



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

Willow Master Development Plan

Supplemental Environmental Impact Statement

FINAL

Volume 5: Appendix A.4

Figures 3.12.1 to 3.14.2

January 2023

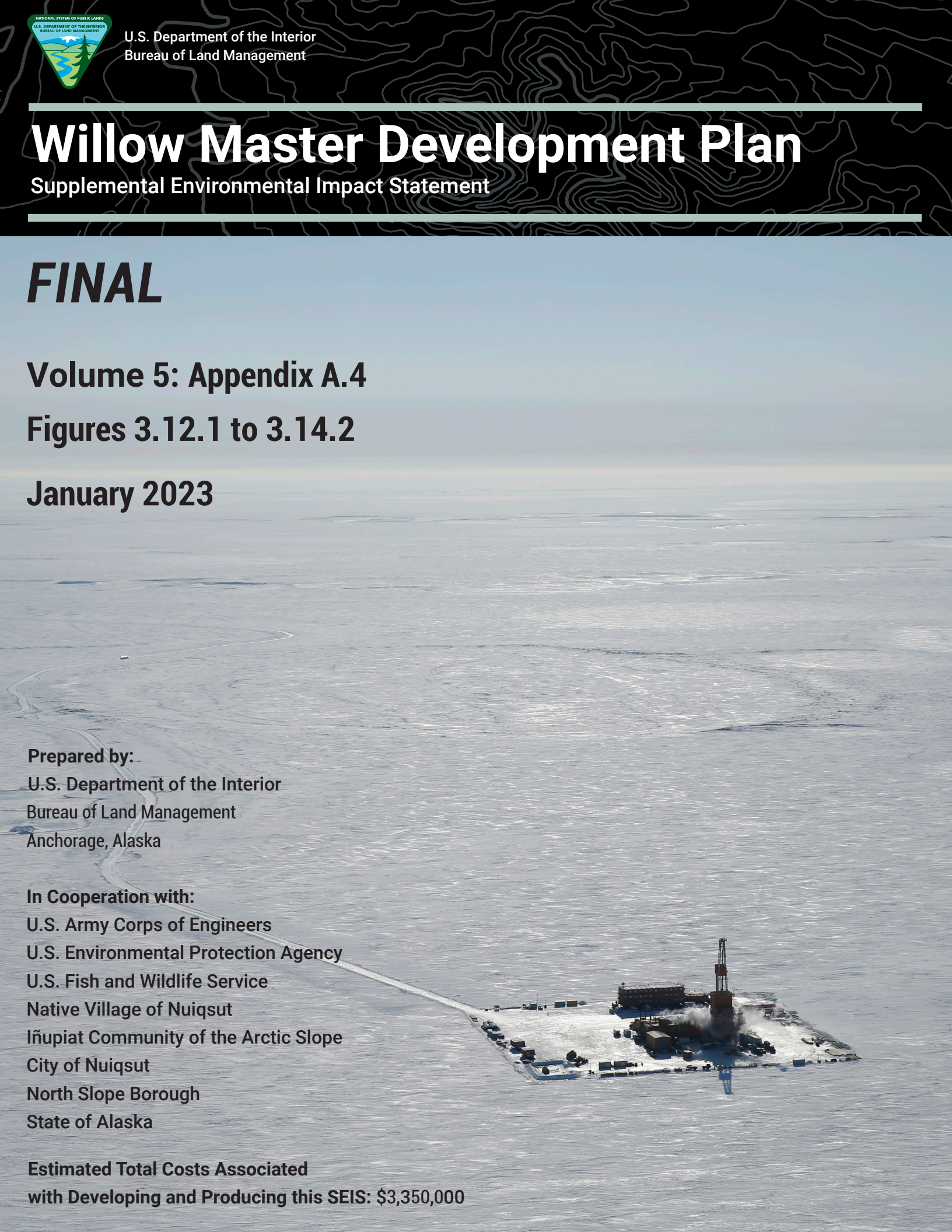
Prepared by:

U.S. Department of the Interior
Bureau of Land Management
Anchorage, Alaska

In Cooperation with:

U.S. Army Corps of Engineers
U.S. Environmental Protection Agency
U.S. Fish and Wildlife Service
Native Village of Nuiqsut
Iñupiat Community of the Arctic Slope
City of Nuiqsut
North Slope Borough
State of Alaska

**Estimated Total Costs Associated
with Developing and Producing this SEIS: \$3,350,000**



Mission

To sustain the health, diversity, and productivity of the public lands for the future use and enjoyment of present and future generations.

Cover Photo Illustration: North Slope Alaska oil rig during winter drilling.

Photo by: Judy Patrick, courtesy of ConocoPhillips.

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BLM/AK/PL-22/032+1610+F010

Willow Master Development Plan

Appendix A.4

Figures 3.12.1 to 3.14.2

January 2023

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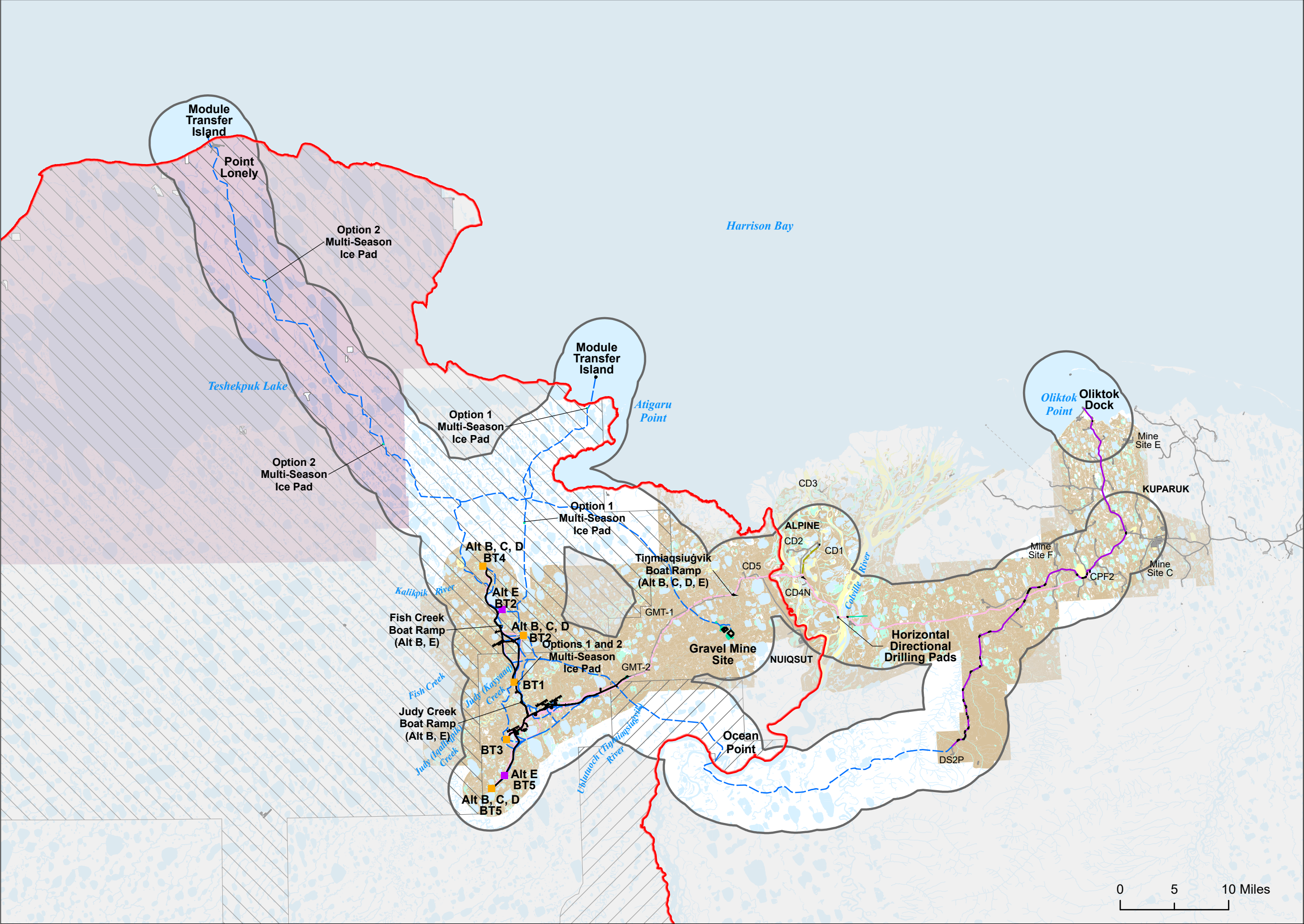
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Terrestrial Mammal Habitat

No. of Species Using

- 1
- 6-8
- >8

Willow Proposed Development Features

- Drill Site (Not to Scale)
- Alt E Drill Site (Not to Scale)
- New Pipeline Existing VSM
- New Pipeline New VSM
- Ice Road
- Option 3 Existing Road
- Gravel Footprint
- Analysis Area

Other Infrastructure

- Existing Road
- Existing Pipeline
- Existing Infrastructure

NPR-A Special Areas

- Colville River Special Area
- Teshekpuk Lake Special Area

Required Operating Procedure

- K-9: No New Infrastructure

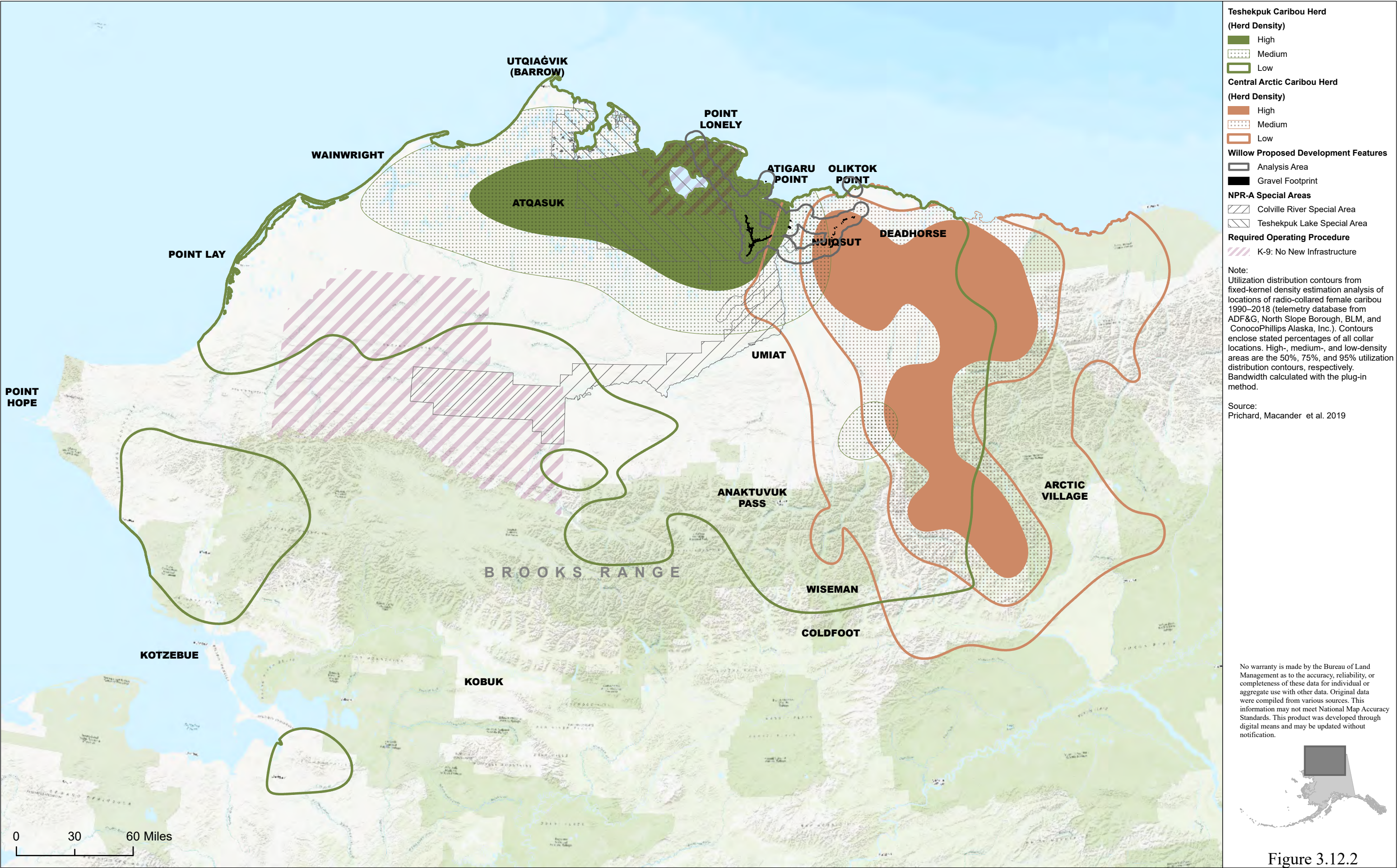
Land Designation

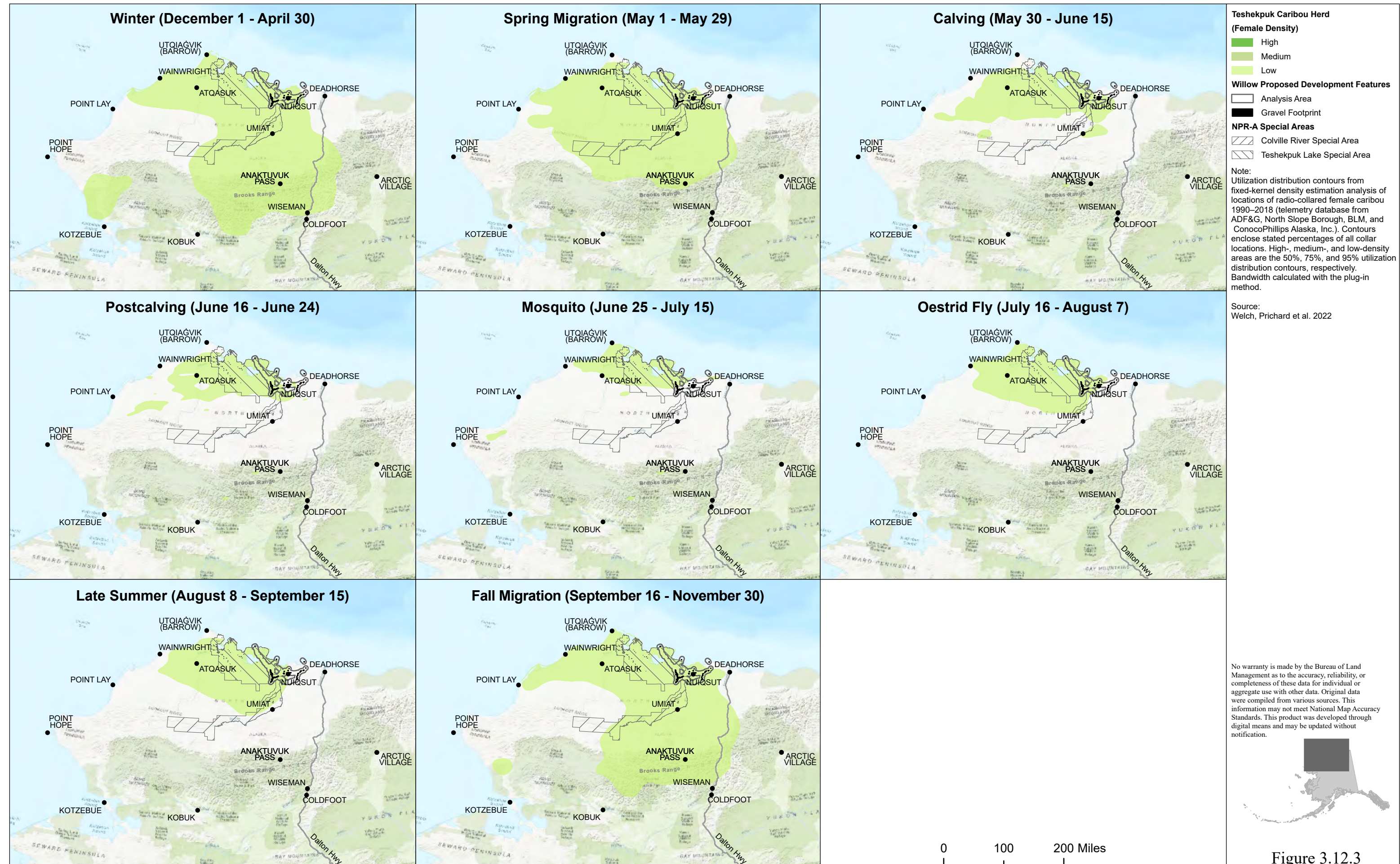
- National Petroleum Reserve in Alaska

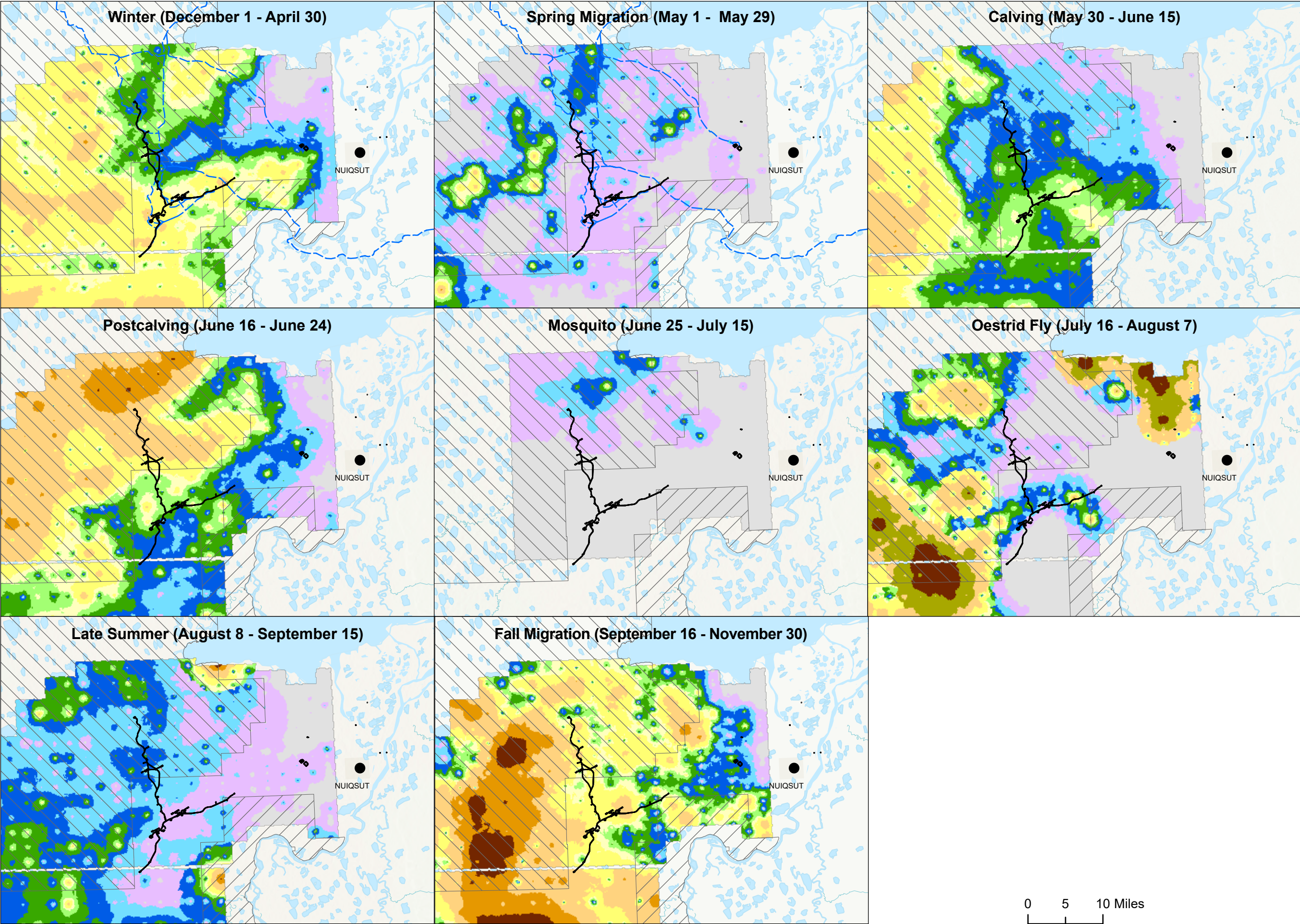
Data Source:
Habitat mapping was done by ABR, Inc. for ARCO Alaska, Inc., PhillipsAlaska, Inc. and ConocoPhillips, Alaska, Inc. as part of their baseline environmental studies and NEPA documentation for the Alpine, Tarn, Meltwater, Palm, West Sak Development Area, Kuparuk, GMT1, GMT2, and Willow oil development projects.

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Figure 3.12.1





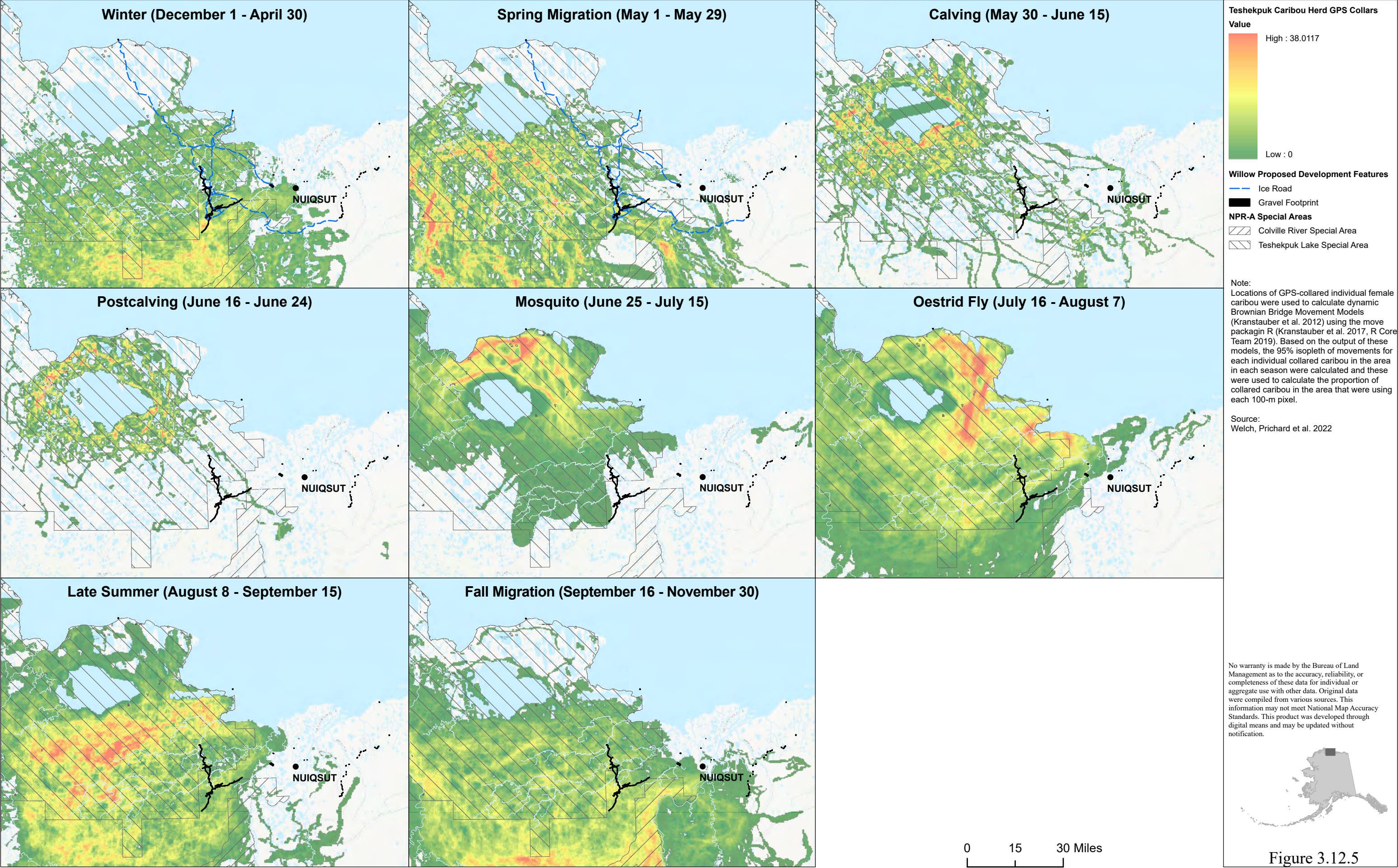


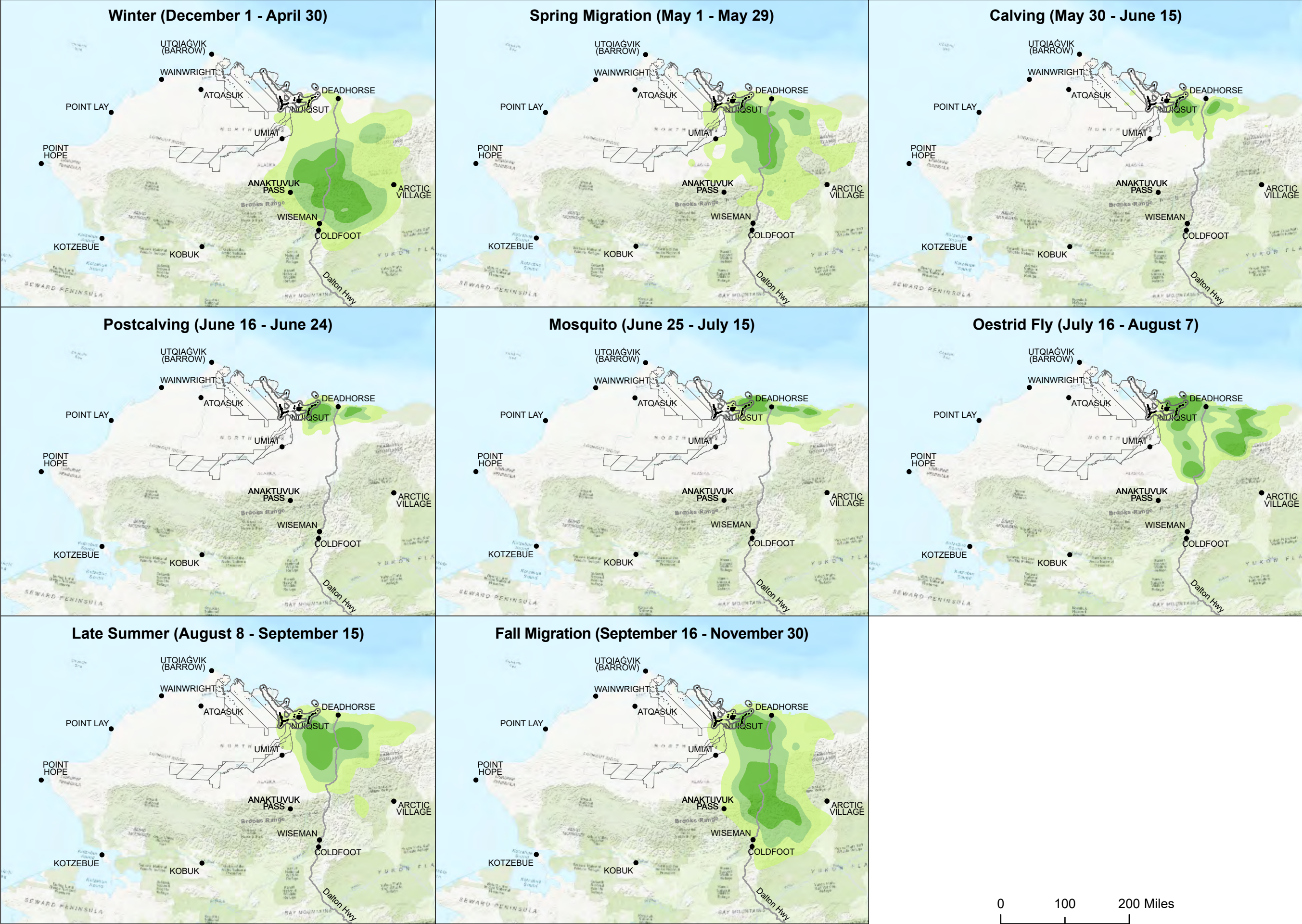
Note:
Seasonal density of caribou observed during aerial surveys conducted 2002-2021 in northeastern NPR-A, inverse distance-weighted interpolation was used to map densities across the survey areas. Methods are described in Welch, Prichard, et al. (2022).

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Figure 3.12.4





Central Arctic Herd (Female Density)

- High
- Medium
- Low

Willow Proposed Development Features

- Analysis Area
- Gravel Footprint

NPR-A Special Areas

- Colville River Special Area
- Teshkepkuk Lake Special Area

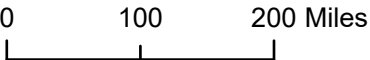
Note: Utilization distribution contours from fixed-kernel density estimation analysis of locations of radio-collared female caribou 1990–2018 (telemetry database from ADF&G, North Slope Borough, BLM, and ConocoPhillips Alaska, Inc.). Contours enclose stated percentages of all collar locations. High-, medium-, and low-density areas are the 50%, 75%, and 95% utilization distribution contours, respectively. Bandwidth calculated with the plug-in method.

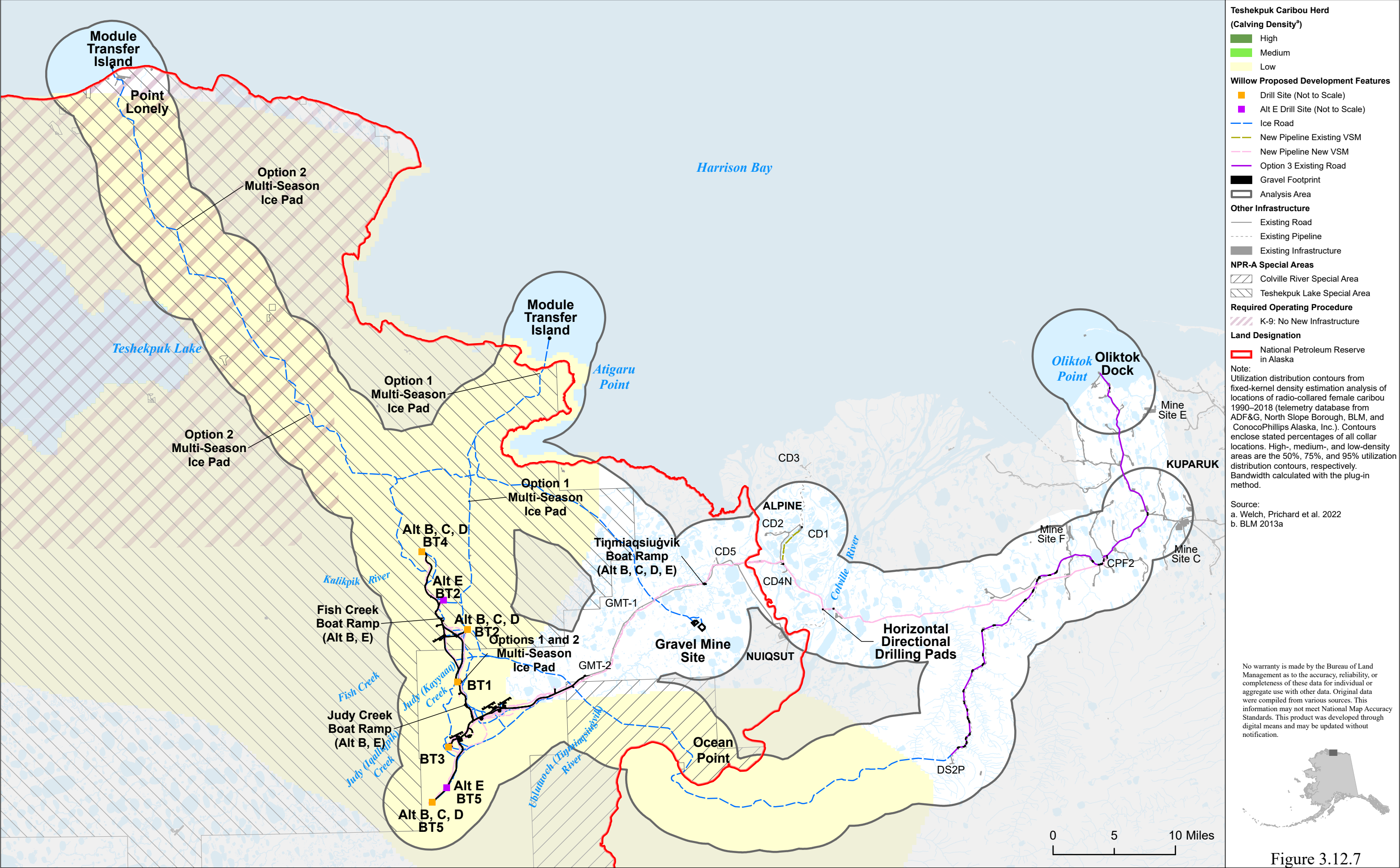
Figure shows distribution of females known to have calved.

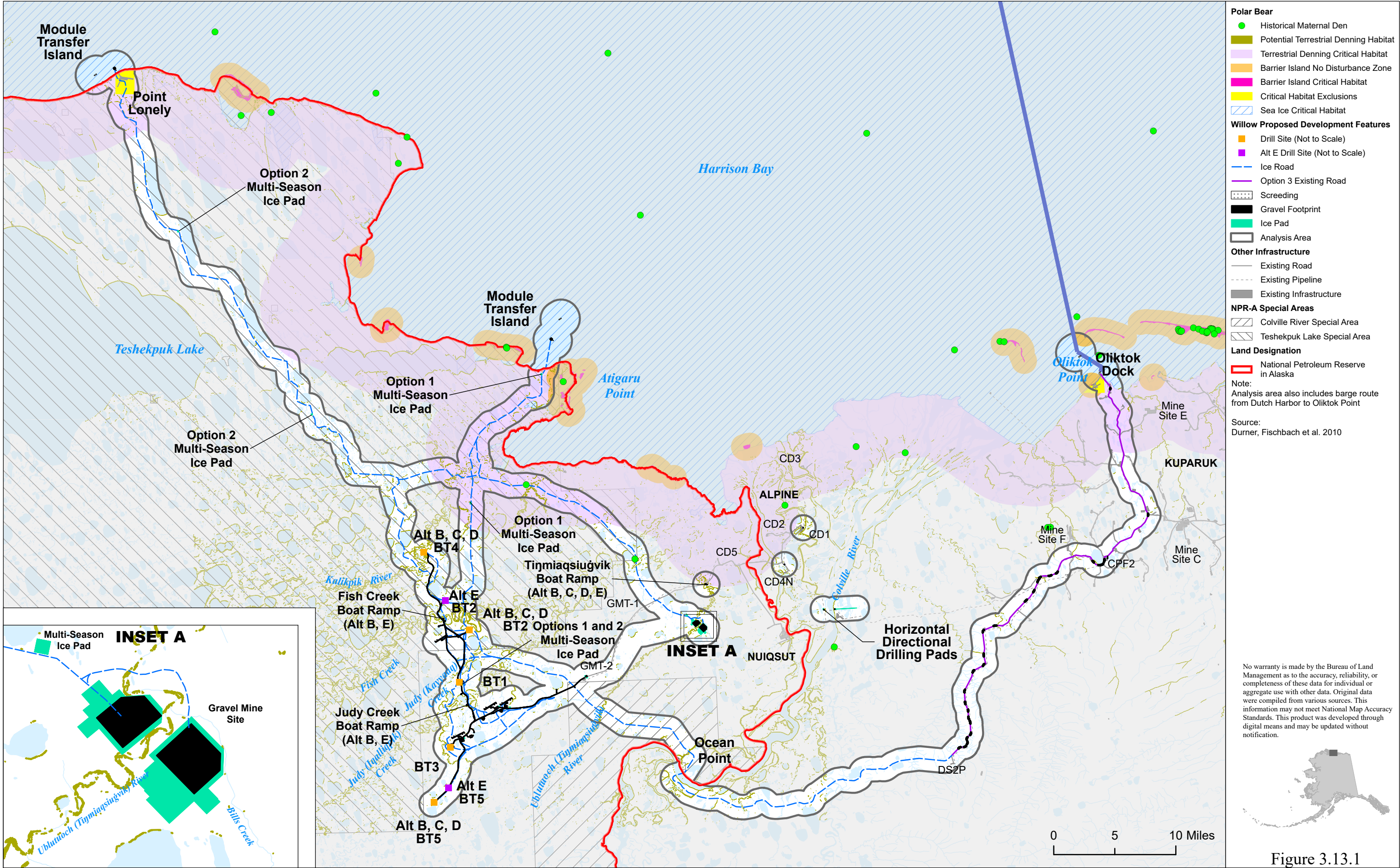
Source: Welch, Prichard et al. 2022

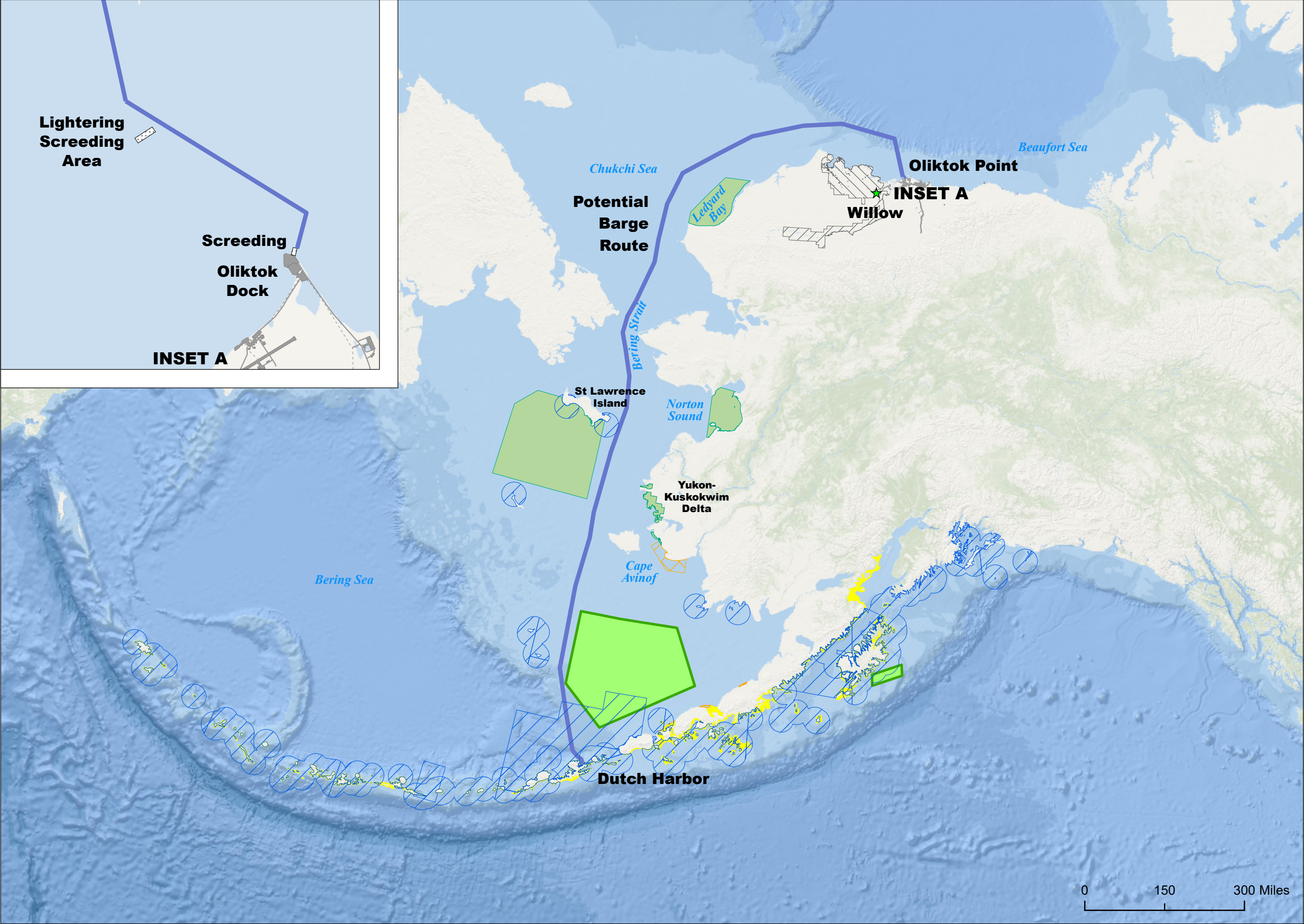
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Figure 3.12.6









Potential Marine Vessel Route

— Potential Vessel Route

National Marine Fisheries Service Critical Habitat

▨ Stellar Sea Lion Critical Habitat (Foraging area and 20 nautical mile aquatic zone)

▨ North Pacific Right Whale Critical Habitat

United States Fish and Wildlife Service Critical Habitat

▨ Sea Otter Critical Habitat

▨ Steller's Eider Critical Habitat

▨ Spectacled Eider Critical Habitat

Willow Proposed Development Features

★ Willow Project

▨ Screening

Other Infrastructure

— Existing Road

NPR-A Special Areas

▨ Colville River Special Area

▨ Teshekpuk Lake Special Area

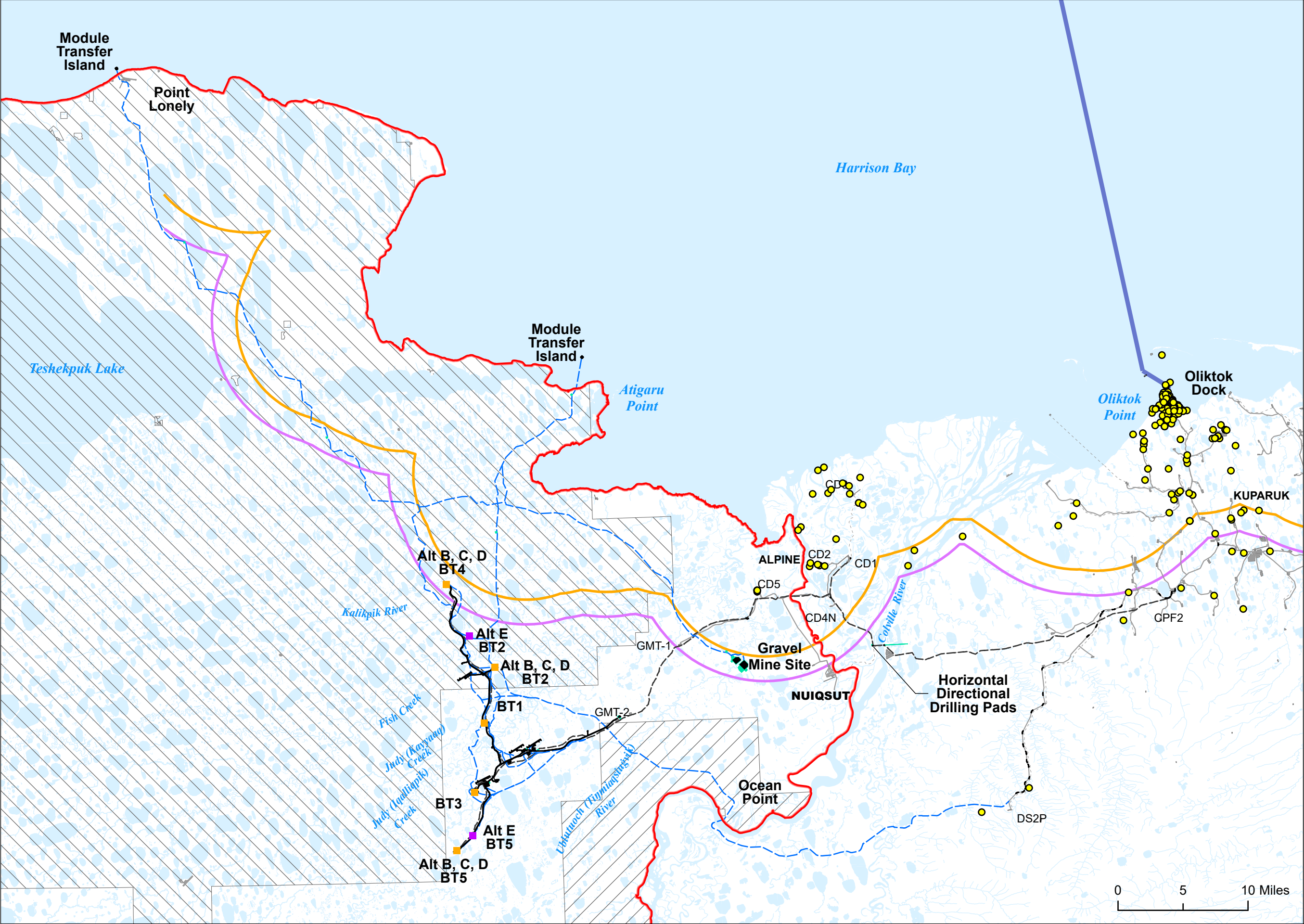
Note: Action Area encompasses a 1.5 mile radius around barge route, support vessel route, screening and 1 mile radius around onshore project components.

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0 150 300 Miles

Figure 3.13.2



Polar Bear

- CPAI Observations (1993-2019)
- 90th Percentile (Observations) 7.7 Miles From Coast
- 95th Percentile (Observations) 9.6 Miles From Coast

Willow Proposed Development Features

- Drill Site (Not to Scale)
- Ice Road
- New Pipeline
- Potential Vessel Route
- Gravel Footprint
- Screeding
- Ice Pad

Other Infrastructure

- Existing Road
- Existing Pipeline
- Existing Infrastructure

NPR-A Special Areas

- Colville River Special Area
- Teshkepuk Lake Special Area

Land Designation

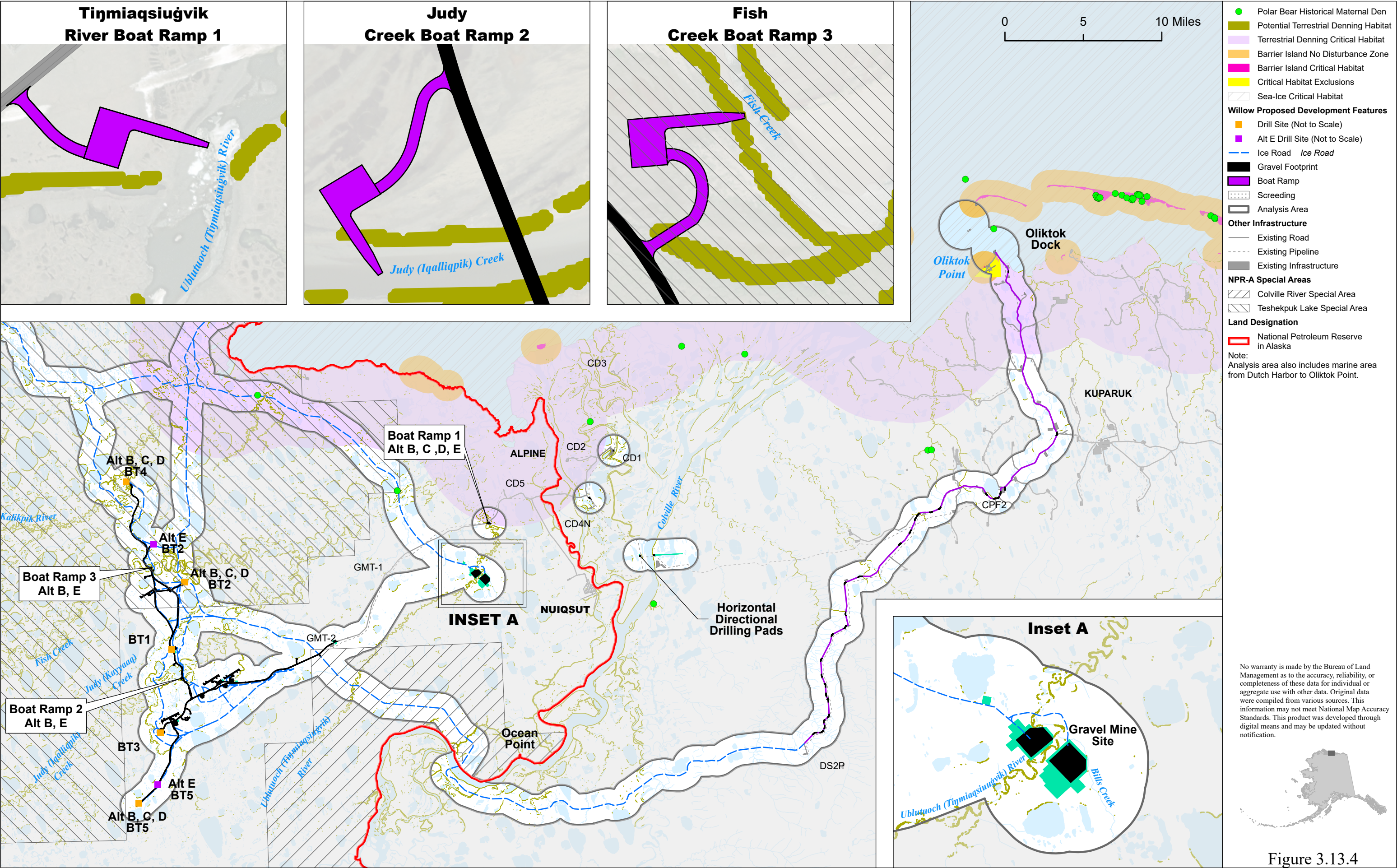
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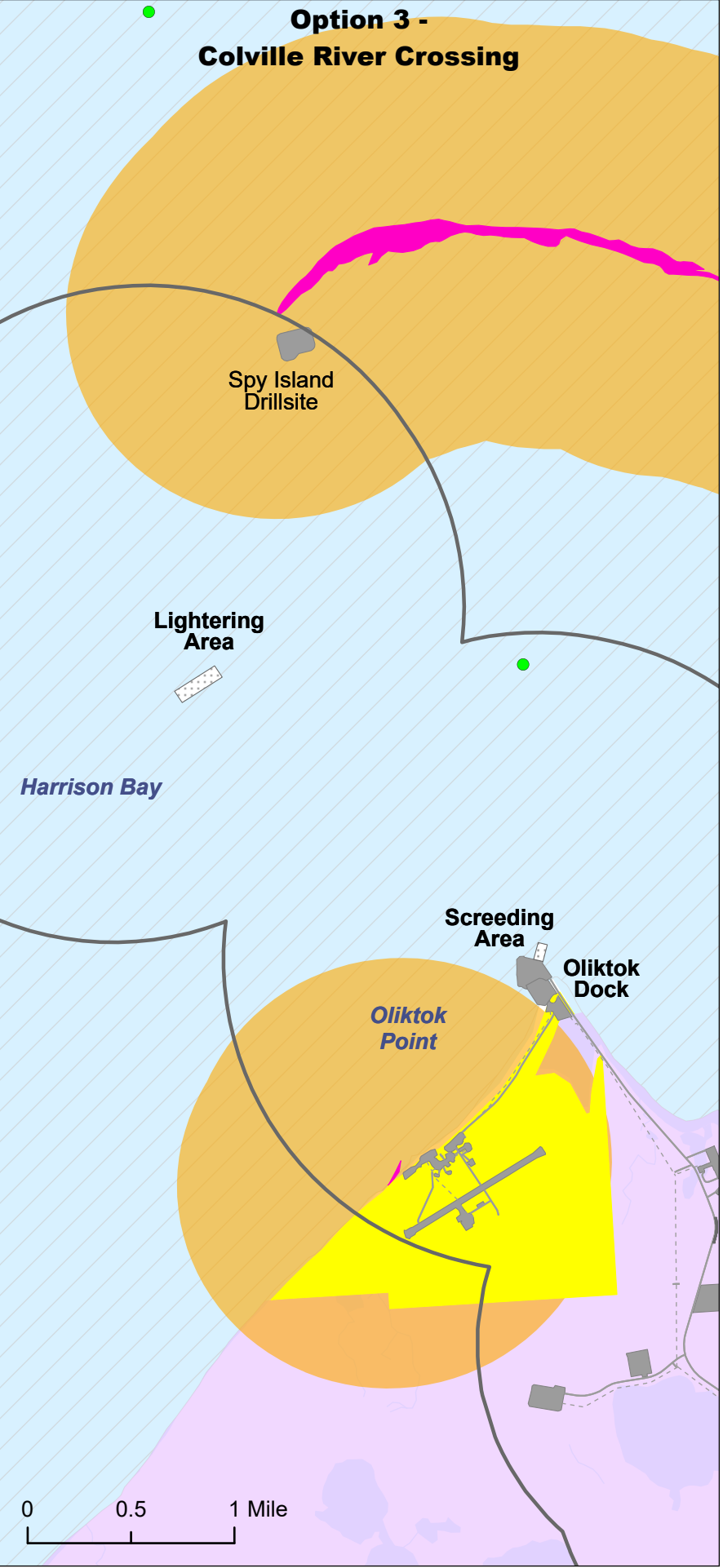
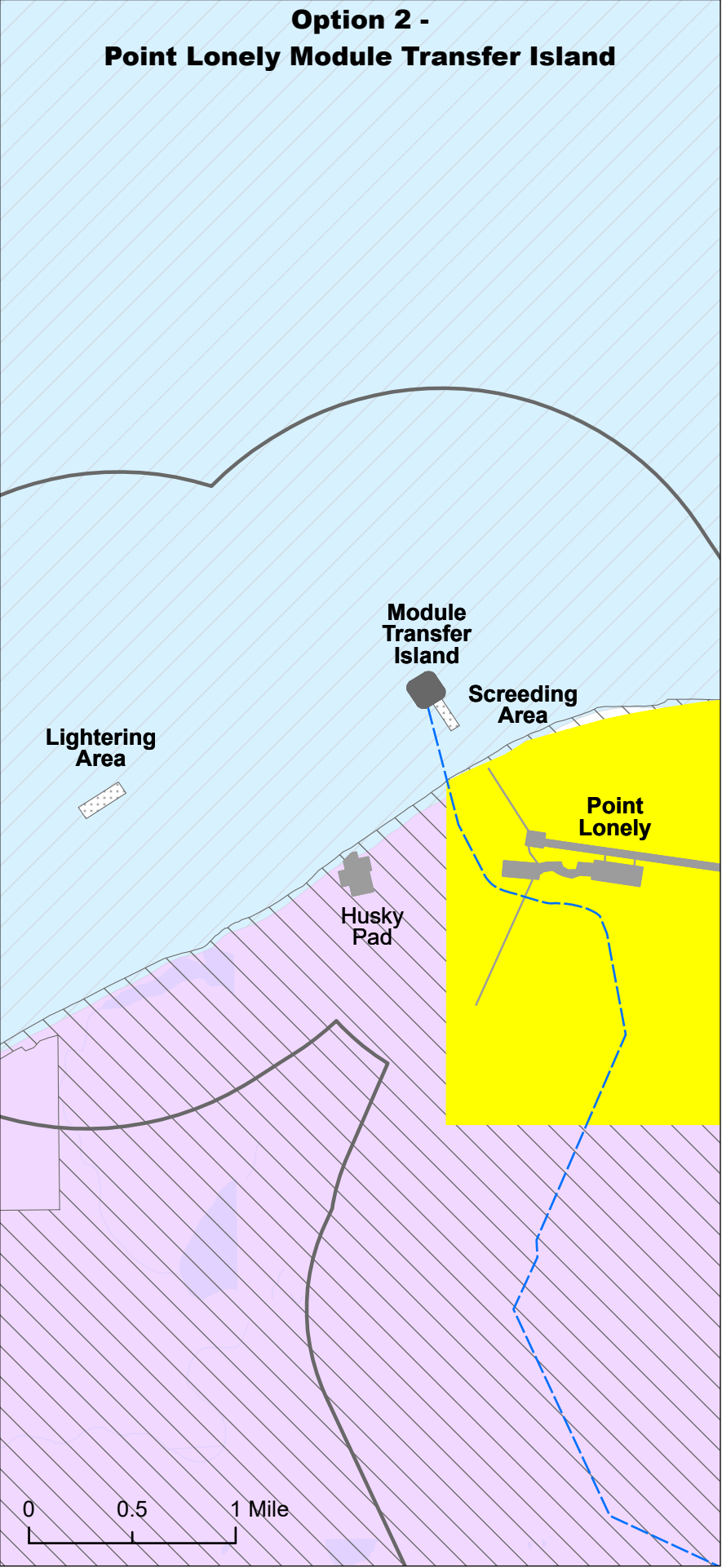
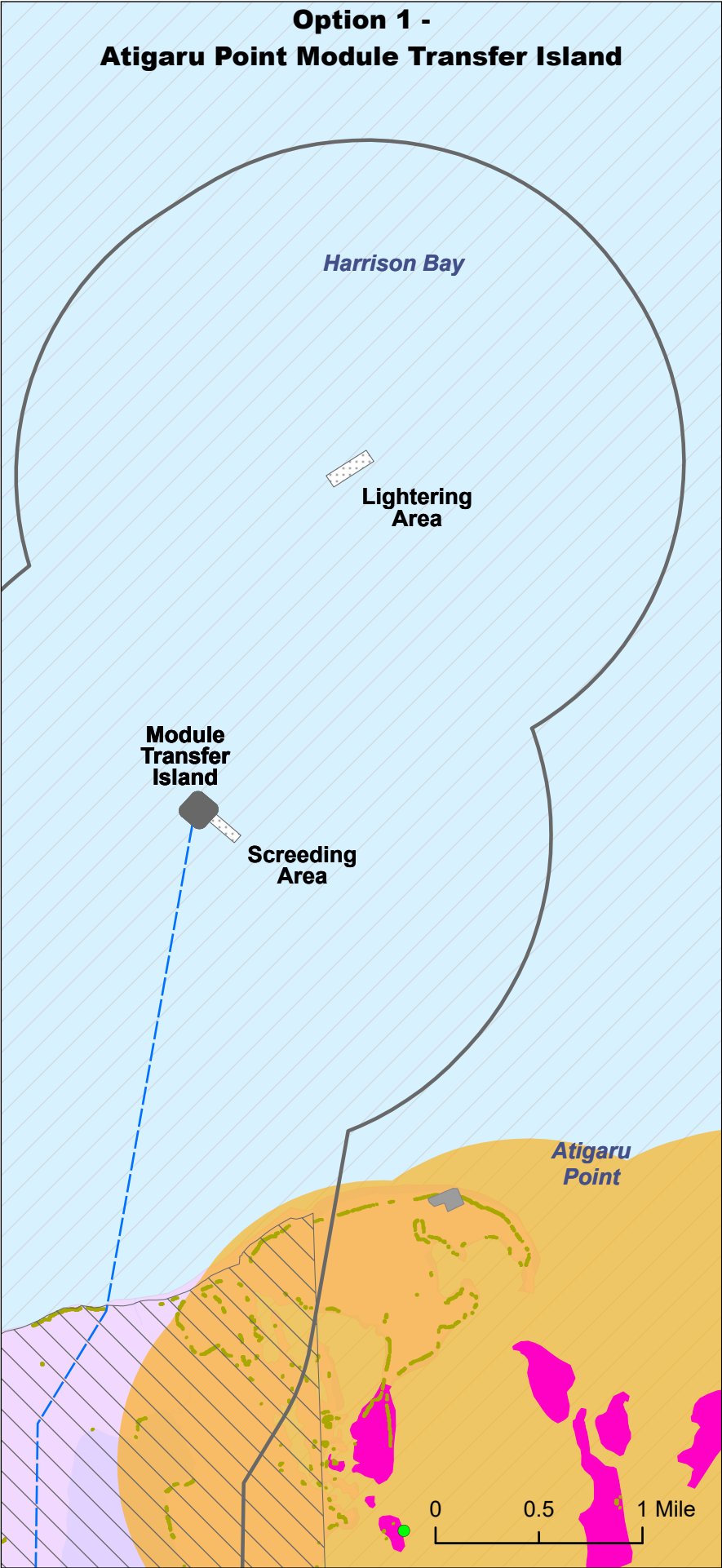
Data Source:
CPAI 2020

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Figure 3.13.3





Polar Bear

- Historical Maternal Den
- Potential Terrestrial Denning Habitat
- Terrestrial Denning Critical Habitat
- Barrier Island No Disturbance Zone
- Barrier Island Critical Habitat
- Critical Habitat Exclusions
- Sea-Ice Critical Habitat

Willow Proposed Development Features

- Ice Road
- Screeding
- Analysis Area

Other Infrastructure

- Existing Road
- Existing Pipeline
- Existing Infrastructure

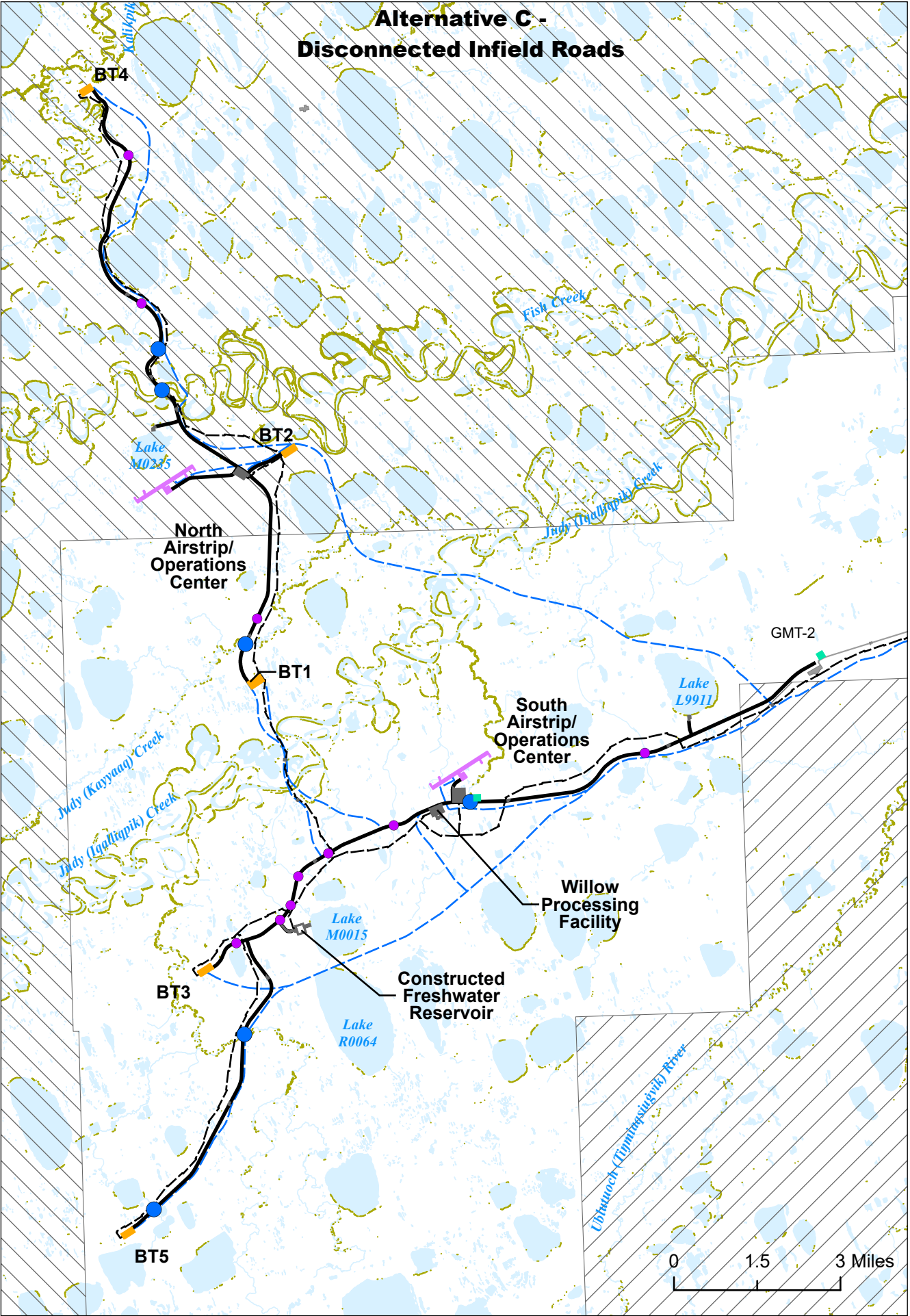
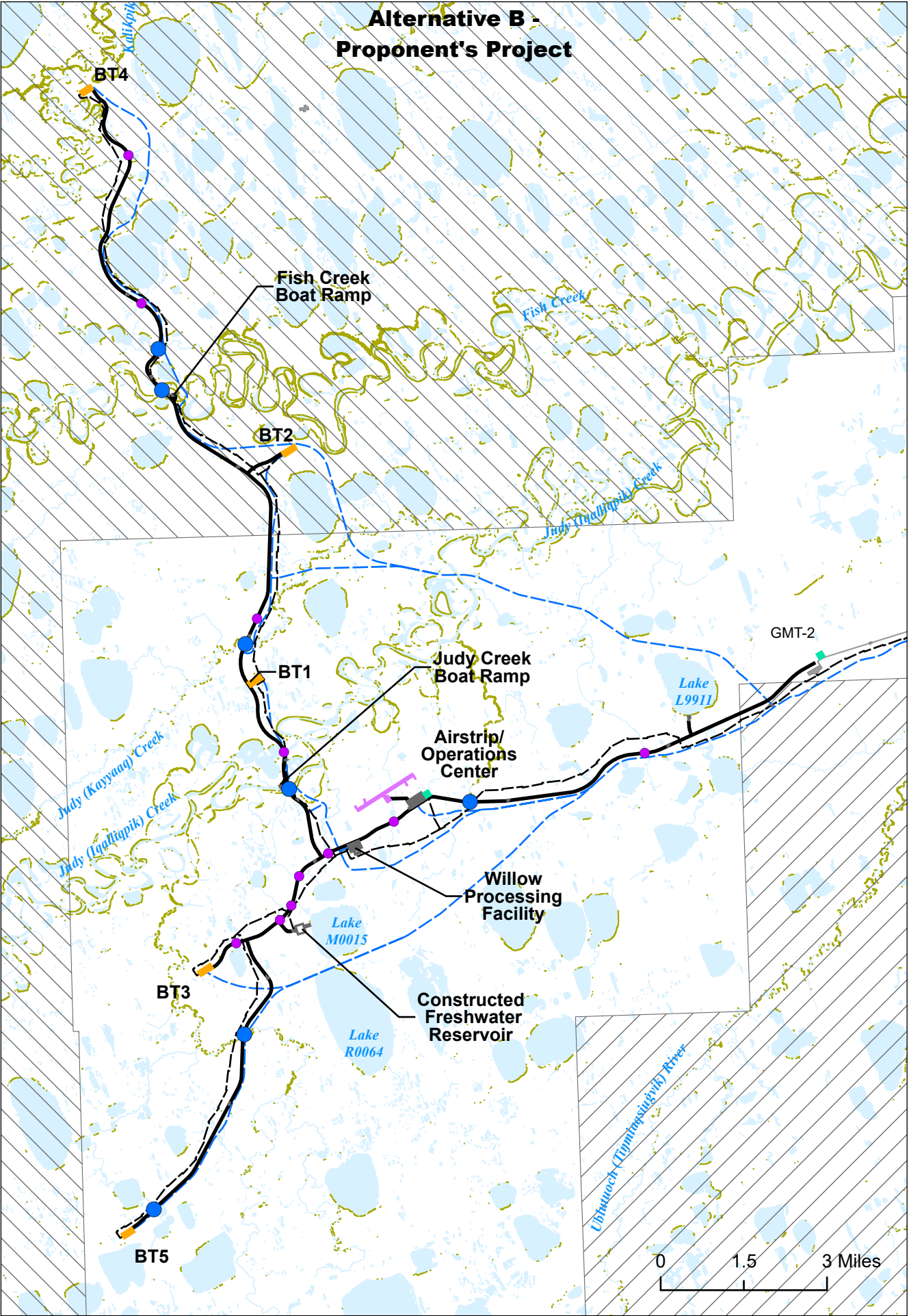
NPR-A Special Areas

- Teshekpuk Lake Special Area

Notes:
1. Oliktok Dock activity would occur under all action alternatives and Option 3: Colville River Crossing.

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Figure 3.13.5



Polar Bear

- Potential Terrestrial Denning Habitat

Willow Proposed Development Features

- Culvert Battery
- Bridge
- Gravel Road
- Pipeline
- Ice Road
- Airstrip
- Drill Site Pad
- Gravel Pad
- Ice Pad

Other Infrastructure

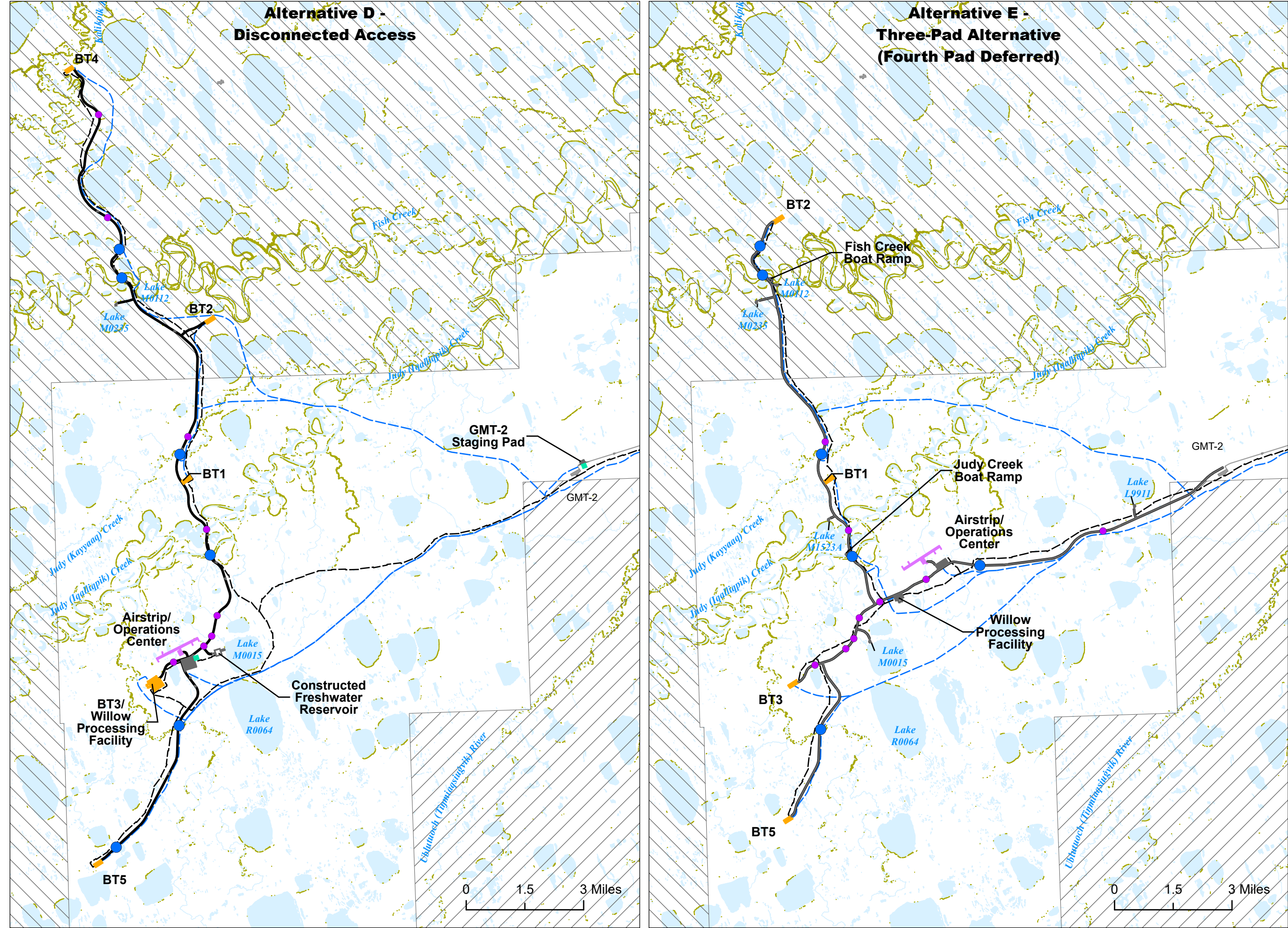
- Existing Road
- Existing Pipeline
- Existing Infrastructure

NPR-A Special Areas

- Colville River Special Area
- Teshekpuk Lake Special Area

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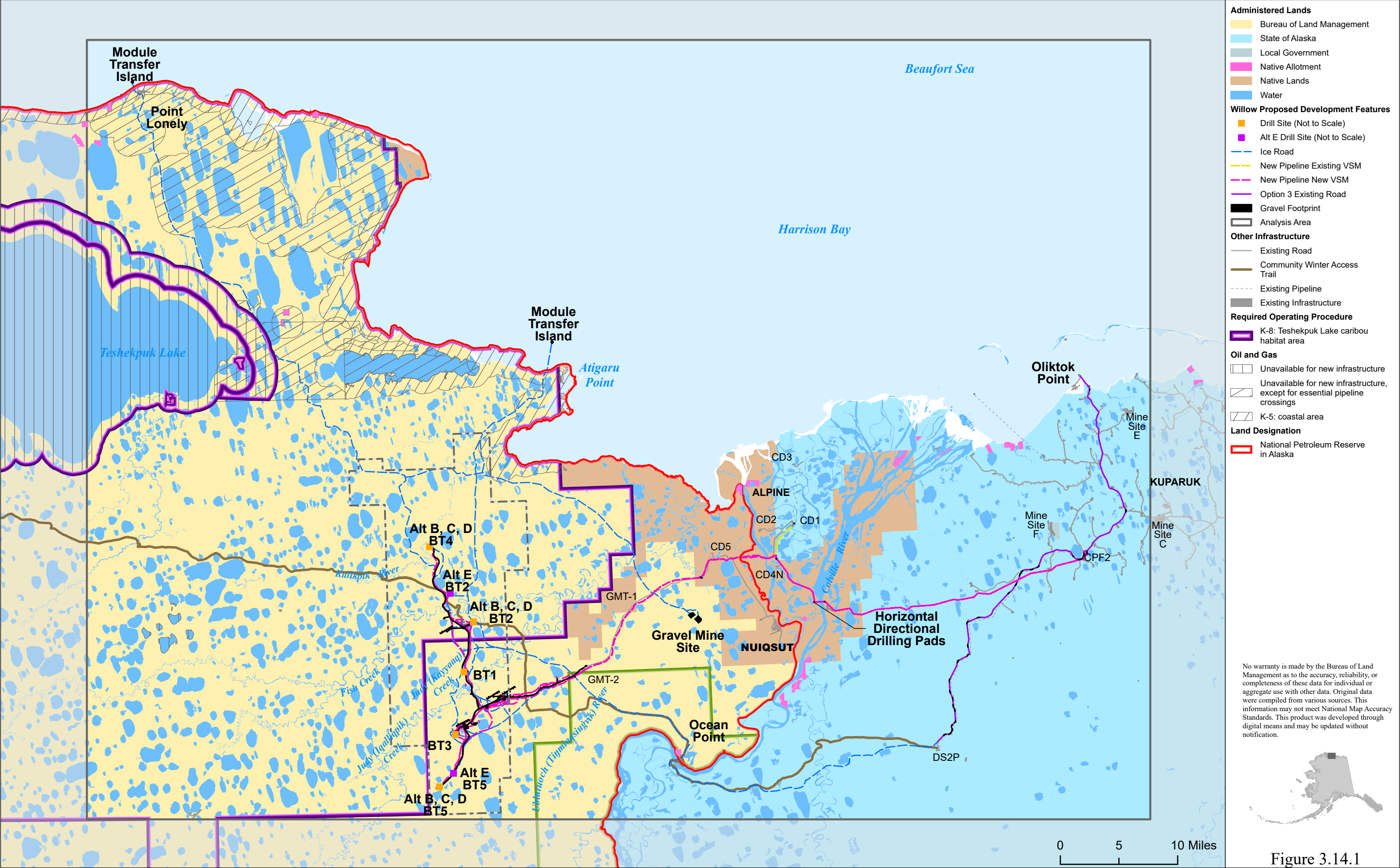
Figure 3.13.6A

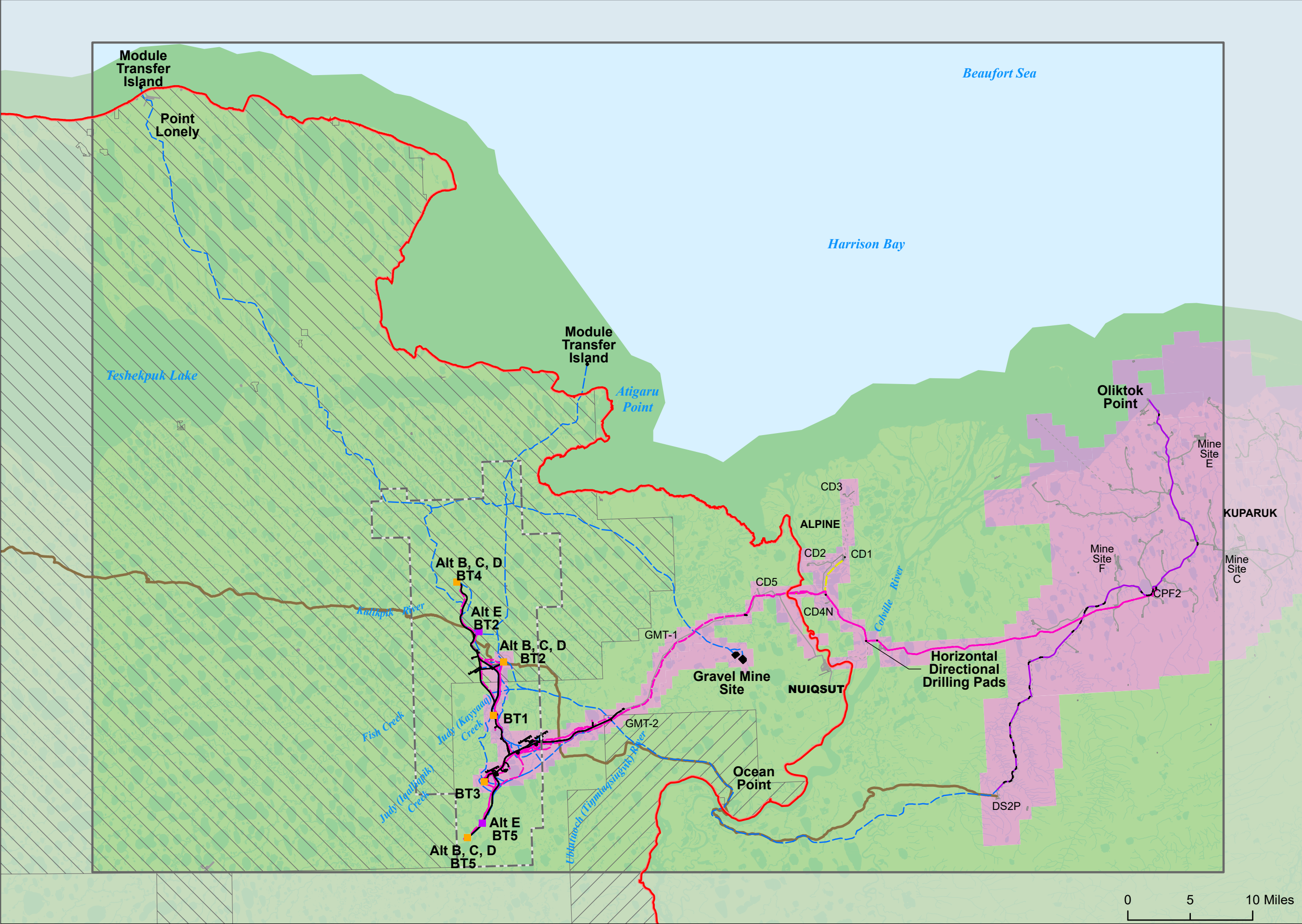


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Figure 3.13.6B





- North Slope Borough Zones**
- Resource Development
 - Conservation
- Willow Proposed Development Features**
- Drill Site (Not to Scale)
 - Alt E Drill Site (Not to Scale)
 - Ice Road
 - New Pipeline Existing VSM
 - New Pipeline New VSM
 - Option 3 Existing Road
 - Gravel Footprint
 - Analysis Area
- Other Infrastructure**
- Existing Road
 - Community Winter Access Trail
 - Existing Pipeline
 - Existing Infrastructure
- NPR-A Special Areas**
- Colville River Special Area
 - Teshkepkuk Lake Special Area
- Land Designation**
- National Petroleum Reserve in Alaska
- Oil and Gas Lease Unit**
- Bear Tooth

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Figure 3.14.2