill (APD) for four new exploration wells
- Two Notice of Intent (NOI) sundries with final reclamation plans for two wells with proposed plugging and abandonment (P&A) work
- One Right-of-Way (ROW) application for access to and between the drilling and plugging well locations. Access for the seismic exploration program would not require its own authorization.

1.2. Purpose and Need

The proposed action is to authorize access across and use of BLM managed lands for conducting a one-year exploration and plugging program. The purpose of the action is to conduct seismic exploration work, drill four new exploration wells, and permanently close (plug and abandon) two previously drilled oil and gas exploration wells. The project areas are located within the NPR-A on land managed by the BLM, some of which are leased by CPAI (Figure 1).

The need for the seismic exploration and exploration drilling proposed actions is established by the BLM's responsibilities under the Naval Petroleum Reserves Production Act of 1976 (NPRPA), the 2022 NPR-A Integrated Activity Plan (IAP) Record of Decision (ROD), and exploration rights CPAI has acquired under their authorized NPR-A leases. The need for the plugging and abandonment proposed action comes from CPAI's obligations under their existing APDs and BLM regulations (namely 43 Code of Federal Regulations (CFR) 2360, 43 CFR 3160, 43 CFR 3162.3-4) which require protection of surface and subsurface resources, to include the plugging of existing wells.

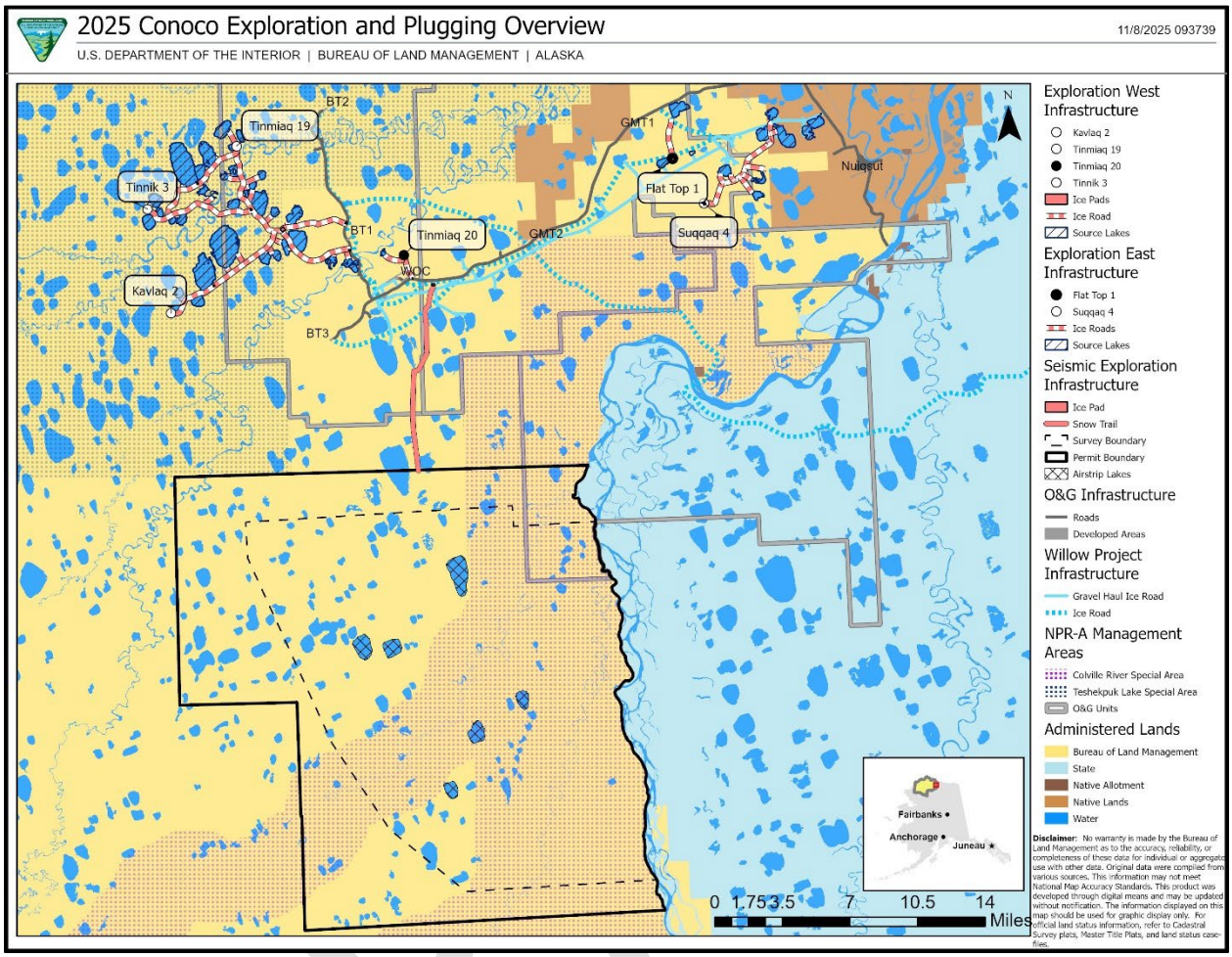

Figure 1. Locations of CPAI 2025 Winter Exploration Activities in relation to NPR-A special areas and Oil and Gas Units.

The purpose of the NPRPA, as amended, is to allow for the exploration and development of oil and gas resources in the NPR-A while also requiring protection of important resources and uses. This purpose is met by responding to CPAI's applications as described herein.

1.3. Decision to be Made

This Draft Environmental Assessment (EA) will assist the BLM in project planning by evaluating the potential significance of environmental impacts related to the proposed projects on different resources. If the BLM determines that the preferred alternative would not result in significant impacts beyond those already addressed in the 2020 IAP Environmental Impact Statement (EIS) (USDOI BLM 2020) the BLM would prepare a Finding of No New Significant Impacts (FONNSI), Decision Record, and Statement of Adverse Effect approving the selected alternative. If the project is found to result in new significant impacts, an EIS would be prepared.

The decision maker, the BLM Authorized Officer, will consider technical, economic, environmental, and social issues, as well as the purpose and need of the proposed project when making the decision. The BLM will decide whether to authorize access across and use of BLM managed lands for conducting a one-year exploration and plugging program, and if so, under what terms and conditions.

1.4. Relationship to Statutes and Regulations

Lease stipulations and Required Operating Procedures (ROPs) were developed through the BLM planning and NEPA process for the NPR-A IAP EIS (USDOI BLM 2020) and are found in Appendix A of the 2022 NPR-A IAP ROD (USDOI BLM 2022). All applicable ROPs from the 2022 NPR-A IAP ROD (USDOI BLM 2022) would be followed unless a deviation is analyzed under this EA and found to meet the objectives of the ROP and an exception, waiver or modification is approved by BLM.

Lease stipulations from the 2008 Northeast NPR-A Supplemental ROD (USDOI BLM 2008) and the 2013 NPR-A Integrated Activity Plan ROD (USDOI BLM 2013) were attached to the leases in the proposed project area when these leases were sold or extended to CPAI (Figure 1). All applicable lease stipulations from the 2008 IAP ROD and the 2013 IAP ROD are required to be followed (Appendix A).

In addition to required lease stipulations and 2022 IAP ROPs found in Appendix A, project specific stipulations are shown in Appendix B (BLM Arctic District Standard Stipulations) and C (BLM Alaska Seismic Conditions of Approval) of this EA. Appendix C would only apply to Seismic Exploration activities. Any applicant proposing to conduct activity on BLM managed lands within the Arctic District Office would be required to meet the objectives of all ROPs listed in Appendix A.

The Proposed Action must comply with numerous Federal laws and Executive Orders (EO) that apply to activities on public lands. Key Federal and State controls associated with the Proposed Action were described in the 2020 NPR-A IAP EIS (USDOI BLM 2020). The Proposed Action is in conformance with the 2022 NPR-A IAP ROD (USDOI BLM 2022), NPRPA, the Federal Land Policy and Management Act of 1976 (FLPMA),, Alaska National Interest Lands Conservation Act (ANILCA), National Historic Preservation Act (NHPA), Endangered Species Act (ESA), Marine Mammal Protection Act (MMPA), Sustainable Fisheries Act, and Executive Orders 11988, 11990, 14153[1], 14154 and 14156.

Portions of the proposed project are within the Teshekpuk Lake Special Area and Colville River Special Area. In accordance with 43 CFR 2361.40, a statement of adverse effect is being prepared to address potential impacts on resource values that cannot be fully avoided.

This EA analyzes the potential environmental impacts of seismic exploration activities, drilling four new exploration oil and gas wells, and plugging two existing exploration oil and gas wells. It has been prepared in accordance with the National Environmental Policy Act of 1969, as amended (NEPA) and regulations implementing NEPA promulgated by the Department of the Interior (43 CFR Part 46). Consistent with Section 3.2(c)(1) of 516 DM 1 – U.S. Department of the Interior Handbook of National Environmental Policy Act Implementing Procedures, this EA incorporates by reference relevant information from existing environmental documents to focus the analysis on issues specific to the proposed action.

[1] Executive Order 14153 directs the Secretary of the Interior to place a moratorium on authorizations granted per the 2022 IAP ROD; however, these authorizations are not subject to that moratorium because they are associated with leases that predate the 2022 IAP

1.5. Conformance with the Integrated Activity Plan

Integrated Activity Plan Name: 2020 NPR-A Integrated Activity Plan

Date Approved: IAP EIS approved June 2020 and ROD approved April 2022

The proposed actions are in conformance with the applicable IAP and its associated ROD because it is specifically provided for in the following IAP decision.

The 2020 NPR-A Integrated Activity Plan Environmental Impact Statement (IAP EIS) (USDOI BLM 2020) and associated 2022 Record of Decision (ROD) (USDOI BLM 2022) were completed to fulfill the BLM's responsibility to manage lands in the NPR-A under the authority of the NPRPA, FLPMA, the NEPA, and ANILCA.

Consistent with the NEPA, as amended, at 42 U.S.C. 4336b, the BLM may rely on analysis contained in prior programmatic environmental documents when evaluating related actions. Further, according to 516 DM 1, *U.S. Department of the Interior Handbook of National Environmental Policy Act Implementing Procedures*, "An environmental assessment may be prepared, and a finding of no significant impact reached, for a proposed action with significant effects, if the environmental assessment is tiered to an environmental impact statement that fully analyzes those significant effects. Tiering to a broader-scoped environmental impact statement may allow for the preparation of an environmental assessment and a finding of no significant impact for the individual proposed action, so long as any previously unanalyzed effects are not significant. A finding of no significant impact other than those already disclosed and analyzed in the environmental impact statement to which the environmental assessment is tiered may also be called a "finding of no *new* significant impact" or a "finding of no *additional* significant impact."

Accordingly, BLM is relying upon and tiering to the analysis presented in the 2020 NPR-A IAP/EIS. The analysis was reevaluated and affirmed in the 2022 ROD. The exploration activities proposed by CPAI for the upcoming winter season fall within the scope of activities considered and evaluated in the 2020 IAP/EIS. As part of the internal scoping process for this EA, an interdisciplinary team of BLM subject matter experts conducted a review of the 2020 IAP/EIS to determine whether new circumstances, new information, or changes in the impacts of the Proposed Action not previously analyzed may result in significantly different environmental effects than those analyzed in the 2020 IAP/EIS. Based on this review of the analysis underlying the 2020 IAP/EIS, BLM has determined that analysis remains valid for the current decision-making process, as supplemented by the analysis provided in this Draft EA.

1.6. Scoping and Issues

Public notification of the Proposed Project and Draft EA development was announced on November 10, 2025, on the BLM NEPA Register website (https://eplanning.blm.gov/eplanning-ui/home) (DOI-BLM-AK-R000-2026-0002-EA). The proposed project has been and will be presented to the North Slope Borough (NSB) and local communities during several public meetings as outlined in Sections 4.1 and 4.2.

The development of the 2020 NPR-A IAP Final EIS (USDOI BLM 2020), which provides guidance for managing land within the proposed project areas, involved extensive input from Federal agencies, State of Alaska, NSB, individuals, and many institutions. The *Executive Summary* (pages 8-9) outlines the collaboration and coordination efforts, detailing the entities

involved. Appendix C lists the preparers and provides dates and locations of government-to-government meetings. Appendix Z includes public comments and BLM responses. Resources potentially impacted by the Proposed Action were considered by BLM specialists in Table 1.1. BLM specialists evaluated each resource and made determinations of potentially impacted, minimally impacted, not present, or not impacted.

A **Potentially Impacted** determination in Table 1.1 means the Proposed Action could result in impacts to a resource that are beyond what could be considered minimal or negligible. Resources identified as potentially impacted are further analyzed in this EA. Five Potentially Impacted resources were identified (Table 1.1) – Fish, Non Threatened and Endangered Mammals, Soils, Vegetation, and Water Resources. Potential impacts to these resources will be evaluated in this document.

A **Minimally Impacted** determination in Table 1.1 means the Proposed Action would not affect a resource to a degree that would require further analysis because the expected impacts would be minimal, negligible, or are already addressed by standard protections such as Required Operating Procedures from the NPR-A IAP ROD (USDOI BLM 2022) or other legal protections. There were seventeen resources found to be Minimally Impacted by the Proposed Action (Table 1.1). Minimally impacted resources are not analyzed further in this EA.

A **Not Present** determination in Table 1.1 means that a resource is not expected to be affected by the proposed project because it is not physically located where the project is occurring, or it is not in the project area during a time when the project is being implemented. There was one resource identified as Not Present in the project area (Table 1.1). This resource is not discussed further in this EA.

A **Not Impacted** determination in Table 1.1 means that a resource may be in the project area but would not be impacted by the project. There was one resource identified as Not Impacted in the project area (Cultural and Paleontological Resources) (Table 1.1). This resource will not be discussed further in this EA.

Table 1.1. Resources Considered in Evaluating Environmental Impacts

Resources Considered	Determination	Location of Tiered Information (2020 IAP EIS)	Basis of Determination
Air Quality	Minimally Impacted	2020 IAP EIS §3.2.2	Regulatory defined minor amounts of air pollutants, hazardous air pollutants, and greenhouse gases would be generated during the proposed project from operation of equipment such as camp generators, mobile on-road and non-road engines, and construction equipment. These emissions would be temporary, short-term, and localized, only occurring over the winter season, and transitory, occurring in various locations depending on the schedule. These would not be considered stationary sources. For these reasons emissions from the proposed activities would not likely cause or contribute to any new or recognized air quality issues in the project area. In addition, extended vehicle idling would be reduced, when practical, in accordance with ROP A-9.
Cultural and Paleontological Resources	Not Impacted	2020 IAP EIS §3.2.8 and §3.4.2	Some aspects common to the seismic exploration, exploration drilling, and P&A components of CPAI's proposed winter 2025/2026 program do not have the potential to cause effects on historic properties or other cultural or paleontological resources (e.g., water withdrawals, lake airstrip use/construction, and transportation over frozen lakes and streams). Under certain circumstances, other components of the proposed undertaking could have potential to adversely affect historic properties and other cultural or paleontological resources. However, after assessing components of the proposed undertaking that have this potential, BLM found that these are not expected to result in adverse effects to Historic Properties or other cultural or paleontological resources. In accordance with the Alaska Protocol established by the Alaska Department of Natural Resources Office of History and Archeology (ADNR OHA and USDOI BLM 2014), CPAI's proposed project also does not meet the threshold for a project requiring the standard Section 106 review process, as it is a routine and neither international nor interagency undertaking, has little-to-no potential to affect Historic Properties. Protections

Resources Considered	Determination	Location of Tiered Information (2020 IAP EIS)	Basis of Determination
			are provided by the National Historic Preservation Act, Archaeological Resources Protection Act, Alaska Historic Preservation Act, Antiquities Act, Native American Graves Protection and Repatriation Act, EO 13007, Paleontological Resources Preservation Act, 2022 IAP ROPs C-2, E-13, and I-1.
Climate Change	Minimally Impacted	2020 IAP EIS §3.2.1	Climate change has already been analyzed and accounted for in Section 3.2.1 of the NPR-A IAP EIS.
Economy	Minimally Impacted	2020 IAP EIS §3.4.11	Minor short-term impacts to the local economy could occur as a result of the Proposed Action. Temporary displacement of furbearers could have a minor impact on furbearer harvest and opportunities for local hunters to sell pelts. However, the local community would likely experience beneficial economic effects from local employment for ice road and pad construction and/or camp management.
Fish	Potentially Impacted	2020 IAP EIS §3.3.3	As part of the proposed one-year exploration and plugging program, CPAI has requested an exception from several 2022 NPR-A IAP ROD ROPs. First, an exception from the 2022 NPR-A IAP ROD ROP A-5 has been requested to refuel light plants placed on frozen lakes at water pump houses and at road intersections for safety purposes. Although fuel spills could potentially impact aquatic habitats, required plans for handling fuel (i.e., Spill Prevention, Control, and Countermeasure (SPCC) Plan), secondary containment practices, and local environmental conditions (i.e., ice and snow cover) mitigate the risk of impacts to fish from fuel storage and during fuel transfers. In addition, an exception from the 2022 NPR-A IAP ROD ROP B-2(d) has been requested to harvest an increased volume of ice aggregate from five lakes within the exploration east and west areas. All requested winter liquid water

Resources Considered	Determination	Location of Tiered Information (2020 IAP EIS)	Basis of Determination
			withdrawal volumes would adhere to thresholds outlined in ROP B-2(a-c), thereby minimizing potential impacts to overwintering fish. Finally, CPAI is requesting an exception from the 2022 NPR-A IAP ROD ROP B-2(g) that prohibits compaction of snow or snow removal from fish-bearing waterbodies at areas of ungrounded ice to construct ice airstrips. Areas of ungrounded ice may provide overwintering habitat for fish. Ice airstrips would be constructed on ice-covered lakes within the seismic program area to facilitate delivery of supplies and crew changes. Removing snow cover from areas of ungrounded ice would increase ice thickness that, in turn, would reduce overwintering habitat quantity. However, given the size of each airstrip relative to the size of the proposed lakes, an increase in ice thickness is unlikely to impinge on overwintering habitat in such a way to impact overwintering fish. ***See Section 3.2 for more detailed discussion on potential impacts to fish from the proposed activities. Based on the analysis, the Essential Fish Habitat assessment finding is: no adverse effect.*** Protections are provided by the 2022 IAP ROPs A-3, A-4, B-1, B-2(a-c, e-f), C-2, C-3, C-4, C-5; 2008 NPR-A ROD Lease Stipulation D-1 (Appendix A); Alaska Department of Fish and Game (ADF&GADF&G) Fish Habitat Permits; and Alaska Department of Natural Resources (ADNR) Temporary Water Use Authorizations.
Floodplains and Riparian Zones	Minimally Impacted	2020 IAP EIS §3.3.2	Floodplains and riparian areas would be crossed by snow or ice roads, but the proposed operations would occur during the winter when soils are frozen to minimize impacts to stream banks. River and stream crossings would occur at areas with the lowest angle of approach and snow ramps would be constructed

Resources Considered	Determination	Location of Tiered Information (2020 IAP EIS)	Basis of Determination
			to protect stream banks and riparian vegetation. Protections are provided by the 2022 NPR-A IAP ROPs A-4, B-1, C-2, C-3, C-4 (Appendix A), and Executive Orders 11988 and 11990.
Wetlands	Minimally Impacted	2020 IAP EIS §3.3.2	Minimal impacts to wetlands would be expected from the Proposed Action because ground activities would be conducted during the winter when soils were frozen and covered with snow. Protections are provided by the 2022 NPR-A IAP ROD ROPs A-4, A-5, B-1, B-2, C-2 (Appendix A), and Executive Order 11990.
Invasive, Non-native species	Minimally Impact	Not Applicable	As required by the 2022 NPR-A IAP ROD ROP M-2 (Appendix A) and CPAI's Invasive Weed Plan (Appendix F) all vehicles and equipment would be inspected, and power washed prior to entering the NPR-A to ensure they are free of dirt, vegetation, and potentially non-native species.
Native American Religious Concerns	Not Present	2020 IAP EIS §3.4.2, Appendix U	There are no known Native American Religious concerns in the area of the Proposed Action. Protections are provided by the National Historic Preservation Act, American Indian Religious Freedom Act, Native American Graves Protection and Repatriation Act, Executive Order 13007, and 2022 NPR-A ROD IAP ROPs E-13, and I-1.
Recreation	Minimally Impacted	2020 IAP EIS §3.4.6	Recreation activities in the project areas are limited due to lack of public access. Any potential recreation activity is normally limited to the summer months at which point project work would be limited to clean-up activities using helicopters. Protections are provided by the 2022 NPR-A IAP ROD ROPs A-1, A-2, A-3, A-4, A-5, A-6, A-9, B-1, B-2, C-1, C-2, C-3, C-4, F-1, H-3, I-1, M-2, M-3, and lease notice 1 and 3, and additional project stipulations required by this EA (Appendix B) 1, 4, 18, 20, and 23-25.

Resources Considered	Determination	Location of Tiered Information (2020 IAP EIS)	Basis of Determination
Sociocultural Systems	Minimally Impacted	2020 IAP EIS §3.4.4	Sociocultural issues include stress over the pace of exploration, tensions, and conflict related to the permitting process, lack of capacity to participate at levels desired, distrust of agencies and industry, lack of local control over the activity, and cultural (subsistence) concerns. The impacts of the project would be expected to be minor to moderate. Past, present, and reasonably foreseeable effects to sociocultural systems have been previously analyzed. No new impacts beyond what has been described and analyzed in the 2020 NPR-A EIS would be anticipated. Protections are provided by the 2022 NPR- IAP ROD ROPs A-1, A-2, A-3, A-4, A-5, A-6, A-9, B-1, B-2, E-1, F-1, H-1, H-2, H-3, and I-1.
Subsistence	Minimally Impacted	2020 IAP EIS §3.4.3, 3.4.4, 3.4.5, 3.4.11, 3.4.12	Large game (subsistence resources) would likely be deflected from the project area. Caribou hunting activity is lowest during winter; therefore, the deflection of furbearers and potential overlap with trapping areas would be the most likely impact. Hunting and trapping activity occurs over a large area within Nuiqsut's broader subsistence use area. Hunters (mainly furbearer hunters) may avoid the area and travel further and longer to harvest. The area is on the edge of the high use area for furbearer hunting and trapping. Caribou could be deflected from areas of summer activity. Hunters would likely be disturbed by helicopter use but would likely continue to harvest in adequate quantities. Aircraft disturbance would be short-term, occurring over two weeks. Impacts to subsistence use from this project in and of itself would be expected to be minimal and short term (reduced traditional access and reduced availability of resources, primarily affecting families for whom furbearer harvesting is important). Past, present, and reasonably foreseeable effects to subsistence have been previously analyzed, and analyses have concluded that the cumulative scenario may significantly restrict subsistence access and the availability of resources in areas where they are traditionally harvested. Harvest levels have remained stable to

Resources Considered	Determination	Location of Tiered Information (2020 IAP EIS)	Basis of Determination
			date, and no reduction in the overall abundance of subsistence resources would be anticipated. The proposed activity would occur at the same time and place as other activities. No new significant impacts would be anticipated outside of what was noted in the NPR-A IAP EIS. Protections are provided the 2022 NPR-A IAP ROD ROPs A-1, A-2, A-3, A-4, A-5, A-6, A-9, B-1, B-2, C-3, C-4, E-1, F-1, H-1, H-2, H-3, I-1, L-1, and M-1. ***Based on the ANILCA 810 analysis this proposed action would not significantly reduce subsistence uses. No reasonably foreseeable and significant decrease in the abundance of harvestable resources or in the distribution of harvestable resources, and no reasonably foreseeable limitations on harvester access would result from the proposed action.***
Threatened and Endangered Species Steller's eider	Minimally Impacted	2020 IAP EIS §3.3.4 Consultation between BLM and USFWS is pending.	Steller's eiders are listed as Threatened under the Endangered Species Act (ESA). No impacts would be expected other than those already analyzed in 2020 NPR-A IAP EIS. Although Steller's eider would be very unlikely to be found in the project area at any time of year, there could be potential to impact nesting habitat for this species. Impacts to vegetation and soil have the potential to negatively affect nesting habitat of both eider species. There is no designated critical habitat in the project area. Additional protections are provided by the 2022 IAP Lease Stipulation K-3, ROPs A-1, A-2, A-3, A-4, A-5, A-6, A-8, C-2, D-1, E-20, F-1, I-1, and M-2 (Appendix A) and standard stipulations required by this EA (34, 37, 49, and 54) (Appendix B). The U.S. Fish and Wildlife Service section 7 consultation which helps inform this determination is pending.

Resources Considered	Determination	Location of Tiered Information (2020 IAP EIS)	Basis of Determination
Threatened and Endangered Species Spectacled eider	Minimally Impacted	2020 IAP EIS § 3.3.4 Consultation between BLM and USFWS is pending.	Spectacled eiders are listed as Threatened under the ESA. No impacts would be expected other than those already analyzed in the 2020 NPR-A Final IAP EIS. The Proposed Action would not alter the distribution, migration or location of fisheries resources that could impact spectacled eiders feeding from lakes or rivers in the project area. There is no designated critical habitat in the project area. Additional protections are provided by the 2022 IAP Lease Stipulation K-3, ROPs A-1, A-2, A-3, A-4, A-5, A-6, A-8, C-2, D-1, E-20, F-1, I-1, and M-2 (Appendix A) and standard stipulations required by this EA (34, 37, 49, and 54) (Appendix B). The U.S. Fish and Wildlife Service section 7 consultation which helps inform this determination is pending.
Threatened and Endangered Species Polar Bear	Minimally Impacted	2020 IAP EIS §3.3.6 Consultation between BLM and USFWS is pending.	CPAI has a Letter of Authorization (LOA 25-INC-08) for the Incidental and Intentional take (LOA 25-INT-03) of polar bears issued under the Marine Mammal Protection Act. Protections are provided by Section 7 of the ESA. Additional protections are provided by the NPR-A IAP ROPs A-3, A-4, A5, A-8, C-1, F-1, and I-1 (Appendix A) and standard stipulations required by this EA (14, 17, 18, 19, 34, 37, 54-57) (Appendix B). The U.S. Fish and Wildlife Service section 7 consultation which helps inform this determination is pending.
Non threatened and endangered birds	Minimally Impacted	2020 IAP EIS §3.3.4	Snowy owls, gyrfalcons, ravens, and ptarmigan may inhabit the proposed project area during the operations period. No impacts would be expected other than those already analyzed in 2020 IAP EIS. The Proposed Action would not alter the distribution, migration or location of water or fisheries resources that would impact birds feeding from lakes or rivers in the project area. Protections are provided by the 2022 NPR-A IAP ROPs A-2, A-3, A-4, A-5, A-8, C-2, E-9, E-20, F-1, and standard stipulations required by this EA (34, 37 and 54) (Appendix B).

Resources Considered	Determination	Location of Tiered Information (2020 IAP EIS)	Basis of Determination
Non threatened and endangered mammals	Potentially Impacted	2020 IAP EIS §3.3.5	Caribou, musk ox, grizzly bear, wolf, wolverine, fox, and small mammals (weasel, rabbits, rodents, and shrews) may inhabit the proposed project area. Impacts would be expected, and these impacts were described in the 2020 NPR-A IAP EIS. The Proposed Action could temporarily disturb and displace wildlife from the immediate area of activities. Furthermore, some aspects of the Proposed Action, plugging and abandonment of exploration sites, would be expected to return the sites to their natural state, serving to improve the area for future habitat use. Protections are provided by the 2022 NPR-A IAP ROD ROPs A-8, C-1, E-9, F-1 and M-1 and standard stipulations required by this EA (34, 37 and 54) (Appendix B). ***See Section 3.3 for more discussion on potential impacts to non-threatened and endangered mammals from the proposed activities.***
Soils	Potentially Impacted	2020 IAP EIS §3.3 and 3.2.9	The proposed snow and ice roads, trails and seismic lines would pass over tundra and ice-rich permafrost. Potential disturbance to vegetation and the soil surface would directly impact the thermal regime of permafrost. Impacts to permafrost initiate from alteration of ground temperatures that can be caused by compression or damage to vegetation. Disturbance from repeated heavy vehicle traffic that alters the insulating surface organic layer or exposes bare ground, decreases the solar reflectance of the surface, causing differential thawing of permafrost. ROPs for minimum snow depths and soil temperatures seek to minimize potential impacts from snow access routes, camp moves and seismic operations. Additional protections are provided by the 2022 NPR-A IAP ROD ROPs A-1, A-2, A-3, A-4, A-5, C-2, E-10, M-1, M-2, M-3. ***See Section 3.5 for more discussion on potential impacts to soils and permafrost from the proposed activities.***

Resources Considered	Determination	Location of Tiered Information (2020 IAP EIS)	Basis of Determination
Vegetation	Potentially Impacted	2020 IAP EIS §3.3.1 and 3.2.9	The proposed snow and ice roads, trails and seismic lines would pass over tundra and ice-rich permafrost. Potential disturbance to vegetation would directly impact the thermal regime of permafrost. Impacts to permafrost initiate from alteration of ground temperatures that can be caused by compression or damage to vegetation. Disturbance from repeated heavy vehicle traffic that causes changes in soil thermal regime and mechanical damage to vegetation, including the crushing of tussocks and dwarf shrubs, can result in community successional changes in vegetation, potentially reducing or changing habitat value for foraging species such as caribou. ROPs for minimum snow depths seek to minimize potential impacts from snow access routes, camp moves and seismic operations. Additional protections are provided by the 2022 NPR-A IAP ROD ROPs A-1, A-2, A-3, A-4, A-5, C-2, M-1, M-2, M-3. ***See Section 3.4 for more discussion on potential impacts to vegetation from the proposed activities.***
Visual Resource Management	Minimally Impacted	2020 IAP EIS §3.4.9	Temporary infrastructure such as ice roads, ice pads, operation equipment, and mobile units would not remain in the project area long term. Any remaining well heads and gravel from plugging activities would be located in lands categorized as Class IV for Visual Resources. Areas within Class IV allow for management activities to dominate the view and be the major focus of a viewer's attention, provided attempts are still made to minimize the impact of these activities. The remaining well heads and any gravel from well plugging would be spaced far apart and located at remote sites not viewable by the standard observer. Protections are provided by the 2022 IAP ROPs A-1, A-2, A-3, A-4, A-5, A-6, A-8, A-9, B-1, B-2, C-1, C-2, C-3, C-4, F-1, H-3, I-1, M-2, M-3, and lease notice 1 and 3.

Resources Considered	Determination	Location of Tiered Information (2020 IAP EIS)	Basis of Determination
Water Resources	Potentially Impacted	2020 IAP EIS §3.2.11	As part of the CPAI's one-year exploration and plugging program, an exception from the 2022 NPR-A IAP ROD ROP A-5 has been requested to refuel light plants placed on frozen lakes at water pump houses and at road intersections for safety purposes. Potential spills could impact lake water quality conditions. However, required plans for handling fuel (i.e., SPCC Plan) and secondary containment practices mitigate the risk of impacts to water resources during fuel transfers. In addition, an exception from the 2022 NPR-A IAP ROD ROP B-2(d) has been requested to harvest increased volumes of ice aggregate from a total of five lakes within the exploration east and west areas. While increased ice aggregate harvest could impact lake recharge during spring break up and hydrological connectivity of nearby waterbodies, multiple years of effectiveness monitoring support the conclusion that proposed ice/water volumes (i.e., 20 percent of total lake volume) would be within thresholds unlikely to impact lake recharge or hydrological connectivity. ***See Section 3.2 for more detailed discussion on potential impacts to water resources from the proposed activities.*** Protections are provided by the 2022 IAP ROPs A-2, B-1, B-2(a-c, e-f), and C-2, C-3, C-4; 2008 NPR-A ROD Lease Stipulation D-1; additional project ROPs required by this EA; and required permits issued by Environmental Protection Agency, Alaska Department of Environmental Conservation, ADF&G, and ADNR.

Resources Considered	Determination	Location of Tiered Information (2020 IAP EIS)	Basis of Determination
Waste (Hazardous/Solid)	Minimally Impacted	2020 IAP EIS §3.2.12	CPAI prepared a Waste Management Plan (Section 2.2.17.5) describing how they would handle and dispose of waste generated during the proposed action. During exploration drilling and testing activities they estimate up to 26,000 cubic feet of cuttings and 30,000 barrels of waste fluids could be produced (Section 2.2.10). They would transport these wastes for disposal at a Class II injection well at Alpine or Kuparuk or through a grind and inject facility at Alpine, Prudhoe Bay, or Milne Point. Other wastes they anticipate generating during the proposed action include solid waste from plugging and abandonment activities (Section 2.2.11) and garbage and waste water from camp activities (Section 2.2.12). Workers would consolidate trash from field and camp operations in wildlife resistant containers for disposal. They would incinerate food and other burnable wastes at camp, and transport non-burnable solid waste to Deadhorse or Prudhoe Bay for proper disposal. To support the proposed project, ConocoPhillips would use multiple gasoline and diesel fuel tanks with a maximum storage capacity of approximately 195,000 gallons of fuel at one time. They anticipate using over 2,900,000 gallons of fuel for the winter season. Workers would follow proper procedures when performing fueling and transfer operations, including using liners and drip pans as appropriate (Section 2.2.13). CPAI has an Alaska Department of Environmental Conservation (ADEC) approved Oil Discharge Prevention and Contingency Plan (Section 2.2.17.3) and a SPCC Plan (Section 2.2.17.4) describing how they will store and handle fuel and respond to potential spills. The following 2022 NPR-A IAP ROPs are applicable to the proposed action: A-1, A-2, and A-4

Resources Considered	Determination	Location of Tiered Information (2020 IAP EIS)	Basis of Determination
Wild and Scenic Rivers	Minimally Impacted	2020 IAP EIS §3.4.7	The 2020 NPR-A IAP EIS and 2022 NPR-A IAP ROD considered twelve rivers or river segments previously found to be eligible and suitable for designation. The plan adopted by the 2022 ROD provides protection to these rivers and river segments and their wild and scenic river values. One of the twelve eligible rivers or river segments, the Colville River, is within the proposed action area. Protections for this river are primarily for permanent infrastructure. Although the proponent is requesting some surface disturbance for the drilling and plugging operations, the proposed actions would not affect this river enough to require more detailed analysis due to its distance from the eligible river and its placement near already existing infrastructure.
Wilderness Characteristics	Minimally Impacted	2020 IAP EIS §3.4.8	Protections are provided by the 2022 NPR-A IAP ROPs A-1, A-2, A-4, and M-2 (Appendix A).

CHAPTER 2. ALTERNATIVES

This chapter describes the alternatives analyzed in Chapter 3.

2.1. Alternative A – No Action Alternative

Under Alternative A, CPAI would not conduct seismic exploration, drilling of four exploration wells, and plugging and abandonment of the two existing exploration wells. Winter routes and ice pads would not be constructed to support the proposed activities. No water would be removed from lakes to support the construction of new proposed ice roads and pads, drilling, well closures, or the camps associated with these applications.

Although the No Action Alternative would not meet the regulatory requirements to permanently plug and abandon two previously drilled exploration wells as required under 43 CFR Part 2360, 43 CFR Part 3160, and 43 CFR 3162.3-4, the No Action analysis is used to provide a baseline against which action alternatives are measured.

2.2. Alternative B – Proposed Action

Under Alternative B, CPAI would conduct seismic exploration work, drill four new exploration wells, and permanently plug and abandon two existing exploration wells located within the NPR-A. Access routes would traverse portions of Oil and Gas Units, including the Greater Mooses Tooth Unit (GMTU) and the Bear Tooth Unit (BTU), non-unitized leases, and/or unleased lands enroute to the project areas are located (Figure 1). CPAI has divided the proposed winter work into three distinct areas: Seismic Exploration, Exploration East, and Exploration West.

CPAI would adhere to the applicable lease stipulations from the 2008 IAP (USDOI BLM 2008) and 2013 IAP (USDOI BLM 2013) and the applicable ROPs from the 2022 IAP ROD (USDOI BLM 2022) unless a waiver, exception, or modification is applied for and approved by BLM.

2.2.1. Seismic Exploration

The proposed seismic program would be conducted south of the Bear Tooth Unit (BTU) and west of the Colville River (Figure 2). This three-dimensional (3D) seismic data acquisition program is designed primarily in support of future exploration and would occur between November 2025 and September 2026. Activities would be similar to previous seismic programs conducted in the NPR-A and would include equipment and operations typical of those prior programs. Additional details regarding the proposed seismic program are provided in Section 2.2.9.

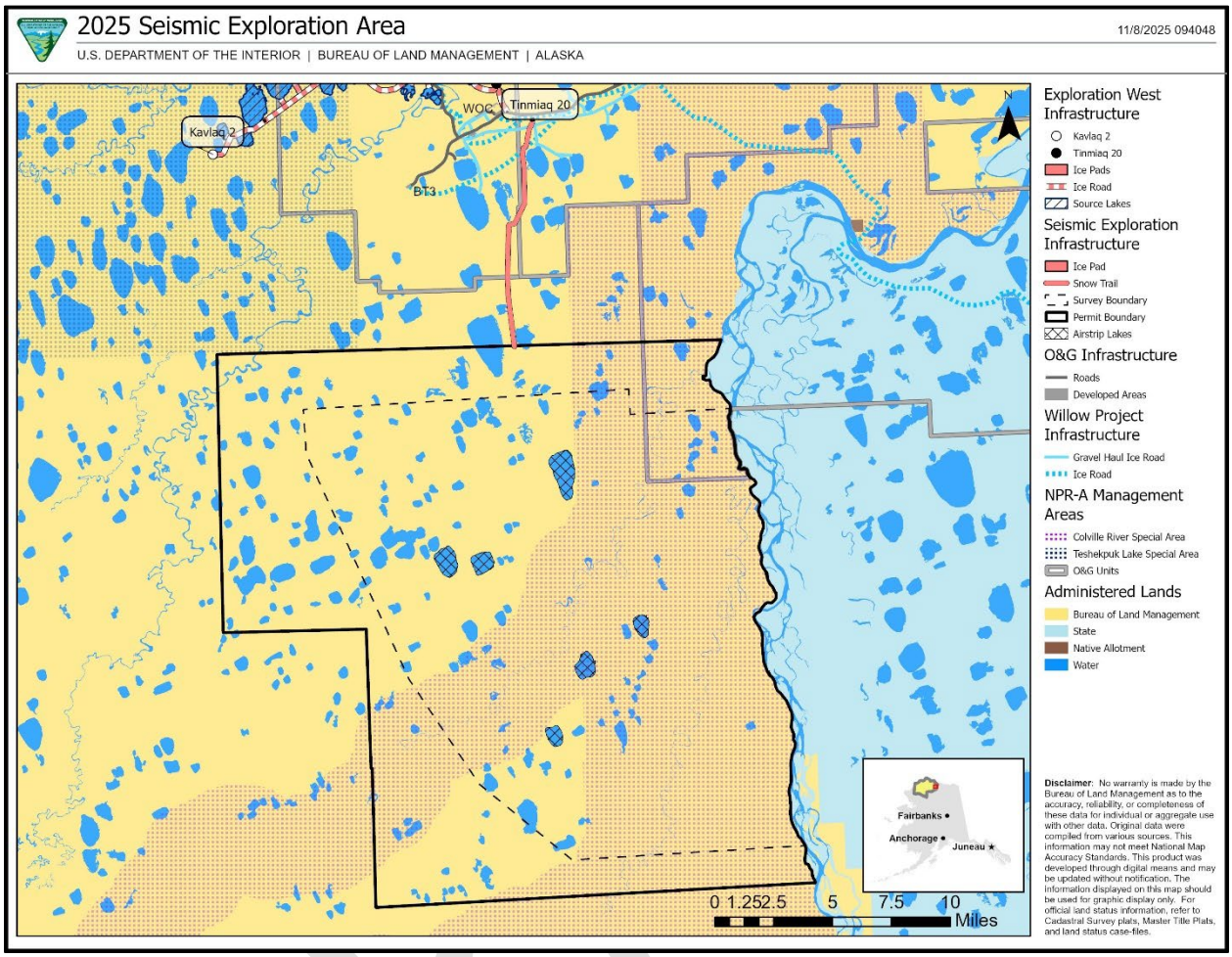

Figure 2: Seismic Exploration project area overview.

The full project area of 467 square miles (grey solid line in Figure 2) includes the area of the seismic program along with a buffer around it to facilitate safe and efficient crew movements within the area. The total extent of the survey area (grey dashed line in Figure 2) would be approximately 300 square miles, or 192,000 acres. In general, activities associated with the seismic program would only be occurring in a small portion of the total project area at any given time.

2.2.2. Exploration East

The proposed work for Exploration East would occur near the Willow gravel mine (Figure 3). It would involve drilling a single exploration well, Suqqaq 4, and plugging an existing exploration well, Flat Top 1, which was originally drilled in 2014. Access for drilling Flat Top 1 was authorized under Rights-of-Way FF096701. All well locations are located on BLM lands managed by the Arctic District Office and leased by CPAI. Exact locations of the wells are provided in Table 2.1. Additional details regarding proposed drilling and plugging activities are provided in Sections 2.2.10 and 2.2.11.

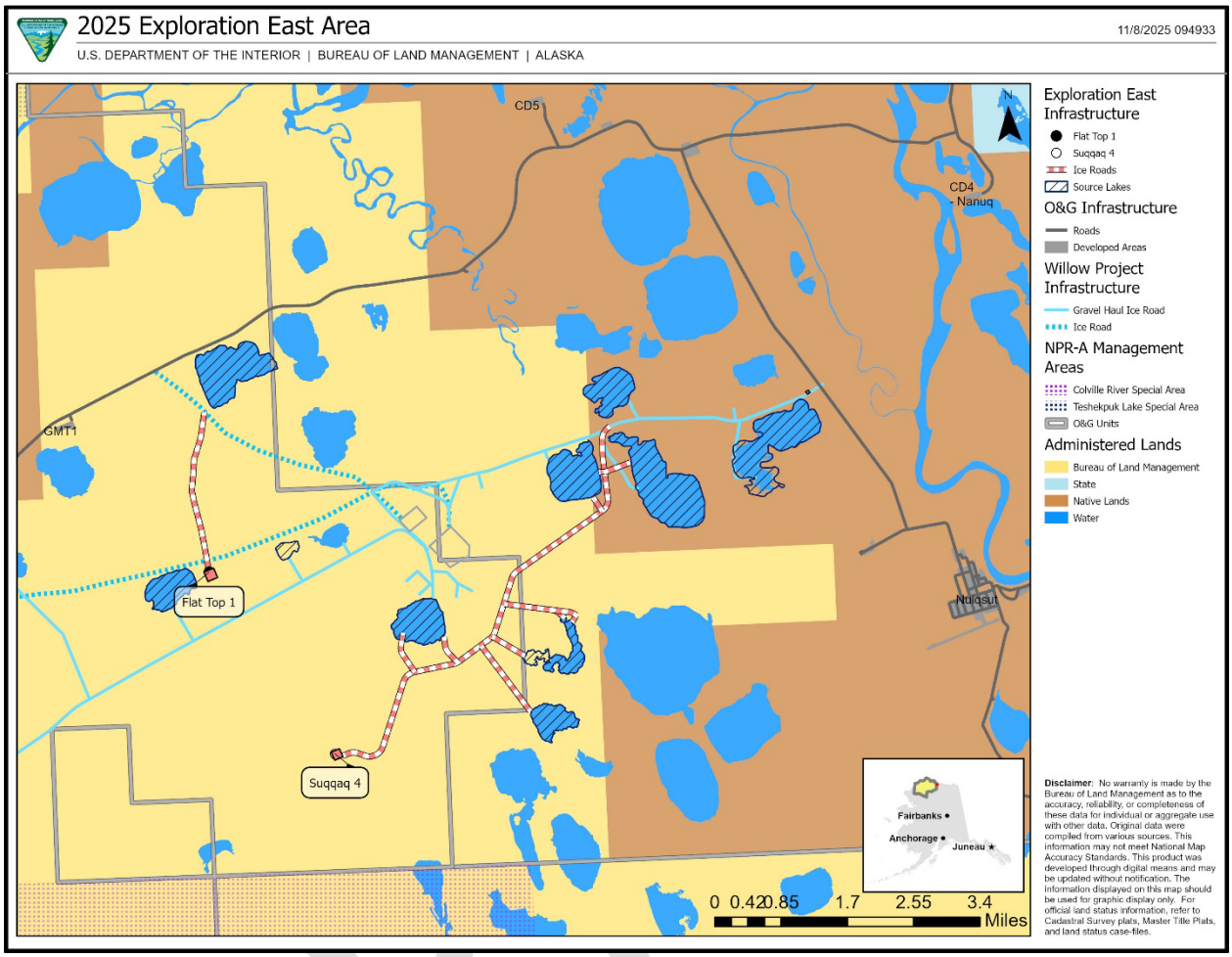

Figure 3. Exploration East project area overview

Table 2.1. Location of Proposed Work on Oil and Gas Wells

Well Name	Proposed Action	Lease #	Applicable ROD	MTRS	Latitude	Longitude
Kavlaq 2	Drill	AA094403	2013	U009N002W19	70.12172222	-152.5032778
Suqqaq 4	Drill	AA081795	2008	U010N003E27	70.19233333	-151.3455556
Tinmiaq 19	Drill	AA094407	2013	U010N002W03	70.24738889	-152.3535
Tinnik 3	Drill	AA094166	2013	U010N003W24	70.20111111	-152.5494167
Flat Top	Plug and Abandon	AA087896	2008	U010N003E16	70.227421	-151.409247
Tinmiaq 20	Plug and Abandon	AA095290	2008	U009N001E06	70.161088	-151.997901

Note: Coordinates are provided in NAD 83 ASP Zone 4

2.2.3. Exploration West

The proposed work for Exploration West would occur just west of the BT1 and BT3 production pads (Figure 4), which are part of the BTU. It would involve drilling three exploration wells: Kavlaq 2, Tinnik 3, and Tinmiaq 19. In addition to drilling the three exploration wells, CPAI would plug the existing exploration well Tinmiaq 20 which was originally drilled in 2020.

Access for drilling Tinmiaq 20 was authorized under Rights-of-Way FF097559. All well locations are located on BLM lands managed by the Arctic District Office and leased by CPAI. Exact locations of the wells are provided in Table 2.1. Additional details regarding proposed drilling and plugging activities are provided in Sections 2.2.10 and 2.2.11.

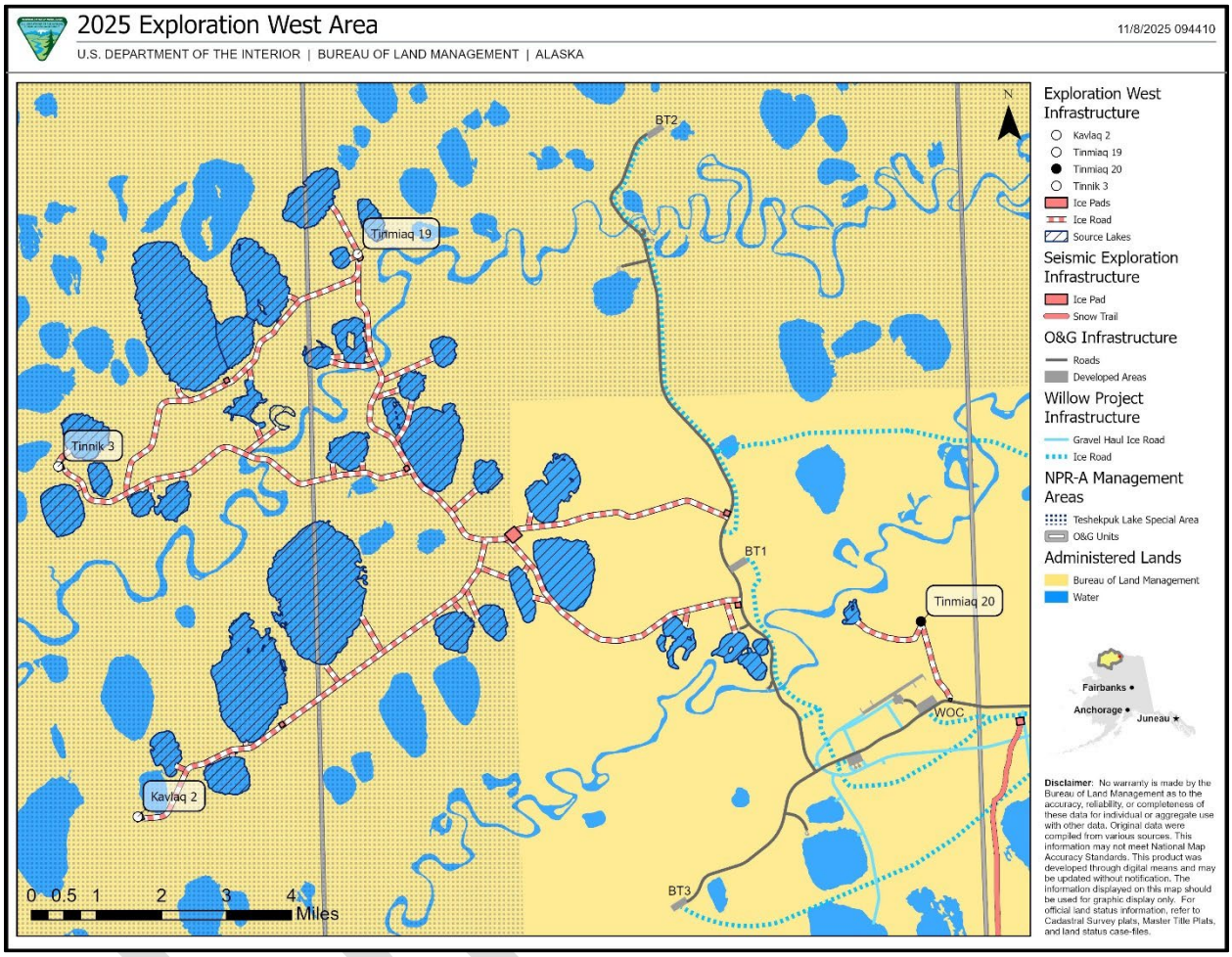

Figure 4. Exploration West project area overview

2.2.4. Proposed Schedule

The approximate schedule for the proposed activities is shown in Table 2.2. The proposed project activities would begin with ground verification, staking of the access route, and/or prepacking (creating a base) of the snow/ice road routes and snow/ice pad locations to make them suitable for road/pad construction. These activities may begin as early as November 2025, or when suitable snow cover and temperature occur. Mobilization of equipment and access to the project areas would begin in January 2026, and project activities would occur through April 2026. Cleanup of surface debris would extend into the summer of 2026. The timing of all proposed project activities would be dependent on field conditions present, and include, but are not limited to, snow cover, temperature, rig availability, and logistics. Additional details regarding prepacking and construction are provided in Sections 2.2.6 and 2.2.7.

Table 2.2. Approximate Schedule of Exploration and Plugging Activities (subject to change based on weather and/or logistical issues)

Activity	Proposed Timeframe
Route verification, Prepacking, and/or Construction of Snow and Ice Infrastructure	November 2025 – March 2026
Drilling, Completion, Testing, and Seismic Operations	January 15, 2026 – April 28, 2026
Demobilization	April 1, 2026 – May 1, 2026
Clean up of Surface Debris, Inspections, and Close Out	May 2026 – September 2026

2.2.5. Access

Access to the different project areas would include a combination of permanent gravel roads, temporary snow or ice roads, and temporary ice airstrips constructed on lakes. Ground based travel to the proposed project areas would start from existing infrastructure. Starting from the Prudhoe Bay oil fields, access would continue through the Kuparuk oil field, along the Alpine roads (ice and gravel roads), to the Greater Mooses Tooth and Willow Development gravel roads. Access from the gravel roads to the different project areas then follows a combination of project specific access as described in Sections 2.2.5.1-2.2.5.3 below and shown in Figures 2-4. The equipment would only be transported to the project locations once conditions are adequate for tundra travel to the area of operations. At project completion, the demobilization of equipment to other locations or Prudhoe Bay would occur using the same routes. The exploration and plugging areas would be closed to the public for purposes of safety and confidentiality.

A combined total of approximately 40.5 miles (~7.2 miles for Exploration East and ~33.3 miles for Exploration West) of project specific ice road would be required to access the exploration drilling sites and existing wells for both Exploration East and Exploration West. The snow trail to access the Seismic Exploration area would be approximately 10.1 miles long.

A variety of vehicles, construction equipment, and trailers would use these routes to access the 3 project areas. A full equipment list is provided in Appendix E, and includes water and fuel trucks, loaders, graders, passenger vans, pickups, and tractor trailers. The pound per square inch (psi) for vehicles using the routes would range from 1 to 100 psi depending on the vehicle and tire type (tundra vs. standard road tires). There may be up to 4000 total round trips to/from the project areas for the four exploration wells, 1000 round trips for the two wells to be plugged, and 120 round trips for Seismic Exploration work over the course of project activities.

2.2.5.1. *Seismic Exploration*

During the work season, personnel would be transferred to and from the project area via tundra travel using personnel carriers and/or by plane. Access to the seismic exploration area from the gravel roads would start on the Lake R0058 ice road spur. CPAI is proposing to construct a 600 ft by 600 ft ice pad staging area located adjacent to this ice road spur and then construct a snow trail from the staging area ice pad heading mostly south to access the seismic project area. The exact location of the snow trail may vary up to 1 mile from either side of the centerline based on conditions present at the time of construction. Location of the proposed ice pad staging area is shown in Figure 2 and described in Table 2.4. No buffer zones are anticipated to be needed for the construction of ice pads.

Temporary airstrips are being requested to aid with transport of personnel, food, and equipment via fixed wing aircraft (CASA or Otter) to and from the project area on the lakes depicted in

Figure 2 and described in Table 2.3. An estimated 20 landings on ice airstrips are anticipated for the season. The airstrips would be prepared by clearing the lake of snow and setting up necessary lights and equipment. To do this, Conoco has applied for an exception to the 2022 NPR-A IAP ROP B-2(g) (see Section 2.2.8.1). Airstrips would be oriented in a way to ensure there is a sufficient length of runway as required for the aircraft. Lake ice thickness would be checked regularly using ground penetrating radar and drilling test cores.

Table 2.3. Proposed Temporary Ice Airstrip Locations. Latitudes and longitudes are a generic point near the center of the lake.

Airstrip	Latitude	Longitude	Township	Range	Sections
A	69.919111	-151.902281	6 North	1 East	4
			7 North	1 East	28, 29, 32, 33
B	69.865021	-152.111683	6 North	1 West	15, 16, 21, 22
C	69.863517	-152.047657	6 North	1 West	13, 14, 23. 24
D	69.821539	-151.772047	5 North	1 East	1
			6 North	1 East	36
E	69.797107	-151.875439	5 North	1 East	9, 10, 15, 16
F	69.754073	-151.931323	5 North	1 East	28, 29, 32, 33

2.2.5.2. *Exploration East*

Access to the Exploration East project area from the gravel roads would start on already authorized ice roads as part of the Willow Development ROW (serial number AKAK106233187), running south of the Greater Mooses Tooth 1 gravel pad and Greater Mooses Tooth gravel road (Figure 3). Project specific ice roads would be constructed off the Willow ice roads as depicted in Figure 3. Exact alignment of the routes may be relocated to minimize impacts to vegetation and tundra and would be within ¼ mile on either side of the centerline of the route. No buffer zones are anticipated to be needed for the construction of ice pads.

2.2.5.3. *Exploration West*

Access to the Exploration West project area from the gravel roads would include project specific ice roads constructed off the gravel roads as depicted in Figure 4. Exact alignment of the routes may be relocated to minimize impacts to vegetation and tundra and would be within ¼ mile on either side of the centerline of the route. No buffer zones are anticipated to be needed for the construction of ice pads.

2.2.6. Winter Route and Pad Preparation

Snow trails, ice roads, and ice pads would be pioneered and/or prepacked prior to equipment being transported across them to the project areas. Prepacking snow creates a base for the ice road, promotes lower tundra soil temperatures, and compresses the insulating snow to accelerate freezing of soils before construction of winter roads and pads. Frozen ground conditions help protect tundra during winter road and ice pad construction, maintenance, and use, and prepacking is a common practice on the North Slope of Alaska to help promote and preserve frozen ground conditions.

Prepacking would not begin until at least six inches of snow cover has accumulated, and CPAI would provide the BLM with snow survey data for the planned area of operations prior to the start of prepacking activities. Once 6 inches or more of snow has accumulated, low ground

pressure vehicles (such as snow machines, Terra Gators, smooth tracked tuckers, Rolligons, and/or Dynahaulers) would be driven along the proposed snow trail, ice road, and ice pad locations to compact and capture snow in place ("prepacking" snow), leading to reduced insulating properties of existing snow and accelerated freezing of soils to a depth that would protect soils from ice road/pad construction, maintenance, and use. Only low ground pressure vehicles would be used on the frozen tundra. Snow and/or ice from permitted lakes may also be used to assist in prepacking activities. For ice roads and pads, after the initial use of vehicles to compact and capture snow in place, water may be sprayed on the prepacked snow to fill pore spaces and form an ice crust to further accelerate the freezing of soils and armor the base before construction.

River and stream crossings (Appendix F) would occur at areas of grounded ice or of sufficient ice thickness, as verified prior to crossing, and where there is minimal willow cover. Adequate ice thickness is determined per CPAI's Non-grounded Ice Entry Safety Protocol and calculated based on vehicle weight. Where ice is not grounded or sufficiently thick, it may be necessary to apply water to increase the thickness of the ice to establish temporary river crossings with snow ramps. Upon completion of use, all crossings would be slotted, breached, or weakened to facilitate breakup and minimize potential impacts to fish movement and stream banks. Any snow or ice used as fill for ramps would be removed from banks in a manner that does not disturb the natural stream bank.

Access routes constructed across lakes are generally avoided when possible. When necessary, like when constructing a route to a water pumping station, lake crossings access is determined per CPAI's Non-grounded Ice Entry Safety Protocol. For Seismic Exploration, lake crossings would be more frequent to allow for consistent data acquisition and follow the protocol as described in Section 2.2.9.

All routes would be constructed to avoid hazards such as steep terrain and environmentally sensitive areas, including willow habitat, areas with low snow cover, and culturally sensitive sites. Minor site-specific variations in the routes shown in Figures 2-4 would likely occur due to field conditions and to minimize impacts to vegetation and/or tundra.

Once tundra conditions meet the specifications for tundra travel, the snow trail to the Seismic Exploration area would be constructed. Maintenance work to keep the trail clear would continue throughout the winter season, but the application of water and ice chips as described in Section 2.2.7 would not occur for this route.

No camps or fuel storage would be required during route and pad pioneering and prepacking activities. Prepacking activities could begin as early as November 2025, although the actual dates of prepacking would depend on temperature and snow levels.

2.2.7. Ice Route and Pad Construction

Ice road and pad construction would start once prepacking the route has been completed and the ground is frozen to at least a depth of 12 inches. The work is proposed to begin as early as November 2025; however, the start date may vary based on ground conditions. The optimal ambient temperature for ice road construction is approximately -20 degrees Fahrenheit, although construction can still occur outside this range.

Construction of ice roads would occur for all project specific routes associated with the Exploration East and West project areas, and creation of ice pads would occur for all project

specific pads in all three project areas. Ice road construction for Exploration East would start from the Willow gravel mine ice road system (Figure 3) and for Exploration West would start from the Willow Development section of gravel road that runs north to the BTU pads (Figure 4).

The creation of ice surfaces would be constructed using standard industry practices. Typically, this entails pushing snow and ice chips onto the prepacked areas and packed down by heavy equipment. Liquid water may also be sprayed onto the area to further armor the road or pad surface. Water and ice for ice infrastructure construction and maintenance would be taken from permitted lakes (Appendix H) within the respective project area. Maintenance would continue throughout the winter season and would include snow plowing and applying water to maintain the ice infrastructure thickness and to repair areas of deterioration. Additional details regarding water sources and requirements are provided in Section 2.2.8. No alteration of the tundra is required for the creation of ice surfaces.

Ice roads would be a minimum of 6-inches thick and generally 25-35 feet wide depending on equipment and vehicle requirements. Pullouts or wide sections of the ice road would be constructed at certain locations along the route, the number and location of which would be based on field and safety conditions present at the time of construction.

All ice pads would be used for staging equipment, safety stations, satellite offices, storage areas (e.g., fuel, equipment, miscellaneous tanks, etc.), maintenance buildings, and project operations. Ice pads would be at least 100 feet from the shoreline of water bodies. Locations of the proposed ice pads are shown in Figures 2-4 and described in Table 2.4. CPAI staked the exploration well site ice pads in the summer of 2025 and inspections of the sites were conducted by BLM personnel to collect baseline site condition information (Appendix G). In the event of any spill, affected ice would be chipped and/or scraped, and the scrapings would be hauled to an approved disposal facility.

Table 2.4. Exploration and Plugging Ice Pads. Latitudes and longitudes are a generic point near the center of the pad.

Project Area	Ice Pad Name	Latitude	Longitude	Dimensions (ft)	Area (Acres)
Seismic	Colville West Ice Pad	70.137947	-151.936832	600’ x 600’	8.26
Exploration East	Suqqaq 4 Drilling/Testing Ice Pad	70.191927	-151.344686	800’x800’	14.7
	Flat Top 1 P&A Ice Pad	70.226738	-151.408720	700’x700’	11.3
	E7 Ice Pad	70.256605	-151.084147	200’x200’	0.9
Exploration West	Exploration Base Camp (XBC)	70.183331	-152.258393	1000’x1000’	23
	Tinmiaq 19 Drilling/Testing Ice Pad	70.274050	-152.352915	800’x800’	14.7
	Tinnik 3 Drilling/Testing Ice Pad	70.200826	-152.548072	800’x800’	14.7
	Kavlaq 2 Drilling/Testing Ice Pad	70.121553	-152.502275	800’x800’	14.7

Project Area	Ice Pad Name	Latitude	Longitude	Dimensions (ft)	Area (Acres)
	Tinmiaq 20 P&A Ice Pad	70.160628	-151.997945	400'x400'	3.7
	E1 Staging Pad	70.165966	-152.115296	450'x450'	4.6
	E2 Staging Pad	70.186894	-152.120552	450'x450'	4.6
	E3 Staging Pad	70.198828	-152.325608	400'x400'	3.7
	E4 Staging Pad	70.219501	-152.439893	400'x400'	3.7
	E5 Staging Pad	70.141665	-152.409978	400'x400'	3.7
	E6 Staging Pad	70.143214	-151.980797	200'x200'	1

2.2.8. Water Source Requirements

Fresh water would be required for the construction and maintenance of ice roads and ice pads, the crew camp, well drilling, and well closures. Water would be pumped from the lakes shown in Figures 3 and 4 and transported by truck, tractor, or all-terrain vehicle to use on the ice road/pads, the camp, and well sites. Information regarding lakes proposed for water withdrawals to support Exploration East and West is provided in Appendix H. Water needed for Seismic Exploration work would come from melted snow collected from lakes within the project area.

All water intake hoses would have screens at the intake points to prevent entrapment of fish, regardless of whether the lake has been identified as fish-bearing. CPAI would comply with the ADF&G screen designs (including screen mesh that is no greater than ¼-inch in size) and would implement 0.5 feet per second or less intake velocity. In addition to water, ice chips and snow could also be removed from the lakes, but snow would only be removed from fish bearing lakes at water pumping stations, on areas of grounded ice, and where approved for the construction of lake ice airstrips.

The proposed water source lakes would be accessed by ice road spurs from the main ice road using the most direct route possible. Snow could also be removed from areas of lakes for installation of temporary water pump houses, as well as to provide access for water trucks and ice chippers, and truck turnaround areas.

Signs would be placed at lake access points to identify each permitted lake that is being actively used. Light plants would be placed on the frozen lakes at the water houses and at road intersections for safety purposes. Light plants are portable units about the size of a small generator with a stand of lights about ten feet into the air. The light plants would be refueled on the frozen lakes following CPAI's standard procedures for fuel transfers. All light plants would have 110 percent fuel containment.

Ice road construction requires approximately one million gallons of freshwater per mile. The construction of each ice pad requires approximately 250,000 gallons per acre. Drilling the new exploration wells would require approximately 300,000 gallons of water per well, and permanently closing wells would require approximately 150,000 gallons of water per well. Estimates of water withdrawal for camp use for Exploration East and West project areas are estimated to be 10,162,500 gallons. Throughout the Exploration East and West project areas, and estimated 91,607,200 gallons of water is anticipated to be withdrawn from the lakes listed in

Appendix H. The sole source of water for Seismic Exploration would be melted snow collected from lake surfaces.

For Exploration East the source of fresh water for ice road/pad construction and maintenance, well drilling and closures, and camp use would come from lakes along and adjacent to the ice roads shown in Figure 3. The freshwater requirements for constructing ice road and pads, well closures, and camp use associated with Exploration East are approximately 16.7 million gallons (Table 2.5).

Table 2.5. Estimated water required for Exploration East.

Activity	Estimated Quantity	Water Use*	Estimated Total Gallons Proposed for Use
Ice Roads	7.2 Miles	1,000,000 per Mile	7,200,000
Ice Road Spurs	10 Miles	Average of 200,000 per mile**	2,000,000
Ice Pads	26.86 Acres	250,000 per Acre	6,715,000
Rig Use	1	300,000 per Well	300,000
Well Closure	1	150,000	150,000
Camp Use	70 Days	3,750 per Day	262,500
TOTAL			**16,657,200**

Camp water use is based on 50 gallons per person per day, averaging 75 people per day. Estimates per mile take into account that in some areas more water is needed than others; however, throughout the project area this is the average amount of estimated water usage.*

For Exploration West the source of fresh water for ice road/pad construction and maintenance, well drilling and closures, and camp use would come from lakes along and adjacent to the ice roads show in Figure 4. The freshwater requirements for constructing ice road and pads, well closures, and camp use associated with Exploration West are approximately 75 million gallons (Table 2.6).

Table 2.6. Estimated water required for Exploration West.

Activity	Estimated Quantity	Water Use*	Estimated Total Gallons Proposed for Use
Ice Roads	34 Miles	1,000,000 per Mile	34,000,000
Ice Road Spurs	30 Miles	Average of 200,000 per mile**	6,000,000
Ice Pads	96 Acres	250,000 per Acre	24,000,000
Rig Use	3	300,000 per Well	900,000
Well Closure	1	150,000	150,000
Camp Use	720 Days	13,750 per Day	9,900,000
TOTAL			**74,950,000**

**Camp water use based on 8 camps x 90 days at 50 gallons per person per day, averaging 275 people per day.*

***Estimates per mile take into account that in some areas more water is needed than others, however throughout the project area this is the average amount of estimated water usage.*

Water use amounts shown in Tables 2.5 and 2.6 are estimated. The actual amount of water needed would be based on environmental conditions including the amount of snow cover, temperature, ice road/pad construction, and maintenance needs but the amount of water use would not exceed the amounts identified in Tables 2.5 and 2.6.

Water, ice chips, and snow removed from the lakes shown in Figures 3 and 4 would be authorized by the Alaska Department of Natural Resources Temporary Water Use Authorizations and Alaska Department of Fish and Game Fish Habitat Permits, where necessary. Potable water for human use could also be withdrawn from the permitted lakes and would be treated in accordance with Alaska Department of Environmental Conservation drinking water standards. Water may also be hauled from additional approved sources at Kuparuk, Alpine or Prudhoe Bay.

2.2.8.1. ROP B-2 Exception

CPAI has requested an exception from ROP B-2(d) of the 2022 NPR-A IAP ROD to allow for the additional removal of ice chips from lakes where additional volume needs are documented beyond what is requested in this proposal. The exception would identify how CPAI would meet the objectives of B-2, and no water withdrawal/ice chip harvest activities would commence prior to approval of the exception request.

In addition, CPAI is requesting an exception to ROP B-2(g), to allow for the clearing of snow during construction of the proposed ice airstrips as described in Section 2.2.5.1.

If approved, the exception would only pertain to the described activities the exception is requested for and not all three projects holistically.

2.2.9. Seismic Activities

The method of seismic acquisition would be Source Driven Shooting combined with Compressive Seismic Imaging. The seismic operation would be conducted utilizing rubber tracked/vibroseis vehicles and wireless autonomous recording devices (geophones/nodes). Rubber tracked vibroseis vehicles would provide an energy source to generate a subsurface seismic wave. The resulting signals and data would be recorded with geophones and wireless nodes. Vibroseis vehicles would typically operate within a constrained area approximately 660 feet from the next line and move in a grid-like pattern. Geophone receiver lines would run perpendicular to source lines, and both source and receiver lines would be spaced approximately 660 feet apart. Vibrator points would be located along source lines every 20-65 feet; and geophones would be located along receiver lines every 50-280 feet. Approximately 40 receiver lines would be placed on the ground at one time. Vibrators, while operating would sound similar to a large tractor and the seismic vibrations that are generated are largely inaudible and would only be felt in the immediate vicinity (within ~20 feet) of the vibrators.

Wireless nodes and geophones would be laid out by crews on foot and by use of tundra travel-approved vehicles. Each station would be placed individually with Global Positioning System (GPS) locations surveyed upon deployment and retrieval. Stations are comprised of a node and a single survey lath to assist with locating the node at the time of retrieval. The node is a self-contained all-in-one unit that has the recording sensor (geophone), recording system and

memory, and battery built into a single housing. The specific node used for this project is the GeoSpace GCL Node (GCL-450-04450-01-02 - EASYCommerce), although the metal spike on the bottom of this model is replaced with a flat snow base for this project. Upon retrieval, all GPS data would then be entered into a database so the location of each unique node is tracked. Up to a total of 30,000 wireless nodes would be used throughout survey operations.

Lake ice thickness surveys would be done prior to crossing to verify the integrity of the ice via a tucker equipped with Ground Penetrating Radar (GPR) systems. Lakes determined to have a higher risk profile (i.e., they are deep) would be checked on foot using a hand-operated auger in a grid system of drilled holes prior to equipment entry. In areas where river channels exist, unusual surface fracturing is evident, or where drilling shows substandard ice conditions, the grid would be tightened to ensure a safe path for equipment to follow. Freeboard measurements would be conducted when working on floating ice to ensure ice stability.

Personnel would typically work 12-hour shifts and operations would be ongoing 24 hours per day. Field communications with crews would be done via radio.

2.2.10. Exploration Drilling and Testing Activities

Drilling and testing of the exploration wells would be done similar to previous North Slope exploration and appraisal wells. The wells would be authorized by drilling permits issued by the BLM and Alaska Oil and Gas Conservation Commission (AOGCC). All drilling activities would be conducted using drilling rigs suitable for arctic operations. Well information would be confidential under federal law.

Water-based and oil-based drilling muds would be used. Each drilling location would have up to ten cuttings bins inside ice-bermed storage cells permitted by ADEC to store cuttings prior to being hauled away for disposal. Once work is complete, the storage cells would be trimmed and the ice hauled to an approved disposal facility. Excess drilling muds and cuttings would be disposed of into an approved disposal well.

For Exploration East an anticipated 6,000 cubic feet of cuttings and up to 5,000 barrels of waste fluids could be generated from the well. For Exploration West an anticipated 20,000 cubic feet of cuttings and up to 25,000 barrels of waste fluids could be generated from the three exploration wells. The waste fluids would be collected in portable storage tanks or vehicles before being removed from the site and disposed of at an appropriate disposal facility. Appropriate secondary containment structures would be used for all waste storage facilities.

Once drilling is completed and production casings are set, production testing and well evaluation through hydraulic stimulation and extended flow periods may be performed. Produced fluids would pass through a separator system to prevent oil from being carried over into the gas stream. Oil from testing would be transported to facilities in Alpine or Kuparuk or held in tanks within lined bermed areas until testing is complete. After testing, the produced oil would either be injected back into the formation from which it was produced or processed though the Alpine or Kuparuk facilities. Produced gas would be flared. If a well proves unsuccessful, it would be plugged and abandoned prior to completion of same season winter activities.

2.2.11. Plugging and Abandonment (Well Closure) Activities

Well closures would be conducted as schedules and resources allow. Work would be completed using equipment (e.g., Coil/Slickline/E-Line/Cement Pumps) suitable for arctic operations.

To permanently close the two wells, cement would be pumped down the tubing of each well. To provide adequate space for personnel to safely access the wells and perform welding and cutting operations, an area of roughly 15 feet by 15 feet around each wellhead would be excavated to approximately 5 feet in depth. Once the cement has set, all casings and tubing would be cut approximately 4-5 feet below ground level. The original guardrail, cellar, wellhead, and cut casings and tubing would be removed and transported to Prudhoe Bay for proper disposal. A marker plate would be welded on top of the original well casing, and the site would be backfilled with the excavated soil. An additional five cubic yards of clean gravel would be placed over the well site to compensate for any settling as the soil thaws.

2.2.12. Camp and Support Facilities

All three projects are proposing the use of temporary field camps as described in Table 2.7 to support project personnel. Up to 745 personnel may be working throughout the three project areas at any one time, with up to 200 personnel within the Seismic project area, up to 120 personnel within the Exploration East project area, and up to 425 personnel within the Exploration West project area. The average daily number of personnel throughout the three project areas at any one time could be 550. These personnel may travel back and forth between other approved camp facilities at the WOC, K-Pad, or Alpine, or utilize one of the camp facilities proposed as part of the project work depending on availability and job duties.

Table 2.7. Proposed support camps

Project Area	Camp Name	Maximum Capacity	Location
Seismic	Seismic Camp	200	Moved every 2-6 days
Exploration East	Doyon Camp 1, 2, or 5	55	Well Location
	Stallion RC-34	55	XBC or Well Location*
Exploration West	Brown Bear w/ Annex	85	XBC
	Sea Lion	100	XBC
	Doyon Camp 1 or 2	55	Well Location
	Doyon Boars Nest	55	Well Location
	Doyon Camp 4	30	XBC or Well Location*
	Stallion RC-26	45	XBC or Well Location*
	Stallion RC-33	55	XBC or Well Location*
	Stallion RC-41	55	XBC or Well Location*

*Camp units may be moved between the Exploration Base Camp and the designated well location as required

Stallion Camp RC-42 while not listed in table 2.7 is included in Appendix E as alternatives, subject to the availability of the camp units outlined above.

Most project specific camps would be moved around to various well locations and exploration base camps as needed until demobilization at the end of the winter season (roughly May 1). The Seismic Exploration camp would be moved every 2 to 6 days generally North to South through the project area depending on survey progress and regional conditions to help mitigate tundra

impacts. This camp move route would cover approximately 45 miles (~55 acres) and generally take the same route in at the beginning and out at end of project work.

The camps would consist of a combination of kitchen, dining area, restrooms, showers, offices, sleeping quarters, generator rooms, shops, laundry, medical clinics, and/or storage trailers. Not all camps would have all listed facilities, and which facilities are present at the different locations would depend on project needs. Equipment at camps could include long haul fuel tractors, remote fuelers, a water maker, incinerator, resupply and survival sleigh, tractors, loaders, and rubber tracked tuckers. A full equipment list is provided in Appendix E.

Potable water for human use at the Exploration Drilling and Plugging project areas would be withdrawn from the lakes identified in Figures 3 and 4 and described in Appendix H, and water would be treated in accordance with ADEC drinking water standards. Potable water for the Seismic Exploration project area would be produced by a skid-mounted water maker which melts snow. Snow for the water maker comes from grounded-area lake surfaces, and any impurities are filtered and the filters are handled as solid waste and would be properly disposed of. Water may also be hauled from additional approved sources at Kuparuk, Alpine, Willow, or Prudhoe Bay.

Camps would potentially be using Sanitherm wastewater treatment units authorized by ADEC Alaska Pollutant Discharge Elimination System (APDES) permit. The Sanitherm units would service multiple camps and be staged at Exploration Base Camp (XBC). Sanitherm maintains its own APDES permits. Camps with no wastewater treatment units would be equipped with wastewater tanks. Wastewater from these camps would be collected and hauled to the Sanitherm units or to permitted wastewater treatment facilities outside the NPR-A. All treatment systems used would meet the ADEC APDES requirements.

Wastewater generated by the camp facilities will be processed and treated to meet the permitted ADEC discharge requirements obtained by facility operator. Estimated volume of wastewater generated from Seismic Exploration is 300,000, Exploration East is 522,600 and Exploration West is 2,500,000 gallons. The 2022 IAP ROPs require that all CPAI facilities and camps are required to minimize impacts to local wildlife populations. CPAI has provided an approved Wildlife Interaction Plan outlining their committed measures to meet the ROPs. To prevent attracting animals, food and other waste known to be attractive to animals would be kept inside buildings, vehicles, or in outdoor dumpsters equipped with animal-proof lids that minimize odors. Food waste and trash discarded indoors would be placed in appropriately marked containers or designated kitchen dumpsters. Burnable waste may be incinerated in a skid-mounted incinerator or sent to Alpine or Willow for incineration. Solid, non-burnable waste and ash from the incinerator would be deposited in large wildlife resistant containers and transported to a landfill in Deadhorse. Garbage would be consolidated from field and camp operations in wildlife resistant containers until it can be managed for further disposal. See Sections 2.2.17.1, 2.2.17.2, and 2.2.17.5 for further information about wildlife interaction and waste management plans.

Upon completion of the winter portion of the project, all materials would be removed from the site and all debris would be hauled to an approved disposal site. An onsite Health, Safety, and Environmental (HSE) advisor and/or local hire subsistence representative would revisit every

camp site after the camp has moved on to its next location to ensure clean-up is sufficient and efforts documented by HSE staff.

2.2.12.1. Communication Towers

Communication towers are proposed to be erected in the Exploration East and West areas to support operations. No towers are proposed for Seismic Exploration work. All towers would be temporary and removed during demobilization.

For Exploration East one 45-foot free standing communication tower would be erected at the Suqqaq 4 drill site. No guide wires or anchors would be required. The tower would be mounted on a 12,000 pound (lb) concrete block placed on the surface of an ice pad. Red lights would be used to increase visibility of the tower and concrete block. There would also be an 8-foot by 20-foot telecommunication (TCOM) shelter located next to the tower to house the required network equipment. There would also be a generator and light plant located on the pad with the tower and TCOM shelter. The tower and associated structures would be temporary and removed during demobilization.

For Exploration West one 120-foot communication tower would be erected at the XBC along with a 60-foot tower erected at each of the three exploration well sites. Communication towers would be anchored with guide wires attached to concrete blocks on the surface of the ice pads. The concrete blocks for the 120-foot tower would be approximately 22,000 lbs. and would be 6 feet by 7 feet by 3.5 feet. For the 60-foot towers the concrete blocks would be 6,000 lbs. and measure 4 feet by 4 feet by 3 feet. To increase visibility guide wires would be equipped with bird diverters, 16 feet of candy-striped sleeve, and red lights mounted to the concrete blocks.

2.2.13. Fuel and Chemical Storage

Remote fuel storage and refueling would be required for all project areas. All staged fuel would be stored in lined, bermed secondary containment capable of holding 110 percent of tank contents. All fueling and transfer operations would be performed in accordance with the CPAI North Slope Fluid Transfer Procedure (S-001), and liners would be used as required by the CPAI North Slope Liner and Drip Pan Use Guidance (S-002). Each contractor working throughout the project areas would maintain a SPCC plan for fuel storage associated with their operations (as applicable), in addition to the SPCC Plan submitted by CPAI for exploration and plugging activities. See Section 2.2.17.3 and 2.2.17.4 for more information about spill and SPCC plans.

For Seismic Exploration, several 3000-4500 gallon self-contained mobile fuel tanks would be moved with the mobile camp and utilized throughout the project area. These tanks would be mounted on skis or tracks and refilled at the seismic area staging ice pad on an as-needed basis. When equipment needs to be refueled, they would either refuel at camp or one of the mobile tanks would be deployed to the equipment's location.

For Exploration East one gasoline tank (9,900 gallon) and three diesel tanks (9,900 each) would be required for the proposed project. A total of up to 39,600 gallons of fuel could be stored within these tanks at any one time (Table 2.8). An estimated 900,000 gallons of fuel would be required for the entire eastern project area over the course of the winter season.

For Exploration West two gasoline tanks (9,900 gallons each) and up to 12 diesel tanks (9,900 or 24,000 each) would be required for the proposed project. A total of up to 194,800 gallons of fuel

could be stored within these tanks at any one time (Table 2.8). An estimated 2,000,000 gallons of fuel would be required for the entire western project area over the course of the winter season.

Table 2.8. Proposed Fuel Storage

Project Area	Location	Number of Tanks		Quantity per tank (Gallons)	Total Combined Fuel Amount (Gallons)
		Gasoline	Diesel		
Exploration East	Flat Top 1 Plugging Ice Pad	0	1	9,900 Diesel	9,900
	Drilling/Testing Ice Pad	1	2	9,900 Deisel 9,900 Gasoline	29,700
				Total	39,600
Exploration West	Exploration Base Camp (XBC)	1	4	24,000 Diesel 9,900 Gasoline	105,900
	Drilling/Testing Ice Pads	1	6	9,900 Diesel 9,900 Gasoline	69,300
	Tinmiaq 20 Plugging Ice Pad	0	1-2	9,900 Diesel	19,800
				Total	194,800

Refueling of equipment associated with Seismic Exploration work would mostly occur from fuel trucks. An average of 5,000 gallons of ultra-low sulfur diesel fuel would be consumed daily. No fuel would be stored within 100 feet of a water body or on active floodplains nor would any refueling occur within 100 feet of a water body for Seismic Exploration work. This is in compliance with the 2022 NPR-A IAP ROD ROP A-5 and is not part of the exception request described in Section 2.2.13.1.

Drip liners would be placed under parked vehicles and containment would be placed under valves or connections during transfer operations. All vehicles would contain a spill kit and be inspected before use to ensure there are no leaks, no duck ponds or containment devices attached to the vehicle, and no mechanical issues. All observed spills would be noted and cleaned up by on-site personnel. All reportable spills would be communicated through the proper agencies and landowners.

All light plants and pump houses would be equipped with a small portable generator to power the lights and pumps at water withdrawal areas. All light plants and pumps would have secondary containment capable of holding 110 percent of the pump's fuel capacity. Refueling of the light plants and pumps would occur on the surface of frozen lakes at the pump houses approximately every 12 hours. Proper secondary containment would be used during all fueling operations and the pump house fuel tank would also be contained inside the pump house as an extra measure to prevent spills on the lake. Pumps associated with the lake light plants and pump houses would be refueled on the frozen lakes following CPAI's standard procedures for fuel transfers which includes using liners and drip pans at all connection points during the entire refueling process (before refueling begins through disconnection).

Camps would also include a housekeeping/maintenance room with basic chemicals required to operate the camp including cleaning supplies, laundry detergent, dish soap, hand sanitizer, and other general camp maintenance products. Cement products, chemicals, and mix fluids would be mobilized to each well site by cement pump truck and bulk trucks during operations and would be onsite short-term during well closures.

2.2.13.1. ROP A-5 Exception

CPAI has requested an exception from the 2022 NPR-A IAP ROD ROP A-5, which states "Fuel storage and refueling of equipment within 100 feet of any lake shoreline or top of streambank is prohibited. Small fuel caches (up to 210 gallons) are permitted within this distance. The AO may allow larger fuel caches or refueling operations within the 100 foot setback if properly designed to account for local site conditions". If approved, the exception would only pertain to the described activities the exception is requested for, and not all three projects holistically.

CPAI has requested this exception to allow them to refuel light plants, pump houses, and generators located on lakes being used for water withdrawal and ice removal. Moving light plants off the lakes for refueling would be impractical as light plants would require an additional vehicle to move them every 12 hours for refueling. In addition, moving pump houses off lakes for refueling would not be practical or safe as they are heavy, self-contained modules and would have to be moved using a winch or flatbed truck. No other fueling or storage of fuel would occur within 100 feet of any lakeshore or streambanks.

2.2.14. Air Emissions

Sources of air emissions from the three project areas would include rig engines, camp generators, steam generators, mobile non-road engines, and construction equipment, oil burners, hot-air heaters, light plants, and well testing and flaring equipment. These emissions would be temporary, short-term, and localized, only occurring over the winter season, and transitory, occurring in various locations depending on the schedule. Air emissions would be expected to be relatively small and be an incremental addition to all other emissions in the area including emissions from CPAI and other operations.

To reduce potential impacts to air quality, vehicles would be turned off and plugged in where possible and not be started sooner than needed to adequately warm up before beginning a shift based on temperature and equipment type.

CPAI would obtain ADEC air quality authorization for the drilling locations under Minor General Permit #1 (MGP1) for Oil and Gas Drilling Rigs (18 AAC 50.390).

2.2.15. Summer Cleanup Activities

All winter roads, ice pads, work areas, and the camp locations would be inspected during summer 2026 (May - September 2026) to ensure no debris or materials had been left on the landscape after winter seismic work, well drilling, and abandonment activities. Roads, pads, and work areas would be flown with a helicopter at low elevation (<500 feet) to survey for debris. If debris is located, the helicopter would land, and all materials would be removed from the site. Approximately 630 landings over approximately 14 days would be expected for the 2026 summer cleanup associated with exploration and plugging activities. Two to four crew members are estimated for each helicopter-based clean-up crew, with the potential of up to 3 helicopters running at any one time. Landings are typically short enough to not require the helicopter to fully

shut down; however, it could be longer if there's a large amount of debris or larger pieces requiring additional handling.

All personnel would be housed in existing facilities such as Alpine or Willow for summer cleanup activities. Refueling of helicopters would occur at one of the existing helicopter base facilities located on existing gravel infrastructure.

Human waste may be generated during cleanup activities when personnel are away from lavatory facilities. The deposition of materials would be infrequent and widely distributed geographically. CPAI adheres to a "pack it in, pack it out" policy, and measures would be taken to prevent human waste from being deposited away from lavatory facilities when possible. Any paper or sanitary waste would be bagged, removed from site, and disposed of at Alpine Central Facilities. Care would be taken to avoid negative impacts to waterbodies or plants.

2.2.16. Cultural Resources and Historic Properties

Multiple surveys for cultural resources have occurred in the past in the project area, The most recent being conducted in August 2025.

There are no known cultural resources sites within the project area. The Program would not be located on or near Native Allotments. CPAI has submitted a report detailing the cultural resource surveys to BLM separately to maintain protection of sensitive cultural resource information.

Permanent surface disturbance resulting from the Program is limited to new wells and surface disturbance for each well would be limited to the well cellar, which is 8 feet in diameter. All other Program impacts would be temporary. Known culturally sensitive areas and private cabins would be avoided by the appropriate distance (e.g., one mile from private cabins).

2.2.17. Contingency Plans

2.2.17.1. Wildlife Interaction Plan

CPAI has in place a Wildlife Avoidance and Interaction Plan that is applicable for all CPAI's North Slope locations, including all 3 project areas. The plan provides guidance to CPAI employees and contractors working on the North Slope of Alaska in order to assist them in implementing appropriate, standardized procedures when wildlife is encountered. CPAI would comply with the requirements of the Wildlife Avoidance and Interaction Plan during activities associated with the proposed projects. Wildlife that may be in the area during the winter includes owls, ravens, arctic and red fox, musk oxen, over-wintering caribou, and possibly wolverine and wolf. CPAI also has a polar bear interaction plan that has been reviewed and approved by the U.S. Fish Wildlife Service (USFWS). All project personnel receive wildlife specific training, which includes, but is not limited to, information on identification and reporting of North Slope wildlife, attractant and waste management, and safety and wildlife avoidance information.

To prevent wildlife encounters, attractants are strictly managed. Food would be kept inside buildings or containers that minimize odors and animal proof dumpsters would be used. Hazardous materials would be kept in drums or other secure containers. Buildings and pad layouts would be designed to maximize visibility and minimize potential areas that a bear could crawl into or otherwise be hidden from view. Project personnel would be instructed not to feed or bait wildlife of any type in any way and wildlife encountered along the roads are given the right-of-way.

CPAI maintains a Public Safety Permit from ADF&G for certain deterrence activities to maintain the safety of project personnel and/or wildlife. CPAI would use a local subsistence representative for the projects to assist in the avoidance and minimization of interactions with subsistence resources.

Grizzly bears also inhabit the general exploration and plugging area, but they should be denned in the winter season. In the unlikely event that a grizzly bear be encountered, the procedures outlined in CPAI's Wildlife Plan would be applicable. CPAI would work with ADF&G and ADNR to determine if there are any known grizzly bear dens in or near the project area and if so, would avoid any dens. CPAI and its contractors would exercise caution while establishing any route and watch for bear signs. Any sightings would be immediately reported to the site superintendent and personnel in the area warned of the location of the bear and subsequently reported to ADF&G within 24 hours.

2.2.17.2. Polar Bear Interaction Plan

The likelihood of encountering polar bears within the project areas is low; however, CPAI has a Polar Bear Avoidance and Interaction Plan that is applicable for all CPAI's North Slope locations including the exploration and well plugging operations. The Polar Avoidance and Interaction Plan identifies the procedures designed to avoid attracting bears to project areas, reduce the risk of interactions with bears, and prescribes actions that would be taken if a bear is encountered, including denning bears. This document also identifies what responsibilities personnel have regarding bear interactions, including reporting. CPAI would comply with the practices described in the plan during activities associated with the proposed actions. The Polar Bear Avoidance and Interaction Plan has been reviewed and approved by the USFWS. CPAI also has a Letter of Authorization (LOA 25-INC-08) for incidental (unintentional) take of polar bears during the Program’s activities.

CPAI and its contractors would exercise caution and watch for signs of polar bears while establishing infrastructure and operating in the field. If bear signs are observed or a den site identified the ADF&G and USFWS would be notified and the transportation route altered to avoid disturbance.

All exploration and plugging personnel would also receive an additional training module on polar bear den identification and avoidance. CPAI conducts winter aerial infrared (AIR) flights to detect and avoid maternal polar bear dens. AIR flights are typically conducted in December and/or January, and dates may be further refined by regulatory authorizations and/or environmental conditions.

CPAI understands that authorization to take polar bears by harassment (deterrent activities) for the protection of both human life and polar bears while conducting the exploration and plugging activities in polar bear habitat remains in place, per the Marine Mammal Protection Act. CPAI has a Letter of Authorization for Incidental/Intentional Take, 25-INT-03, to cover all CPAI North Slope activities (expires January 12, 2027).

2.2.17.3. Oil Discharge Prevention and Contingency Plan

An approved Oil Discharge Prevention and Contingency Plan is maintained for use in guiding control and cleanup up any accidental discharges of fuels, lubricants, or produced fluids. Information related to immediate response actions, spill response equipment mobilization and

deployment, and capability to respond to small discharges or well control incidents is described in the plan.

2.2.17.4. Spill Prevention Control and Countermeasure Plan

Per 40 CFR Part 112 (Oil Pollution Act regulations), fuel storage of more than 1,320 gallons requires that a SPCC plan be developed and maintained on site. CPAI has an SPCC Plan for exploration activities, which covers all project activities; however, contractors working throughout the different project areas would also be required to maintain an SPCC for their respective subset of project operations.

2.2.17.5. Waste Management Plan

Waste and recyclables would be temporarily stored onsite prior transporting to the North Slope landfill located in Deadhorse, where they would be recycled, treated, disposed, or transferred to appropriate commercial facilities in Alaska or the lower 48 states. Certain non-hazardous waste, such as food waste, may be incinerated in a portable incinerator or at Alpine's incinerator, recycled, or transported for disposal at an appropriately permitted landfill facility.

Waste management practices would be in accordance with the Alaska Waste Disposal and Reuse Guide (Revision 11, October 2021). Bagged oily waste, universal wastes, and small quantities of hazardous waste that that accumulate onsite would be managed in proper containers and hauled to CPAI facilities for shipment to commercial recycling, treatment, storage, or disposal facilities. The Alaska Waste Disposal and Reuse Guide (Revision 11, October 2021) is CPAI's principal resource for waste management activities in Alaska.

2.2.17.6. Other Plans

CPAI maintains emergency response plans and procedures developed for CPAI's facilities that are generally applicable to any project incident requiring a response. The CPAI North Slope operating fields have an Incident Management Team (IMT) which follows the Incident Command System (ICS). The IMT is on call 24 hours per day. Personnel involved in an emergency situation would notify CPAI Security who would then initiate the emergency response.

The mobile Seismic camp would have a conventional phone system (i.e., normal phone numbers using, for example, a voice over internet protocol) and internet access via satellite. CPAI maintains 24-hour security coverage at the CPAI Tower in Anchorage. Personnel on duty are trained to handle incoming emergency calls.

2.2.18. Training

CPAI requires all unescorted North Slope employees and contractors to complete an 8-hour unescorted training program provided by the North Slope Training Cooperative. The unescorted training includes review of the Alaska Safety Handbook, and sections on personal protective equipment, camps and safety orientation, hazard communication, HAZWOPER Level 1, and Environmental Excellence.

Site specific training, such as CPAI's BLM-approved NPR-A orientation program, would be conducted for all personnel who would be working in the NPR-A. Personnel receiving NPR-A training would be provided with additional information regarding CPAI's proposed winter operations. The NPR-A training module teaches awareness of the environmental, social, and

cultural concerns that relate to NPR-A. Topics included in the training are the importance of not disturbing archeological and biological resources and habitats; guidance on how to avoid disturbing of the aforementioned; and avoidance of conflicts with subsistence hunting and fishing activities, and pertinent mitigation.

2.2.19. Local Hire and Community Relations

The CPAI employment process places a priority on local hire. The intent of the process is to search for competitive local candidates. This includes maintaining the ConocoPhillips Alaska External Job Posting Website, notifying the Alaska Job Service of vacancies, and maintaining a network of Alaska community organizations which receive notices of vacancies..

In previous years, CPAI has participated in job fairs held in the village of Nuiqsut. The job fairs are an opportunity for CPAI to inform Nuiqsut and other North Slope residents about jobs available with CPAI's winter activities on the North Slope. Attendees can gather information on the specific jobs available with CPAI and its contractors, the time period the jobs would be available, and the pay scales. The job fair is an excellent opportunity for local residents to become familiar with the planned winter operations and to talk with the people who would be hiring residents.

In addition to the local hire efforts described here, CPAI would adhere to their previously approved subsistence plan which was developed as part of the Willow Project, approved March 14, 2023.

CHAPTER 3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL IMPACTS

This chapter provides an overview of the resources that could be potentially affected by the activities described in Chapter 2. Chapter 3 also takes into consideration the No Action Alternative. The No Action Alternative would reject the Proposed Actions and deny authorization of seismic exploration, drilling of four exploration wells, and the plugging, closing, and abandonment of the two existing wells. The existing condition (baseline conditions) would be the same for the No Action Alternative as the Proposed Action.

3.1. Reasonably Foreseeable Future Actions (RFFA) Common to all Issues

Table 3.1 identifies past, present, and reasonably foreseeable projects that will be considered when analyzing how these activities, along with the action alternatives, could impact resources in the Project Area. Reasonably foreseeable activities are those actions for which there are existing decisions, funding, formal proposals, or which are highly probable, based on known opportunities or trends. The 2020 NPR-A IAP EIS (USDOI BLM 2020) which is incorporated by reference, discusses and analyzes reasonably foreseeable development scenarios in the NPR-A.

The projects and activities shown in Table 3.1 will be taken into consideration as part of the existing condition as well as the environmental impacts described throughout the rest of this chapter.

Table 3.1. Winter 2025/2026 NPR-A Projects

Operator	Locations and Proposed Work
BLM Legacy Well Program	Plugging and abandonment activities at select legacy wells with access acquired via the North Slope Community Winter Access Trail.
Alaska West Express Inc. (Lynden Oilfield Services)	Travel on the North Slope Community Winter Access Trail.
Cruz Construction	Travel on the North Slope Community Winter Access Trail.
MagTec	Travel on the North Slope Community Winter Access Trail.
UIC	Travel on the North Slope Community Winter Access Trail.
Blue Goose Hauling LLC	Travel on the North Slope Community Winter Access Trail.
Arnold Arey	Travel on the North Slope Community Winter Access Trail.
North Slope Borough	Snow Trail between villages in the NPR-A collectively known as the Community Winter Access Trail
ADF&G	Transportation of housing units utilizing portions of the CWAT near Nuiqsut, AK and snow trails heading south to Umiat, if approved.
Quintillion Subsea Operations Inc	Installation and maintenance of a fiber optic cable from GMT2 pad to Utqiagvik, AK, if approved.
ASTAC	Installation and maintenance of a fiber optic cable from Nuiqsut, AK to Utqiagvik, AK, if approved
ConocoPhillips Greater Mooses Tooth One (GMT1) Operations	There are currently 7 wells operating on the GMT1 pad. Operations of the pad and wells would continue during the same time as the Proposed Action.
ConocoPhillips Greater Mooses Tooth One (GMT2) Operations	There are currently 15 wells operating on the GMT2 pad. Operations of the pad and wells would continue during the same time as the Proposed Action.
ConocoPhillips Willow Development continued construction	The Willow Development Area is connected by a gravel road to GMT2. The first oil production is planned for the winter of 2029/2030. Gravel mining and construction activities would continue throughout the project area during the same time as the Proposed Action.
Subsistence	Subsistence activities occur throughout the Project Area.

Operator	Locations and Proposed Work
Summer Studies	Ongoing summer studies for bathymetry, fish, vegetation, and summer cleanup activities.

3.2. Issue 1: How would refueling and fuel storage within 500 feet of waterbodies impact fish and water resources? How would construction and use of airstrips on frozen lakes impact fish? How would an increase in ice aggregate harvest from lakes impact water resources?

3.2.1. Methodology and Assumptions

The analysis area of impacts to fish and water resources would include various lakes within the CPAI seismic exploration, exploration east, and exploration west areas.

3.2.2. Affected Environment

A comprehensive summary of (1) water resources and (2) fish species, including distribution and life histories, within the region can be found in the 2012 NPR-A IAP EIS (USDOI BLM 2012). In addition, the 2020 NPR-A IAP EIS (USDOI BLM 2020) contains updated supporting information based on more recent studies.

3.2.3. Environmental Effects

3.2.3.1. *Impacts of Alternative A – No Action Alternative*

Under the No Action Alternative, the proposed activities would not take place, so there would be no potential impacts to fish and(or) water resources from (1) refueling of light plants on frozen lakes, (2) construction and use of airstrips on frozen lakes, and (3) an increase in ice aggregate harvest volume from five lakes within the exploration east and west areas.

3.2.3.2. *Impacts of Alternative B – Proposed Action*

ROP A-5 Exception

Comprehensive summaries of the potential impacts of contaminant spills on fish and water resources can be found in sections 3.2.11 (Water Resources), 3.2.12 (Solid and Hazardous Waste), and 3.3.3 (Fish) in the 2020 NPR-A IAP EIS (USDOI BLM 2020). More specific to the proposed action, potential spills during light plant refueling would likely be small in volume (less than or equal to 50 gallons) and would directly affect small areas. The probability of small spills occurring as a result of the Proposed Action is greater than medium-sized or large/very large spills (USDOI BLM 2020). However, required plans for handling fuel (e.g., SPCC plan) would mitigate the risk of spills during fuel transfers. Built-in secondary containment capable of holding 110 percent of the fuel volume as described in the Proposed Action would further mitigate the risk of spills, thereby meeting the objective and intent of ROP A-5. Should refueling protocols fail, fuel spilled on ice and snow can be cleaned up effectively by removing contaminated material from the site before it can enter liquid water. Given the protective

measures and the season of the activity, measurable impacts to fish and water resources from fuel spills are unlikely.

This exception has been granted in the past for previous winter operations (USDOI BLM 2015b, 2017, 2018, 2024). To date, there have been no reported spills on waterbodies for operators that were granted an exception from ROP A-5, illustrating that proactive mitigation and other requirements have been effective in minimizing spills.

ROP B-2(d) Exception

Impacts of water withdrawals on water sources and fish are described in Section 4.2.2.1 "*Water Withdrawal and Ice Road Construction*", Section 4.2.2.2 "*Drilling and Operations*", Section 4.3.2 "*Fish*", and Section 4.3.2.1 "*Construction*" of the GMT1 SEIS (USDOI BLM 2015a); in Section 4.2.2.2 "*Water Resources*" and Section 4.3.2 "*Fish*" of the GMT2 SEIS (USDOI BLM 2018a and b); and Section 3.2.11 "*Water Resources*" and Section 3.3.3 "*Fish*" of the NPR-A IAP EIS (USDOI BLM 2020).

Impacts of exceptions to the 2022 NPR-A IAP ROD ROP B-2(d) on fish and water resources for other water source lakes within the NPR-A are described in Section 4.1.1 "*Issue 1: Fish*" of the ConocoPhillips Alaska, Inc. 2015/2016 Exploration Project Environmental Assessment (USDOI BLM 2015b); Section 4.1.1 "*Issue 1: Fish and Water Resources*" of the CPAI 2017/2018 Exploration Project EA (USDOI BLM 2017); Section 3.2.2 "*Direct and Indirect Impacts*" of the ConocoPhillips Alaska, Inc. Exploration 2018-2019 Environmental Assessment (USDOI BLM 2018c); and Section 3.2.2 "*Direct and Indirect Impacts*" of the ConocoPhillips Alaska, Inc. Exploration and Appraisal 2019-2020 Environmental Assessment (USDOI BLM 2019). There have been no known changes that would effect or alter these analyses.

The primary concern about removing large volumes of ice aggregate (exceeding volumes outlined in ROP B-2(d)) from lakes during winter is that lake levels would not be replenished naturally by snowmelt during spring break up and (or) that summer lake outflow would be impacted that could, in turn, impact habitat connectivity and fish movements during summer. The Proposed Action would minimize potential impacts to overwintering fish because (1) winter liquid water withdrawals have not been permitted for lakes M0420 and MM1707 (only ice) and (2) winter liquid water withdrawals from lakes M0104, M0105, and M0702 would be within thresholds that have been illustrated to be broadly protective of overwintering fish (i.e., ROP B-2a, b, and c) (Hinzman et al. 2006; Chambers et al. 2008; Hilton et al. 2009).

The characteristics of the five lakes, summarized in Table 3.2, are similar to those analyzed in previous EAs where an exception from ROP B-2(d) was granted (USDOI BLM 2015b, 2017, 2018c, 2019, 2023).

Table 3.2. Lake basin characteristics and volume estimates.

Lake	Physical Characteristics			Fish Presence		Applicable ROP B-2 Classification			Water Use Request			Exception Considerations
						15% Water	30% Water <5ft of	35% Total Lake				

	Max Depth (feet)	Surface Area (Acres)	Volume (MG)	Sensitive Fish	Resistant Fish	<7ft of Ice (MG)	Ice (MG)	Volume (MG)	Water Volume (MG)	Ice Volume (MG)	Total Volume (MG)	Percent total Lake Volume
M0104	5.5	514	618.3	No	Yes	0.0	0.315	216.405	0.315	42.300	42.615	7%
M0105	6	360	492.93	No	Yes	0.0	6.280	172.526	6.280	28.090	34.370	7%
M0420	6	126	91.04	Yes	Yes	0.00	0.009	31.864	0.0	9.040	9.040	10%
M0702	6.7	119	185.94	No	Yes	0.00	3.927	65.079	3.927	1.390	5.317	3%
MM1707	6.7	657	622.554	Yes	Yes	0.00	11.781	217.894	0.0	123.40	123.40	20%

The combined volume of ice/water currently permitted by the State of Alaska is 20 percent of total lake volume. This threshold was set based on many years of lake recharge monitoring that repeatedly demonstrated this threshold did not impact lake recharge, or replenishment, during spring break up (Baker 2002, 2007, 2008, 2011, 2012, 2013a, 2013b, 2014a, 2014b, 2014c, 2015; USDOI BLM 2018c). Because the requested ice aggregate volumes are at or within this threshold (i.e., 20 percent total lake volume or less), impacts from increased ice aggregate harvest on lake recharge would be minimal. This is further supported by water use reporting that indicates CPAI generally uses a fraction of the total permitted volume from other permitted water source lakes in the area (USDOI BLM 2019).

Despite ongoing monitoring efforts to document potential impacts of winter liquid water withdrawals and ice aggregate harvest, it is recognized that understanding impacts to surface water connectivity from lake water extraction is complex because flow regimes can be highly variable and influenced primarily by annual climate conditions. For example, a recent simulation study concluded downstream flows within the northeast portion of the NPR-A may be impacted by lake water extraction during years with extreme environmental conditions of low rainfall and low snowfall (Gädeke et al. 2022). This conclusion was based on simulations of modeled streamflow responses under different climate scenarios (Gädeke et al. 2022). However, a similarly recently analysis of stream discharge data collected as part of a comprehensive hydrological monitoring program in areas of oil and gas development in the NPR-A concluded that low flows and reduced connectivity have not been an issue to date with regional increases in summer rainfall (Arp and Whitman 2022). As part of an adaptive management approach, BLM is continuing to invest in multiple aspects of cooperative research and monitoring of lake systems on the Arctic Coastal Plain related to lake water use and potential advancements in aquatic resource management.

Considering the potential to affect a proportionally lower number of lakes within the context of thousands of lakes in the region, the fact that a wide range of natural variability exists annually, and the intensity (severity) of any impacts would be low, any potential effects to the five lakes would be minimal.

ROP B-2(g) Exception

A deviation from the 2022 NPR-A IAP ROD ROP B-2(g) has been requested to construct airstrips on ungrounded lake ice to bring crews, food, supplies, and equipment to the proposed seismic project area. Airstrips would be located on areas of ungrounded ice for safety reasons, as grounded ice would be more likely to unexpectedly buckle or crack (CPAI, personal

communication). No water would be used to construct the airstrips, and no fuel would be stored at the airstrip, thereby minimizing potential impacts to water resources.

Comprehensive summaries of the potential impacts of compacting and(or) removing snow cover on fish can be found in Section 3.3.3 (Fish) of the 2020 NPR-A IAP EIS (USDOI BLM 2020).

In general, removal or compaction of snow from ungrounded ice on fish-bearing waterbodies is limited to reduce the risk of causing increased ice growth that could impinge on fish overwintering habitat space. This could, in turn, reduce dissolved oxygen levels. Depletion of dissolved oxygen, caused by overcrowding or over-demand by biological and chemical processes, can result in fish mortality (Schreier et al. 1980; Schmidt et al. 1989; Reynolds 1997) as well as non-lethal effects (Kramer 1987; Evans 2007). Fish species within the NPR-A are broadly classified as "sensitive" or "nonsensitive" to low concentrations of dissolved oxygen (USDOI BLM 2012). More specifically, Alaska blackfish and ninespine stickleback are considered "nonsensitive" because these species have been routinely documented surviving in aquatic environments characterized by extremely low concentrations of dissolved oxygen (Lewis et al. 1972, Crawford 1974, MJM Research 2002; Haynes et al. 2014). All other species in the region are considered "sensitive" in that acute or prolonged exposure to hypoxic conditions could have lethal or sublethal effects (USDOI BLM 2020). As a result, the magnitude of potential impacts on fish in these lakes depends on (1) the unfrozen volume of the lake relative to the size of the airstrip and (2) the presence and abundance of sensitive and(or) non-sensitive fish. Potential impacts on fish would be expected to be greater for a small lake with low quantities of liquid water and marginal overwintering habitat relative to a large, deep lake that would have high-quality overwintering habitat.

Similar exceptions have been granted for operators that proposed construction of ice airstrips on ungrounded ice for safety reasons, as an airstrip on grounded ice could heave or buckle and pose a greater safety risk than an airstrip on ungrounded ice (USDOI BLM 2017, 2018, 2023). In these previous circumstances, the lakes in question were relatively large and deep enough that the airstrips and aprons were a small proportion of the total ungrounded ice area. The operators monitored the effect of the airstrip on ice thickness and found that the ice was thicker under the airstrip but that grounding did not occur in areas outside of that for natural conditions. This supports the general conclusion that construction of ice airstrips on lakes would have minimal impacts to overwintering fish.

Ultimately, potential impacts on overwintering fish, if any, would be local and impact only individual fish that those lakes; potential impacts would not be expected to be reflected at the population level. Any impacts would be minimized through applicable mitigation measures.

3.3. Issue 2: How would the project impact caribou and other wildlife?

3.3.1. Methodology and Assumptions

The analysis area of caribou and other wildlife would include the entire project area.

3.3.2. Affected Environment

Caribou (*Rangifer tarandus*) are the most abundant large mammal on the North Slope and are an important subsistence species for regional Alaska native hunters in Nuiqsut, Utqiagvik,

Anaktuvuk Pass, Atqasuk, and Wainwright. Caribou are also hunted and viewed by other visitors to the region and are prey for grizzly bears (*Ursus arctos*) and wolves (*Canis lupus*). The caribou herd most commonly occurring in the proposed project area is the Teshekpuk Caribou Herd (TCH) which was estimated to comprise 61,500 caribou in 2022 (Carmen Daggett, ADF&G, pers. comm. 2022). The Teshekpuk Caribou Herd ranges over an area of approximately 71,000 square miles (45,352,994 acres) on the arctic coastal plain.

Teshekpuk Lake provides key habitat for calving, post-calving, and insect-relief for the TCH in most years (Parrett, 2021; Yokel *et al*., 2011). While some caribou remain near Teshekpuk Lake year-round, many animals from the herd utilize the area surrounding Teshekpuk Lake over the summer and then migrate to the southeast for the winter. Important migration pathways to and from winter ranges cross the proposed project area, with caribou traversing the area during spring migration from winter range towards calving habitat in April and May (Figure 5). Consequently, migrating caribou could be encountered during proposed operations in the project area. Additionally, caribou are found in the project area during all times of the year, including during calving, post-calving, and insect relief periods, and therefore could also be encountered during summer clean-up activities associated with the proposed project.

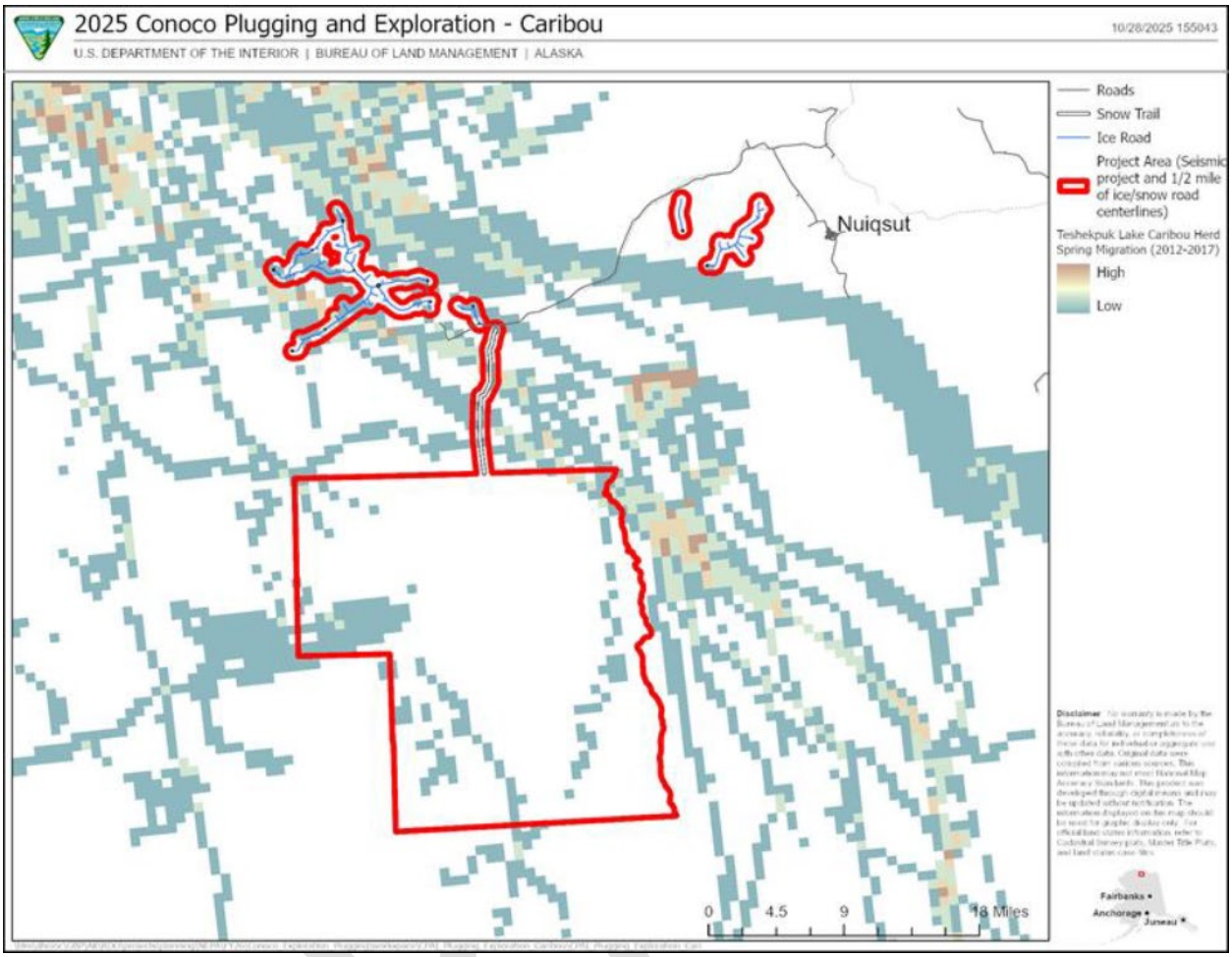

Figure 5. Average spring migration activity for the Teshekpuk Caribou Herd based on analysis of satellite collar locations from 2012-2017 within and near the proposed Project Area.

Figure 6 shows the seasonal distributions of the TCH within the proposed project area based on kernel density estimates. High density utilization and occupancy (found in the dark green area which encompasses one-half of all studied collar locations) occurs in parts of the proposed project area during many seasons important to TCH life cycles. Seasons where the proposed project area is largely utilized at the high-density level include fall migration and winter. These periods collectively run from mid-September through mid-April. Partial utilization of the project area at the high-density level occurs during the spring migration and late summer seasons (mid-April through mid-September). Medium density (found in the light green area encompassing 75 percent of all collar locations) utilization and occupancy of portions of the project area occurs during the spring migration, oestrid fly, late summer and fall migration periods (mid-April through end of May and again from mid-July through end of November). Low density (found in the yellow area encompassing 95 percent of all collar locations) utilization and occupancy of portions of the project area occurs during the calving, post-calving, mosquito, oestrid fly and late summer seasons (early June through mid-September). In general, most TCH caribou utilize areas

closer to Teshekpuk Lake during the summer months and are more likely to be found across the proposed project area during fall, winter, and spring months.

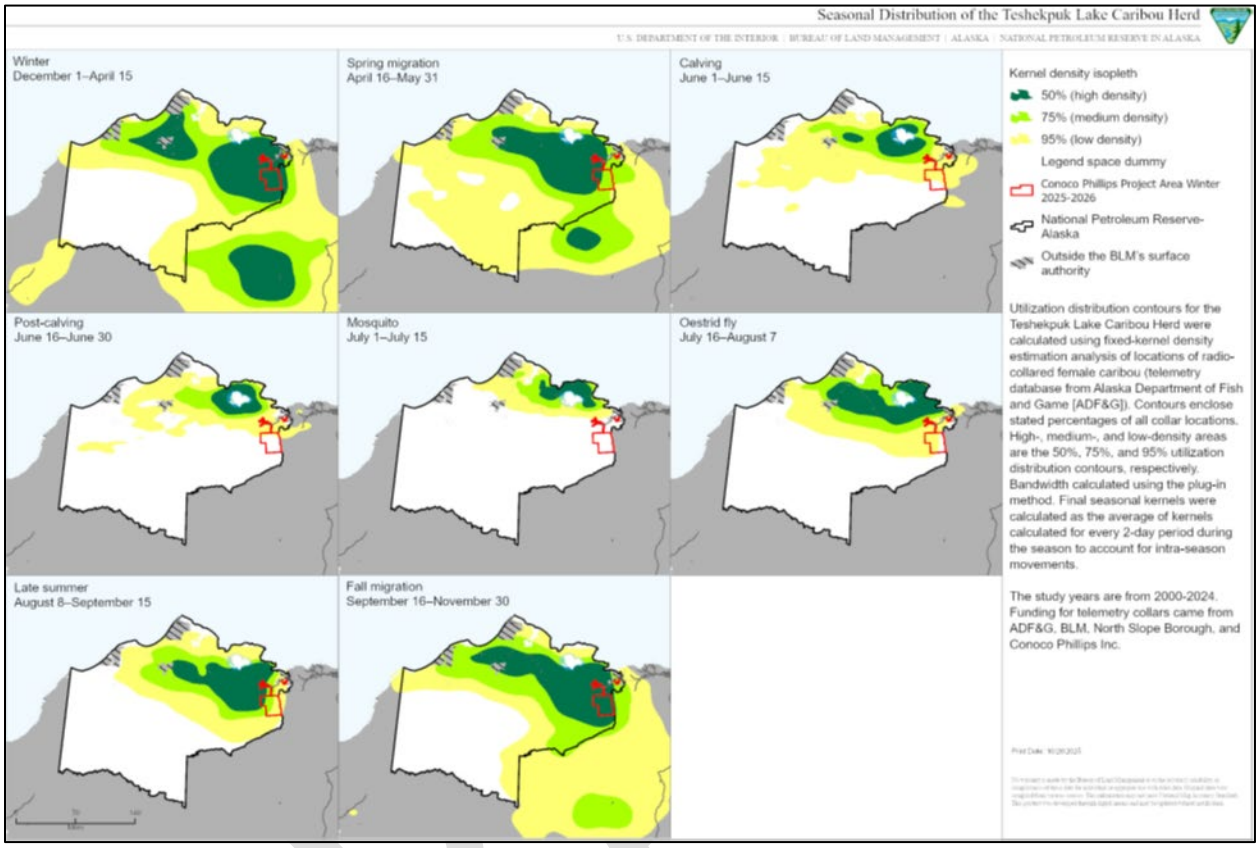

Figure 6. Seasonal distributions of the Teshekpuk Caribou Herd within the proposed Project Area based on analysis of satellite collar locations from 2000-2024.

Calving, post-calving, and insect-relief seasons are critical time periods for caribou. Calving has the potential to occur across the project area but is most likely to occur in the northwestern corner of the project area, where utilization density during calving season is high and proximity to early emergent, high nutrient forage near Teshekpuk Lake is high.

Of the total 339,210 acres utilized for mapping caribou impacts in the proposed activity area, 0 acres (0 percent) would be used at the high-density level for calving grounds (areas utilized from June 1 – June 15) by the TCH; 17,008 acres (5 percent) would be used for annual calving grounds by the TCH at the medium-density level; and 219,236 acres (65 percent) would be used for annual calving grounds by the TCH at the low-density level.

For annual post-calving grounds (areas utilized from June 16 – June 30) of the TCH, 0 acres (0 percent) would be used at the high-density level; 0 acres (0 percent) would be used at the medium-density level; and 78,307 acres (23 percent) would be used at the low-density level.

For annual mosquito relief habitat (areas utilized from July 1 – July 15) of the TCH, 0 acres (0 percent) would be used at the high-density level; 0 acres (0 percent) would be used at the

medium-density level; and 2,155 acres (1 percent) would be used at the low-density level. Mosquito relief habitat is primarily located along the coast, north, east and west of Teshekpuk Lake, where higher winds help to keep mosquitoes away.

For annual oestrid fly relief habitat (areas utilized from July 16 – August 7) of the TCH, 0 acres (0 percent) would be used at the high-density level; 0 acres (0 percent) would be used at the medium-density level; and 243,063 acres (72 percent) would be used at the low-density level.

Late Summer habitat (areas utilized from August 8 – September 15) of the TCH would be utilized across 64,450 acres (19 percent) at the high-density level; 122,807 acres (36 percent) at the medium-density level; and 153,489 acres (45 percent) at the low-density level.

Winter habitat (areas utilized from December 1 – April 15) of the TCH would be utilized across 334,078 acres (98.5 percent) at the high-density level; 5,131 acres (1.5 percent) at the medium-density level; and 0 acres (0 percent) at the low-density level.

Spring migration habitat (areas utilized from April 16 – May 31) of the TCH would be utilized across 129,029 acres (38 percent) at the high-density level; 204,136 acres (60 percent) at the medium-density level; and 6,186 acres (2 percent) at the low-density level.

Fall Migration habitat (areas utilized from September 16 – November 30) of the TCH would be utilized across 331,363 acres (98 percent) at the high-density level; 7,988 acres (2 percent) at the medium-density level; and 0 acres (0 percent) at the low-density level.

Caribou are particularly active during the post-calving and insect-relief periods, seeking optimal forage and escape from pests, resulting in lower localized site fidelity but high regional site fidelity. The longest cumulative distances traveled per day throughout the entire year by TCH caribou typically occur in July, when mosquito harassment peaks (Fancy *et al*. 1989; Prichard *et al*. 2014; Dau 2015).

3.3.2.1. *Other Wildlife Affected Environment*

In addition to caribou, the proposed project area provides habitat for many species of terrestrial mammals, including muskoxen (*Ovibos moschatus*), moose (*Alces alces*), grizzly bear *(Ursus arctos*), wolves (*Canis lupus*), Arctic fox (*Alopex lagopus*), red fox (*Vulpes vulpes*), wolverine (*Gulo gulo*), and numerous small mammal species.

Muskoxen were reintroduced to the region in 1969 and 1970 in Game Management Units (GMU) 26C and 23. The GMU 26C population, also known as the Eastern North Slope (ENS) population, increased and spread into the central arctic coastal plain of GMU 26A by the mid-2000's. In 2012, a group of musk oxen that had moved into GMU 26A fell through lake ice and drowned. Since that time, the remaining ENS muskox have dwindled in number and remained east of the NPR-A. Currently, few muskoxen from the ENS population reside within the NPR-A year-round (Lenart 2021). The ENS population is estimated to be approximately 200 animals and remains predominantly in GMU's 26B and 26C, east of the proposed project area. The GMU 23

muskox population, also known as the Cape Thompson (CT) population, has had more success with a population estimated at 911 animals (Hughes 2016, USDOI NPS 2017). The core of the CT population remains west of the NPR-A on the Cape Thompson peninsula; however, increasingly groups of musk ox from this population have been observed further east, in the Cape Lisburne area. It is possible that some animals from both the ENS and CT populations may occur in the project area.

Moose near the proposed project area are largely restricted to patches of woody vegetation along streams during winter, but moose spread out across the area during summer, moving into tributaries and hills surrounding riparian habitat. Winter densities of moose are highest in inland portions of the Colville River drainage, south of the proposed project area (Klimstra and Daggett 2020).

Grizzly bears, wolves, and wolverines all occur in the proposed project area but are more common in the foothills and mountains of the Brooks Range. Some grizzly bears den in the proposed project area during winter, but bear abundance in the area is highest in early summer during caribou calving. Typically, around 10 percent of collared grizzly bears found at some point of the year in the project area will also den there (Kerry Nicholson, ADF&G, pers. comm. 2023). Collar failure rate is high, however, and the number of bears denning in the area may be higher than indicated. The sample size (n=30) is also not representative of all bears in the area. Arctic fox are widespread and relatively common near the Arctic coast during summer. Red fox are common inland and appear to be increasing in abundance along the coast.

Little is known about the abundance, distribution, and species composition of small mammal communities in the proposed project area. Of the more common species, arctic ground squirrels (*Spermophilus parryii*) have a patchy distribution on the central arctic coastal plain because denning habitat is limited. Microtine rodents, particularly brown lemmings (*Lemmus trimucronatus*), are year-round residents of the region and are an important source of food for many predators in years when they are abundant. Arctic fox abundance cycles in response to changes in small mammal abundance, particularly lemming abundance, which has pronounced effects on alternate prey species, such as ground-nesting birds. Lemming populations and recruitment are affected by winter snow characteristics (Krebs *et al* 2011; Bilodeau *et al*. 2013). Snow depth, density, and hardness strongly influence population dynamics and the amplitude and periodicity of lemming population cycles (Domine *et al*. 2018; Bilodeau *et al*. 2013). Shallow, hard, and dense snow has adverse impacts on lemming populations. Lemming cyclical population fluctuations impact the whole tundra food web (Domine *et al*. 2018). No mammals on BLM's Special Status Species list are found in the proposed project area.

3.3.3. Environmental Impacts

3.3.3.1. *Impacts of the Alternative A – No Action Alternative*

Under the No Action Alternative, the proposed activities would not take place, so there would be no potential impacts to caribou or other wildlife.

3.3.3.2. *Impacts of the Alternative B – Proposed Action*

Caribou Overwintering period (November-April)

Winter project activities could have adverse impacts on caribou overwintering and migrating in the project area, potentially causing displacement. The displacement of caribou could have a negative effect on their energy balance, resulting from a reduced intake of quality forage and an increased energy expenditure to relocate to other areas (Reimers *et al*. 2003). Although caribou are mobile and the seismic portion of the project would be short in duration (e.g., two to six days in one area), it is possible that project disturbance could have an additive effect on winter mortality and disproportionately impact young of the year and parturient cows (Cameron *et al*. 2005), particularly during the spring migration period (April-May) when parturient cows are heading towards calving grounds. Habitat connectivity between winter habitat areas to the south and calving grounds near Teshekpuk Lake could be disrupted by project operations. Disruption to habitat connectivity from the project would be reduced by the temporary duration of the seismic portion of the project. Applied mitigation for the exploration and plugging portions of the project would reduce impacts from those portions of the project, as well as a future increase in suitable winter, spring migration, calving, late summer and fall migration habitat due to plugging and reclamation portion of the project. Combined effects with future activities in the proposed project area may result in a net gain of alterations to habitat connectivity.

Caribou Pre-calving and Calving periods (April-June)

Project activities that occur during the spring pre-calving and calving periods could have a greater impact on migrating caribou. In particular, TCH parturient cows migrating to their calving grounds during April and May could be negatively impacted. Parturient cows have been observed to be more sensitive to the proximity of infrastructure and industry activities than other caribou, with some calving caribou avoiding roads by up to 6.2 miles (10 kilometers) (Johnson *et al*, 2019). Project and demobilization activities could act as a deterrent to calving caribou, deflecting them to areas not as suitable for calving, potentially with greater predation and lower-nutrient forage options, factors which both have negative implications for cow and calf health and survival (Kuropat 1984; Griffith *et al*. 2002: Johnstone *et al*. 2002). Additionally, although calving grounds can vary annually within a larger calving region, USDOI FWS (2015) has concluded that some herds may require a large region to select the best conditions for calving in a given year, accounting for varying snow conditions and timing of forage emergence. Displacement away from a selected calving area could potentially have negative consequences for both cow and calf, even if the alternative site is still within the larger calving region.

The location of caribou calving grounds in key areas with few predators and with abundant early-emergent, high-nutrient forage, and the impact of disturbance and displacement during the calving period is further detailed in Section 3.3.5 of the NPR-A IAP EIS (USDOI BLM 2020). Some protections for calving habitat are provided by ROP M-1 of the NPR-A IAP ROD (USDOI BLM 2022). ROP M-1 minimizes disturbance of wildlife or alteration and hinderance of wildlife movements through the NPR-A by prohibiting the chasing of caribou with ground vehicles. Flight activity for the proposed project is planned for later in the summer, when caribou are no longer calving.

Caribou Post-calving and Insect relief periods (June-August)

During early July, caribou are highly aggregated in most years on coastal areas north and east of Teshekpuk Lake (Parrett 2021). Insect harassment can be substantial on these summer ranges during this period, resulting in dense aggregations and movements to seek insect relief (Lawhead *et al*. 2015, Cameron *et al*. 2005). The TCH travels inland during the latter half of July, leaving coastal areas. Some TCH caribou may remain near Teshekpuk Lake throughout the year, while others migrate from the area in mid to late August (Parrett 2021).

Impacts to caribou from low flying helicopters during summer clean-up activities would be exacerbated by numerous take-offs and landings of the aircraft. All camp locations and areas of "high use" would be inspected and debris collected and removed. The number of helicopter landings would vary depending on camp locations, areas of concern and the amount of debris located, but it is estimated there would be up to 630 take-offs and landings during clean-up activities. Disturbance to caribou during this activity from low flying aircraft and landings could cause animals to flee, increase stress, separate calves from their mothers, and potentially expose calves to predation (Fancy *et al*. 1989, Griffith *et al*. 2002, Webster 1997). Low-level aircraft traffic in the vicinity of calving grounds and early post-calving aggregations can reduce calf survival (Wolfe 2000).

Severe insect harassment resulting from a herd's inability to avoid biting insects or access insect-relief habitat can substantially decrease caribou conditions in fall, causing them to enter winter in poor body condition, increasing calf mortality and potentially leading to lower herd productivity (Helle and Tarvainen 1984; Colman *et al*. 2003; Weladji *et al*. 2003; Couturier *et al*. 2009; Cameron and Ver Hoef 1994). Flights in early July would be more disruptive to maternal females and calves than flights occurring in the latter part of July when calves are older (Dau 2013).

The impacts of aircraft operations on post-calving caribou and insect relief aggregations are further detailed in Section 3.3.5 of the NPR-A IAP EIS (USDOI BLM 2020). Some protections for post-calving and insect-relief ranges are provided by M-1 and F-1 of the NPR-A IAP ROD (USDOI BLM 2022). ROP M-1 minimizes disturbance of wildlife or alteration and hinderance of wildlife movements through the NPR-A by prohibiting the chasing of caribou with ground vehicles. ROP F-2 minimizes the effects of low-flying aircraft on wildlife.

Caribou Project Specific Environmental Impacts

Caribou located within one mile of winter project activity could be temporarily deflected from work areas, with parturient caribou avoiding areas of activity, on average, by up to four miles during spring migration (Severson *et al*, 2023). Caribou, however, are locomotively energy-efficient, allowing them to migrate long distances despite severe winter conditions (Fancy and White, 1987). Noise and movements associated with winter project activities could temporarily increase stress levels and alertness levels in some caribou within the area, causing animals to relocate away from the area of activity. Heightened stress and alertness would likely subside once relocated. Additionally, the winter range of the TCH is large, winter habitat is widespread, and caribou would be unlikely to be displaced from preferred winter forage (Pedersen *et al*, 2021).

Caribou respond most strongly to rapid movements in general and respond more strongly to foot traffic than vehicular traffic (Webster 1997). Seismic vehicles are slow (traveling at an average of 30 mph for Tuckers and 20 mph for vibroseis vehicles) and foot traffic during all parts of the project outside of camp locations would likely be minimal. Caribou would be likely to avoid camps more than seismic project activity due to increased foot traffic at the camps.

Deflection of parturient caribou away from their migration route and calving grounds is a large concern for the late wintertime and early spring periods. Parturient caribou are highly sensitive to disturbance and would likely give active work areas a wide berth. Project activities would already be in progress when migrating caribou encounter the area during spring migration, and caribou would likely alter their migration route around the area. It is not clear if altered migration paths would allow animals to reach preferred calving habitat in a similar amount of time as those that are not deflected. Caribou that do not reach preferred calving habitat could see increases in calf mortality due to predation, low birth weights, and malnourishment from lower quality forage. Most caribou that migrated away from Teshekpuk Lake during the winters between 2012-2017 returned in the spring by following the southern migration pathway through the project area (Figure 5).

The impacts to caribou from winter activities would be expected to be temporary due to the transient nature and applied mitigation of the seismic portion of the project across the landscape Additionally, applied mitigation for the exploration and plugging portions of the project would also reduce impacts. The seismic advance crew would lay out geophones and nodes ahead of vibroseis vehicles collecting seismic data along individual source lines. The seismic survey would move throughout the seismic portion of the project area at a rate of approximately one mile per day after which the geophones and nodes would be picked up. Applied mitigation, the slow movement of operations across the landscape (allowing caribou to move), the ability of caribou to migrate despite winter conditions, and caribou winter range and habitat for the TCH being widespread would result in moderate levels of winter disturbance to caribou. These

impacts would be temporary as activity moves through the project area and for the larger seismic portion of the project, for just one winter season.

Caribou movement increases as insect harassment increases in July, and as summer progresses towards the fall migration period, caribou move southward and further inland into the project area. Additionally, calves are younger and more susceptible to disturbance in early July than in late July and August. Summer disturbances due to the project would occur during mid to late summer when caribou are already highly mobile and less likely to be displaced by air traffic or other activities. The impacts from summer inspections and cleanup of the seismic portion of the project would be expected to be temporary in duration (15 days) and effect. Summer maintenance of production and, if necessary, abandonment sites would occur on an as needed basis. The number of animals directly impacted during this time period would be likely to be a fraction of the total number of animals in the herd and not likely to result in long lasting or population-level effects. Impacts from summer activities would be expected to be minimal and temporary as project activity moves through the project area.

In conclusion, potential impacts from summer activities to caribou are expected; however, they are expected to be minimal and temporary. Potential impacts from winter activities to caribou are expected; however, they are expected to be moderate but temporary. Any impacts would be minimized through applicable mitigation measures.

Although concurrent impacts to vegetation quality and availability could occur, making the project area potentially less attractive to maternal caribou as future calving and post-calving habitat, the proposed project alone would not likely deter caribou from migrating to and utilizing the area in future years after the project is completed, particularly with required vegetation mitigation and if any unmitigated impacts to vegetation are given adequate time to recover.

Other Wildlife Environmental Impacts

Potential causes of disturbance to terrestrial mammals other than caribou from project activities would include surface vehicular traffic on frozen tundra or ice and fixed-wing aircraft traffic. In most cases, these activities would cause short-term displacements of and/or disturbance to terrestrial mammals. These disturbances, however, could result in animals having to relocate to less favorable areas to avoid the disruptive activities associated with project activities. Where seismic survey lines are located, localized displacement of terrestrial mammals could last for several days or lead to complete abandonment of localized habitat. Mortality in small mammals unable to effectively relocate could also occur, with potential cascading trophic consequences.

Previous studies of the effects of oil and gas exploration on muskoxen in Alaska and Canada focused on disturbances associated with winter seismic operations. Some muskoxen reacted to seismic activities at distances up to 2.5 miles from the operations; however, reactions were highly variable among individuals (Reynolds and LaPlant 1986). Responses varied from no change in behavior to becoming alert, forming defense formations, or running away (Winters and

Schideler 1990). The movements of muskoxen away from the seismic operations did not exceed three miles and had no apparent effect on muskox distribution (Reynolds and LaPlant 1986). Unlike caribou, muskoxen are not able to travel and dig through snow easily. In the winter, they search out sites with shallow snow and greatly reduce movements and activity to conserve energy (USDOI FWS 1999). Muskoxen survive the winter by using stored body fat and reducing movement to compensate for low forage intake (Dau 2001). Because of this strategy, muskoxen may be more susceptible to disturbances during the winter. It is possible that repeated disturbances of the same animals during winter could result in increased energetic costs that could increase mortality rates. Depending on the location of project activities and the location of muskoxen, it is anticipated that impacts on muskox populations would be non-existent to minor. Further detail on the impacts of general oil and gas exploration activity on muskoxen is given in Section 3.3.5 of the NPR-A IAP EIS (USDOI BLM 2020).

During winter, moose, wolves, Arctic fox, red fox, and wolverines may occur in the proposed project area. These species are mobile and could possibly move to other locations. This is not the case for grizzly bears. Most grizzly bears spend several months in an energy-saving state of hibernation in a den. A review of responses to disturbance from grizzly bear showed that activity closer than approximately one-half mile and especially within 656 feet caused variable responses. For females with young of the year, den abandonment can lead to increased cub mortality with potential deleterious effects on adults as well (Linnell *et al*. 2000). If an active grizzly bear den is encountered, avoiding project activity in the vicinity of the den could reduce potential deleterious impacts, particularly to females with young of the year. Specific protections for grizzly bears and occupied dens are provided by ROP's A-8 and C-1 of the NPR-A IAP ROD (USDOI BLM 2022). Further detail on the impacts of general oil and gas exploration activity on moose, wolves, Arctic fox, red fox, wolverines, and grizzly bears is given in Section 3.3.5 of the NPR-A IAP EIS (USDOI BLM 2020).

During winter, small mammals depend on the subnivean zone (the area between the surface of the ground and the bottom of the snowpack) for access to resources necessary for survival. The home ranges for many small mammals are generally very small, especially during the winter. Although snowpack limits access to food, snow also provides protection from predation, insulation from low surface temperatures and ease of travel in low density unconsolidated snow. Compaction of snow and tundra vegetation from project activities could fragment individual home ranges, increase the amount of energy expended to travel in search of food, reduce thermal stability, block travel corridors, and cause individuals to surface, increasing the potential for predation and mortality.

Bilodeau *et al*. 2013 noted that snow density and depth had large impacts on subnivean mammals, with increased snow density having a negative effect. Snow density would be expected to increase in tracks of machinery. This could have negative effects locally for small mammal populations as well as cascading trophic effects on the local food web, as predators turn to alternate prey species, such as tundra-nesting birds, for food. It is possible that, given the short

timeframe of the seismic portion of the proposed project and the minimal long-term disturbance of the production and abandonment portions, these effects could be short-term and minimal. ROP E-9 of the NPR-A IAP EIS (USDOI BLM 2020) aims to protect ground-nesting birds by avoiding human-caused changes in predator populations, including foxes; however, it does not address protecting alternate prey species such as small mammals to avoid indirect impacts to ground-nesting birds. Further details on the impacts of general oil and gas exploration activity, including compaction, on small mammals is given in Section 3.3.5 of the NPR-A IAP EIS (USDOI BLM 2020).

In conclusion, non-threatened or endangered wildlife maybe potentially impacted but any impacts would be minimal and further minimized through applicable mitigation measures.

3.4. Issue 3: *How would construction and use of snow and ice roads, seismic survey, exploration drilling and well plugging impact vegetation?*

3.4.1. Methodology and Assumptions

The analysis area of impacts to vegetation includes the entire project area within the CPAI seismic exploration, exploration east, and exploration west areas.

3.4.2. Affected Environment

Vegetation in the NPR-A is influenced by physiography, cold Arctic climate, short summers, low precipitation, and permanently frozen ground. The NPR-A can be roughly divided into three latitudinal bands from north to south including the Arctic Coastal Plain, the Arctic Foothills, and the Brooks Range. The vegetation of the NPR-A consists primarily of dwarf shrubs, herbaceous plants (especially graminoids), lichen, and mosses. Most species of vegetation within NPR-A can be found in all three latitudinal bands; however, the relative frequency of occurrence of each species varies across bands, due in large part to differences in moisture levels (USDOI BLM 2002). The Arctic Coastal Plain is characterized by many small lakes and very poorly drained soils, while the Brooks Range has relatively few lakes, improved drainage, and increased topography. The Arctic Foothills are intermediate between the two in both characteristics and geography.

The Arctic Coastal Plain ecoregion is a smooth treeless plain rising gradually from the Arctic Ocean to the foothills of the Brooks Range. This ecoregion is mainly undulating plains and vast floodplains. The dominant vegetation along the coast and within the Arctic Coastal Plain is moist sedge-willow or moist sedge-Dryas tundra; however, salt marshes are found in coastal depressions along the coast while wet graminoid occupy basins on the Arctic Coastal Plain. On the southern end of the Arctic Coastal Plain, the Arctic Foothills ecoregion has rolling hills and plateaus, with better defined drainages and fewer lakes than in the Arctic Coastal Plain. Vegetation in the foothills is mainly moist tussock tundra due to the high prevalence of ice-rich permafrost. Mineral-rich granite and limestone bedrock and glaciers of the Brooks Range mountains to the south feed its numerous rivers and floodplains and have carved the landscape into deep ravines and channels. The steep topographic gradients are reflected in the diverse geology, soils, snow regimes, hydrology, and vegetation, which form a complex mosaic of

habitats supporting the high biological diversity of the region. There are few known non-native or invasive species within the NPR-A.

A more detailed description of vegetation in the NPR-A, including discussion of vegetation mapping methods, can be found in section 3.3.1 of the 2020 NPR-A IAP EIS (USDOI BLM 2020a).

Wet vegetation types and soils usually freeze more rapidly and solidly than drier areas and generally can endure a higher vehicle load-bearing capacity. In general, wetter areas are less affected by disturbance than moist and dry areas (Walker 1996). Due to topographic variation within the project area, however, some wetter sites could be more highly susceptible to disturbance than their moisture status would suggest.

Tussock tundra whose tussocks project above the surrounding land surface, and sedge-dryas tundra, notable for a hummocky surface topography, are both vulnerable to disturbance by winter tundra travel (Yokel and Ver Hoef 2014). Along with sensitive willow habitats, these cover classes are recognized as some of the most susceptible to long-term disturbance from vehicle use due to shearing of tussocks. For the purpose of this EA, "long-term disturbance" is defined as disturbance lasting more than 10 years with a 25 to 50 percent decrease in vegetation or shrub cover, 5 to15 percent exposed organic or mineral soil, and obvious compression of mosses and standing litter in wet graminoid and moist sedge-shrub tundra. In addition, areas with long-term disturbance usually appear wetter or have more standing water compared to the surrounding vegetation and tussocks or hummocks are sheared or crushed (Felix et al 1992).

To determine impacts to vegetation, the project area is defined as the full 467 square miles including the crew movement buffer (Figure 2). Higher impact activities include the area potentially impacted by snow roads, ice pads (including the drilling/testing pads for the exploration wells), seismic camp move route and survey footprint and ice roads. The snow road access route to the seismic survey (10.1 miles by 10 feet wide, 12.2 acres), ice pads (127.3 acres), camp move route (45 miles by 10 feet wide, ~55 acres), ice roads (40.5 miles by 35 feet wide, 171.8 acres), total approximately 366.8 acres. Coarse vegetation land cover classes for the proposed project area and large buffered corridor, based on descriptions found in the Alaska Vegetation and Wetland Composite User Guide (Alaska Center for Conservation Science 2017), are found in Table 3.3 Vegetation land cover class descriptions are listed by prevalence and show susceptibility to long-term disturbance for each class. Characteristics and features specific to each vegetation land cover class determine the susceptibility to long-term disturbance.

Table 3.3. Coarse vegetation land cover classes in the buffered project area.

Coarse Land Cover Class	Acres	% of planning area	Susceptibility to Long-Term Disturbance
Tussock Tundra (Low shrub or Herbaceous)	156,319	52	Intermediate
Herbaceous (Marsh) (Northern and Western Alaska)	35,962	12	Low
Freshwater or Saltwater	29,405	10	Low
Low Shrub	26,626	9	Intermediate
Herbaceous (Wet) (Northern and Western Alaska)	20,449	7	High

Coarse Land Cover Class	Acres	% of planning area	Susceptibility to Long-Term Disturbance
Herbaceous (Mesic) (Northern and Western Alaska)	16,915	6	High
Dwarf Shrub	9,331	3	High
Bare ground	2,071	1	High
Sparse Vegetation (Northern and Western Alaska)	1,700	1	High
Tall Shrub (Open-Closed)	312	0	Intermediate
Fire Scar	7	0	Intermediate
Grand Total	**299,098**		

3.4.2.1. *Vegetation Cover Classes with High Susceptibly to Long-Term Disturbance*

The Herbaceous (Wet) land cover class (7 percent of the buffered proposed project area)

(Table 3.3) is characterized by more than 20 percent herbaceous cover, 5-25 percent water or more than 20 percent *Carex aquatilis*. This class represents sites which are wet or seasonally flooded by freshwater. These sites are typically dominated by *Carex aquatilis* and *Eriophoru mangustifolium*. Dwarf shrubs (less than 0.2 m tall) such as *Salix fuscescens, S. polifolia, Betula nana*, and *Vaccinium uliginosum* may also be present but make up less than 25 percent cover. Moss species are typically dominated by *Sphagnum spp*. The Herbaceous Wet cover class includes both non-patterned ground and low-centered-polygonal ground. Despite their relatively high-water content, polygonal ground and associated vegetation are at a high risk of disturbance from snow and ice road building and use due to the microtopography along ice-wedge margins and an increase in sensitive shrub species on these microhabitats. The seasonally flooded ground at the center of polygons is less susceptible to long-term disturbance from tundra travel than the margins of ice-wedges. Because it is difficult to map out individual polygonal ground features at a useful scale and nearly impossible to reroute to avoid ice-wedge polygons, this vegetation type is assigned a "high susceptibility" rating to long-term disturbance. If disturbed, the low centers of polygons would show increased green up for several years and rapidly show full to nearly full recovery. The higher microtopography along ice-wedge margins, however, could be easily damaged by vehicles resulting in ruts, bare ground, crushed or sheared tussocks, and broken stems on woody vegetation, if not sufficiently protected. These features, similar to tussocks or shrubs, project above the surrounding land surface and are susceptible to scuffing or partial removal (Yokel and Ver Hoef 2014).

The Herbaceous (Mesic) land cover class (6 percent of the buffered proposed project area)

(Table 3.3) is defined by its occurrence on mesic to dry sites with more than 25 percent cover of herbaceous species. Dominant and codominant species include sedges, grasses and forbs. These sites are commonly dominated by *Carex bigelowii*, *Luzula confusa* and lichens. Dwarf shrubs (≤ 0.2 m tall) such as *Arctostaphylos alpina*, *Empetrum nigrum*, *Salix pulchra* and *Betula nana* may be present but contribute less than 25 percent to the canopy cover. The high occurrence of sensitive dwarf shrubs and ground willow present in the Herbaceous Mesic cover class lead to a high susceptibility rating for long-term disturbance. The Herbaceous Mesic land cover class

includes sites higher and drier than the vast majority of NPR-A. The low moisture content and better drainage of soils in this cover class cause soils to be less solidly frozen with lower load bearing capacities due to reduced ice bonding between soil particles.

The Dwarf Shrub land cover class (3 percent of the buffered proposed project area)

(Table 3.3) is defined when more than 25 percent of the cover is shrub and either 25 percent of the site consists of shrubs less than 0.2 m in height or shrubs less than 0.2 m tall are the most common shrubs. Lichen cover is less than 20 percent. *Dryas integrifolia* and/or *Dryas octopetala* dominate the shrub layer with more than 20 percent cover. Other dwarf shrubs include *Cassiope tetragona*, *Salix arctica*, *S. phlebophylla*, *Vaccinium uliginosum*, *Empetrum nigrum*, *Rhododendron tomentosum*, *Diapensia lapponica* and *Arctostaphylos rubra*. Common herbaceous species may include *Senecio lugens*, *Anemone parviflora*, *Hierochloe alpina*, *Carexscirpoidea*, *C. microchaeta*, *Festuca altaica*, *Lupinus arcticus*, *Artemisia globularia* and *Equisetum spp*. Common mosses include *Hylocomium splendens*, *Racomitrium spp.* and *Tortula ruralis*. Dwarf shrubs, dryas and lichens occurring in this land cover class are sensitive to disturbance. These sites contain high percentages of dwarf shrubs, dryas and lichen, are typically better drained than surrounding tussock tundra or emergent vegetation habitats and freeze less solidly during the winter. The combination of improved drainage and sensitive plant species result in a highly susceptible to long term disturbance rating for this cover class. Dwarf Shrub classified sites occupy 3 percent of the project area and should be avoided whenever possible. Ground willows, dwarf shrubs, dryas, and lichens in this cover class are susceptible to disturbance with inadequate protective cover, and vegetational succession to a low shrub cover class over time would be possible.

The Bare Ground land cover class (1 percent of the buffered proposed project area)

(Table 3.3) is defined by vegetation cover less than 10 percent. This class includes sand along the major rivers, high-elevation rock/gravel areas and unvegetated sand dunes. While high-elevation rock and gravel areas are not highly susceptible to long-term vegetation disturbance, this cover class includes sensitive sand dune features located in NPR-A. Since sand dunes and all bare ground occupies less than 1 percent of the project area, avoidance of this sensitive habitat type is the best option. Soils in these relatively well drained sites are poor locations for ice road routing due to the same reasons as detailed in the Mesic site above. If disturbed with inadequate protection, this vegetation type easily shows vehicle tracks and rutting, and the low percent of vegetation present may not recover before soils erode or hydrology is permanently altered.

The Sparse Vegetation land cover class (1 percent of the buffered proposed project area)

(Table 3.3) is defined by at least 50 percent cover of unvegetated ground and vascular vegetation with more than 10 percent cover. The canopy is sparse due to extreme exposure, exposed bedrock or unstable substrates. Soils are typically thin, stony, and well-drained. Common dwarf shrubs include *Dryas octopetala*, *D. integrifolia*, *Saxifraga oppositifolia*, *Rhododendron lapponicum*, *Salix arctica*, *S. reticulata*, *Cassiope tetragona* and *Arctostaphylos rubra*. Herbaceous species may include *Lupinus arcticus*, *Hedysarum boreale ssp. mackenziei*, *Carex scirpoidea*, *C. rupestris*, *Oxytropis nigrescens*, *Potentilla uniflora*, *Artemisia senjavinensis*, *A. globularia*, *A. furcata*, *Saxifraga oppositifolia* and *Equisetum spp.* Lichens such as *Thamnolia spp.* and *Cetraria islandica* also commonly occur. Lichens are very slow growing, resulting in longer recovery times. Sparse Vegetation sites should be avoided, when possible, for similar

reasons to bare ground (see above) and are also classified as highly susceptible to long term disturbance.

3.4.2.2. *Vegetation Cover Classes with Intermediate Susceptibly to Long-Term Disturbance*

The Tussock Tundra (Low Shrub or Herbaceous) land cover class (52 percent of the buffered proposed project area)

(Table 3.3) is defined by more than 35 percent cover of tussocks and trees have less than 10 percent cover. These sites may have more than 25 percent cover of low shrubs 0.2-1.3 m tall, or a combination of low and dwarf shrubs. These sites are typically cold, poorly drained, and underlain by mesic, silty mineral soils with a shallow surface organic layer surrounding the tussocks (Viereck et al. 1992). Permafrost is present. *Eriophorum vaginatum* is the primary tussock-former in most stands, but *Carex bigelowii* may dominate some sites. Common shrubs include *Betula nana*, *Salix pulchra*, *Rhododendron tomentosum*, *Vaccinium vitis-idaea*, *Vaccinium uliginosum* and *Empetrum nigrum*. The Tussock Tundra land cover class covers a range of tussock sizes and represents a major fraction of land cover in NPR-A. Wetter tussock tundra with seasonal flooding has a lower disturbance susceptibility than higher and drier tussock tundra with increased topography. Tussocks that project above the surrounding land surface are susceptible to scuffing or partial removal by snow and ice road vehicles (Yokel and Ver Hoef 2014). With insufficient protective cover, tussock scuffing, crushing and vehicle ruts are likely to occur. With sufficient snow cover and ice road building standards, some lesser tussock or hummock scuffing may occur but would rapidly recover and would likely be the highest observed disturbance level of this land cover class.

The Low Shrub land cover class (9 percent of the buffered proposed project area)

(Table 3.3) is defined by 25-100 percent cover of shrubs, where shrubs taller than 1.3 m make up less than 25 percent of the site, and either more than 25 percent of the site consists of shrubs 0.2-1.3 m in height or shrubs 0.2-1.3 m are the most common shrubs. Lichen cover is less than 20 percent. Common shrubs include *Salix spp.*, *Alnus viridis ssp*., *Betula nana*, *Vaccinium uliginosum* and *Rhododendron tomentosum*. Other species include *Calamagrostis canadensis, Carex aquatilis*, *Comarum palustre*, *Empetrum nigrum*, *Chamaedaphne calyculata* and *Sphagnum spp.* (Jorgenson and Heiner 2003). Initial disturbance on low shrubs would be more visible than other vegetation classes due to shrubs projecting far above the ground surface, facilitating greater damage from vehicles than for most other vegetation classes. Despite low shrubs suffering initial disturbance, they recover more quickly than dwarf shrubs (Yokel and Ver Hoef 2014). Part of recovery for low shrubs includes replacement by grasses, a natural, intermediate stage in succession that occurs when shrubs are killed (Jorgenson and Heiner 2003). In other cases, low shrubs may recover more quickly than dwarf shrubs because they tend to capture deep enough snow (Emers et al. 1995) such that the underlying soils are protected and stems either bend over or break off well above ground level. In the latter case, these stems can then sprout new branches, and the shrub canopy appears no different than surrounding shrubs after several years.

The Tall Shrub land cover class (<1 percent of the buffered proposed project area)

(Table 3.3) is defined by 25-100 percent cover of shrubs and either more than 25 percent of the site consists of shrubs taller than 1.3 m in height or shrubs taller than 1.3 m are the most common

shrubs. This class is widespread adjacent to streams and rivers. Patch size is small to large and often linear, and soils are mesic to wet. Common tall shrubs include *Salix alaxensis, S. pulchra, S. glauca, S. richardsonii, Alnus incana ssp. tenuifolia, A. viridis ssp. crispa*, and *A. viridis ssp. Sinuata*.Vegetation in the Tall Shrub land cover class tends to show relatively quick and complete recovery after disturbance, even when initial damage is extreme (Jorgenson et al. 2010). The ice-poor gravel substrate does not subside when thawed and conditions for plant growth therefore remain unchanged. Taller willows also tend to collect wind-blown snow which helps to protect the ground cover. Additionally, although willows may be badly broken, they tend to grow back vigorously after disturbance as a physiological adaptation to herbivory. Studies suggest that mechanical cutting during snow road pioneering and construction is preferable to crushing during vehicular disturbance.

The Fire Scar land cover class (~0 percent of the buffered proposed project area)

(Table 3.3) is defined as burned areas dominated by snags or burned vegetation. These areas are typically too difficult to label spectrally, had poor field data (as it is difficult and dangerous to access remote areas with numerous snags by helicopter), or had changed significantly between the time of burn, the image acquisition date, and/or the date of field work. The lack of data for fire scar cover class type makes it difficult to categorize for long-term disturbance susceptibility. Areas with severe burns could be at increased risk for long-term disturbance due to already exposed soils and sparse vegetation, whereas those areas that are insufficiently evaluated have indeterminant susceptibility to long term disturbance.

3.4.2.3. *Vegetation Cover Classes with Low Susceptibility to Long-Term Disturbance*

The Herbaceous (Marsh) land cover class (12 percent of the buffered proposed project area)

(Table 3.3) is defined by sites which are periodically wet or continually flooded and dominated by emergent herbaceous plants such as sedges. Soils are muck or mineral, and water can be nutrient-rich. Vegetation is typically dominated by monocultures of *Arctophila fulva*, *Carex aquatilis* or *Eriophorum angustifolium*. The higher moisture content found in the Herbaceous (Marsh) land cover class allows vegetation and soils to freeze more rapidly and solidly, protectively freezing vegetation in place and providing a higher load-bearing capacity for vehicle traffic.

The Freshwater or Saltwater land cover class (10 percent of the buffered proposed project area)

(Table 3.3) is defined by aquatic sites where the cover of vegetation is less than 10 percent. As with the Herbaceous (Marsh) land cover class above, the higher moisture content found in the Freshwater or Saltwater land cover class allows vegetation and soils to freeze more rapidly and solidly, protectively freezing what little vegetation may be present in place and providing a higher load-bearing capacity for vehicle traffic.

3.4.3. Environmental Impacts

3.4.3.1. *Impacts of the Alternative A – No Action Alternative*

Under the No Action Alternative, the proposed activities would not be authorized, so there would be no potential impacts to vegetation resources.

3.4.3.2. *Impacts of the Alternative B – Proposed Action*

The total length of the proposed snow access road (10 feet wide) would be approximately 10.1 miles, with an additional 40.5 miles (up to 35 feet wide) of ice roads, 127.3 acres of ice pads, and a 45-mile (10 feet wide) camp move route. The proposed action would be expected to potentially impact an estimated total of approximately 366.8 acres.

To optimize snow road placement and help minimize impacts, the operator would have the flexibility to move the proposed snow road up to one mile to either side of the planned route. Within this ~299,000-acre buffered project area, the 366.8-acre proposed route would potentially impact approximately 0.1 percent of the total vegetative cover. Figure 7 shows vegetation cover classes within the buffered proposed project area and Figure 8 shows vegetation susceptibility to long-term disturbance.

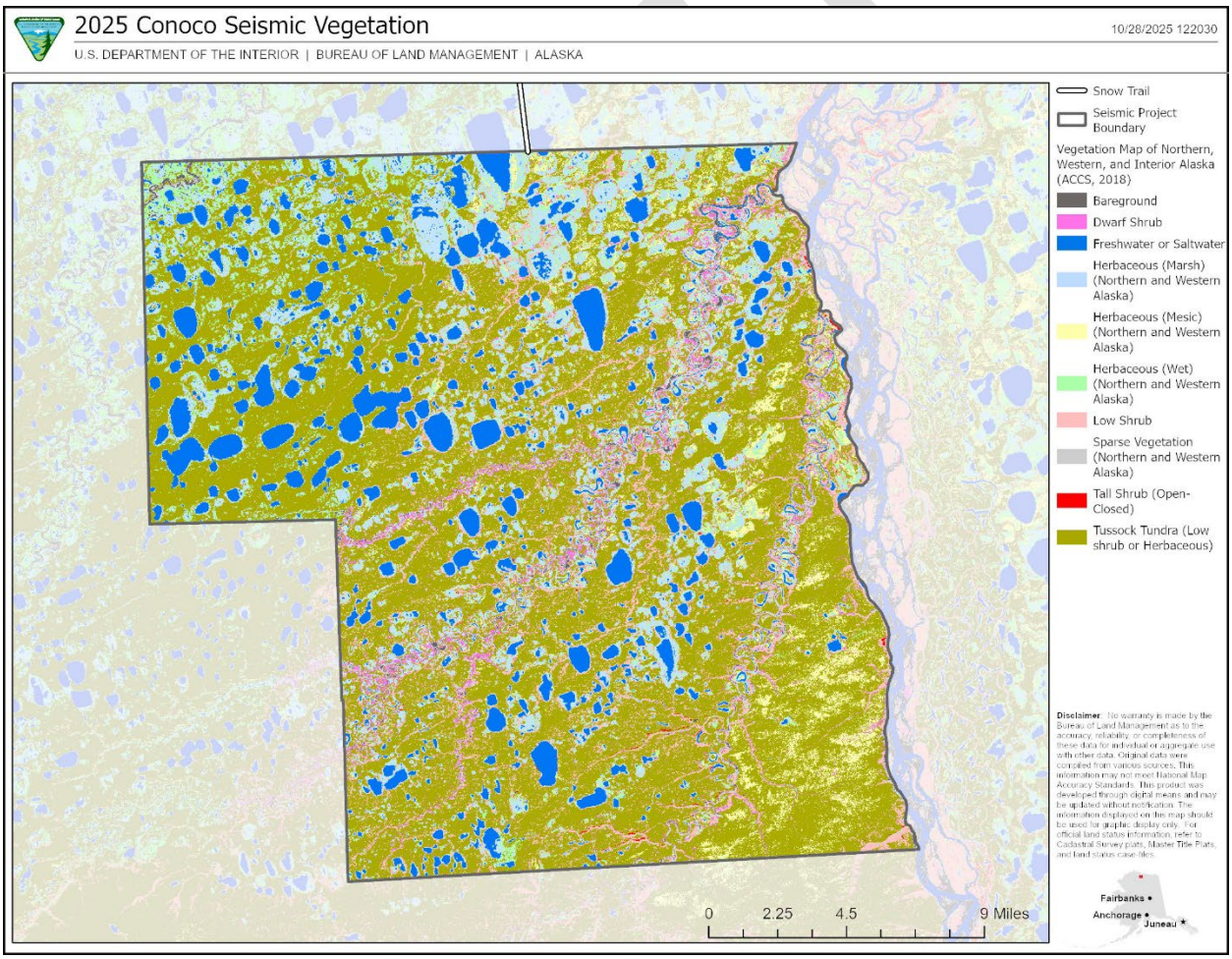

Figure 7. Vegetation classes within the proposed project area.

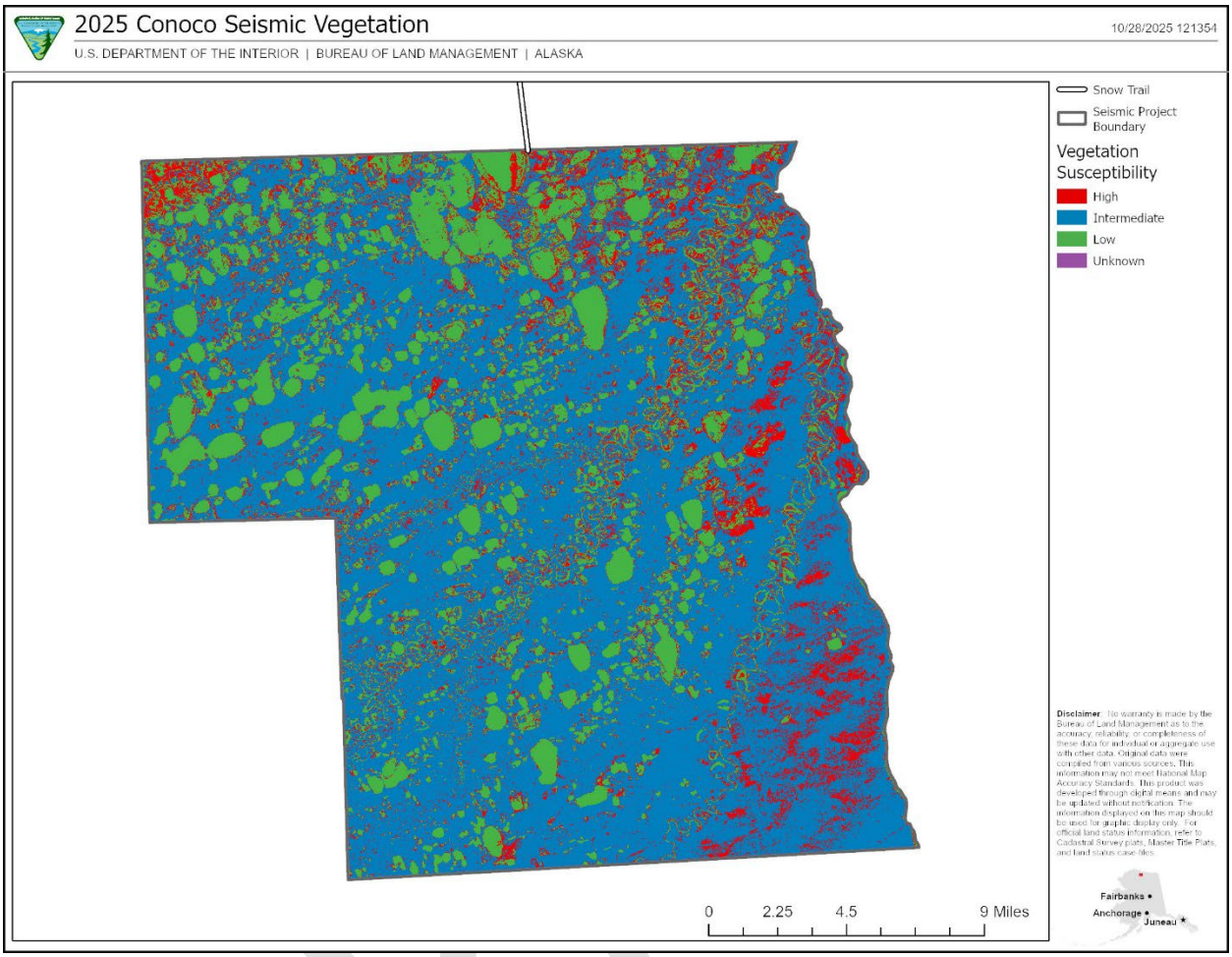

Figure 8. Susceptibility of vegetation within project area to long-term disturbance.

Magnitude of disturbance would vary along the route, due in part to differences in snow road construction and number of passes. Ice roads persist longer in the summer than conventional snow roads. Vehicle and road design variables that could lead to vegetative damage have been considered in the project design. Vehicles to be used for the Proposed Action have been specially designed or modified for snow and ice road travel and to reduce environmental damage. This includes lowering PSI by use of appropriate tires or tracks, as well as careful monitoring of speed and turning radius. Road building specifications include minimizing sharp turns and ensuring proper snow and ice thickness and quality. Use of these practices would help reduce vegetative impacts to the extent possible.

Impacts to vegetation associated with winter activities depend on the type of vehicle, number of passes, vegetation type, soil physical properties, ground ice content, and snow conditions (NRC 2003; Jorgenson et al. 2010). Construction and use of snow and ice roads and ice pads would occur solely during winter months once conditions have been determined to be sufficiently protective to begin prepacking activities. Because vegetation, soils, ground ice, and snow conditions can vary, careful site-specific monitoring to meet standards would need to occur in order to minimize impacts. Protective measures to mitigate potential impacts would include delaying prepacking until snow depth reaches an average of six inches, use of tundra approved vehicles for prepacking, avoiding areas with low snow cover, starting snow road construction

once soil temperatures reach 23-degree Fahrenheit (or below) at a depth of 12 inches, and minimizing sharp turns. Use of these protective measures for previous ice road construction has resulted in little to no long-term environmental damage. Additionally, ROP M-2 from the 2020 IAP ROD would help ensure that invasive species would not become established in the proposed project area (Appendix A).

For the seismic survey, there would be a grid of receiver lines and source lines throughout the seismic survey area (192,000 acres), with both receiver and source lines placed approximately 660 feet apart. Receiver lines would be traveled twice, once to lay out the receivers and again to pick up equipment after recording. Source lines would be traveled by the advance crew in Tuckers to identify hazards and conduct ice stability checks and then would be traveled by one vibroseis vehicle. If the acquisition spread covers the entire seismic survey area there would be roughly 9,580 miles of source and receiver lines. However, due to terrain and lakes that may not be safe to conduct seismic activities, it is assumed that only 80 percent of the seismic area would be surveyed resulting in approximately 7,660 miles of source and receiver lines. If each line is approximately 10 feet in width, there could be up to 9,430 acres impacted by the seismic survey (<5 percent of the total seismic survey area). Impacts from seismic survey lines are expected to be minor and vegetation would generally recover rapidly from low intensity disturbance.

Access routes for plugging and abandonment have been included in the snow and ice road acreages. Ice pads for exploration drilling are shown on Table 2.4 along with acres and locations. These acres are included in the vegetation analysis and total estimated area of disturbance. Effects from the plugging and abandonment and winter exploration access are expected to be similar to those from other snow and ice road and ice pad access and development uses. Vegetation would be expected to recover rapidly from these diffuse, low-intensity disturbances.

Response of arctic tundra plant communities to winter vehicle disturbance depends on the level of disturbance. Following disturbance, plant cover values would be expected to be lower at most sites especially for nonvascular plants, such as mosses, lichens and evergreen shrubs (Jorgenson et al. 2010). Graminoids are typically less affected by disturbance, however, compression of snow and plant material would likely impact the vegetation in the short term. Impacts at higher levels of disturbance could include ground surface subsidence at moist sites, with replacement of shrubs and mosses by hydrophytic sedges. Identification and avoidance of sensitive willow habitats before and during seismic activities would minimize crushing and breaking of stems and branches of shrubs, in particular, where shrubs are common such as along streams and in tussock tundra and other moist tundra types.

Damage to sedge-dryas tundra, unlike tussock tundra is not easily identifiable immediately following winter disturbance. Plant species are differentially sensitive to vehicle disturbance. Species with the poorest recovery are evergreen shrubs (including Labrador tea (*Rhododendron decumbens*), low bush cranberry (*Vaccinium vitis-idaea)*, mountain avens (*Dryas integrifolia*)), deciduous shrubs (dwarf birch (*Betula nana*)), dwarf willows (*Salix phlebophyla, S. reticulata, S. arctica*), cotton grass tussocks (*Eriophorum vaginatum*), some mosses, especially Sphagnum spp. and feather mosses (*Tomentypnum nitens*), and all lichens (Jorgenson et al. 2010). Some vascular plants and moss species appear to be particularly sensitive to compression of the depth hoar snow layer at the base of the snowpack (Walker et al. 1987). Felix and Raynolds (1989) noted that the taller the tussocks the more likely they would be disturbed through seismic activity.

Tussock tundra would likely recover well if disturbance was low and ground ice was not affected, resulting in thaw settlement. Felix and Raynolds (1989) found that micro relief of an area was important in determining its susceptibility to disturbance, because high mounds or tussocks had less snow cover and were easily scuffed or crushed by vehicle tracks. Jorgenson et al. (2010) emphasized the importance of sufficient snow cover to minimize vehicle damage to tundra and that snow had to be deep enough to cover tussocks in tussock tundra. Sedge-willow tundra would recover well with low disturbance, but higher levels of disturbance could cause soil subsidence and change in species composition to wet sedge tundra. Low shrubs have a substantial proportion of live tissue above snow level during winter. Frozen branches can be readily broken off by passing vehicles. Wet sedge tundra would be expected to incur little vegetation damage from winter tundra travel due to lower stature growth in flatter terrain and would recover rapidly due to dominance of the sedge growth form if disturbance is low. Those land cover classes containing evergreen shrubs and bryophytes would show little recovery if damaged in contrast to deciduous shrubs that would be expected to recover within a decade. Table 3.3 shows the abundance of each vegetation type within the entire project area.

Typical effects of individual seismic trails would be expected to be minor but could vary greatly with topography, vegetation type, vehicle type, operator skill, snow cover and snow depth (NRC, 2003). Under the Proposed Action, seismic activity would likely result in both short and long-term impacts to vegetation. Long term impacts could include isolated areas of an irreversible eroding thermal process (e.g., thermokarst), ground subsidence, and changes in species composition, such as a reduction in mosses and evergreen shrubs and increase in sedges. Aesthetic impacts from linear "scars" could also persist. The timeframe for full vegetation recovery could be highly variable. Jorgenson et al. (2010) showed that after 25 years, none of the seismic survey trails were still disturbed, but 9 percent of the camp move trails were. Impacts from seismic lines would be expected to be less compared to earlier studies as methodologies have greatly improved since the 1984-1985 seismic work. Camp moves use equipment with similar ground pressures to that earlier exploration though snow trail design and standards have improved.

In conclusion, expected impacts to vegetation would be minor and would be further minimized through applicable mitigation measures.

3.5. Issue 4: *How would construction and use of snow and ice roads, seismic survey, exploration drilling and well plugging impact soils and permafrost?*

3.5.1. Methodology and Assumptions

The analysis area of impacts to soils and permafrost resources includes the entire project area within the CPAI seismic exploration, exploration east and exploration west areas.

3.5.2. Affected Environment

Soil types within the NPR-A have only generally been described and mapped. To better characterize baseline soil and permafrost conditions and aid monitoring efforts, BLM contracted with the Natural Resources Conservation Service (NRCS) to produce a detailed soil survey around the Willow development near the project area. Once analysis of those data is complete, results will be made available at the NRCS Web Soil Survey website (Soil Survey Staff 2023, Willow NPR-A (AK760) Initial Soil Survey. In Progress, to be published: *Web Soil Survey)*.

All soil types documented in the region are characterized by a cold temperature regime. Soil texture varies across topographic features though not to the extent as further east in the 1002 area of the Arctic Coastal Plain (Coastal Plain). Topography slopes gently northward towards the ocean. Upland soils are generally composed of silt, rocky silt, and peat with some glaciated uplands containing a broader range of particle sizes. Lowlands such as the plains and floodplains have coarser textured soils composed of sand, gravel and peat. Wetlands, however, dominate the landscape and much of the proposed project area.

Permafrost is any soil which remains below 32 degrees Fahrenheit for at least two consecutive years. Permafrost underlies most of the land surfaces on the North Slope. Most of the NPR-A is underlain by ice rich permafrost (>50 percent water). Except where water influences permafrost, such as below lakes and adjacent to streambanks, nearly the entire project area is underlain by ice rich permafrost. Massive ice occurs in the form of ice wedges, buried glacial ice in glacial deposits, and intrusive ice (Jorgenson et al. 2015). Permafrost on the North Slope is generally between 650-1,300 feet thick (Gold and Lachenbruch 1973). The presence of this ice rich permafrost results in soils with maximum potential settlement of up to 98 feet (Jorgenson et al. 2015). Degradation of permafrost can be substantial in soils with high ice content and surface cover sensitive to mechanical disturbance (Gold and Lachenbruch 1973).

The top layer of the soil profile that typically thaws and refreezes annually is known as the active layer. Within the North Slope, the active layer is usually between one to four feet thick. Nearly all the biological activity in soils takes place within the active layer and it is critical to the ecology and hydrology of permafrost terrain, as it provides a rooting zone for plants and acts as a seasonal aquifer for near-surface groundwater (Burn 1998; Hinzman et al. 1991). In winter, snow insulates the soil from the cold air temperature. The resulting difference between soil and air temperatures is important for the ground thermal regime and thus permafrost temperatures (Zhang, 2005). Vegetation affects snow depth and density because tall shrubs trap snow (Pomeroy et al. 2006; Sweet et al. 2014). Some vegetation types preferentially grow in locations with deeper snow cover to be protected from cold air temperatures and benefit from additional moisture in spring (Lantz et al. 2009; Sturm et al., 2005). This association leads to warm soil temperatures in winter below tall shrubs (Lantz et al. 2009; Frost et al. 2018) and in tussock tundra found in poorly drained areas. In contrast, lichen tundra is usually associated with wind-scoured areas which accumulate the least snow. Timing of snowmelt is considered to be one of the most important drivers of active layer thickness at the end of summer (Chapin et al. 2005).

3.5.3. Environmental Impacts

3.5.3.1. *Impacts of the Alternative A – No Action Alternative*

Under this alternative, there would be no additional adverse impacts to soils and permafrost on BLM managed lands. Under the No Action Alternative, there would be no impacts to soils from the snow access route, camp moves, exploration, well plugging, ice roads and pads or the seismic survey.

3.5.3.2. *Impacts of the Alternative B – Proposed Action*

The thermal regime of permafrost is the dominant control on soil formation and soil properties in the project area. Damage to the vegetation and soil surface would directly impact the thermal regime of permafrost. Impacts to permafrost stem from alteration of ground temperatures that

can be caused by compression or damage to vegetation. Any disturbance that alters the insulating surface organic layer decreases the solar reflectance of the surface and may result in differential thawing of the permafrost and cause irreversible thermokarst, subsidence, and increased potential for soil erosion and sedimentation (USDOI BLM 2012). Thermokarst often results where permafrost thawing occurs in ice-rich, fine-grained sediments. Soils in the Arctic are subjected to cold and anoxic conditions that slow rates of soil formation, allowing exposed mineral soil layers to persist for decades if disturbance is extensive.

Breaking the tundra mat, creating ruts and channeling water into vehicle tracks, and exposure of frozen soil have the potential for localized permafrost thawing and thermokarsting. Repeated vehicle passes, particularly with heavier vehicles, could adversely affect vegetation, resulting in a braided pattern as tracks diverge from these areas (Felix and Raynolds 1989).

Degradation of permafrost below winter snow trails can also alter water storage and flow processes, with potential implications to the water balance both locally and regionally. Snow drifts caused by camp locations would increase the soil surface temperature in winter and increase thaw depth in the soil near structures. Blockage of natural drainage patterns can lead to the formation of impoundments or redirection of surface water flow and may cause deposition or erosion of sediment.

Operations over snow cover would likely show some evidence of crushed tussocks. However, new growth would preclude any exposed soils or extensive changes in the active layer. If damage is severe or extensive, irreversible thermo-degradation would occur causing permanent thermokarsting and subsidence. Degradation of permafrost below seismic lines could also alter water storage and flow processes, with implications for the water balance at local and regional scales (Dabros et al. 2018). Small-scale thermokarst could occur due to added insulation of deep compacted snow which reduces frost penetration during winter months (O'Neill and Burn 2017).

Even under a minimally impacted scenario, seismic operations would be expected to displace small areas of soil in isolated locations. Because of snow depth restrictions and sensitive vegetation avoidance procedures, impacts to soils would be limited to compression (reduction) of the insulating mat, similar to what happens during other winter operations following traffic by low-ground-pressure vehicles.

Under the Proposed Action there could be some areas where soils are impacted due to damage of the protective vegetation. With insufficient protective snow cover these effects could be long lasting and could include subsidence, rutting, ponding, and lake drainage. These effects would most likely occur in areas where snow cover is not adequate to protect the vegetative cover such as drainage crossings with taller shrubs and wind scoured sites with shallow cover. Avoiding areas with inadequate snow cover and sensitive vegetation types would help minimize these risks. Highly sensitive vegetation habitat types include low ground willows, relatively higher/drier sand dunes, dryas communities and shrub willows located along stream crossings and riverbanks (refer to Section 3.4 Vegetation). Vegetation land cover classes most susceptible to long term disturbance within the project area are shown in Table 3.3. Sensitive vegetation types would be avoided whenever possible, but even with advance pre-planning and routing flexibility these types of habitat types would be inevitably traversed on occasion. Increased disturbance could also occur if terrain is excessively steep, vegetation species are less resilient, turning radiuses for vehicles are too tight, snow cover is shallow, or soils are insufficiently frozen.

As required by the 2022 NPR-A IAP ROD ROP C-2, ground operations would not be permitted on tundra unless the active layer is sufficiently frozen (defined as 23°F at one foot depth) and the vegetation is covered with adequate snow (defined as 6 inches average depth). The objective of the minimum snow thickness requirement within ROP C-2 is to minimize impacts to soils/permafrost and vegetation. Based on the requirements of ROP C-2, potential impacts to soils from construction and use of the access snow road, camp trails, ice roads and at camp sites would be expected to be minimal, though increased snow drifting along the edges of camps could reduce winter frost penetration and temporarily increase the active layer depth.

The length of the resupply road from the ice pad to the seismic operations area would be approximately 10.1 miles (Figure 2). The camp move is estimated to require the use of up to 45 miles of snow trail (10 feet wide). Though minimum snow depth and soil freeze up requirements remain in place to protect the tundra as required by ROP C-2, areas of wind scour, localized high spots along the landscape, sensitive vegetation types, and unavoidable terrain features such as river crossings would be encountered along all potential routing options and some level of disturbance would be anticipated.

Approximately 3 percent (based on the percent of vegetation susceptible to long-term disturbance) of the 12.2 acres along the resupply/access route would be expected to be disturbed beyond what would rapidly recover within a few growing seasons. The vast majority of vegetation disturbance from the resupply route would be expected to recover rapidly. Snow depth and distribution, and soil temperature during snow road construction and early use would impact the extent and magnitude of disturbance.

The footprint of the camp move route would be roughly 55 acres but disturbance to soils would only be expected at those areas with vegetation sensitive to disturbance. The camp moves could be expected to disturb roughly 1.7 acres of soils (assuming 3 percent of the camp move routes would be located within vegetation types that are susceptible to long-term damage). Potential impacts could include localized rutting, scrapes along high spots, bare ground, and increased wetness and emergent vegetation along routes. Actual disturbance severity and extent would depend on site conditions and timing of the action, particularly snow conditions during the initial operations when snow depths are at their lowest.

Seismic lines would be unlikely to impact soils to the extent that the camp moves potentially could. Low ground pressure vehicles, routing flexibility, and few passes would lead to effects which would recover relatively rapidly.

Access routes for plugging and abandonment have been included in the snow and ice road acreages. Ice pads for exploration drilling are shown on Table 2.4 along with acres and locations. These acres are included in the analysis and total estimated area of disturbance. Effects from the plugging and abandonment and winter exploration access are expected to be similar to those from other snow and ice road and ice pad access and development uses. Since vegetation isn't expected to be disturbed to the extent where it alters the thermal regime of permafrost, soil resources wouldn't experience permanent impacts.

Effects under the Proposed Action would be dispersed, and disturbance intensity and location would depend on localized snow conditions, microtopography, and vegetation type. Extensive areas of thermokarsting would not be expected as a result of this action, and effects would likely to be distributed throughout the project area over higher/drier areas and wind scoured surfaces

with lower snow. Some compression of the insulating vegetative mat would be expected along the camp move trails.

In conclusion, expected impacts to soils and permafrost would be dispersed and any impacts would be minimized through applicable mitigation measures.

CHAPTER 4. PUBLIC INVOLVEMENT, CONSULTATION AND COORDINATION

This chapter will be updated after the public comment period.

4.1. Public Involvement

CPAI has conducted and would continue to conduct public meetings to help keep the local residents informed of CPAI's planned activities. Table 4.1 provides a list of previously conducted and upcoming engagement meetings pertaining to the planned program activities.

Table 4.1. Stakeholder and Public Engagement Meetings

Organization	Date	Location
BLM Pre-Application Meeting	February 27 and July 2025	Fairbanks, AK
NSB Planning Department Pre-Application	September 15, 2025	Utqiagvik, AK
Past Community Meetings	May 21, 2025 November 5, 2025 November 6, 2025 November 6, 2025	Atqasuk Wainwright Utqiagvik Point Lay
Planned Community Meetings	November 18, 2025 December 4, 2025	Nuiqsut Anaktuvuk Pass

The permitting actions associated with all proposed project activities would be listed publicly as required by agency specific regulatory programs. This action would provide opportunities for public input and involvement.

CPAI is working with the North Slope Borough to address the proximity between the Kavlaq 2 ice pad and the Community Wide Access Trail (CWAT). Provisions would be made to ensure the safety of travelers on the trail. These provisions include equipment positioning, signage, and additional awareness training for workers on the ice pad.

4.2. Consultation and Coordination

Public notification of this Environmental Analysis will be on file at the Arctic District Office and available on the Arctic District Office Environmental Assessment web site.

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APPENDICES

APPENDIX A:
Lease Stipulations and Required Operating Procedures

2008 Northeast NPR-A ROD Lease Stipulations

D-1 Lease Stipulation

Objectives: Protect fish-bearing rivers, streams, and lakes from blowouts and minimize alteration of riparian habitat.

Requirement/Standard: Exploratory drilling is prohibited in rivers and streams, as determined by the active floodplain, and fish-bearing lakes.

D-2 Lease Stipulation

Objective: Minimize surface impacts from exploratory drilling.

Requirement/Standard: Construction of permanent or gravel oil and gas facilities shall be prohibited for exploratory drilling. Use of a previously constructed road or pad may be permitted if it is environmentally preferred.

G-1 Lease Stipulation

Objective: Ensure the final disposition of the land meets the current and future needs of the public.

Requirement/Standard: Upon abandonment or expiration of the lease, all oil- and gas-related facilities shall be removed and sites rehabilitated to as near the original condition as practicable, subject to the review of the AO. The AO may determine that it is in the best interest of the public to retain some or all facilities. Within the Goose Molting Area, the AO, when determining if it is in the best interest of the public to retain a facility, will consider the impacts of retention to molting geese and goose molting habitat.

2013 NPR-A ROD Lease Stipulations

D-1 Lease Stipulation

Objectives: Protect fish-bearing rivers, streams, and lakes from blowouts and minimize alteration of riparian habitat.

Requirement/Standard: Exploratory drilling is prohibited in rivers and streams, as determined by the active floodplain, and fish-bearing lakes.

D-2 Lease Stipulation

Objective: Minimize surface impacts from exploratory drilling.

Requirement/Standard: Construction of permanent or gravel oil and gas facilities shall be prohibited for exploratory drilling. Use of a previously constructed road or pad may be permitted if it is environmentally preferred.

E-2 Lease Stipulation

Objective: Protect fish-bearing water bodies, water quality, and aquatic habitats.

Requirement/Standard: Permanent oil and gas facilities, including roads, airstrips, and pipelines, are prohibited upon or within 500 feet as measured from the ordinary high water mark of fish-bearing waterbodies. Essential pipeline and road crossings will be permitted on a case-by-case basis. Note: Also refer to Stipulations/Best Management Practices K-1 and K-2. Construction camps are prohibited on frozen lakes and river ice. Siting of construction camps on river sand and gravel bars is allowed and encouraged. Where leveling of trailers or modules is required and the surface has a vegetative mat, leveling shall be accomplished through blocking rather than use of a bulldozer.

E-3 Lease Stipulation

Objective: Maintain free passage of marine and anadromous fish and protect subsistence use and access to subsistence hunting and fishing.

Requirement/Standard: Causeways and docks are prohibited in river mouths or deltas. Artificial gravel islands and bottom-founded structures are prohibited in river mouths or active stream channels on river deltas. Causeways, docks, artificial islands, and bottom-founded drilling structures shall be designed to ensure free passage of marine and anadromous fish and to prevent significant changes to nearshore oceanographic circulation patterns and water quality characteristics. A monitoring program, developed in consultation with appropriate federal, State, and North Slope Borough regulatory and resource agencies, shall be required to address the objectives of water quality and free passage of fish.

G-1 Lease Stipulation

Objective: Ensure long-term reclamation of land to its previous condition and use.

Requirement/Standard: Prior to final abandonment, land used for oil and gas infrastructure—including but not limited to well pads, production facilities, access roads, and airstrips—shall be reclaimed to ensure eventual restoration of ecosystem function. The leaseholder shall develop and implement an abandonment and reclamation plan approved by the BLM. The plan shall describe short-term stability, visual, hydrological, and productivity objectives and steps to be taken to ensure eventual ecosystem restoration to the land's previous hydrological, vegetative, and habitat condition. The BLM may grant exceptions to satisfy stated environmental or public purposes.

2022 NPR-A ROD Required Operating Procedures

ROP A-1 – Waste and Litter

Objective: Protect the health and safety of oil and gas field workers and the general public by disposing of solid waste and garbage in accordance with applicable federal, State, and local law and regulations.

Requirement/Standard: Areas of operation shall be left clean of all debris.

ROP A-2 – Waste Management Plan

Objective: Minimize impacts on the environment from non-hazardous and hazardous waste generation. Encourage continuous environmental improvement. Protect the health and safety of oil field workers and the general public. Avoid human-caused changes in predator populations.

Requirement/Standard: Lessees/permittees shall prepare and implement a comprehensive waste management plan for all phases of exploration and development, including seismic activities. The plan shall be submitted to the authorized officer for approval, in consultation with federal, State, and North Slope Borough regulatory and resource agencies, as appropriate (based on agency legal authority and jurisdictional responsibility), as part of a plan of operations or other similar permit application.

Management decisions affecting waste generation shall be addressed in the following order of priority: 1) prevention and reduction, 2) recycling, 3) treatment, and 4) disposal. The plan shall consider and take into account the following requirements:

Methods to avoid attracting wildlife to food and garbage. The plan shall identify precautions that are to be taken to avoid attracting wildlife to food and garbage.

b. Disposal of putrescible waste. Requirements prohibit the burial of garbage. Lessees and permitted users shall have a written procedure to ensure that the handling and disposal of putrescible waste will be accomplished in a manner that prevents the attraction of wildlife. All putrescible waste shall be incinerated, backhauled, or composted in a manner approved by the authorized officer. All solid waste, including incinerator ash, shall be disposed of in an approved waste-disposal facility in accordance with EPA and Alaska Department of Environmental Conservation regulations and procedures. The burial of human waste is prohibited except as authorized by the authorized officer.

c. Disposal of pumpable waste products. Except as specifically provided, the BLM requires that all pumpable solid, liquid, and sludge waste be disposed of by injection in accordance with EPA, Alaska Department of Environmental Conservation, and the Alaska Oil and Gas Conservation Commission regulations and procedures. On-pad temporary muds and cuttings storage, as approved by Alaska Department of Environmental Conservation, will be allowed as necessary to facilitate annular injection and/or backhaul operations.

d. Disposal of wastewater and domestic wastewater. The BLM prohibits wastewater discharges or disposal of domestic wastewater into bodies of fresh, estuarine, and marine water, including wetlands, unless authorized by a National Pollutant Discharge Elimination System or State permit.

ROP A-3

Objective: Minimize pollution through effective hazardous-materials contingency planning.

Requirement/Standard: For oil- and gas-related activities, a hazardous materials emergency contingency plan shall be prepared and implemented before transportation, storage, or use of fuel or hazardous substances. The plan shall include a set of procedures to ensure prompt response, notification, and cleanup in the event of a hazardous substance spill or threat of a release. Procedures in the plan applicable to fuel and hazardous substances handling (associated with

transportation vehicles) shall consist of ROPs if approved by the authorized officer. The plan shall include a list of resources available for response (e.g., heavy-equipment operators, spill-cleanup materials or companies), and names and phone numbers of federal, State, and North Slope Borough contacts. Other federal and State regulations may apply and require additional planning requirements. All appropriate staff shall be instructed regarding these procedures. In addition contingency plans related to facilities developed for oil production shall include requirements to:

a. Provide refresher spill-response training to North Slope Borough and local community spill-response teams on a yearly basis,

b. Plan and conduct a major spill-response field-deployment drill annually,

c. Prior to production and as required by law, develop spill prevention and response contingency plans and participate in development and maintenance of the North Slope Subarea Contingency Plan for Oil and Hazardous Substances Discharges/Releases for the National Petroleum Reserve-Alaska operating area. Planning shall include development and funding of detailed (e.g., 1:26,000 scale) environmental sensitivity index maps for the lessee's/permittee's operating area and areas outside the lessee's/permittee's operating area that could be affected by their activities. (The specific area to be mapped shall be defined in the lease agreement and approved by the authorized officer in consultation with appropriate resource agencies.) Maps shall be completed in paper copy and geographic information system format in conformance with the latest version of the U.S. Department of Commerce, National Oceanic and Atmospheric Administration's Environmental Sensitivity Index Guidelines. Draft and final products shall be peer reviewed and approved by the authorized officer in consultation with appropriate federal, State, and North Slope Borough resource and regulatory agencies.

ROP A-4 – Spill Prevention

Objective: Minimize the impact of contaminants on fish, wildlife, and the environment, including wetlands, marshes and marine waters, as a result of fuel, crude oil, and other liquid chemical spills. Protect subsistence resources and subsistence activities. Protect public health and safety.

Requirement/Standard: Before initiating any oil and gas or related activity or operation, including field research/surveys and/or seismic operations, lessees/permittees shall develop a comprehensive spill prevention, control, and countermeasure plan per 40 CFR § 112 (Oil Pollution Act). The plan shall consider and take into account the following requirements:

a. On-site Clean-up Materials. Sufficient oil-spill-cleanup materials (absorbents, containment devices, etc.) shall be stored at all fueling points and vehicle-maintenance areas and shall be carried by field crews on all overland moves, seismic work trains, and similar overland moves by heavy equipment.

b. Storage Containers. Fuel and other petroleum products and other liquid chemicals shall be stored in proper containers at approved locations. Except during overland moves and seismic operations, fuel, other petroleum products, and other liquid chemicals designated

by the authorized officer that in total exceed 1,320 gallons shall be stored within an impermeable lined and diked area or within approved alternate storage containers, such as over packs, capable of containing 110% of the stored volume. In areas within 500 feet of water bodies, fuel containers are to be stored within appropriate containment.

c. Liner Materials. Liner material shall be compatible with the stored product and capable of remaining impermeable during typical weather extremes expected throughout the storage period.

d. Permanent Fueling Stations. Permanent fueling stations shall be lined or have impermeable protection to prevent fuel migration to the environment from overfills and spills.

e. Proper Identification of Containers. All fuel containers, including barrels and propane tanks, shall be marked with the responsible party's name, product type, and year filled or purchased.

f. Notice of Reportable Spills. Notice of any reportable spill (as required by 40 CFR § 300.125 and 18 AAC § 75.300) shall be given to the authorized officer as soon as possible, but no later than 24 hours after occurrence.

g. Identification of Oil Pans *("duck ponds").* All oil pans shall be marked with the responsible party's name.

ROP A-5 – Refueling and Fuel Storage

Objective: Minimize the impact of contaminants from refueling operations on fish, wildlife and the environment.

Requirement/Standard: Refueling of equipment within 500 feet of the active floodplain of any water body is prohibited. Fuel storage stations shall be located at least 500 feet from any water body with the exception that small caches (up to 210 gallons) for motor boats, float planes, ski planes, and small equipment, e.g. portable generators and water pumps, are permitted. The authorized officer may allow storage and operations at areas closer than the stated distances if properly designed to account for local hydrologic conditions.

ROP A-6

Objective: Minimize the impact on fish, wildlife, and the environment from contaminants associated with the exploratory drilling process.

Requirement/Standard: Surface discharge of reserve-pit fluids is prohibited.

ROP A-8

Objective: Minimize conflicts resulting from interaction between humans and bears during oil and gas activities.

Requirement/Standard: Oil and gas lessees and their contractors and subcontractors will, as a part of preparation of lease operation planning, prepare and implement bear-interaction plans to minimize conflicts between bears and humans. These plans shall include measures to:

a. Minimize attraction of bears to the drill sites.

b. Organize layout of buildings and work sites to minimize human/bear interactions.

c. Warn personnel of bears near or on work sites and identify proper procedures to be followed.

d. Establish procedures, if authorized, to discourage bears from approaching the work site.

e. Provide contingencies in the event bears do not leave the site or cannot be discouraged by authorized personnel.

f. Discuss proper storage and disposal of materials that may be toxic to bears.

g. Provide a systematic record of bears on the work site and in the immediate area.

ROP A-9

Objective: Reduce air quality impacts.

Requirement/Standard: All oil and gas operations (vehicles and equipment) that burn diesel fuels must use "ultra-low sulfur" diesel as defined by the Alaska Department of Environmental Conservation-Division of Air Quality.

ROP B-1 – Water Use from Rivers and Stream

Withdrawal of unfrozen water from rivers and streams during winter is prohibited. The removal of ice aggregate from grounded areas ≤4-feet deep may be authorized from rivers on a site-specific basis.

ROP B-2 - Water Use from Lakes

Withdrawal of unfrozen water from lakes and the removal of ice aggregate from grounded areas ≤4-feet deep may be authorized on a site-specific basis depending on water volume and depth and the waterbody's fish community. Current water use requirements are:

a. Lakes with sensitive fish (i.e., any fish except ninespine stickleback or Alaska blackfish): unfrozen water available for withdrawal is limited to 15% of calculated volume deeper than 7 feet; only ice aggregate may be removed from lakes that are ≤7-feet deep.

b. Lakes with only non-sensitive fish (i.e., ninespine stickleback or Alaska blackfish): unfrozen water available for withdrawal is limited to 30% of calculated volume deeper than 5 feet; only ice aggregate may be removed from lakes that are ≤5.

c. Lakes with no fish present, regardless of depth: water available for use is limited to 35% of total lake volume.

d. In lakes where unfrozen water and ice aggregate are both removed, the total use shall not exceed the respective 15%, 30%, or 35% volume calculations.

e. Additional modeling or monitoring may be required to assess water level and water quality conditions before, during, and after water use from any fish-bearing lake or lake of special concern.

f. Any water intake structures in fish bearing or non-fish bearing waters shall be designed, operated, and maintained to prevent fish entrapment, entrainment, or injury. Note: All water withdrawal equipment must be equipped and must utilize fish screening devices approved by the Alaska Department of Fish and Game, Division of Habitat.

g. Compaction of snow cover or snow removal from fish-bearing waterbodies shall be prohibited except at approved ice road crossings, water pumping stations on lakes, or areas of grounded ice.

ROP C-1

Objective: Protect grizzly bear, polar bear, and marine mammal denning and/or birthing locations.

Requirement/Standard:

a. Grizzly bear dens—Cross-country use of all vehicles, equipment, and oil and gas activity is prohibited within 0.5 miles of occupied grizzly bear dens identified by the ADF&G or the U.S. Fish and Wildlife Service (USFWS), unless alternative protective measures are approved by the BLM AO, in consultation with the ADF&G.

b. Polar bear dens—Cross-country use of vehicles, equipment, oil and gas activity, and seismic survey activity is prohibited within 1 mile of known or observed polar bear dens, unless alternative protective measures are approved by the BLM AO and are consistent with the Marine Mammal Protection Act and the Endangered Species Act (ESA).

c. In order to limit disturbance around known polar bear dens, implement the following:

1. Attempt to locate polar bear dens—Permittees seeking to carry out onshore activities in known or suspected polar bear denning habitat during the denning season (approximately November to April) must make efforts to locate occupied polar bear dens within and near areas of operation, utilizing den detection techniques approved in consultation with the USFWS. All observed or suspected polar bear dens must be reported to the USFWS prior to the initiation of activities.

2. Observe the exclusion zone around known polar bear dens—Permittees must observe a 1-mile operational exclusion zone around all known polar bear dens during the denning

season (approximately November–April, or until the female and cubs leave the areas). Should previously unknown occupied dens be discovered within 1 mile of activities, work must cease and the USFWS must be contacted for guidance. The USFWS will evaluate these instances to recommend the appropriate action. Potential actions may range from cessation or modification of work to conducting additional monitoring, and the holder of the authorization must comply with any additional measures specified.

3. Use the den habitat map developed by the U.S. Geological Survey—This measure ensures that the location of potential polar bear dens is considered when conducting activities in the coastal areas of the Beaufort Sea.

4. Polar bear den restrictions—Restrict the timing of the activity to limit disturbance around dens.

d. In order to limit disturbance of activities to seal lairs in the nearshore area (< 9.8-foot water depth):

1. Specific to seismic operations:

i. Prior to the initiation of winter seismic surveys on marine ice, the permittee will conduct a sound source verification test approved by the BLM and National Marine Fisheries Service (NMFS). The test is to measure the attenuation distance to the 120 decibels re 1 micro Pascal of project-associated sound levels through grounded ice to areas potentially occupied by ice seals (ungrounded ice and open water). The permittee will share the results with the BLM and the NMFS. The attenuation distance will be used to buffer all marine on-ice seismic survey activity operations to areas potentially occupied by ice seals.

2. For all activities:

i. Maintain airborne sound levels of equipment below 100 decibels re 20 micro Pascals at 66 feet. If equipment will be used that differs from what was originally proposed, the permittee must inform the BLM AO and share sound levels and air and water attenuation information for the new equipment.

ii. On-ice operations after May 1 will employ a full-time, trained, protected species observer on vehicles to ensure that all basking seals are avoided by vehicles by at least 500 feet and will ensure that all equipment with airborne noise levels above 100 decibels re 20 micro Pascals are operating at distances from observed seals that allow for the attenuation of noise to levels below 100 decibels. All sightings of seals will be reported to the BLM using a NMFS-approved observation form.

iii. Sea ice trails must not be greater than 12 feet wide. No driving will be allowed beyond the shoulder of the ice trail or off planned routes unless necessary to avoid ungrounded

ice or for other human or marine mammal safety reasons. On-ice driving routes shall minimize travel over snow/ice/topographical features that could foster the development of birthing lairs.

e. No unnecessary equipment or operations (e.g., camps) will be placed or used on sea ice.

ROP C-2

Objective: Protect stream banks, minimize compaction of soils, and minimize the breakage, abrasion, compaction, or displacement of vegetation.

Requirement/Standard:

a. Ground operations shall be allowed only when frost and snow cover are at sufficient depths to protect the tundra. Ground operations shall cease when the spring snowmelt begins (approximately May 5 in the foothills area where elevations reach or exceed 500 feet and approximately May 15 in the northern coastal areas). The exact dates will be determined by the authorized officer.

b. Low-ground-pressure vehicles shall be used for on-the-ground activities off ice roads or pads. Low-ground-pressure vehicles shall be selected and operated in a manner that eliminates direct impacts to the tundra by shearing, scraping, or excessively compacting the tundra mat. Note: This provision does not include the use of heavy equipment such as front-end loaders and similar equipment required during ice road construction.

c. Bulldozing of tundra mat and vegetation, trails, or seismic lines is prohibited; however, on existing trails, seismic lines or camps, clearing of drifted snow is allowed to the extent that the tundra mat is not disturbed.

d. To reduce the possibility of ruts, vehicles shall avoid using the same trails for multiple trips unless necessitated by serious safety or superseding environmental concern. This provision does not apply to hardened snow trails for use by low-ground-pressure vehicles such as Rolligons.

e. The location of ice roads shall be designed and located to minimize compaction of soils and the breakage, abrasion, compaction, or displacement of vegetation. Offsets may be required to avoid using the same route or track in the subsequent year.

f. Motorized ground-vehicle use within the Colville River Special Area associated with overland moves, seismic work, and any similar use of heavy equipment shall be minimized within an area that extends 1 mile west or northwest of the bluffs of the Colville River, and 2 miles on either side of the Kogosukruk and Kikiakrorak rivers and tributaries of the Kogosukruk River from April 15 through August 5, with the exception that use will be minimized in the vicinity of gyrfalcon nests beginning March 15. Such use will remain 1/2 mile away from known raptor nesting sites, unless authorized by the authorized officer.

ROP C-3

Objective: Maintain natural spring runoff patterns and fish passage, avoid flooding, prevent streambed sedimentation and scour, protect water quality, and protect stream banks.

Requirement/Standard: Crossing of waterway courses shall be made using a low-angle approach. Crossings that are reinforced with additional snow or ice ("bridges") shall be removed, breached, or slotted before spring breakup. Ramps and bridges shall be substantially free of soil and debris.

ROP C-4

Objective: Avoid additional freeze-down of deep-water pools harboring over-wintering fish and invertebrates used by fish.

Requirement/Standard: Travel up and down streambeds is prohibited unless it can be demonstrated that there will be no additional impacts from such travel to over-wintering fish or the invertebrates they rely on. Rivers, streams, and lakes shall be crossed at areas of grounded ice whenever possible.

ROP C-5

Objective: Minimize the effects of high-intensity acoustic energy from seismic surveys on fish.

Requirement/Standard:

a. When conducting vibroseis-based surveys above potential fish overwintering areas (water 6 feet deep or greater, ice plus liquid depth), operators shall follow recommendations by Morris and Winters (2005): only a single set of vibroseis shots should be conducted if possible; if multiple shot locations are required, these should be conducted with minimal delay; multiple days of vibroseis activity above the same overwintering area should be avoided if possible.
b. When conducting air gun-based surveys in freshwater, operators shall follow standard marine mitigation measures that are applicable to fish (e.g., Minerals Management Service 2006): operators will use the lowest sound levels feasible to accomplish their data-collection needs; ramp-up techniques will be utilized (ramp-up involves the gradual increase in emitted sound levels beginning with firing a single air gun and gradually adding air guns until the desired operating level of the full array is obtained).
c. When conducting explosive-based surveys, operators shall follow setback distances from fish-bearing waterbodies based on requirements outlined by Alaska Department of Fish and Game (1991).

ROP D-1

Objective: Minimize surface impacts from exploratory drilling.

Requirement/Standard: Construction of permanent or gravel oil and gas facilities shall be prohibited for exploratory drilling. Use of a previously constructed road or pad may be permitted if it is environmentally preferred.

ROP E-1

Objective: Protect subsistence use and access to subsistence hunting and fishing areas and minimize the impact of oil and gas activities on air, land, water, fish, and wildlife resources.

Requirement/Standard: All roads must be designed, constructed, maintained, and operated to create minimal environmental impacts and to protect subsistence use and access to subsistence hunting and fishing areas. The authorized officer will consult with appropriate federal, State, and North Slope Borough regulatory and resources agencies prior to approving construction of roads. Subject to approval by the authorized officer, the construction, operation, and maintenance of oil and gas field roads is the responsibility of the lessee unless the construction, operation, and maintenance of roads are assumed by the appropriate governing entity.

ROP E-9

Objective: Avoidance of human-caused increases in populations of predators of ground nesting birds.

Requirement/Standard:

a. Lessee shall utilize best available technology to prevent facilities from providing nesting, denning, or shelter sites for ravens, raptors, and foxes. The lessee shall provide the authorized officer with an annual report on the use of oil and gas facilities by ravens, raptors, and foxes as nesting, denning, and shelter sites.

b. Feeding of wildlife is prohibited and will be subject to non-compliance regulations.

ROP E-10

Objective: Minimize bird collisions with infrastructure, especially during migration and inclement weather.

Requirement/Standard: Flagging of structures, such as elevated utility lines and guy wires, shall be required to minimize bird collision. All facility external lighting, during all months of the year, shall be designed to direct artificial exterior lighting inward and downward or be fitted with shields to reduce reflectivity in clouds and fog conditions, unless otherwise required by the Federal Aviation Administration.

ROP E-13

Objective: Protect cultural and paleontological resources.

Requirement/Standard: Lessees shall conduct a cultural and paleontological resources survey prior to any ground-disturbing activity. Upon finding any potential cultural or paleontological

resource, the lessee or their designated representative shall notify the authorized officer and suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the authorized officer.

ROP E-20

Objective: Minimize the impacts on bird species from direct interaction with aboveground utility infrastructure.

Requirement/Standard:

a. To reduce the possibility of birds colliding with aboveground utility lines (power and communication), such lines would either be buried in access roads or would be suspended on VSMs. Exceptions are limited to the following situations:

1. Overhead power or communication lines may be allowed when located entirely within the boundaries of a facility pad.
2. Overhead power or communication lines may be allowed when engineering constraints at the specific and limited location make it infeasible to bury or connect the lines to a VSM.
3. Overhead power or communication lines may be allowed in situations when human safety would be compromised by other methods.

b. To reduce the likelihood of birds colliding with them, communication towers would be located, to the extent practicable, on existing pads and as close as possible to buildings or other structures and on the east or west side of buildings or other structures, if possible. Support wires associated with communication towers, radio antennas, and other similar facilities would be avoided to the extent practicable. If support wires are necessary, they would be clearly marked along their entire length to improve visibility to low-flying birds. Such markings would be developed through consultation with the USFWS.

c. Design of other utility infrastructure, such as wind turbines, would be evaluated under a specific development proposal.

d. The permittee shall comply with current industry-accepted practices for raptor protection on power lines, such as the most recent Avian Power Line Interaction Committee suggested practices.

ROP F-1

Objective: Minimize the effects of low-flying aircraft on wildlife, subsistence activities, and local communities.

Requirement/Standard: The lessee shall ensure that aircraft used for permitted activities maintain altitudes according to the following guidelines (Note: This ROP is not intended to restrict flights necessary to survey wildlife to gain information necessary to meet the stated objectives of the stipulations and ROPs. However, flights necessary to gain this information will be restricted to the minimum necessary to collect such data.):

a. Aircraft shall maintain an altitude of at least 1,500 feet above ground level when within ½ mile of cliffs identified as raptor nesting sites from April 15 through August 15 and an altitude of at least 1,500 feet above ground level when within ½ mile of known gyrfalcon nest sites from March 15 to August 15, unless doing so would endanger human life or violate safe flying practices. Permittees shall obtain information from the BLM necessary to plan flight routes when routes may go near falcon nests.

b. Aircraft shall maintain an altitude of at least 1,000 feet above ground level (except for takeoffs and landings) over caribou winter ranges from December 1 through May 1, unless doing so would endanger human life or violate safe flying practices. Caribou wintering areas will be defined annually by the authorized officer. The BLM will consult directly with the Alaska Department of Fish and Game in annually defining caribou winter ranges.

c. Land user shall submit an aircraft use plan as part of an oil and gas exploration or development proposal. The plan shall address strategies to minimize impacts to subsistence hunting and associated activities, including but not limited to the number of flights, type of aircraft, and flight altitudes and routes, and shall also include a plan to monitor flights.

d. Proposed aircraft use plans should be reviewed by appropriate federal, State, and borough agencies. Consultations with these same agencies will be required if unacceptable disturbance is identified by subsistence users. Adjustments, including possible suspension of all flights, may be required by the authorized officer if resulting disturbance is determined to be unacceptable.

e. The number of takeoffs and landings to support oil and gas operations with necessary materials and supplies should be limited to the maximum extent possible. During the design of proposed oil and gas facilities, larger landing strips and storage areas should be considered to allow larger aircraft to be employed, resulting in fewer flights to the facility.

f. Use of aircraft, especially rotary wing aircraft, near known subsistence camps and cabins or during sensitive subsistence hunting periods (spring goose hunting and fall caribou and moose hunting) should be kept to a minimum.

g. Aircraft used for permitted activities shall maintain an altitude of at least 2,000 feet above ground level (except for takeoffs and landings) over the Teshekpuk Lake Caribou Habitat Area from May 20 through August 20, unless doing so would endanger human life or violate safe flying practices. Aircraft use (including fixed wing and helicopter) by oil and gas lessees in the Goose Molting Area should be minimized from May 20 through August 20, unless doing so would endanger human life or violate safe flying practices.

h. Hazing of wildlife by aircraft is prohibited. Pursuit of running wildlife is hazing. If wildlife begins to run as an aircraft approaches, the aircraft is too close and must break away.

ROP H-1

Objective: Provide opportunities for participation in planning and decision making to prevent unreasonable conflicts between subsistence uses and other activities.

Requirement/Standard: Lessee/permittee shall consult directly with affected communities using the following guidelines:

a. Before submitting an application to the BLM, the applicant shall consult with directly affected subsistence communities, the North Slope Borough, and the National Petroleum Reserve-Alaska Subsistence Advisory Panel to discuss the siting, timing, and methods of their proposed operations to help discover local traditional and scientific knowledge, resulting in measures that minimize impacts to subsistence uses. Through this consultation, the applicant shall make every reasonable effort, including such mechanisms as conflict avoidance agreements and mitigating measures, to ensure that proposed activities will not result in unreasonable interference with subsistence activities. In the event that no agreement is reached between the parties, the authorized officer shall consult with the directly involved parties and determine which activities will occur, including the timeframes.

b. The applicant shall submit documentation of consultation efforts as part of its operations plan. Applicants should submit the proposed plan of operations to the National Petroleum Reserve-Alaska Subsistence Advisory Panel for review and comment. The applicant must allow time for the BLM to conduct formal government-to-government consultation with Native Tribal governments if the proposed action requires it.

c. A plan shall be developed that shows how the activity, in combination with other activities in the area, will be scheduled and located to prevent unreasonable conflicts with subsistence activities. The plan will also describe the methods used to monitor the effects of the activity on subsistence use. The plan shall be submitted to the BLM as part of the plan of operations. The plan should address the following items:

    1. A detailed description of the activity(ies) to take place (including the use of aircraft).
    2. A description of how the lessee/permittee will minimize and/or deal with any potential impacts identified by the authorized officer during the consultation process.
    3. A detailed description of the monitoring effort to take place, including process, procedures, personnel involved and points of contact both at the work site and in the local community.
    4. Communication elements to provide information on how the applicant will keep potentially affected individuals and communities up-to-date on the progress of the

activities and locations of possible, short-term conflicts (if any) with subsistence activities. Communication methods could include holding community meetings, open house meetings, workshops, newsletters, radio and television announcements, etc.

5. Procedures necessary to facilitate access by subsistence users to the permitees' area of activity or facilities during the course of conducting subsistence activities.

d. During development, monitoring plans must be established for new permanent facilities, including pipelines, to assess an appropriate range of potential effects on resources and subsistence as determined on a case-by-case basis given the nature and location of the facilities. The scope, intensity, and duration of such plans will be established in consultation with the authorized officer and NPR-A Subsistence Advisory Panel.

e. Permittees that propose barging facilities, equipment, supplies, or other materials to NPR-A in support of oil and gas activities in the NPR-A shall notify, confer, and coordinate with the Alaska Eskimo Whaling Commission, the appropriate local community whaling captains' associations, and the North Slope Borough to minimize impacts from the proposed barging on subsistence whaling activities.

f. Barge operators requiring a BLM permit are required to demonstrate that barging activities will not have unmitigable adverse impacts on the availability of marine mammals to subsistence hunters.

g. All vessels over 50 ft. in length engaged in operations requiring a BLM permit must have an Automatic Identification System (AIS) transponder system on the vessel.

ROP H-2

Objective: Prevent unreasonable conflicts between subsistence activities and geophysical (seismic) exploration.

Requirement/Standard: In addition to the consultation process described in ROP H-1 for permitted activities, before activity to conduct geophysical (seismic) exploration commences, applicants shall notify the local search and rescue organizations of proposed seismic survey locations for that operational season. For the purpose of this standard, a potentially affected cabin/campsite is defined as any camp or campsite used for subsistence purposes and located within the boundary of the area subject to proposed geophysical exploration and/or within 1 mile of actual or planned travel routes used to supply the seismic operations while it is in operation.

a. Because of the large land area covered by typical geophysical operations and the potential to impact a large number of subsistence users during the exploration season, the permittee/operator will notify all potentially affected subsistence-use cabin and campsite users.

b. The official recognized list of subsistence-use cabin and campsite users is the North Slope Borough's most current inventory of cabins and campsites, which have been identified by the subsistence users' names.

c. A copy of the notification, a map of the proposed exploration area, and the list of potentially affected users shall also be provided to the office of the appropriate Native Tribal government.

d. The authorized officer will prohibit seismic work within 1 mile of any known subsistence-use cabin or campsite unless an alternate agreement between the cabin/campsite owner/user is reached through the consultation process and presented to the authorized officer. (Regardless of the consultation outcome, the authorized officer will prohibit seismic work within 300 feet of a known subsistence-use cabin or campsite.)

e. The permittee shall notify the appropriate local search and rescue (e.g., Nuiqsut Search and Rescue, Atqasuk Search and Rescue) of their current operational location within the NPR-A on a weekly basis. This notification should include a map indicating the current extent of surface use and occupation, as well as areas previously used/occupied during the course of the operation in progress. The purpose of this notification is to allow hunters up-to-date information regarding where seismic exploration is occurring, and has occurred, so that they can plan their hunting trips and access routes accordingly. Identification of the appropriate search and rescue offices to be contacted can be obtained from the coordinator of the NPR-A Subsistence Advisory Panel in the BLM's Arctic Field Office.

ROP H-3

Objective: Minimize impacts to sport hunting and trapping species and to subsistence harvest of those animals.

Requirement/Standard: Hunting and trapping by lessee's/permittee's employees, agents, and contractors are prohibited when persons are on "work status." Work status is defined as the period during which an individual is under the control and supervision of an employer. Work status is terminated when the individual's shift ends and he/she returns to a public airport or community (e.g., Fairbanks, Barrow, Nuiqsut, or Deadhorse). Use of lessee/permittee facilities, equipment, or transport for personal access or aid in hunting and trapping is prohibited.

ROP I-1

Objective: Minimize cultural and resource conflicts.

Requirement/Standard: All personnel involved in oil and gas and related activities shall be provided information concerning applicable stipulations, ROPs, standards, and specific types of environmental, social, traditional, and cultural concerns that relate to the region. The lessee/permittee shall ensure that all personnel involved in permitted activities shall attend an orientation program at least once a year. The proposed orientation program shall be submitted to the authorized officer for review and approval and should:

a. Provide sufficient detail to notify personnel of applicable stipulations and ROPs as well as inform individuals working on the project of specific types of environmental, social, traditional and cultural concerns that relate to the region.

b. Address the importance of not disturbing archaeological and biological resources and habitats, including endangered species, fisheries, bird colonies, and marine mammals, and provide guidance on how to avoid disturbance.

c. Include guidance on the preparation, production, and distribution of information cards on endangered and/or threatened species.

d. Be designed to increase sensitivity and understanding of personnel to community values, customs, and lifestyles in areas in which personnel will be operating.

e. Include information concerning avoidance of conflicts with subsistence, commercial fishing activities, and pertinent mitigation.

f. Include information for aircraft personnel concerning subsistence activities and areas/seasons that are particularly sensitive to disturbance by low-flying aircraft. Of special concern is aircraft use near traditional subsistence cabins and campsites, flights during spring goose hunting and fall caribou and moose hunting seasons, and flights near North Slope communities.

g. Provide that individual training is transferable from one facility to another except for elements of the training specific to a particular site.

h. Include on-site records of all personnel who attend the program for so long as the site is active, though not to exceed the 5 most recent years of operations. This record shall include the name and dates(s) of attendance of each attendee.

i. Include a module discussing bear interaction plans to minimize conflicts between bears and humans.

j. Provide a copy of 43 CFR 3163 regarding Non-Compliance Assessment and Penalties to on-site personnel.

k. Include training designed to ensure strict compliance with local and corporate drug and alcohol policies. This training should be offered to the North Slope Borough Health Department for review and comment.

l. Include training developed to train employees on how to prevent transmission of communicable diseases, including sexually transmitted diseases, to the local communities. This training should be offered to the North Slope Borough Health Department for review and comment.

ROP L-1

Objective: Protect stream banks and water quality; minimize compaction and displacement of soils; minimize the breakage, abrasion, compaction, or displacement of vegetation; protect cultural and paleontological resources; maintain populations of, and adequate habitat for birds, fish, and caribou and other terrestrial mammals; and minimize impacts to subsistence activities.

Requirement/Standard: On a case-by-case basis, BLM may permit low-ground-pressure vehicles to travel off of gravel pads and roads during times other than those identified in ROP C-2a. Permission for such use would only be granted after an applicant has:

a. Submitted studies satisfactory to the authorized officer of the impacts on soils and vegetation of the specific low-ground-pressure vehicles to be used. These studies should reflect use of such vehicles under conditions similar to those of the route proposed for use and should demonstrate that the proposed use would have no more than minimal impacts to soils and vegetation.
b. Submitted surveys satisfactory to the authorized officer of subsistence uses of the area as well as of the soils, vegetation, hydrology, wildlife and fish (and their habitats), paleontological and archaeological resources, and other resources as required by the authorized officer.
c. Designed and/or modified the use proposal to minimize impacts to the authorized officer's satisfaction. Design steps to achieve the objectives and based upon the studies and surveys may include, but not be limited to, timing restrictions (generally it is considered inadvisable to conduct tundra travel prior to August 1 to protect ground-nesting birds), shifting of work to winter, rerouting, and not proceeding when certain wildlife are present or subsistence activities are occurring. At the discretion of the authorized officer, the plan for summer tundra vehicle access may be included as part of the spill prevention and response contingency plan required by 40 CFR 112 (Oil Pollution Act) and ROP A-4.

ROP M-1

Objective: Minimize disturbance and hindrance of wildlife, or alteration of wildlife movements through the NPR-A.

Requirement/Standard: Chasing wildlife with ground vehicles is prohibited. Particular attention will be given to avoid disturbing caribou.

ROP M-2

Objective: Prevent the introduction, or spread, of non-native, invasive plant species in the NPR-A.

Requirement/Standard: Certify that all equipment and vehicles (intended for use either off or on roads) are weed-free prior to transporting them into the NPR-A. Monitor annually along roads for non-native invasive species, and initiate effective weed control measures upon evidence of their introduction. Prior to operations in the NPR-A, submit a plan for the BLM's approval, detailing the methods for cleaning equipment and vehicles, monitoring for weeds and weed control.

ROP M-3

Objective: Minimize loss of populations of, and habitat for, plant species designated as Sensitive by the BLM in Alaska.

Requirement/Standard: If a development is proposed in an area that provides potential habitat for a BLM Sensitive Plant Species, the development proponent would conduct surveys at appropriate times of the summer season and in appropriate habitats for the Sensitive Plant Species that might occur there. The results of these surveys will be submitted to the BLM with the application for development.

APPENDIX B:
Arctic District Office Standard Stipulations

Administrative Stipulations

1. The authorized user is responsible for obtaining all required permits and authorizations. Authorized users will follow all Federal and State of Alaska laws and regulations and will comply with all applicable Federal and State of Alaska environmental standards.

2. Authorized user shall provide BLM with a detailed map of all camp locations, trails used, and location and species harvested located accurately on a USGS quadrangle map of the 1:63,360 scale. Please include the dates of the trip, the number of people who camped at each site, and GPS location (with datum noted). Data shall be transmitted to the BLM in a GIS format (ESRI shapefiles referencing the North American Datum of 1983).

3. The BLM, through the Arctic District Manager, reserves the right to impose closure of any area to operators in periods when fire danger or other dangers to natural resources are severe.

4. It is the responsibility of the authorized user to ensure that all individuals brought to the project area under its auspices adhere to these stipulations. Authorized users of the planning area shall provide all employees, contractors, subcontractors, and clients with a briefing regarding stipulations applicable to the lease and/or permit.

5. A copy of applicable stipulations will be posted in a conspicuous place in each work site and campsite.

6. The authorized user will provide the BLM Arctic District Office with a weekly activities' summary report using the format provided by BLM. This report shall include all required reports identified below. The report shall be delivered in digital format every Mo through the applicable season(s) for the life of this project.

7. Tundra damage shall be reported to the BLM within 24 hours during operations or within 72 hours during summer inspections to blm_ak_arctic_permitting@blm.gov.

8. A daily record of water removed as unfrozen water or ice aggregate (separately) must be maintained and submitted to the BLM with the weekly report of activities. Submitting water and ice use in the format specified by the BLM is required.

9. The BLM must be notified within 48 hours if water removal exceeds the volume approved at any lake.

10. The BLM must be notified within 48 hours of any observation of dead or injured fish on source intake screens, in the hole being used for pumping, or within any portion of ice roads or pads. If observed at a particular lake, pumping must cease temporarily from that hole until additional preventive measures are taken to avoid further impacts on fish.

11. The authorized user shall maintain an aircraft log of the following information for each take-off and landing (which shall be turned in to BLM in electronic format in an excel spreadsheet with each item below listed in a separate column no later than November 1, each year):

    Type of Aircraft
    Aircraft N number
    Date
    Time
    Decimal Degree Format – latitude of takeoff location
    Decimal Degree Format – longitude of takeoff location
    Date
    Time
    Decimal Degree Format – latitude of landing location
    Decimal Degree Format – longitude of landing location

12. For projects that use aircraft to access numerous sites and locations, the Authorized user shall provide BLM with a map, GPS tracks of flights, and the landing locations at the conclusion of the activity. This should be submitted at the same time as the aircraft log. Not required for Special Recreation Permits or when aircraft is only used to access a campsite.

13. For any activities that take place within 50 miles of Nuiqsut, coordinate with other users in the area by calling in to the ConocoPhillips daily 9am coordination meeting at 907-308-3334, passcode 973 970 59# and emailing the North Slope Helicopter Logistics Coordinator at n2091@conocophillips.com

14. The authorized user must use products that are approved and certified by the Interagency Grizzly Bear Committee (IGBC) as 'bear-resistant" for the storage of all human food. Use of IGBC-certified bear-resistant containers is one of the methods available to comply with food storage regulations. Other methods for compliance may also be considered for approval in some circumstances, for instance electric fencing may be authorized under certain conditions. Information about certified products can be found at: http://www.igbconline.org/index.php/safety-in-grizzly-country/bear-resistant-products/igbc-certified-bear-resistant-products.

15. Each year, prior to the start of winter activity, the authorized user will determine the plan for the season and determine, in consultation with the U.S. Fish and Wildlife Service's (Service) Marine Mammals Management (MMM) office, if Letters of Authorization (LOAs) for take of polar bears pursuant to the Marine Mammal Protection Act (MMPA) are required. If the authorized user obtains an LOA, relevant documents will be submitted to the BLM prior to work starting in NPR-A. The authorized user or designee will follow all terms and condition of LOAs issued by the Service for take of polar bears.

16. The authorized user and designees will cooperate with the Service and other Federal, State, or local agencies designated to represent the Service to monitor impacts of project

activities on polar bears. For example, the authorized user and designees will allow Service personnel access to the activity site upon request.

17. All field crews will follow a Wildlife Interaction Plan prepared by the authorized user detailing how crews will manage wildlife attractants (food and non-food materials) and respond to human- polar bear interactions. This interaction plan will include all guidelines for safely and non- lethally deterring polar bears from damaging property and endangering the public as found in the Final Rule of the Marine Mammal Protection Act Deterrence Guidelines. Other methods of deterring polar bears require authorization by the MMM office. Contact Stephanie Burgess at 907-223-9172 for more information.

18. If a polar bear interaction escalates into a life-threatening situation, section 101(c) of the MMPA allows, without specific authorization, to take (including lethal take) a polar bear. Any injury or lethal take of a polar bear must be reported to the BLM (907-474-2301) and the Service (907-223-9172) within 48 hours

19. The authorized user will complete a BLM Polar Bear Sightings Datasheet. If no bears are observed the log can show "0" bears observed. Also, the authorized user or their contractors shall submit a Polar Bear Sighting Report to the BLM and Service within 60 days of the completion of field operations. This report shall contain information on all evidence of polar bears, including active den locations, and the actions taken by the authorized user. The BLM (907-474-2301) and the Service (907-223-9172) will be notified within 24 hours of any potential or observed polar bear den sites.

20. For multi-year authorizations, the authorized user will provide BLM, all information needed for BLM to determine if the project has changed in any manner that may require reinitiation or amending of the ESA consultation which was completed in the first year of the authorization. This information must be submitted to BLM at blm_ak_arctic_permitting@blm.gov by March 1 each year that the authorization is active. Details of required information can be obtained by contacting BLM at blm_ak_arctic_permitting@blm.gov.

Standard Stipulations

21. Grey wash water and kitchen wastewater may be filtered to remove the solids and the liquid discharged to the land surface, provided the disposal area is a minimum of 100 feet from any water body or stream.

22. The Authorized user accepts responsibility for their campsite conditions and will be liable for identified rehabilitation activities.

23. Tent camps shall be situated on gravel bars, sand, or other durable substrates, if any exist in the vicinity of the desired location. If no such substrates exist nearby, tents may be pitched on tundra vegetation for up to two weeks.

24. All operations shall be conducted with due regard for good resource management and in such a manner as not to block any stream, or drainage system, or change the character or course of a stream, or cause the pollution or siltation of any stream or lake.

25. The authorized user will take no action that interferes with subsistence activities of rural users or restricts the reasonable access of subsistence users to public lands. This may include but is not limited to disturbance of wildlife and their movements near subsistence hunters, and damage to cabins, trails, traditional campsites or caches used by subsistence users. The authorized user must familiarize themselves, their team, and their pilots with any subsistence camps and cabins located near their project site (map available upon request) and, when using aircraft, make all reasonable efforts to avoid disturbing hunters.

26. All activities shall be conducted to avoid or minimize disturbance to vegetation. The clearing of vegetation for camps or aircraft landing areas is prohibited.

27. In accordance with the Archaeological Resources Protection Act (16 U.S.C. 470aa), the removal or disturbance of archeological or historic artifacts is prohibited. The excavation, disturbance, collection, or purchase of historical, recent, ethnological, or archaeological specimens or artifacts is prohibited. Such items include both prehistoric and historic archaeological sites and associated artifacts, including but not limited to stone tools, modified bone, antler, ivory, or wood material, campfire rings, stone cairns, cabins and other structures and their ruins, mining equipment, refuse dumps, etc. In accordance with the Paleontological Resources Protection Act (16 U.S.C. 470aaa), the disturbance, excavation and collection of vertebrate fossils (the bones of prehistoric animals) is also prohibited.

28. Disposal of human waste within 200 feet of water bodies is prohibited.

29. Human waste for camp sites experiencing less than 60 person-days (person-days = number of people × number of days camped at a single location) may be buried in a small "cat" holes 6-8 inches deep and covered with soil and natural materials after use. Follow Leave No Trace principles.

30. Human waste for camp sites experiencing 60 or more person-days may be disposed of using a designated communal toilet such as a pit toilet or latrine trench. Disturbance cannot exceed one square meter (approximately 3×3 feet) in area; for example, a toilet could be one 3×3-foot pit, a 1½×6-foot latrine trench, etc. If additional communal toilets are necessary, these must be spaced at least 100 meters (approximately 110 yards) from previous toilets. The ADEC Water Program provides guidelines on pit privy design, operation, and closure can also be used ().

31. Communal toilets must not be placed in unvegetated areas or the tops of prominent landforms such as river terraces, ridges, and hillocks. Communal toilets must be closed/buried at the end of use.

32. When digging cat holes or pit toilets, the surface vegetation or organic mat will be retained and replaced once the hole is filled to encourage rapid natural recovery.

33. Toilet paper and all hygiene products (including feminine products and diapers) must be packed out.

34. Attracting wildlife to food and garbage is prohibited.

35. Burial of garbage is prohibited.

36. Use of pesticides without the specific authority of the AO is prohibited.

37. Chasing wildlife with ground vehicles is prohibited.

38. The cumulative number of authorized visits (defined as each day in which work is done within 500 meters of a nest site) to any cliff per nesting season (April 15 through August 15) by all authorized users shall be limited to three.

39. To reduce disturbance from campsite activity to nesting falcons, campsites authorized by the BLM, including short- and long-term camps and agency work camps, shall be located at least 1,640 feet from any known falcon nest site. Exceptions may be granted by the AO through the normal permitting process.

40. All authorized users shall submit for approval an operational plan that includes dates, locations, and schedule of visits to cliff sites, when dates are between April 15 and August 1. Authorized users shall follow the guidelines for conducting activities near falcon nests.

41. Off-road foot or vehicle traffic, construction, and nonemergency hazardous material or solid waste cleanup shall be prohibited within 1 mile of known arctic peregrine and gyrfalcon nests from April 15 through August 1. Nonemergency cleanup refers to remediation of old sites, such as removal of drums or soil that have been contaminated for longer than 1 year.

42. The authorized user shall protect all survey monuments and be responsible for survey costs if re-monumentation is required as a result of the user's actions. Survey monuments include, but are not limited to, General Land Office and Bureau of Land Management Cadastral Survey Corners, reference corners, witness points, U.S. Coast and Geodetic benchmarks and triangulation stations, military control monuments, and recognizable civil (both public and private) survey monuments.

43. In the event of obliteration or disturbance of any of the survey monuments above, the Authorized user shall promptly report the incident, in writing, to the Authorized Officer and the respective installing agency, if known. Where General Land Office or Bureau of Land Management (BLM) right-of-way monuments or references are obliterated during operations, the Authorized user shall secure the services of a registered land surveyor or a BLM Cadastral surveyor to restore the disturbed monuments and references using surveying procedures found in the BLM Manual of Surveying Instructions for the Survey of Public Lands of the United States, latest edition, and file an appropriate public record of the corner rehabilitation. If the BLM cadastral surveyors or other Federal surveyors are used to restore the disturbed survey monuments, the Authorized user shall be responsible for survey costs.

44. The authorized user is responsible for costs and coordination related to invasive species management to ensure that activities of the authorized user do not result in the

introduction, establishment, or spread of Priority Invasive Species (PIP) for applicable periods of the permit.

45. In lieu of an initial inspection conducted by the applicant, the BLM may use best available data by consulting the Alaska Exotic Plants Information Clearinghouse (AKEPIC) and notify an applicant of known PIP occurrences to establish a baseline of any pre-activity infestations within the project area.

46. Authorized user shall develop project-specific preventative measures based upon standard best management practices for preventing the introduction and spread of invasive species. Preventative measures shall include but may not be limited to the following:

    a. Authorized user shall ensure that all equipment, vehicles (e.g., trucks, trailers, watercraft, aircraft), and gear is free of visible soil, seeds, and vegetative parts before deploying to the project site and before moving from areas of known PIP infestations.

    b. Authorized user shall not park or stage equipment, supplies, or materials in areas known to be infested with PIP. When feasible, activities shall commence from known un-infested areas and progress toward known infested areas.

    c. The authorized user shall only use feed (e.g., hay cubes, hay pellets), bedding (straw), mulch, erosion control materials, and seed that is certified as weed-free through the Alaska DNR Weed-Free certification programs. Other sources, including stockpiled material from the site, may be approved by the AO on a case-by-case basis.

    d. For operations in waterbodies, when moving equipment or personnel through waterbodies on the way to the project site or before transporting watercraft and aquatic gear (i.e., hip boots, waders, and bait containers) to the authorized use area, authorized user shall:

        i. Remove any aquatic plants, animals, and mud attached to watercraft and equipment
        ii. Drain water from boat, motor, bilge, live wells, and bait containers, and
        iii. Spray all watercraft and equipment with high pressure water or dry for at least 5 days

    e. If the operation involves floatplanes, authorized user shall:

        i. Inspect and remove aquatic plants from floats, wires or cables, and water rudders, transom, bottom, chine, wheel wells and float step area
        ii. Pump water from floats
        iii. Before takeoff, do not taxi through heavy plant growth and do raise/lower water rudders to clear off plants
        iv. After takeoff, raise/lower water rudder several times to free aquatic plant fragments while over the water being left or over land

47. If treatment is necessary to eradicate infestations that result from the permitted activities (i.e. documented establishment or spread of PIP above the baseline of pre-activity infestations), authorized user-proposed treatment methods must receive concurrence from the AO. If the authorized user fails to perform the necessary treatment, the BLM may initiate treatment at the expense of the authorized user. The authorized user shall reimburse BLM for the cost of the treatment. The BLM will proportionally apply any cost incurred among all authorized users of the site.

48. If PIP are incidentally observed, report species, location and size of infestation (number of plants/area of infestation) to the AO for reporting to AKEPIC.

49. If a spectacled or Steller's eider is flushed from the ground or a nest found while conducting Activities, the nest must be avoided in future visits to the area and visits to the nest are prohibited.

50. Although not expected, if a polar bear is observed the observation shall be recorded on a polar bear observation form (available from the BLM). One polar bear observation form is meant to be completed per observation. The form shall be submitted to the BLM within 24 hours of observation. For polar bear sightings, all fields on the polar bear observation form must be filled out including all evidence of polar bears and the actions taken by the Permittee.

54. All personnel working in the area would be required to have both Polar Bear Awareness training and Wildlife Interaction and Avoidance training.

55. To minimize effects to polar bears, aircraft would divert their flight paths to a minimum of 1,500 feet above ground level or a one-half mile horizontal distance from any observed bear(s) whenever possible.

56. Helicopter flight routes would be flown at least one mile from marine waters over terrestrial habitat and aircraft would approach sites, when practical, from a terrestrial aspect rather than from over marine water to minimize any potential disturbance to marine mammals, including polar bears and seals, that may be using the nearshore marine habitat. Further, a 360-degree visual survey of area along the coast would be required before landing. If any marine mammals (including polar bear) are observed within 0.25 mile, the helicopter would not land and would immediately leave the area.

57. Helicopter crews would not takeoff or land if a polar bear is within 0.50 mile of the takeoff/landing site and crews would be trained to observe for polar bears, in addition to having a bear guard.

APPENDIX C:
BLM Alaska Seismic Conditions of Approval

The permittee will conduct all activities in compliance with the terms and conditions of this permit, including the "Stipulations," "Special Provisions," and the approved "Application for Permit," which are attached to and incorporated into this permit.

I. Reports on Operations

A. Under the provisions of 43 CFR 3152.6, the permittee must submit to the Authorized Officer a final report within 30 days after the completion of operations. The final report must contain the following:

1. A description of the work performed including number of line miles or **3D seismic data volume** acquired;
2. Chart(s), map(s), or plat(s) in PDF and ArcGIS compatible format depicting the areas and blocks in which any exploration or scientific research activities were conducted. These graphics must clearly indicate the location of the activities so that the data produced from the activities can be accurately located and identified;
3. The dates on which the actual geophysical exploration or scientific research activities were performed;
4. A narrative summary of any: (a) hydrocarbon occurrences or environmental hazards observed and (b) adverse effects of the geophysical exploration or scientific research activities on the environment, wildlife, archaeological resources, or other uses of the area in which the activities were conducted;
5. The estimated date on which the processed or interpreted data or information will be available for inspection by the BLM or surface manager;
6. Identification of geocentric ellipsoid (NAD 27 or NAD 83) used as a reference for the data or sample locations; and
7. Such other descriptions of the activities conducted as may be specified by the Supervisor.

B. The last status report and the final report can be combined into one report.

Section II. Submission, Inspection, and Selection of Geophysical Data and Information

A. The permittee must notify the Authorized Officer, in writing, when the permittee has completed the initial processing and interpretation of any geophysical data and information collected under an exploration permit or a scientific research permit that involves developing data and information for proprietary use or sale. If further processing of the data and information is conducted, it is the responsibility of the permittee to keep the most current resulting products available in the event the Authorized Officer requests the current status of data processing. At any time within 10 years after receiving notification of the completion of the acquisition activities conducted under the permit, the Authorized Officer may request that the permittee submit for inspection and possible retention all or part of the

geophysical data, processed geophysical information, and interpreted geophysical information.

B. The Authorized Officer will have the right to inspect and select the geophysical data, processed geophysical information, or interpreted geophysical information. This inspection will be performed on the permittee's premises unless the Authorized Officer requests that the permittee submit the data or information to the Authorized Officer for inspection. Such submission must be within 30 days following the receipt of the Authorized Officer's request unless the Authorized Officer authorizes a later delivery date. If the inspection is done on the permittee's premises, the permittee must submit the geophysical data or information selected within 30 days following receipt of the Authorized Officer's request, unless the Authorized Officer grants a longer period of time for delivery. The data or information requested for inspection or selected by the Authorized Officer must be submitted. All data collected under this permit, including all future processed data, may be selected for submittal by the Authorized Officer, whether the data directly overlays federal or non-federal adjacent lands.

C. In the event that a third party obtains geophysical data, processed geophysical information, or interpreted geophysical information from a permittee, or from another third party, by sale, trade, license agreement, or other means:

1. The third party recipient of the data and information assumes the obligations under this section except for notification of initial processing and interpretation of the data and information and is subject to the provisions of 43 CFR 3152 and 3154; and

2. A permittee or third party that sells, trades, licenses, or otherwise provides the data and information to a third party must advise the recipient, in writing, that accepting these obligations is a condition precedent of the sale, trade, license, or other agreement; and

3. Except for license agreements, a permittee or third party that sells, trades, or otherwise provides data and information to a third party must advise the Authorized Officer in writing within 30 days of the sale, trade, or other agreement, including the identity of the recipient of the data and information; or

4. With regard to license agreements, a permittee or third party that licenses data and information to a third party, within 30 days of a request by the Authorized Officer or, must advise the Authorized Officer, in writing, of the license agreement, including the identity of the recipient of the data and information. A third party that licenses the data, is subject to all requests under Section II. B. from the Authorized Officer, who will have the right to inspect and select geophysical data, processed geophysical data and information, 3D volumes and processed data merges, including any other interpreted geophysical information. All data in this permit area, which is licensed by a third party, and subsequently processed, may be selected. This includes data directly over federally managed lands and also over adjacent non-federal lands.

D. Each submission of geophysical data, processed geophysical information, and interpreted geophysical information must contain, unless otherwise specified by the Authorized Officer, the following:

1. An accurate and complete record of each geophysical survey conducted under the permit, including a final edited navigation file as an ASCII file in SEG-P (or similar) format on a CD or DVD. The shot point locations shall be in geodetic form (latitude, longitude). If projected location data are provided in addition to the geodetic data, then the projection and zone shall be specified in a header record. Processing flow information and target display polarity must be provided;
2. PreStack Time Migration (PSTM) or PreStack Depth Migration (PSDM) true amplitude or equivalent data representing final processing. Depth migrated data must be submitted in both time and depth domain. Best available time domain common reflection point CRP/CIP gathers suitable for AVO interpretation. Migration velocities used in final processing of data such as PSTM/PSDM derived velocities.
3. All seismic data developed under a permit must be submitted in SEG-Y format and be of a quality suitable for interpreting and reflecting state-of-the-art processing techniques. 3D seimic data is to be ordered by inline. Shot point field for 2D and inline and crossline field for 3-D must be populated in trace header. Seismic velocities can be submitted in ASCII format.
4. Other geophysical data, processed geophysical information, and interpreted geophysical information obtained from, but not limited to, special studies such as migrated offset or angle stacks, AVO or class volumes, VSP, refraction, shear wave, impedance volumes, velocity volumes, Lambda Rho, velocity surveys, gravity, magnetics and electromagnetic resistivity imaging data.

E. Geophysical data shall be submitted on USB or NAS (network attached storage) hard drives formatted for Linux operating systems or on optical disks such as DVD/CD.

Section III. Reimbursement to Permittees

A. The permittee or third party will **not** be reimbursed for the costs of acquiring, processing, copying, shipping, or interpreting geophysical information.

Section IV. Disclosure to Independent Contractors

All submitted data are held proprietary and confidential as per 43 CFR 2.13. However to assist in the management of subsurface resources and their ultimate recovery, BLM-Alaska reserves the right to disclose any data or information acquired from a permittee to an independent contractor or agent for the purpose of reproducing, processing, reprocessing, or interpreting such data or information. When practicable, BLM-Alaska will advise the permittee who provided the data or information of intent to disclose the data or information to an independent contractor or agent. The BLM-Alaska's notice of intent will afford the permittee a period of not less than 5 working days within which to comment on the intended action. When BLM-Alaska so advises a permittee of the intent to disclose data or information to an independent contractor or agent, all other owners of such data or information will be deemed to have been notified of BLM-Alaska's intent. Prior to any such disclosure, the contractor or agent will be required to execute a written commitment not to sell, trade, license, or disclose any data or information to anyone without the express consent of BLM-Alaska.

APPENDIX D:
Response to Public Comments

Will be updated once public comments received, or removed if not necessary.

APPENDIX E:
Typical Equipment Lists

NPR-A Exploration Drilling and Well Closure Program Typical Equipment List

- **Hydraulic Stimulation Equipment**
  - 12 tractors
  - 1 Treatment Control Vehicle
  - 1 Growler/Blender
  - 1 ADP/Blender
  - 6 Frack Pumps
  - 3 Sand Castles
  - 1 Hardline "Missile"
  - 1 Hardline trailer
  - 1 Chemical trailer
  - 1 Ball-drop trailer
  - 1 Chemical Van/trailer
  - 1 Crane
  - 1 Compressor Connex
  - 3 Generators
  - 12 Heaters
  - 4 Light plants
  - 1 Tiger-style Tank
  - 1 400 bbl. Pop-off tank
  - 1 225 bbl. Open-top tank
  - 1 Treesaver w/ power-pack, 1 transport box, and 1 parts box
  - 1 LRS Down-hole Pump
  - 1 Loader
  - 1-2 300 bbl. vac trucks
  - 1 90 bbl. Fuel Truck
  - ~6 pickup trucks
  - 2-4 Bed Trucks
  - 23 frac tanks
- **P&A Equipment**
  - 1 x E-line logging unit
  - 1 x Slickline unit
  - 1 x Coil Tubing Unit
  - 1 x Rotary Workover Rig (if required)
  - 1 x Cement Pump Unit
  - 2 x Cement Bulk Trucks
  - 3 x Vac Trucks for returns, makeup, and washup fluids·
  - 2 x returns tanks for fluid
  - 1 x manifold for fluid returns
  - 3 x portable heaters
  - 3 x light plants
  - 1 x loader to assist with tree removal

    - 1 x excavator to dig down to 4.5 feet below grade
- **Well Testing Equipment - Equipment per Spread x Two Spreads**
    - Flow back Separator Unit
    - 6 x 400 bbl. upright tanks
    - 5 x 570 bbl. horizontal tanks
    - 2 x 400 bbl. Sand (Relief/Sand) Tiger Tanks
    - 1-2 GenseVAir Compressor
    - 1 x Sampling Lab/Storage trailer
    - 1 x Choke House
    - 1 x Glycol Boller (Line Heater)
    - 1 x Hose Connex
    - 1 x Sand Separator
    - 1 x Vertical Gas Scrubber
    - 1 x Tool House Support Connex
    - 1 x Flare Stack
    - 6-8 mobile light plants
    - 6-8 to 3KW to 25KW Generators
    - 10-12 mobile heaters
    - 1 to 2 Fuel trucks
    - 2-4 Bed Trucks
    - 6-8 trucks to transport crude
    - 10 to 15 pickup trucks
    - 1 x Crane
    - 1 x Slickline unit
    - 1 x Coil Tubing Unit (contingency)
    - 1 x Membrane Nitrogen HP pump package
    - 1 x E-line logging unit
    - 4-6 290 bbl. vac trucks
    - 1 well house
    - 1 - Envirovac bathroom
    - 2 - Mobile Offices (Company Man office *I* Conference Room)
    - 1 to 2 Greywater/Blackwater trucks servicing the camp on location
    - Multiple containment setups
    - 3-4 Well testing support Connex
    - 1 Spill/Emergency Connex
- **Estimated All-Terrain Equipment List for Surveying, Prepacking, and NPR-A Mobilization**
    - 15 ea. Rolligon Tractors with Heavy Haul Trailers
    - 6 snow machines
    - 2 ea. Haaglund
    - 2 ea. Tuckers for surveying
    - 3 ea. Terra Gators
    - 2 ea. Bed Truck
    - 1 ea. 80-ton (or less) Crane
    - 30-man remote camp (Canning Camp)
    - 118-man remote camp (Alaska Camp)

- 12-man Harrison Bay Spike Camp

- **Estimated Equipment List Ice Road Construction. There will be three ice road crews; each crew will have (up to) the following equipment:**
  - 3 ea. Terra Gators
  - 3 ea. Rolligons (construction)
  - 2 ea. Tuckers
  - 1 ea. Envirovac
  - 1 ea. Snow Blower
  - 3 ea. 140 bbl. Volvo Water Wagon (Buffalo)
  - 1 ea. 16G Motor Grader
  - 3 ea. Volvo A35 Rock Truck (25 cy)
  - 5 ea. 966 Loader
  - 5 ea. Maxi Hauls (30 cy) w/ Tractor
  - 4 ea. 150 bbl. Water Truck
  - 2 ea. 300 bbl. Water Tankers with Tractor
  - 1 ea. Fuel Truck
  - 1 ea. Trimmer
  - 1 ea. Mechanics Truck
  - 2 ea. Overhead Pump
  - 2 ea. Conventional Water Pump
  - 7 ea. Pickup
  - 2 ea. 15-Passenger Van/Bus
  - 1 ea. Ice Road Van/Parts Connex
  - 6 ea. Heater
  - 8 ea. Light Plant
- **Drilling Equipment- Per Rig - 2 Rig Program – Equipment per Rig**
  - Conductor drilling rig
  - Cementing pumping unit
  - 1 to 2 Welding trucks
  - 1 to 2 cranes
  - Drilling Rig - 2 ea TBD
  - 10 to 15 pick-ups/vans
  - 2 to 4 bed trucks
  - 12 300 bbl. vac trucks
  - 12 supersuckers
  - Arctic Cuttings Boxes
  - Cementing pumping unit with product silos
  - Hot oil displacement/pumping unit
  - Mudlogging shack
  - Mud lab
  - E-line logging unit
  - LWD/MWD shack
  - 2 to 3 Sows or large trucks for moving the rig modules
  - 1 to 2 cats for assisting with rig moves
  - 1 to 2 winch trucks
  - 6 to 12 mobile light towers

- 6 to 12 mobile heaters
- 1 to 2 backhoes/excavators
- 2 to 4 pump houses for water extraction form lakes
- 2 Fuel trucks
- 2 Greywater/Blackwater trucks servicing the camps

- **Stallion Rig Camps - Four to be used (Stallion Rig Camp 26, Stallion Rig Camp 33, Stallion Rig Camp 34, and Stallion Rig Camp 41) - Equipment per camp**
  - 6,000-gallon waste water tank, 5,000-gallon tank for 26
  - 2 each 2,500 potable water tanks in heater skidded module per camp
  - 6,000-gallon diked Diesel Fuel tanks
  - Back-up Generator
  - Smoke Shack
  - Dumpster
  - Bull Rail
  - Stallion Camp Mobilization Equipment:
    - Sow for Camp Move
    - Tractor-Trailer
    - Bed Truck with Trailer
    - 966 Loader
    - Pick-up
- **Doyon Rig Camps - Three to be used - Equipment per camp**
  - Camps: Single Status 60 bed, double status 60 bed, double status 27 bed
  - 12,000-gallon wastewater tank
  - 2 each 2,500 potable waler tanks in heater skidded module
  - 6,000-gallon diked Diesel Fuel tanks
  - Back0up Generator
  - Smoke Shack
  - Dumpster
  - Doyon Camp Mobilization Equipment
    - Sow for Camp Move
    - Tractor-Trailer
    - Bed Truck with Trailer
    - 966 Loader
    - 80 Ton Crane
    - Pick-up
- **Afognak Camps - 2 to be used (Brown Bear and Sea Lion)**
  - 12,000-gaJlon wastewater tank
  - 2 each 2,500 potable water tanks in heater skiddea module
  - 6, 000-gallon diked Diesel Fuel tanks
  - Back-up Generator
  - Smoke Shack
  - Dumpster
  - Modular Camp Mobilization Equipment:
    - Tractor-Trailer
    - 8-10 Bed Trucks with Trailers
    - 966 Loader

        - 80 Ton Crane
        - Pick-up
- **Sanitherm Unit**
    - 15,000 GDP Wastewater Plant- 1ea 10000 GPD
    - 10,000 GDP Wastewater Plant- 1ea 6000 GPD
    - 2ea. 6000 GPD Wastewater
    - 30,000 GDP Potable Water Plant - 1ea 40000 GPD
    - 15,000 GDP Potable Water Plant - 1ea 40000 GPD
    - 2ea. 100 HP Steamer
    - 2ea. 600-gallon internal fuel tank
    - 1ea. 25,200 gallon (600 bbl.) potable water tank
    - 1ea. 12,000-gallon raw water tank from Sanitherm
    - 1ea. 11,000-gallon potable water tanks.

NPR-A Seismic Exploration Program Typical Equipment List

- **Transport Equipment**
    - 9 ea. Tucker Sno Cat
    - 4 ea. Tucker Ice Cat
    - 3 ea. Tucker Personnel Carrier
    - 1 ea. GPS Base Station
    - 1 ea. Vibe Tender
    - 1 ea. Mechanic Field Shop
    - 1 ea. Node Charging Shack
    - 1 ea. Recorder Station
    - 1 ea. Coordinator Trailer
    - 6 ea. Taco
    - 1 ea. Survival Trailer
- **Recording Equipment**
    - 16,000 to 27,000 Geospace GCL Nodes or Similar
    - 12 ea. Inova AHV-IV Vibrators or smaller, complete with DR3 servovalve
    - Inova Uni Vibe or Similar
    - 14 ea. Pelton Vibe Pro HD or Similar Source Force3 Vibrator Electronics
    - 2 ea. Vibrator Encoder or Similar
    - 4 ea. IFQC System
    - 1 ea. Reaper System
    - 40 ea. In-Vehicle GPS System, equipment and screen
    - 4 ea. Vehicle Tracking System Screens
    - 35 ea. 30 Watt Radio
    - 1 ea. GPSeismic Keys
- **Crew Camp and Support Equipment**
    - 1 ea. Sleigh Camp
    - 4 ea. Fuel Tanks and Station (3000 Gallons)
    - 1 ea. Recreation Trailer
    - 1 ea. Camp Fueler (3000 Gallons)
    - 4 ea. Remote Fueler (4000 Gallons)

- 2 ea. Long Haul Fueler (4000 Gallons)
- Rolligons or similar vehicles for prepacking
- 8 ea. Case/Steiger Tractors
- CAT Dozer
- CAT Loader

APPENDIX F:
Stream Crossing Tables

Table F-1. Exploration East **Stream Crossing Table**

Map Index	River/Stream Name	Anadromous Number	Anadromous Fish	Latitude (DD83)	Longitude (DD83)	TRS
1	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.250212	-151.195083	SEC 5, T1 ON, R4E, UM
2	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.233748	-151 .206775	SEC 7, T10N, R4E, UM
3	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.232258	-151.213343	SEC 7, T10N, R4E, UM
4	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.23148	-151 .216774	SEC 7, T10N, R4E, UM
5	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.227766	-151.233139	SEC 18, T10N, R4E, UM
6	Unnamed River/Stream	330-00-10840-2017-3163	Anadromous Fish Present	70.217861	-151.253361	SEC 13, T10N, R3E, UM
7	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.207544	-151.294089	SEC 23, T10N, R3E, UM
8	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.193932	-151.319203	SEC 26, T10N, R3E, UM
9	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.191743	-151.324399	SEC 26, T10N, R3E, UM
10	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.212673	-151.284526	SEC 24, T10N, R3E, UM
11	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.211487	-151.284131	SEC 24, T10N, R3E, UM
12	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.201668	-151.245701	SEC 24, T10N, R3E, UM
13	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.24426	-151.416343	SEC 5, T10N, R3E, UM

Table F-2. Exploration West Stream Crossing Table

Map Index	River/Stream Name	Anadromous Number	Anadromous Fish	Latitude (DD83)	Longitude (DD83)	TRS
1	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.146562	-151.985918	SEC 7, T9N, R1E, UM
2	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.156989	-152.009523	SEC 1, T9N, R1W, UM
3	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.162696	-152.119505	SEC 3, T9N, R1W, UM
4	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.187141	-152.128147	SEC 27, Tl0N, R1W, UM
5	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.159418	-152.180101	SEC 5, T9N, R1W, UM
6	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.189567	-152.143103	SEC28, Tl0N, R1W, UM
7	Unnamed River/Stream	330-00-10840-2043-3204	Anadromous Fish Present	70.159907	-152.20787	SEC 5, T9N, R1W, UM
8	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.187085	-152.186677	SEC 29, Tl0N, R1W, UM
9	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.187168	-152.204903	SEC 29, Tl0N, R1W, UM
10	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.185293	-152.229048	SEC 30, Tl0N, R1W, UM
11	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.175155	-152.244681	SEC 31, Tl0N, R1W, UM
12	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.173385	-152.26255	SEC 36, Tl0N, R2W, UM

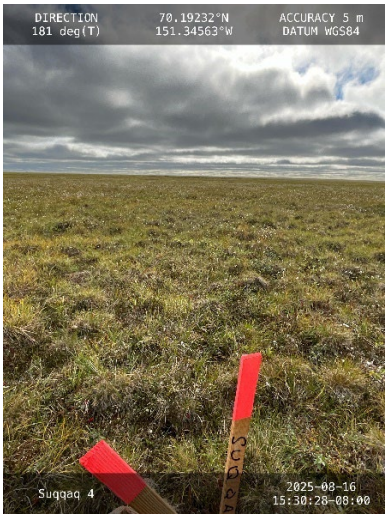
Map Index	River/Stream Name	Anadromous Number	Anadromous Fish	Latitude (DD83)	Longitude (DD83)	TRS
13	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.175095	-152.281944	SEC 36, Tl0N, R2W, UM
14	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.181824	-152.276226	SEC 36, Tl0N, R2W, UM
15	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.182163	-152.277123	SEC 36, Tl0N, R2W, UM
16	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.170296	-152.292055	SEC 36, Tl0N, R2W, UM
17	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.167265	-152.303602	SEC 2, T9N, R2W, UM
18	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.185602	-152.292591	SEC 25, Tl0N, R2W, UM
19	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.160427	-152.331749	SEC 2, T9N, R2W, UM
20	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.197137	-152.320654	SEC 26, Tl0N, R2W, UM
21	Unnamed River/Stream	330-00-10840-2151	Anadromous Fish Present	70.198794	-152.32332	SEC 26, Tl0N, R2W, UM
22	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.152045	-152.366201	SEC 10, T9N, R2W, UM
23	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.196799	-152.340741	SEC 26, Tl0N, R2W, UM
24	Unnamed River/Stream	330-00-10840-2151	Anadromous Fish Present	70.196798	-152.34272	SEC 26, Tl0N, R2W, UM
25	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.223168	-152.308709	SEC 14, Tl0N, R2W, UM
26	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.200236	-152.372916	SEC 22, Tl0N, R2W, UM
27	Fish Creek	330-00-10840	Anadromous Fish Present	70.222132	-152.342896	SEC 14, Tl0N, R2W, UM
28	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.222061	-152.351289	SEC 15, Tl0N, R2W, UM
29	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.195898	-152.392852	SEC 28, Tl0N, R2W, UM
30	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.196605	-152.397923	SEC 28, Tl0N, R2W, UM
31	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.136623	-152.430294	SEC 17, T9N, R2W, UM
32	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.238294	-152.353835	SEC 10, Tl0N, R2W, UM
33	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.136338	-1S2.441377	SEC 17, T9N, R2W, UM
34	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.244661	-152.353162	SEC 3, Tl0N, R2W, UM
35	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.20392	-152.425695	SEC 21, Tl0N, R2W, UM
36	Fish Creek	330-00-10840	Anadromous Fish Present	70.202661	-152.427736	SEC 21, Tl0N, R2W, UM
37	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.22119	-152.430376	SEC 17, Tl0N, R2W, UM
38	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.220502	-152.432566	SEC 17, Tl0N, R2W, UM
39	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.122644	-152.483868	SEC 19, T9N, R2W, UM
40	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.214619	-152.481293	SEC 18, Tl0N, R2W, UM
41	Unnamed River/Stream	330-00-10840-2186-3000	Anadromous Fish Present	70.196736	-152.533666	SEC 25, Tl0N, R3W, UM

Table F-3. Seismic Exploration Stream Crossing Table

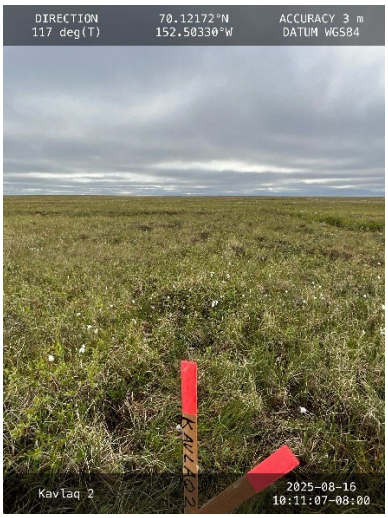
Map Index	River/Stream Name	Anadromous Number	Anadromous Fish	Latitude (DD83)	Longitude (DD83)	TRS
1	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.120265	-151.954233	SEC 20, T9N, R1E, UM
2	Unnamed River/Stream	N/A	Not Present/Not Surveyed	70.047303	-151.98792	SEC 18 T8N, R1E, UM

APPENDIX G:
Site Condition Baseline Photos

Suqqaq 4



Kavlaq 2



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APPENDIX H:
Water Source Lake Information

Table H-1. Water Source Lake Information for Exploration East.

Lake ID	Land Owner	Temporary Water Use Authorization (TWUA)	TWUA Expiration Date	Fish Habitat Permit (FHP)	FHP Expiration Date	Surface Area (Acres)	Max Depth (Feet)	Total Lake Volume (MM gallons)	Sensitive Fish	Resident Fish
L9803	BLM and Native Land	A2023-47	6/14/2028	FH13-III-0315 Amendment 2	5/15/2028	161	6.7	176.47	N/A	Ninespine Stickleback assumed present
L9804	BLM and Native Land	A2022-118	12/5/2027	New	New	244	5.2	235.95	N/A	Ninespine Stickleback
L9805	Native Land	A2022-118	12/5/2027	New	New	435	5.7	429.96	N/A	Ninespine Stickleback
L9806	Native Land	LAS 30039 A2022-116	N/A 12/17/2027	FH12-11-0321 Amendment 3	5/16/2028	362	6.8	423.15	N/A	Ninespine Stickleback
L9816	BLM Land	A2025-93	TBD	No FHP Required	N/A	198	7.6	158.44	N/A	N/A
L9818	BLM Land	A2023-103	8/23/2028	No FHP Required	N/A	33	4	14.36	N/A	Potential
L9820	BLM Land	A2023-47	6/14/2028	FH13-III-0090 Amendment 1	5/15/2028	329	5.5	402.349	N/A	Ninespine Stickleback
M0420	BLM Land	A2025-142	11/30/2030	FH25-III-0181	12/31/2030	208	13.6	815.3	N/A	Ninespine Stickleback
M0702	BLM Land	A2025-142	11/30/2030	FH25-III-0182	12/31/2030	119	6.7	185.94	N/A	Ninespine Stickleback
M1301	BLM Land	A2023-77	7/28/2028	FH13-III-0392 Amendment 3	5/30/2028	193	6.9	198.8	N/A	Ninespine Stickleback

Table H-2. Additional Water Source Lake Information for Exploration East.

Lake ID	Sensitive Species Criteria 15% Water under 7 ft of Ice (MM gallons)	Resident Species Criteria 30% Water under 5 ft of ice (MM gallons)	Non-fish Criteria 20% Total Lake Volume (MM gallons)	Maximum Water Under-Ice Available For Withdrawal (MM gallons)	Maximum Ice Aggregate Available from top 1' of ice in areas 4' or shallower (MM gallons)	Summer Water Volume Requested(MM gallons)	Winter Water Under-Ice Volume Requested (MM gallons)	Ice Aggregate Volume Requested (MM gallons)	Winter Combination Water Under-Ice and/or Ice Aggregate Volume Requested (MM gallons)	Total Water/Ice Volume Requested (MM gallons)	Percent of Total Lake Volume Requested for Withdrawal	Winter fish habitat	ROP B-2	ROP B-2 Deviation Consideration
L9803	--	0.436	35.294	0.436	8.91	--	0.435	8.91	--	9.345	5%			No
L9804	--		47.19	0.001	17.44	--	--	17.444	--	17.444	7%			No
L9805	--	0.012	85.992	0.012	26.34	--	--	26.34	--	26.34	6%			No
L9806	--	14.634	84.63	14.63	14.84	--	--	--	LAS: 12.050 TWUA: 2.580	14.63	3%			No
L9816	0	0.435	31.688	31.69	13.22	--	--	--	31.688	31.688	20%			No
L9818	--	--	2.872		2.56	--	--	2.56	--	2.56	18%			No
L9820	--	0.068	80.47	0.068	72.355	6.5	--	14.44	--	20.94	5%			No
M0420	13.545	73.14	163.06	73.13	16.29	--	--	9.04	--	9.04	10%	Sensitive	B2-a, B2-d	Yes
M0702	--	3.927	37.188	3.927	1.39	--	3.927	1.39	--	5.317	3%	Resistant	B2-b, B2-d	Yes
M1301	--	3.002	39.76	3.002	30.4	--	3.002	30.4	--	33.402	17%			No

Table H-3. Water Source Lake Information for Exploration West.

Lake ID	Land Owner	Temporary Water Use Authorization (TWUA)	TWUA Expiration Date	Fish Habitat Permit (FHP)	FHP Expiration Date	Surface Area (Acres)	Max Depth (Feet)	Total Lake Volume (MM gallons)	Sensitive Fish	Resident Fish
M0012	BLM Land	A2025-74	8/14/2030	FH15-III-0223-A2	8/4/2030	51	16.7	108.45	N/A	Ninespine Stickleback
M0236	BLM Land	A2025-141	11/30/2030	FH25-III-0177	12/31/2030	950.4	18.8	1657.28	Least Cisco	N/A
M0239	BLM Land	A2025-141	11/30/2030	FH25-III-0178	12/31/2030	140	7.8	129.29	N/A	Ninespine Stickleback
M0240	BLM Land	A2025-141	11/30/2030	FH25-III-0179	12/31/2030	208	13.6	815.3	N/A	Ninespine Stickleback
M0241/B84065	BLM Land	A2025-141	11/30/2030	FH25-III-0180	12/31/2030	1514	14.2	3208.525	Broad Whitefish, Least Cisco, Arctic Grayling	Ninespine Stickleback
M1523A	BLM Land	A2024-60	10/31/2029	FH15-III-0225 Amendment 2	5/23/2029	97.7	14.2	164.4	N/A	Ninespine Stickleback
M1523B	BLM Land	A2024-60	10/31/2029	FH15-III-0225 Amendment 2	5/23/2029	78.6	9.7	124.06	N/A	Ninespine Stickleback
M1523C	BLM Land	A2024-60	10/31/2029	FH15-III-0225 Amendment 2	5/23/2029	31.3	9	37.54	N/A	Ninespine Stickleback
M1524	BLM Land	A2024-60	10/31/2029	FH24-III-0118	5/30/2029	148.4	13.7	279	Arctic Grayling	Ninespine Stickleback
MM1702	BLM Land	A2025-144	TBD	No FHP Required	N/A	89	7.4	113.12	N/A	N/A
MM1704	BLM Land	A2025-140	11/30/2030	FH25-III-0162	12/31/2030	316	11.1	364.393	N/A	Ninespine Stickleback
MM1706	BLM Land	A2025-144	TBD	FH25-III-0190	12/31/2030	171	12.9	191.01	N/A	Ninespine Stickleback
MM1707	BLM Land	A2025-144	TBD	FH25-III-0191	12/31/2030	657	6.7	622.554	Broad Whitefish, Arctic Grayling	N/A

Lake ID	Land Owner	Temporary Water Use Authorization (TWUA)	TWUA Expiration Date	Fish Habitat Permit (FHP)	FHP Expiration Date	Surface Area (Acres)	Max Depth (Feet)	Total Lake Volume (MM gallons)	Sensitive Fish	Resident Fish
MM1708	BLM Land	A2025-145	TBD	FH25-III-0208	12/31/2030	162	8.4	175.15	N/A	Alaska Blackfish
MM1709	BLM Land	A2025-148	TBD	No FHP Required	N/A	517.1	5.9	687.23	Least Cisco	N/A
MM1710	BLM Land	A2025-145	TBD	FH25-III-0209	12/31/2030	136	10	308.14	N/A	Ninespine Stickleback
MM1711	BLM Land	A2025-145	TBD	FH25-III-0210	12/31/2030	122	10.4	241.7	N/A	Ninespone Stickleback
MM1712	BLM Land	A2025-145	TBD	FH25-III-0211	12/31/2030	196.6	10.8	324	N/A	Ninespine Stickleback
MM1714	BLM Land	A2025-141	11/30/2030	No FHP Required	N/A	411	7.9	697.593	Arctic Grayling	Ninespine Stickleback
MM1715	BLM Land	A2025-144	TBD	FH25-III-0192	12/31/2030	150	11.7	269.26	N/A	Ninespine Stickleback
MM1717	BLM Land	A2025-144	TBD	FH25-III-0193	12/31/2030	47	15.9	119.508	N/A	Ninespine Stickleback
MM1718	BLM Land	A2025-140	11/30/2030	FH25-III-0163	12/31/2030	114.2	7.8	138.2	N/A	Ninespine Stickleback
MM1825	BLM Land	A2025-148	TBD	No FHP Required	N/A	84	8.5	92.678	N/A	N/A
MM1826	BLM Land	A2025-148	TBD	FH25-III-0212	12/31/2030	39	13.6	73.561	N/A	Ninespone Stickleback
MM1827	BLM Land	A2025-148	TBD	FH25-III-0213	12/31/2030	104	11.4	141.427	N/A	Ninespine Stickleback
MM1828	BLM Land	A2025-148	TBD	FH25-III-0214	12/31/2030	71	8.7	74.002	N/A	Ninespone Stickleback

Lake ID	Land Owner	Temporary Water Use Authorization (TWUA)	TWUA Expiration Date	Fish Habitat Permit (FHP)	FHP Expiration Date	Surface Area (Acres)	Max Depth (Feet)	Total Lake Volume (MM gallons)	Sensitive Fish	Resident Fish
MM1829	BLM Land	A2025-143	11/30/2030	FH25-III-0183	12/31/2030	241	29.9	375.33	Least Cisco	Ninespine Sticleback
MM1830	BLM Land	A2025-143	11/30/2030	No FHP Required	N/A	139	12.4	235.612	N/A	N/A
MM1831	BLM Land	A2025-143	11/30/2030	FH25-III-0184	12/31/2030	89	19	139.162	Least Cisco, Slimy Sculpin	Ninespine Stickleback
MM1832	BLM Land	A2025-143	11/30/2030	FH25-III-0185	12/31/2030	73	9.4	101.657	N/A	Ninespine Stickleback
N77099	BLM Land	A2025-145	TBD	No FHP Required	N/A	106.5	6.9	121.4	N/A	N/A
N77101A/MM1716	BLM Land	A2025-140	11/30/2030	FH25-III-0164	12/31/2030	1328.6	25.1	1546.03	Arctic Grayling, Broad Whitefish, Least Cisco, Lake Trout	Ninespine Stickleback
N77101B/MM1716	BLM Land	A2025-140	11/30/2030	FH25-III-0165	12/31/2030	233.6	6.6	164.61	Arctic Grayling, Broad Whitefish, Least Cisco, Lake Trout	Ninespine Stickleback
N77101C/MM1716	BLM Land	A2025-140	11/30/2030	FH25-III-0166	12/31/2030	482.6	18.2	415.76	Arctic Grayling, Broad Whitefish, Least Cisco, Lake Trout	Ninespine Stickleback
N77102	BLM Land	A2025-143	11/30/2030	FH25-III-0186	12/31/2030	289.11	22.97	721.19	Assumed	N/A

Table H-4. Additional Water Source Lake Information for Exploration West.

Lake ID	Sensitive Species Criteria 15% Water under 7 ft of Ice (MM gallons)	Resident Species Criteria 30% Water under 5 ft of ice (MM gallons)	Non-fish Criteria 20% Total Lake Volume (MM gallons)	Maximum Water Under-Ice Available For Withdrawal (MM gallons)	Maximum Ice Aggregate Available from top 1' of ice in areas 4' or shallower (MM gallons)	Summer Water Volume Requested(MM gallons)	Winter Water Under-Ice Volume Requested (MM gallons)	Ice Aggregate Volume Requested (MM gallons)	Winter Combination Water Under-Ice and/or Ice Aggregate Volume Requested (MM gallons)	Total Water/Ice Volume Requested (MM gallons)	Percent of Total Lake Volume Requested for Withdrawal	Winter fish habitat	ROP B-2	ROP B-2 Deviation Consideration
M1523B	0.84	8.052	24.812	8051	8.1	--	8.051	8.1	--	16.151	13%			No
M1523C	0.011	0.541	7.508	0.541	4.04	--	0.541	4.04	--	4.581	12%			No
M1524	4.83	23.7	55.8	4.836	12.05	--	4.836	12.05	--	16.886	6%			No
MM1702	--	1.203	22.624	22.62	9.46	--	--	--	22.624	22.624	20%			No
MM1704	0.446	13.257	72.879	13.26	51.3	--	--	--	13.26	13.26	4%			No
MM1706	2.976	17.277	38.202	17.28	31.3	--	--	--	17.28	17.28	9%			No
MM1707	--	11.781	124.511	0	123.4	--	--	123.4	--	123.4	20%	Sensitive	B2-a, B2-d	Yes
MM1708	0.004	3.612	35.03	3.61	24.52	--	--	--	3.61	3.61	2%			No
MM1709	--	2.658	137.446	0	38.88	--	--	38.88	--	38.88	6%			No
MM1710	5.441	31.167	61.628	31.17	4.79	--	--	--	31.17	31.17	10%			No
MM1711	2.213	20.445	48.34	20.44	7.33	--	--	--	20.44	20.44	8%			No
MM1712	0.437	17.667	64.8	17.67	14.85	--	--	--	17.67	17.67	5%			No
MM1714	0.252	33.465	139.519	0.252	22.65	--	--	22.65	--	22.65	3%			No
MM1715	5.418	24.291	53.852	24.29	15.48	--	--	--	24.29	24.29	9%			No
MM1717	6.014	16.983	23.902	16.98	3.56	--	--	--	16.98	16.98	14%			No
MM1718	0.015	2.04	27.64	2	15.89	--	--	--	2	2	1%			No
MM1825	0.3	5.487	18.536	18.536	15.009	--	--	--	18.535	18.535	20%			No

Lake ID	Sensitive Species Criteria 15% Water under 7 ft of Ice (MM gallons)	Resident Species Criteria 30% Water under 5 ft of ice (MM gallons)	Non-fish Criteria 20% Total Lake Volume (MM gallons)	Maximum Water Under-Ice Available For Withdrawal (MM gallons)	Maximum Ice Aggregate Available from top 1' of ice in areas 4' or shallower (MM gallons)	Summer Water Volume Requested(MM gallons)	Winter Water Under-Ice Volume Requested (MM gallons)	Ice Aggregate Volume Requested (MM gallons)	Winter Combination Water Under-Ice and/or Ice Aggregate Volume Requested (MM gallons)	Total Water/Ice Volume Requested (MM gallons)	Percent of Total Lake Volume Requested for Withdrawal	Winter fish habitat	ROP B-2	ROP B-2 Deviation Consideration
MM1826	1.884	7.34	14.712	7.34	3.994	--	--	--	7.34	7.34	10%			No
MM1827	0.798	7.846	28.285	7.846	13.733	--	--	--	7.846	7.846	6%			No
MM1828	0.147	2.394	14.8	2.394	12.454	--	--	--	2.394	2.394	3%			No
MM1829	19.675	52.6	131.366	19.675	44.578	--	--	--	19.675	19.675	5%			No
MM1830	2.649	18.453	47.122	47.122	15.134	--	--	--	47.122	47.122	20%			No
MM1831			27.832	4.678	14.81	--	--	--	4.678	4.678	3%			No
MM1832	0.896	7.454	20.331	7.454	10.414	--	--	--	7.454	7.454	7%			No
N77099	--	0.78	24.28	24.3	15.56	--	--	--	24.28	24.28	20%			No
N77101A/MM1716	36.669	142.344	309.206	36.67	254	--	--	--	36.67	36.67	2%			No
N77101B/MM1716	--	3.231	32.922	0	50.31	--	--	32.922	--	32.922	20%			No
N77101C/MM1716	22.026	52.041	83.152	22.03	124.23	--	--	--	22.03	22.03	5%			No
N77102	36.35	103.58	144.238	36.35	Not Estimated	--	--	--	36.35	36.35	5%			No