



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

Willow Master Development Plan

Environmental Impact Statement

FINAL

Volume 3: Appendix A.2

Figures 3.14.1 - 4.3.5

August 2020

Prepared by:

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

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
EIS: \$6,668,400**



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: Caribou in the Alpine Development on Alaska's North Slope.

Photo by: Wendy Mahan, courtesy of ConocoPhillips.

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Willow Master Development Plan

Appendix A.2

Figures 3.14.1 - 4.3.5

August 2020

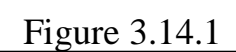
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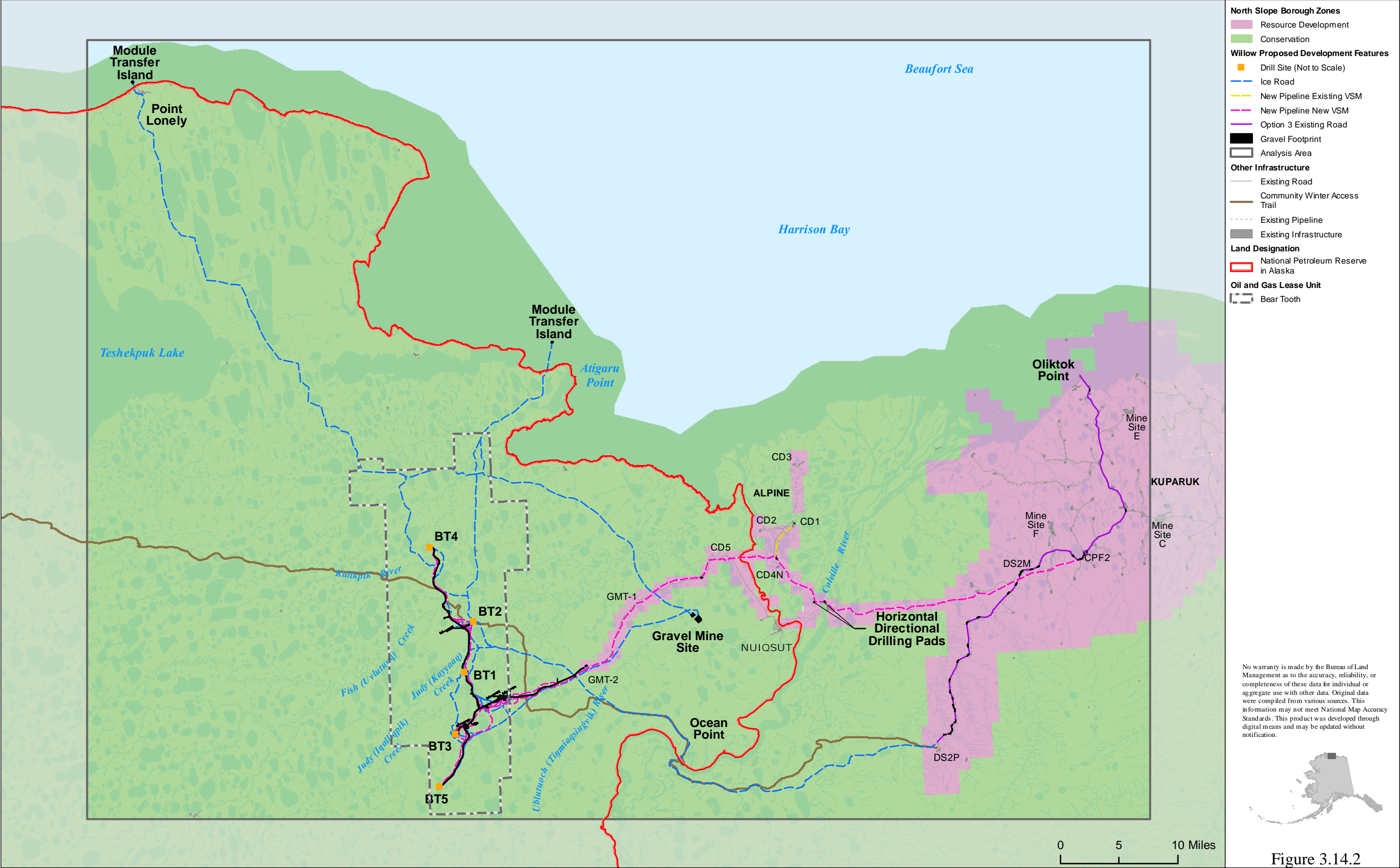
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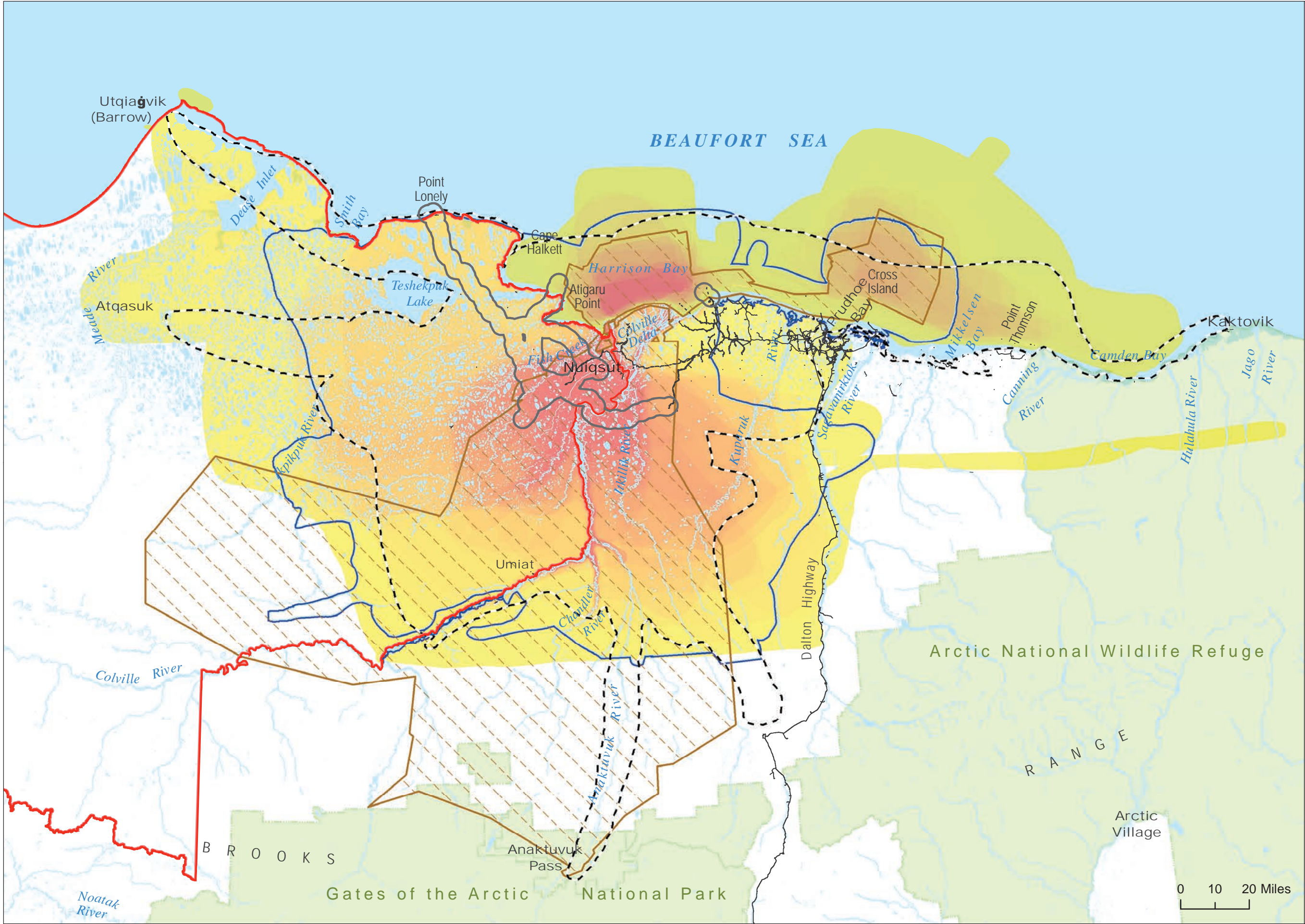
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- Subsistence Data**
- All Resources, 1973-1986 ^a
 - All Resources, 1994-2003 ^b
 - All Resources, 2014 ^c
 - High Overlapping Subsistence Use Areas
 - Low All Resources, 1995-2006 ^d

Willow Proposed Development Features

- Direct Effects Area

Other Infrastructure

- Existing Road
- Existing Pipeline
- Existing Infrastructure

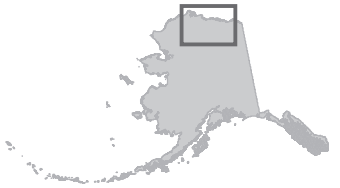
Land Designation

- National Petroleum Reserve in Alaska

Map prepared by
Stephen R. Braund & Associates

- Source**
- a. Pedersen 1986
 - b. BLM 2004a
 - c. Brown, Braem et al. 2016
 - d. SRB&A 2010b

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0 10 20 Miles

Figure 3.16.1



Subsistence Data

- All Resources, Early 1970s ^a
- All Resources, Lifetime Previous to 1979 ^b

Willow Proposed Development Features

- Direct Effects Area

Other Infrastructure

- Existing Road
- Existing Pipeline
- Existing Infrastructure

Land Designation

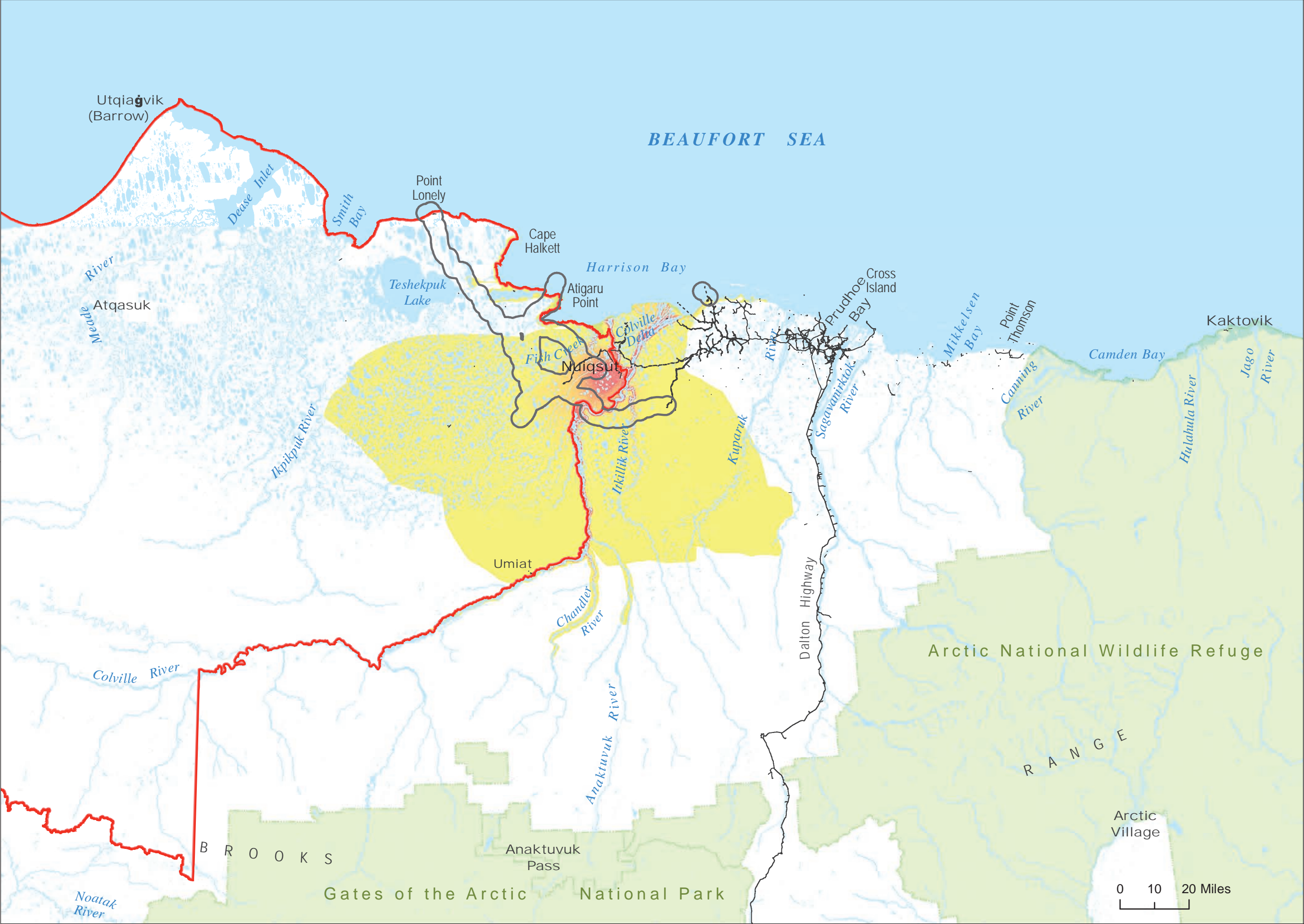
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Source
a. Brown 1979
b. Pedersen 1979

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Figure 3.16.2



Subsistence Data

High Overlapping Subsistence Use Areas^a
Low Caribou, January 2008 through October 2016

Willow Proposed Development Features

Direct Effects Area

Other Infrastructure

Existing Road
Existing Pipeline
Existing Infrastructure

Land Designation

National Petroleum Reserve in Alaska

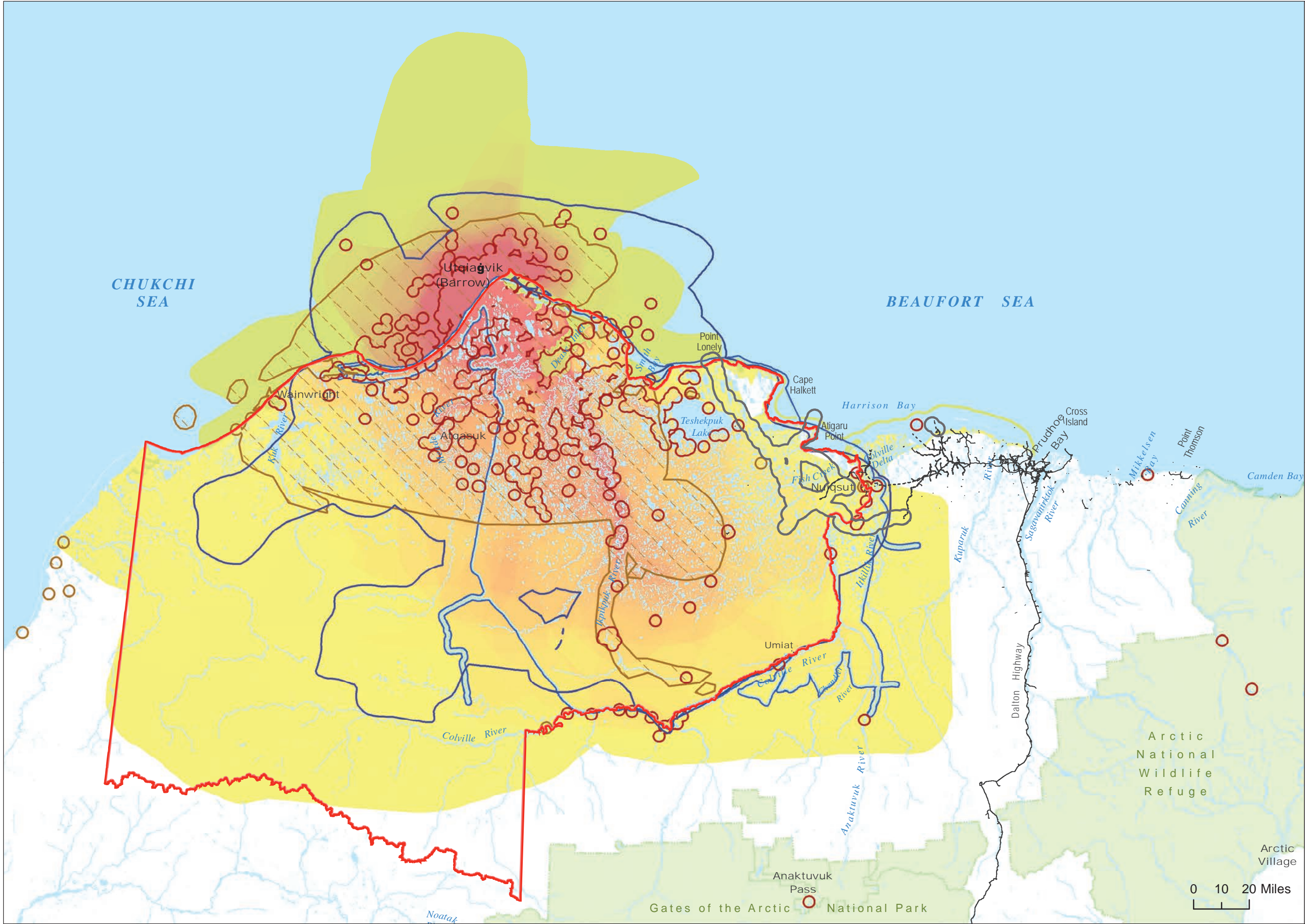
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0 10 20 Miles

Figure 3.16.3



- Subsistence Data**
- All Resource Harvest Sites Buffered, 1987-1989 ^a
 - All Resources, 1987-1989 ^b
 - All Resources, 1994-2003 ^c
 - All Resources, 2014 ^d
 - High Overlapping Subsistence Use Areas
 - Low All Resources, 1997-2006 ^e

Willow Proposed Development Features

- Direct Effects Area

Other Infrastructure

- Existing Road
- Existing Pipeline
- Existing Infrastructure

Land Designation

- National Petroleum Reserve in Alaska

Map prepared by
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- Source**
- a. SRB&A and ISER 1993
 - b. SRB&A Unpublished
 - c. BLM 2004a
 - d. Brown, Braem et al. 2016
 - e. SRB&A 2010b

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Arctic Village

0 10 20 Miles

Figure 3.16.4



Subsistence Data

All Resources, Lifetime Previous to 1979 ^a

Willow Proposed Development Features

Direct Effects Area

Other Infrastructure

Existing Road

Existing Pipeline

Existing Infrastructure

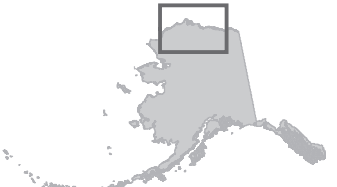
Land Designation

National Petroleum Reserve in Alaska

Map prepared by
Stephen R. Braund & Associates

Source
a. Pedersen 1979

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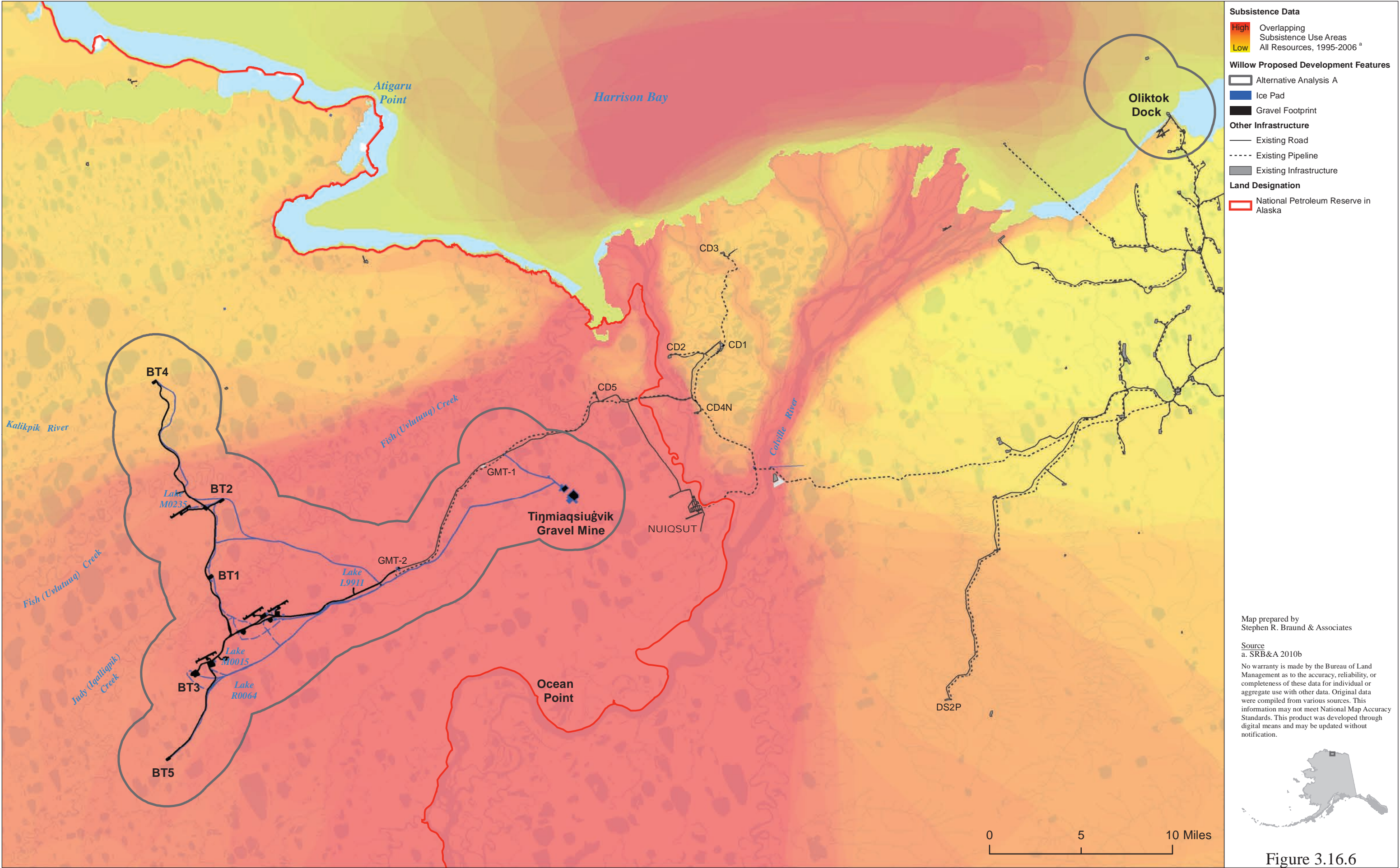


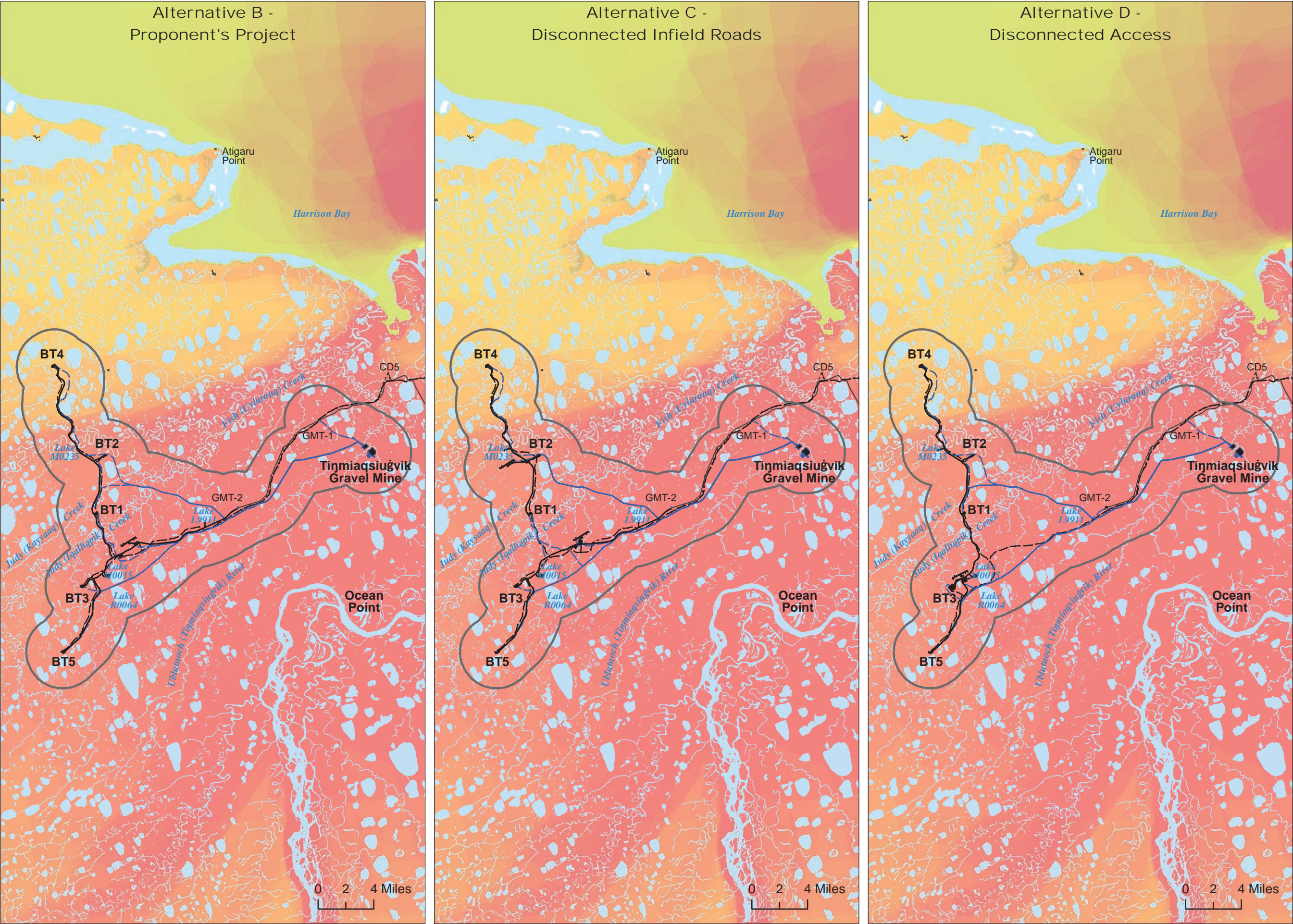
Arctic Village

0 10 20 Miles

Gates of the Arctic National Park

Figure 3.16.5





Subsistence Data

High

Low

Overlapping Subsistence Use Areas
All Resources, 1995-2006^a

Willow Proposed Development Features

Alternative Analysis Area *
Ice Road
Ice Pad
Gravel Footprint

Other Infrastructure

Existing Road
Existing Pipeline
Existing Infrastructure

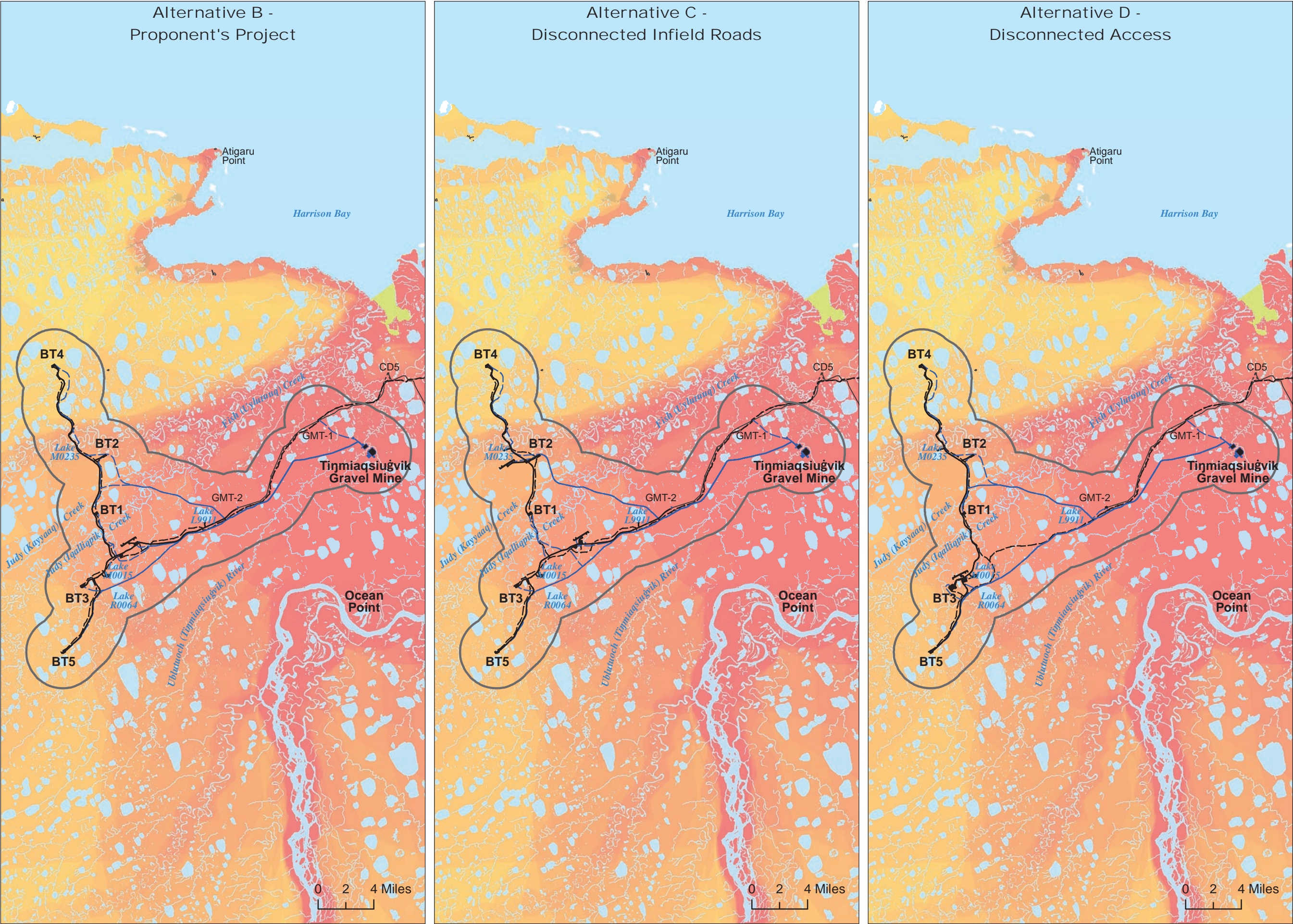
* The alternatives analysis area also includes Oliktok Dock (see Maps 3.16.6 and 3.16.12)

Map prepared by
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Source
a. SRB&A 2010b

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Figure 3.16.7



Subsistence Data

High Overlapping Subsistence Use Areas Caribou, 1995-2006^a

Low

Willow Proposed Development Features

Alternative Analysis Area *

Ice Road

Ice Pad

Gravel Footprint

Other Infrastructure

Existing Road

Existing Pipeline

Existing Infrastructure

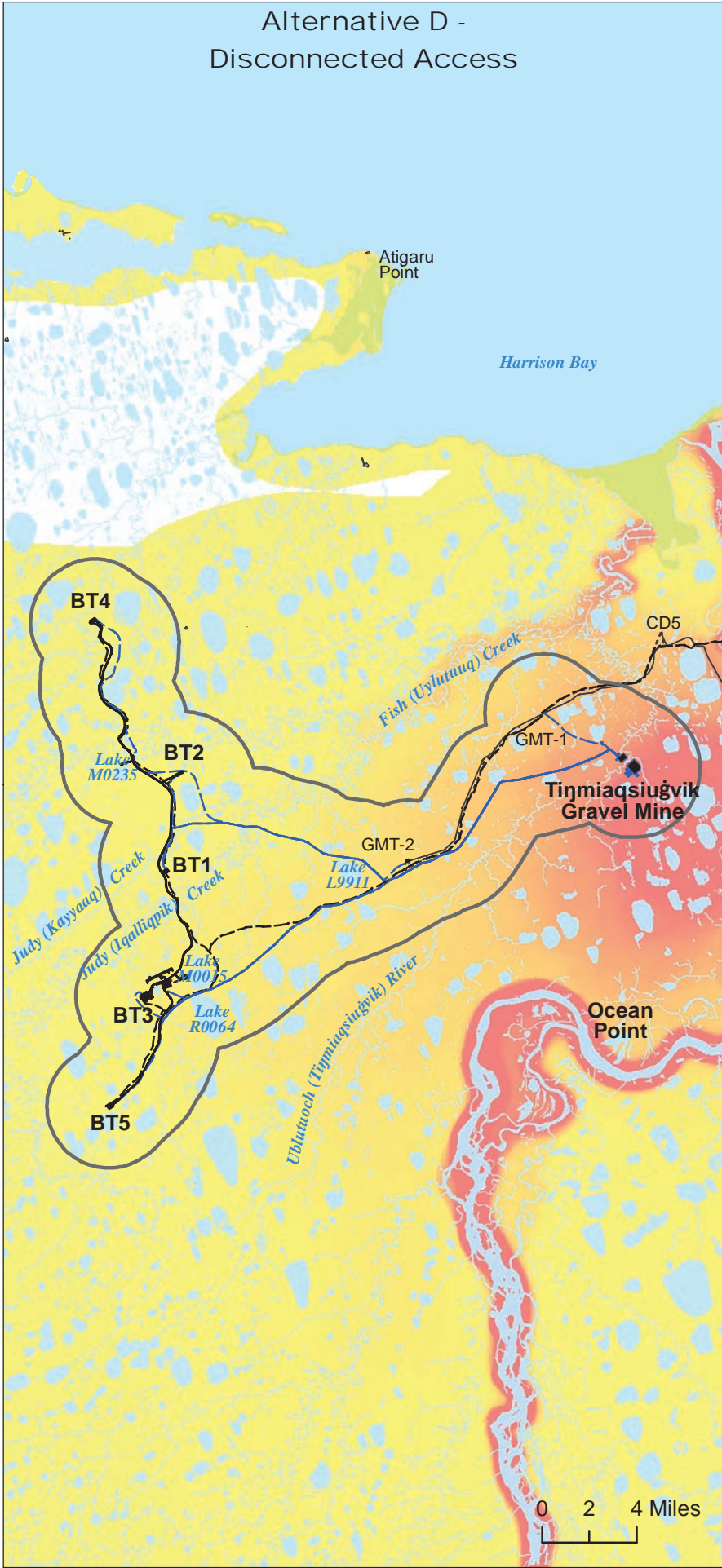
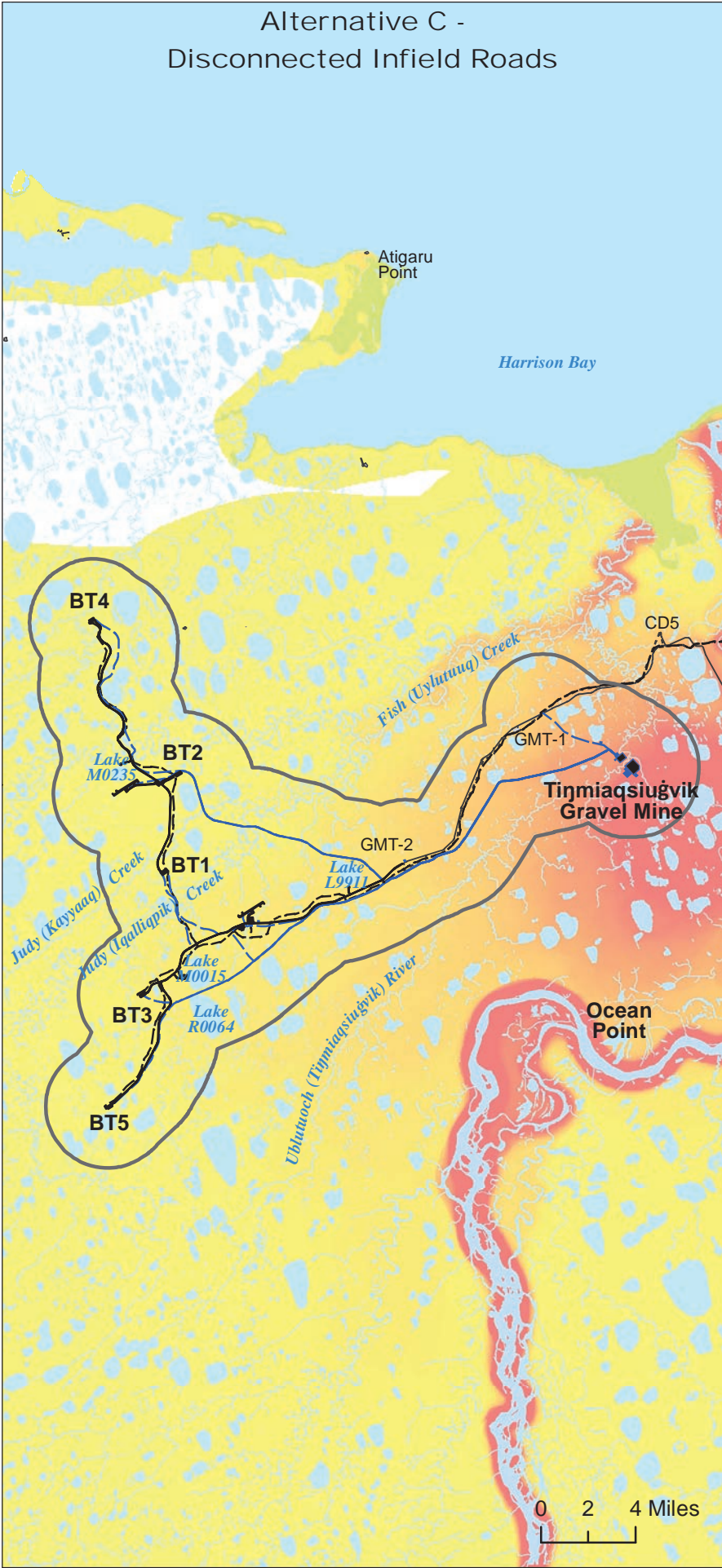
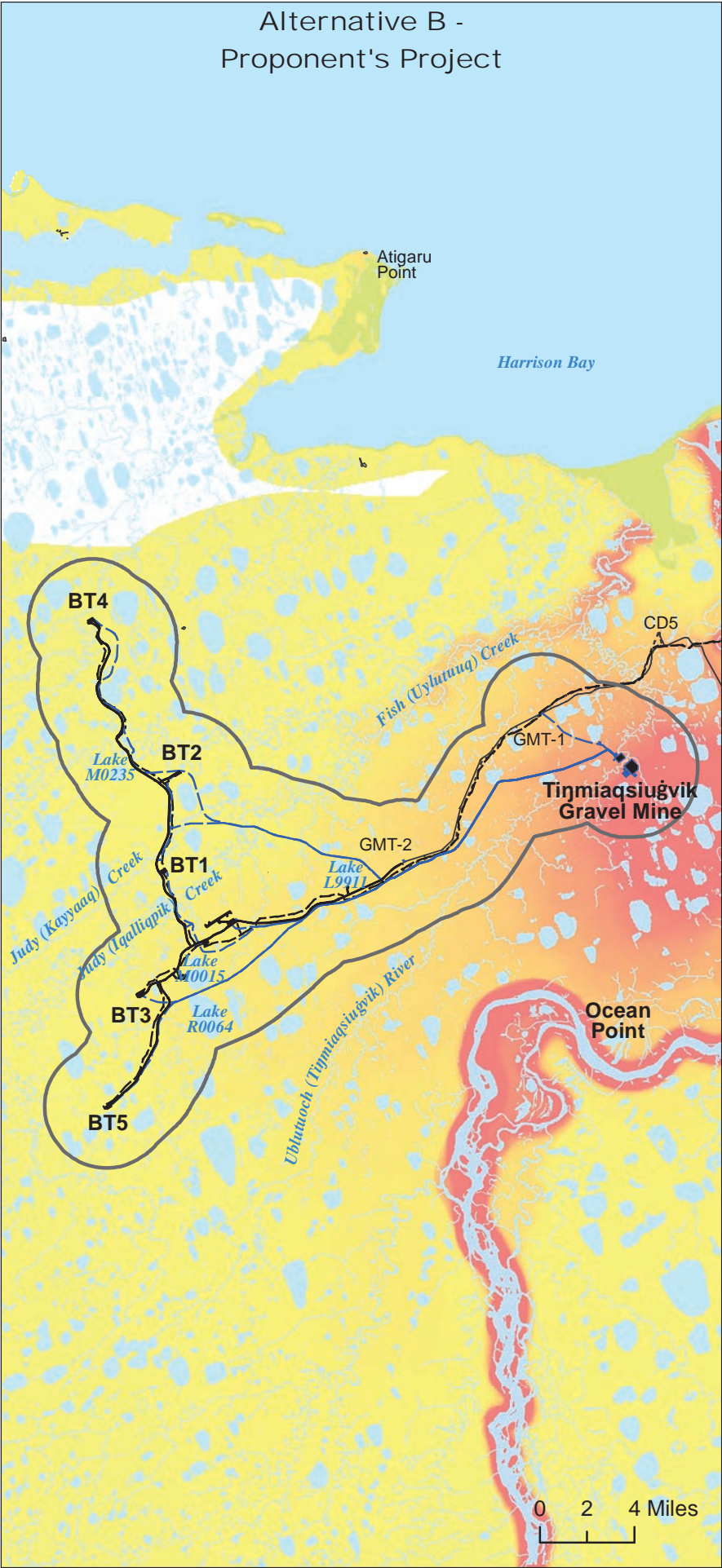
* The alternatives analysis area also includes Oliktok Dock (see Maps 3.16.6 and 3.16.12)

Map prepared by
Stephen R. Braund & Associates

Source
a. SRB&A 2010b

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Figure 3.16.8



Subsistence Data

High Overlapping Subsistence Use Areas Caribou, January 2008 through October 2016^a

Low

Willow Proposed Development Features

Alternative Analysis Area *

Ice Road

Ice Pad

Gravel Footprint

Other Infrastructure

Existing Road

Existing Pipeline

Existing Infrastructure

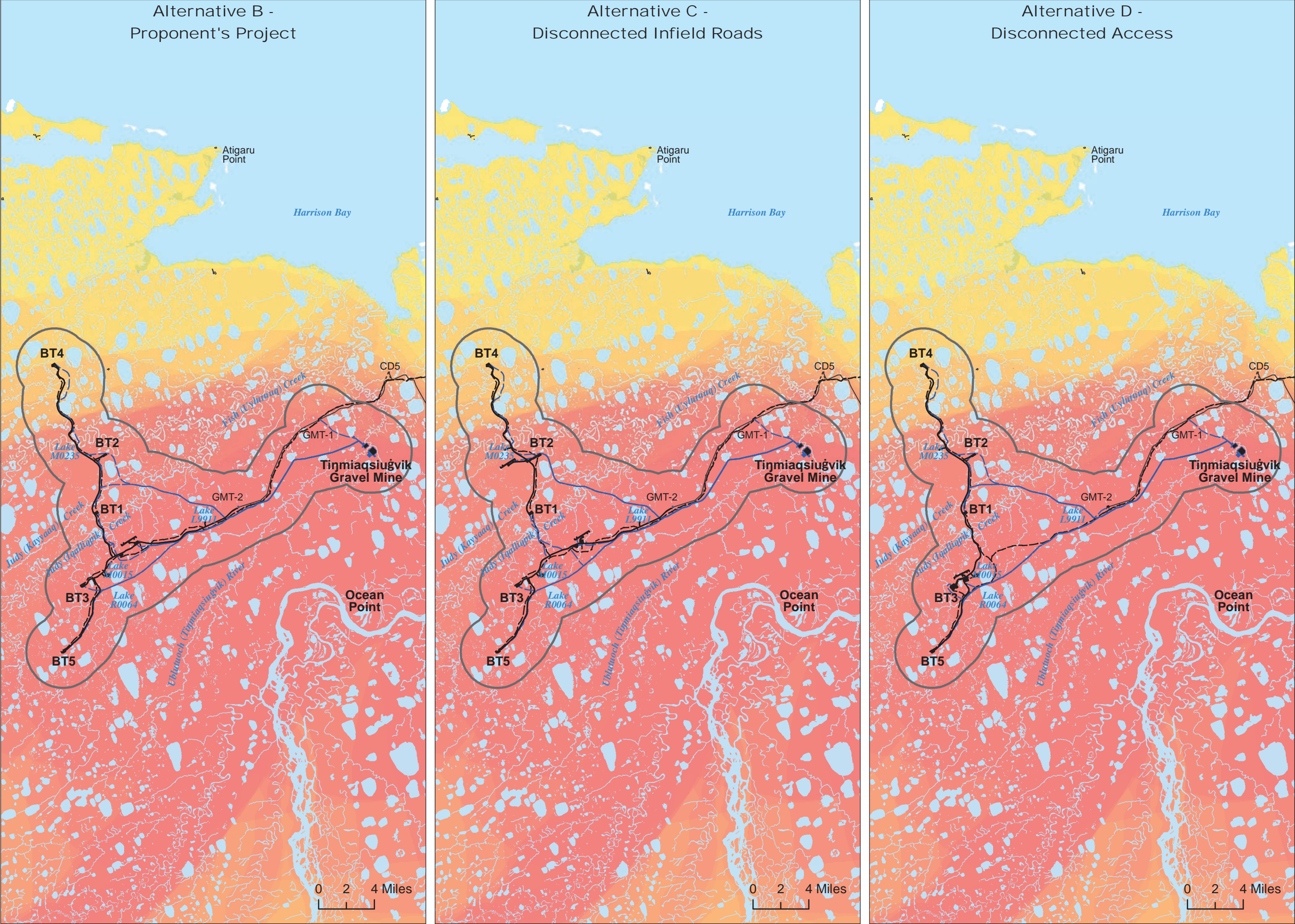
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Figure 3.16.9



Subsistence Data

High Overlapping Subsistence Use Areas Wolf and Wolverine, 1995-2006^a

Low

Willow Proposed Development Features

Alternative Analysis Area *

Ice Road

Ice Pad

Gravel Footprint

Other Infrastructure

Existing Road

Existing Pipeline

Existing Infrastructure

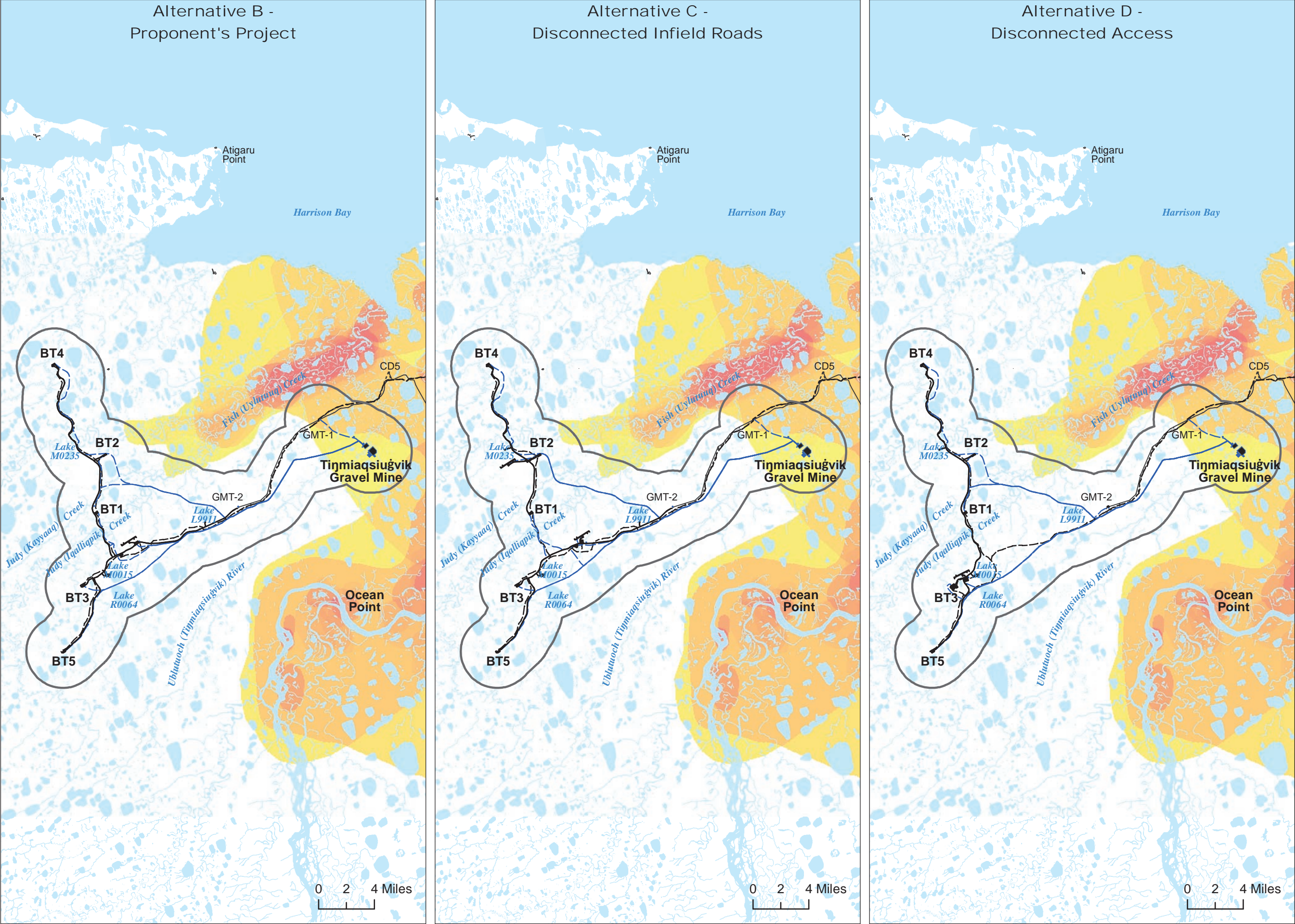
* The alternatives analysis area also includes Oliktok Dock (see Maps 3.16.6 and 3.16.12)

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Source
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Figure 3.16.10



Subsistence Data

High Overlapping Subsistence Use Areas
Low Goose, 1995-2006^a

Willow Proposed Development Features

Alternative Analysis Area *

Ice Road

Ice Pad

Gravel Footprint

Other Infrastructure

Existing Road

Existing Pipeline

Existing Infrastructure

* The alternatives analysis area also includes Oliktok Dock (see Maps 3.16.6 and 3.16.12)

Map prepared by
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Figure 3.16.11



Subsistence Data

High Overlapping Subsistence Use Areas
Low All Resources, 1997-2006 ^a

Willow Proposed Development

Alternative Analysis A
Ice Pad
Gravel Footprint

Other Infrastructure

Existing Road
Existing Pipeline
Existing Infrastructure

Land Designation

National Petroleum Reserve in Alaska

Map prepared by
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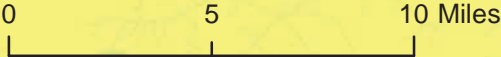
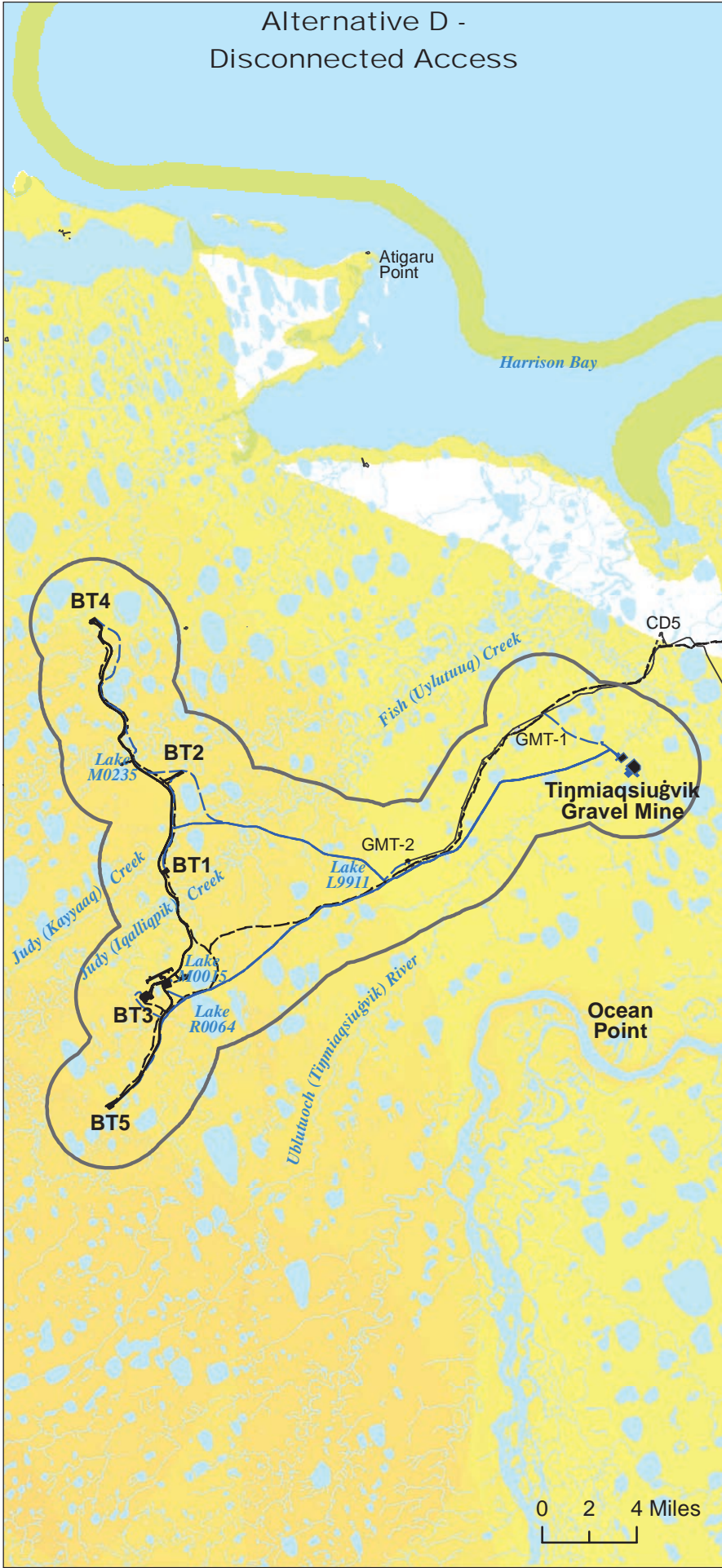
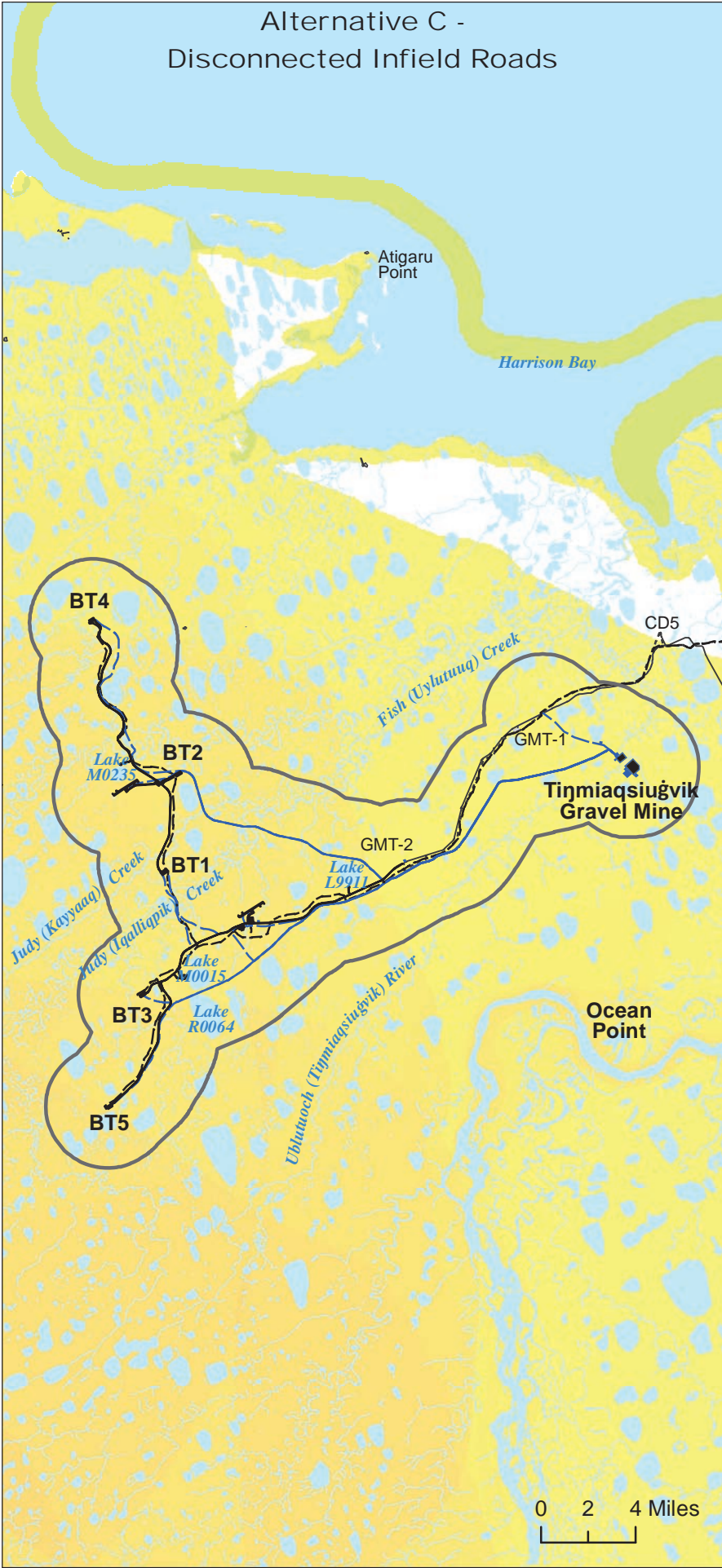
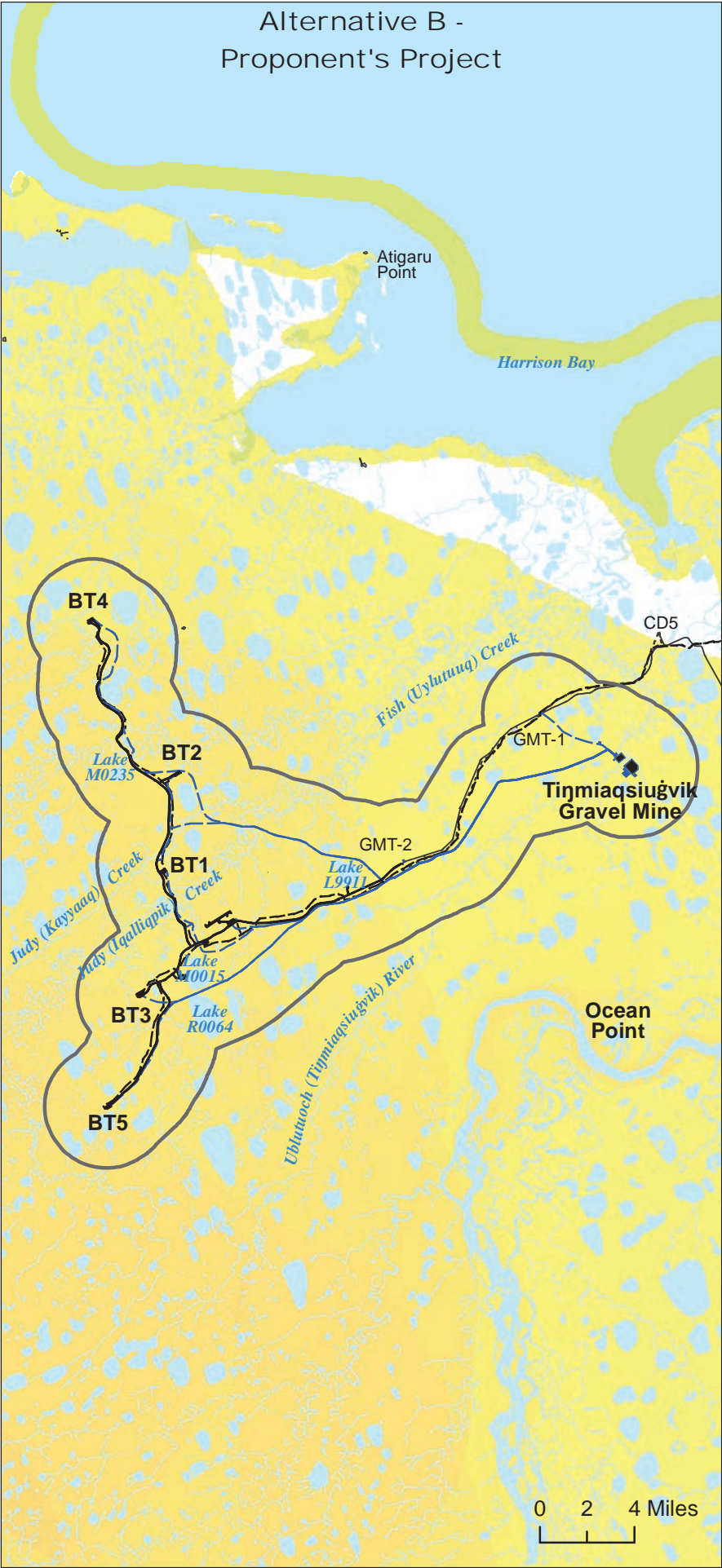


Figure 3.16.12



Subsistence Data

High Overlapping Subsistence Use Areas
Low All Resources, 1997-2006^a

Willow Proposed Development Features

Alternative Analysis Area *

Ice Road

Ice Pad

Gravel Footprint

Other Infrastructure

Existing Road

Existing Pipeline

Existing Infrastructure

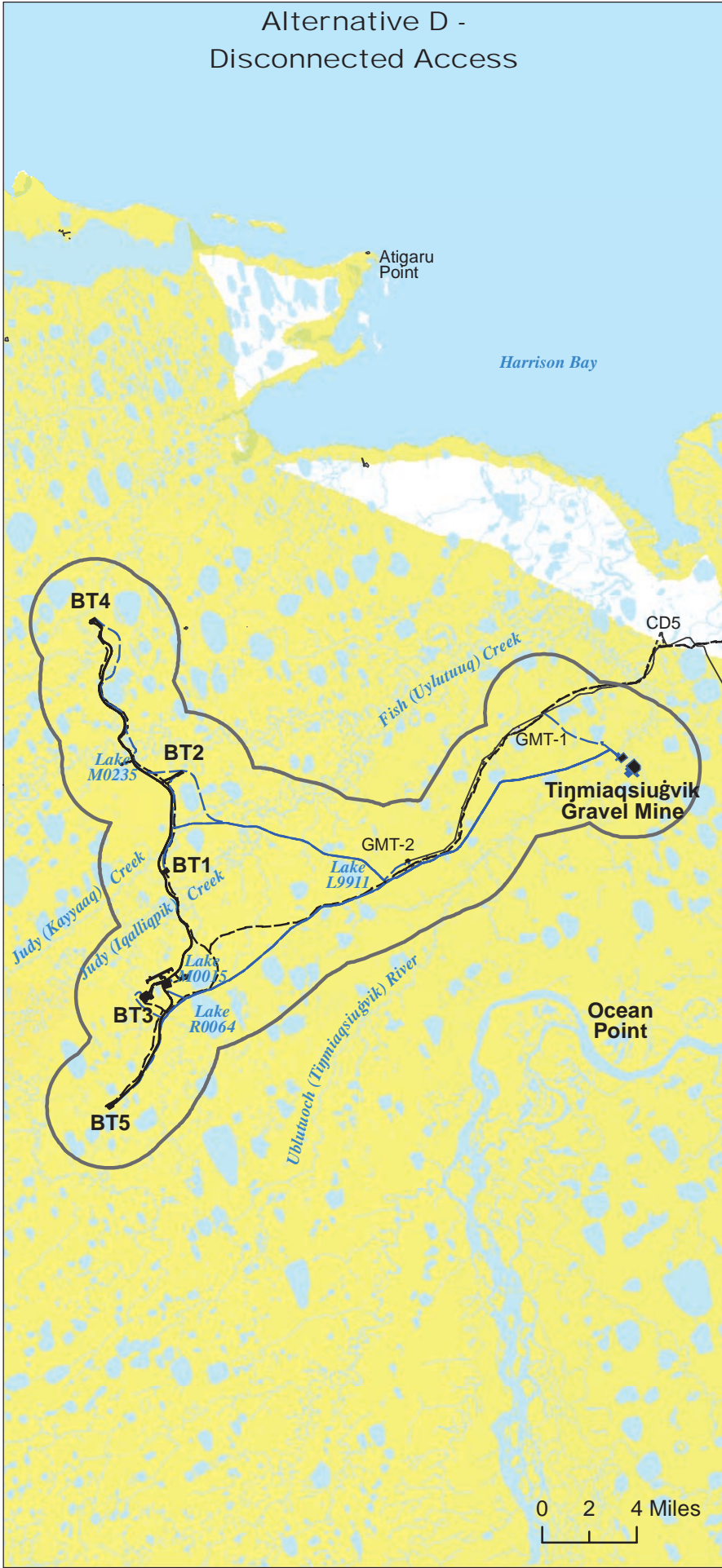
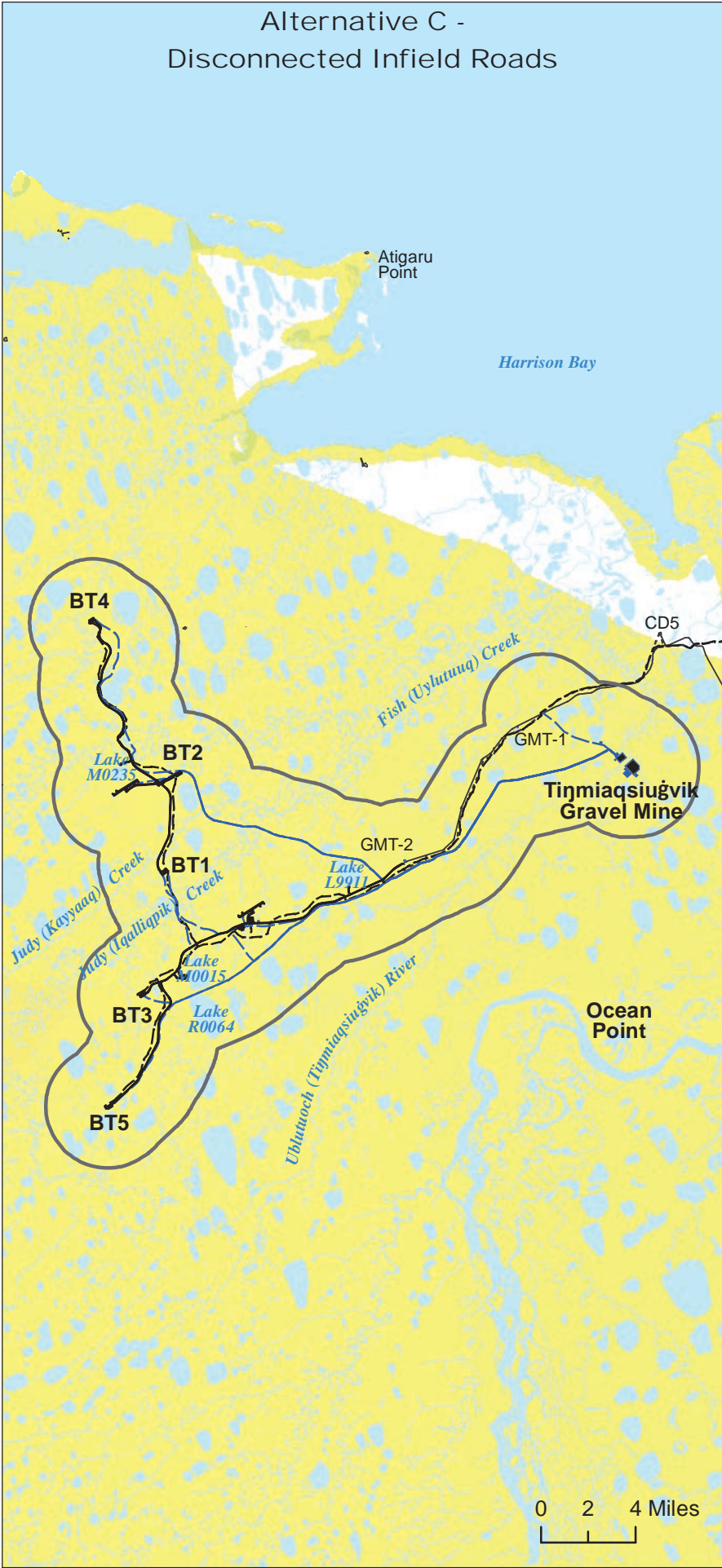
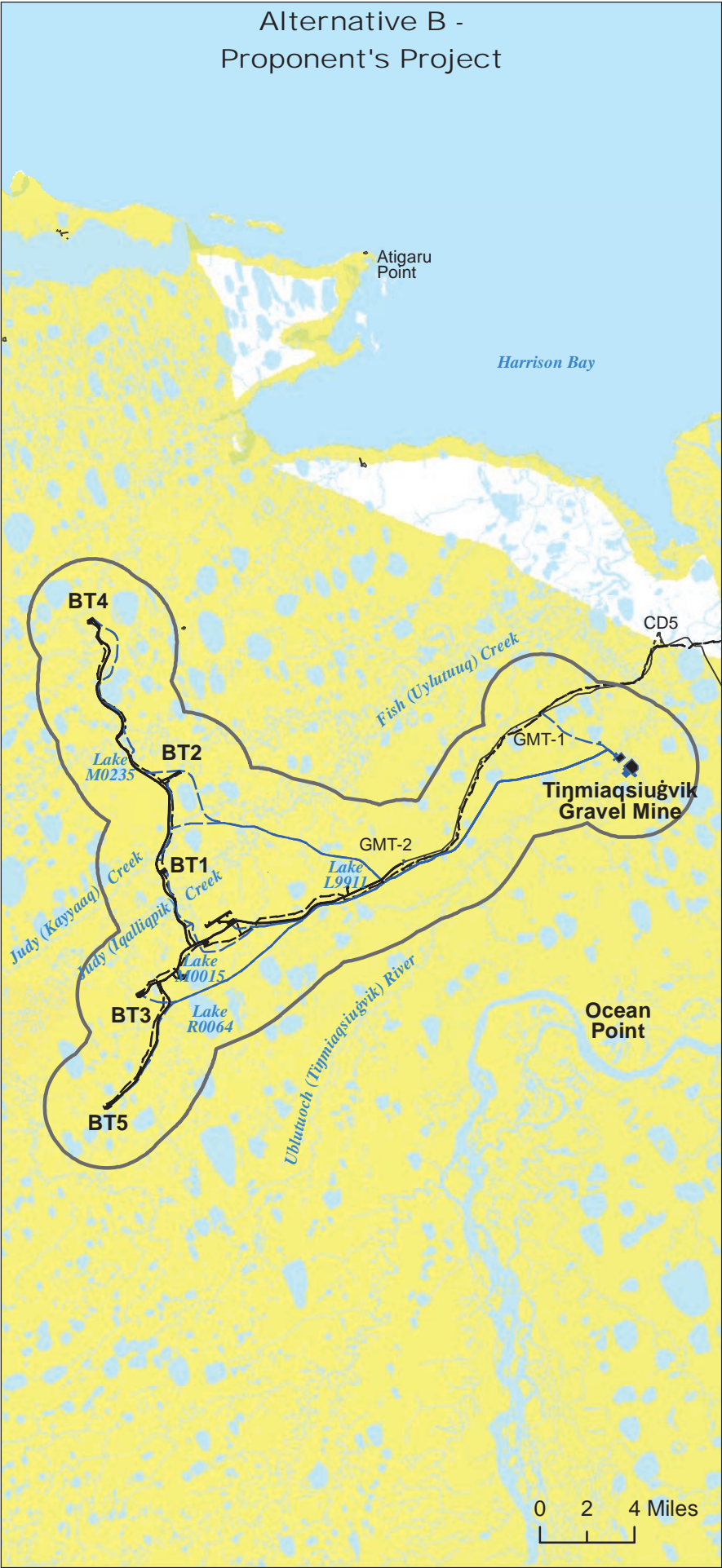
* The alternatives analysis area also includes Oliktok Dock (see Maps 3.16.6 and 3.16.12)

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Figure 3.16.13



Subsistence Data

High Overlapping Subsistence Use Areas
Low Caribou, 1997-2006^a

Willow Proposed Development Features

Alternative Analysis Area *

Ice Road

Ice Pad

Gravel Footprint

Other Infrastructure

Existing Road

Existing Pipeline

Existing Infrastructure

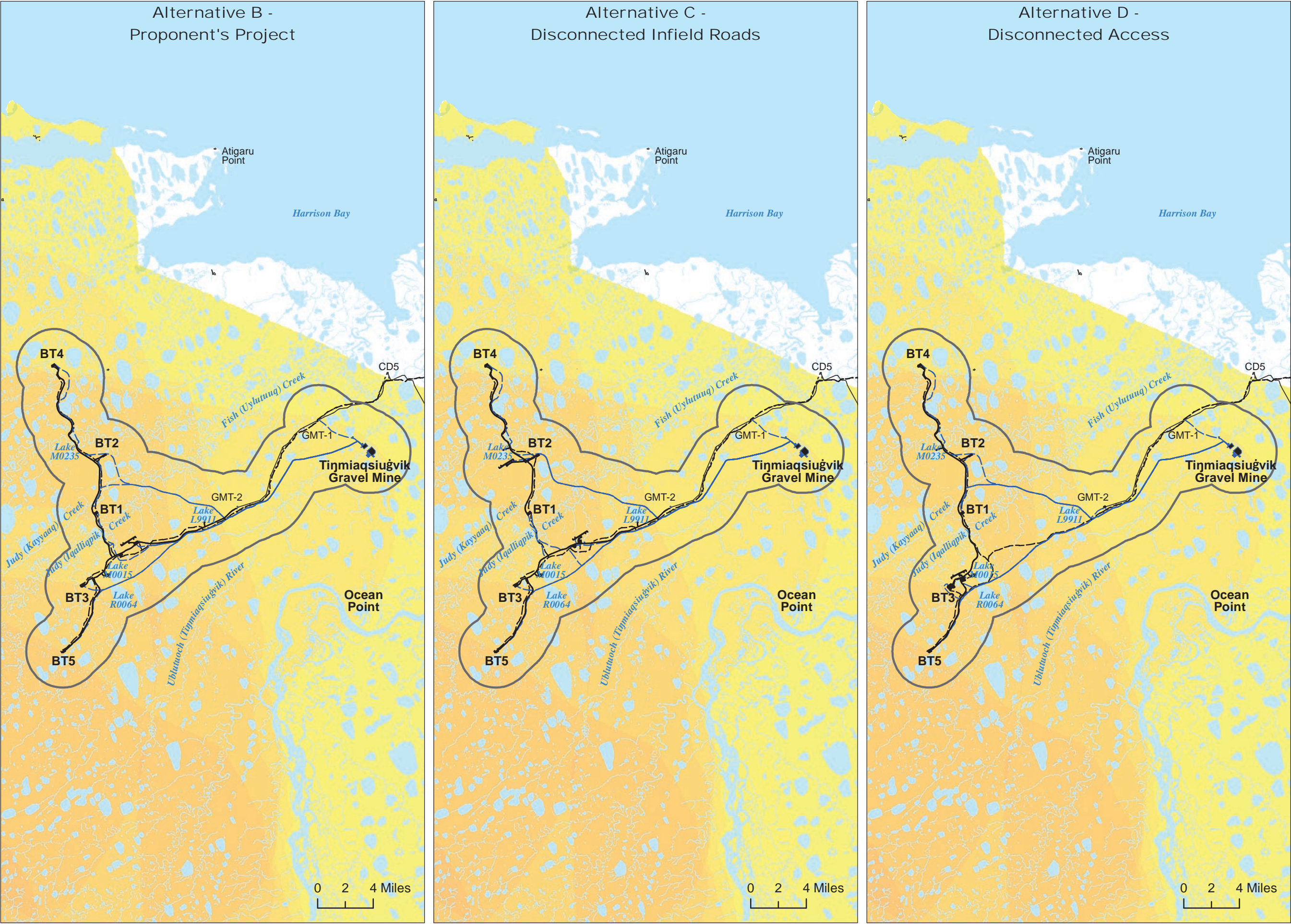
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Figure 3.16.14



Subsistence Data

High Overlapping Subsistence Use Areas
Low Wolf and Wolverine 1997-2006^a

Willow Proposed Development Features

Alternative Analysis Area *
Ice Road
Ice Pad
Gravel Footprint

Other Infrastructure

Existing Road
Existing Pipeline
Existing Infrastructure

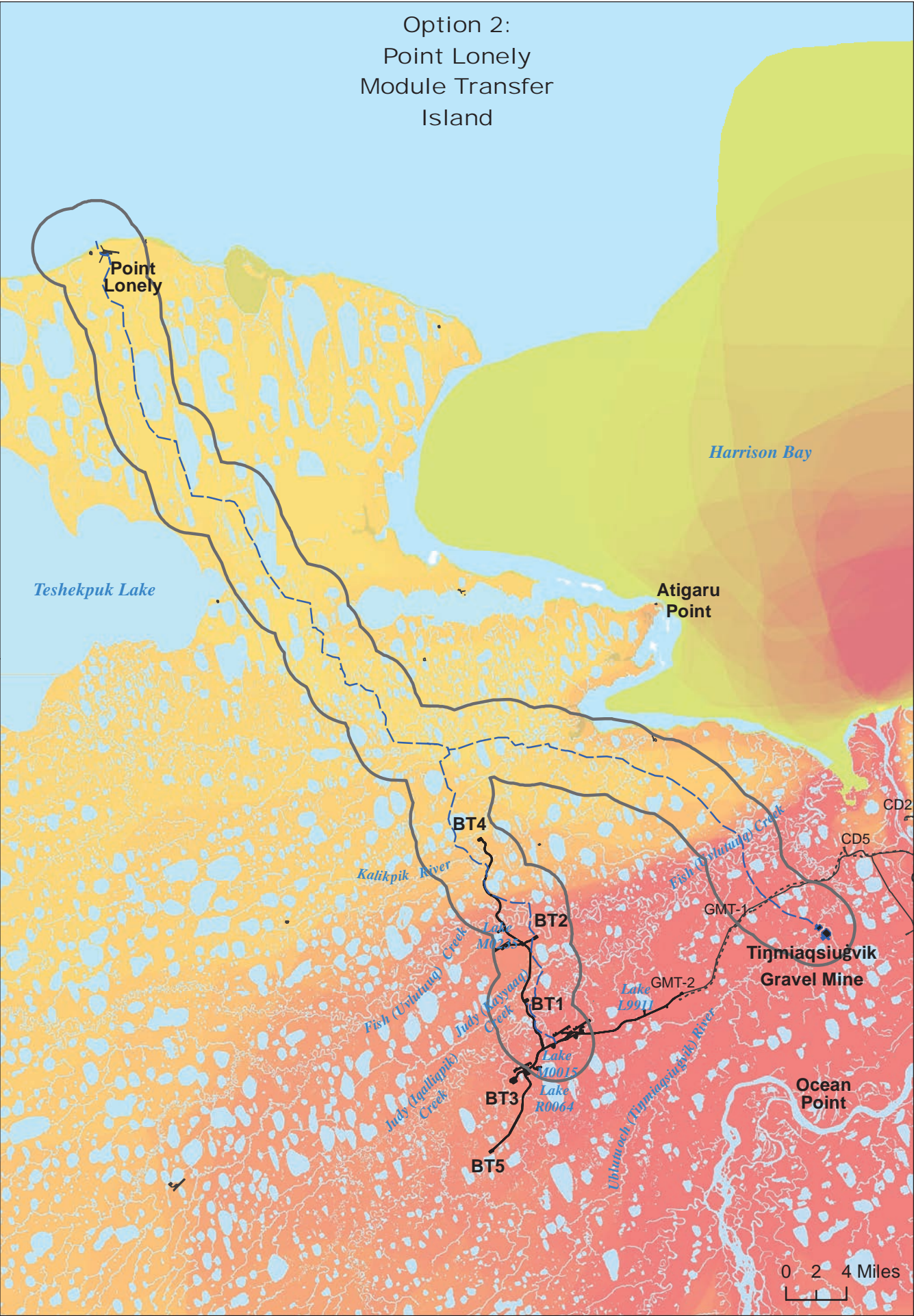
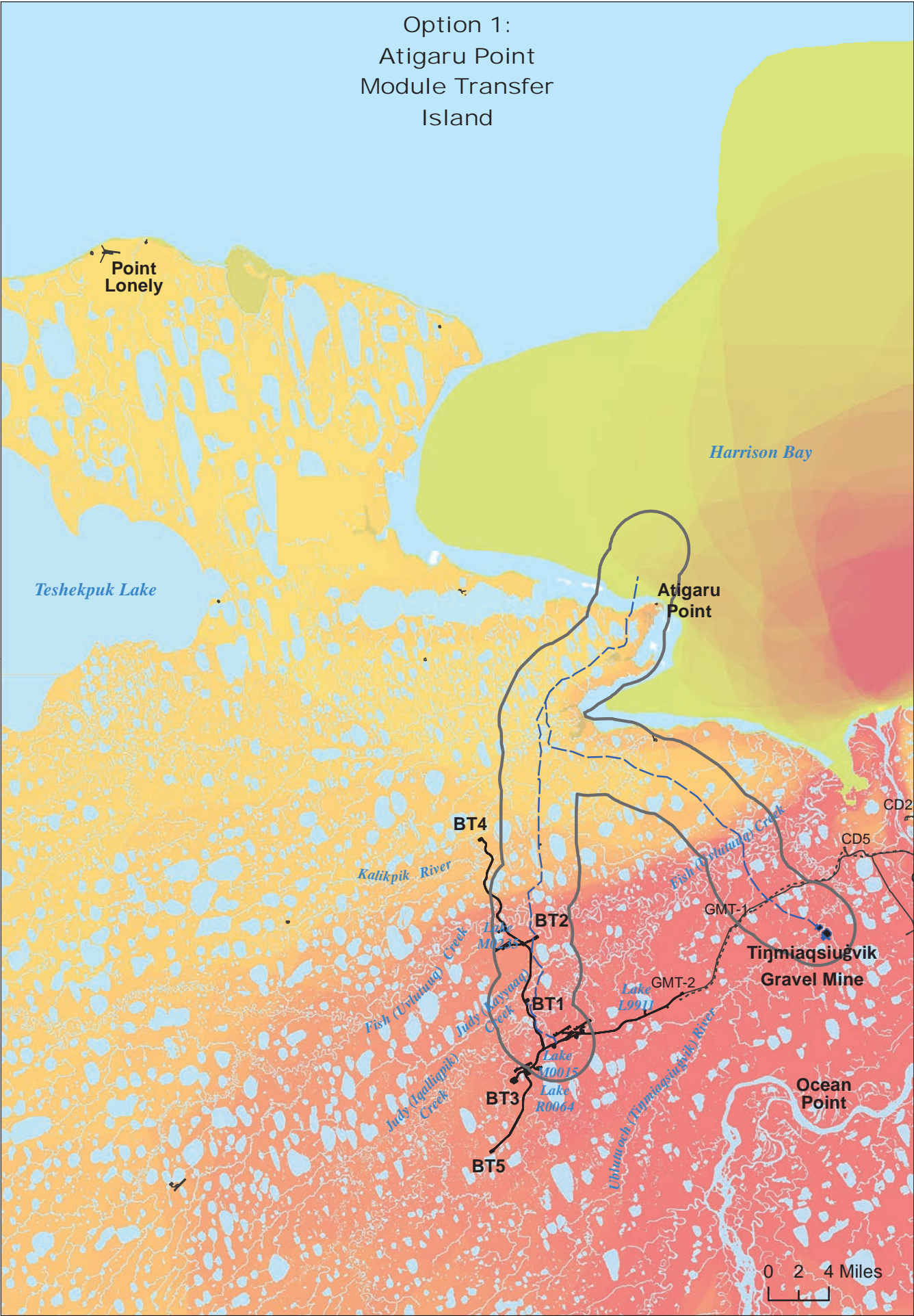
* The alternatives analysis area also includes Oliktok Dock (see Maps 3.16.6 and 3.16.12)

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Source
a. SRB&A 2010b

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Figure 3.16.15



Subsistence Data

High Overlapping Subsistence Use Areas
Low All Resources, 1995-2006^a

Willow Proposed Development Features

Module Transport Analysis Area
Ice Road
Ice Pad
Gravel Footprint

Other Infrastructure

Existing Road
Existing Pipeline
Existing Infrastructure

Map prepared by
Stephen R. Braund & Associates

Source
a. SRB&A 2010b

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Figure 3.16.16



Subsistence Data

- High Overlapping Subsistence Use Areas Caribou, 1995-2006^a
- Low

Willow Proposed Development Features

- Module Transport Analysis Area
- Ice Road
- Ice Pad
- Gravel Footprint

Other Infrastructure

- Existing Road
- Existing Pipeline
- Existing Infrastructure

Map prepared by
Stephen R. Braund & Associates

Source
a. SRB&A 2010b

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Figure 3.16.17



Subsistence Data

High Overlapping Subsistence Use Areas Caribou, January 2008 through October 2016^a

Low

Willow Proposed Development Features

Module Transport Analysis Area

Ice Road

Ice Pad

Gravel Footprint

Other Infrastructure

Existing Road

Existing Pipeline

Existing Infrastructure

Map prepared by
Stephen R. Braund & Associates

Source
a. SRB&A 2018a

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Figure 3.16.18



Subsistence Data

High Overlapping Subsistence Use Areas Wolf and Wolverine, 1995-2006^a

Low

Willow Proposed Development Features

Module Transport Analysis Area

Ice Road

Ice Pad

Gravel Footprint

Other Infrastructure

Existing Road

Existing Pipeline

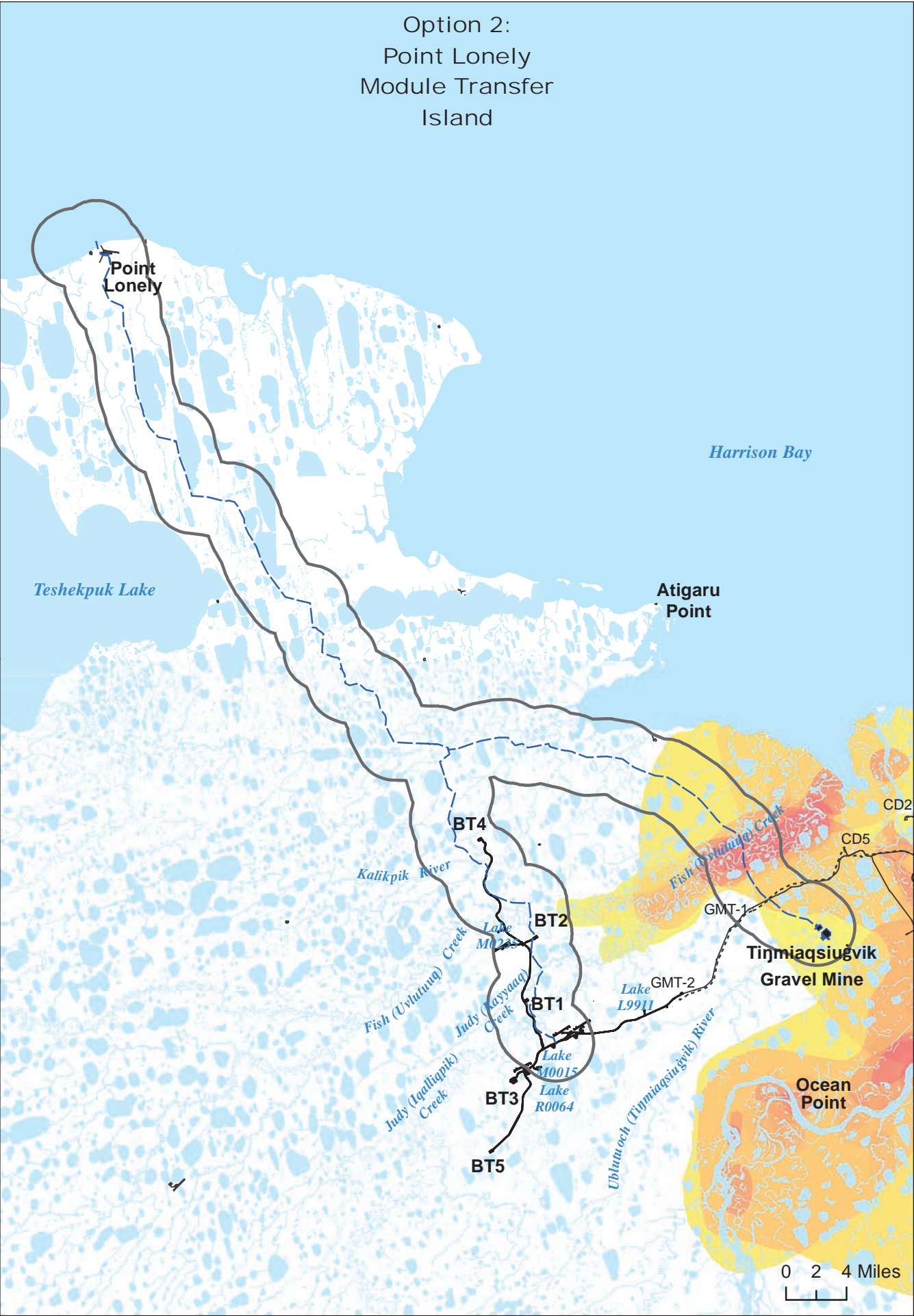
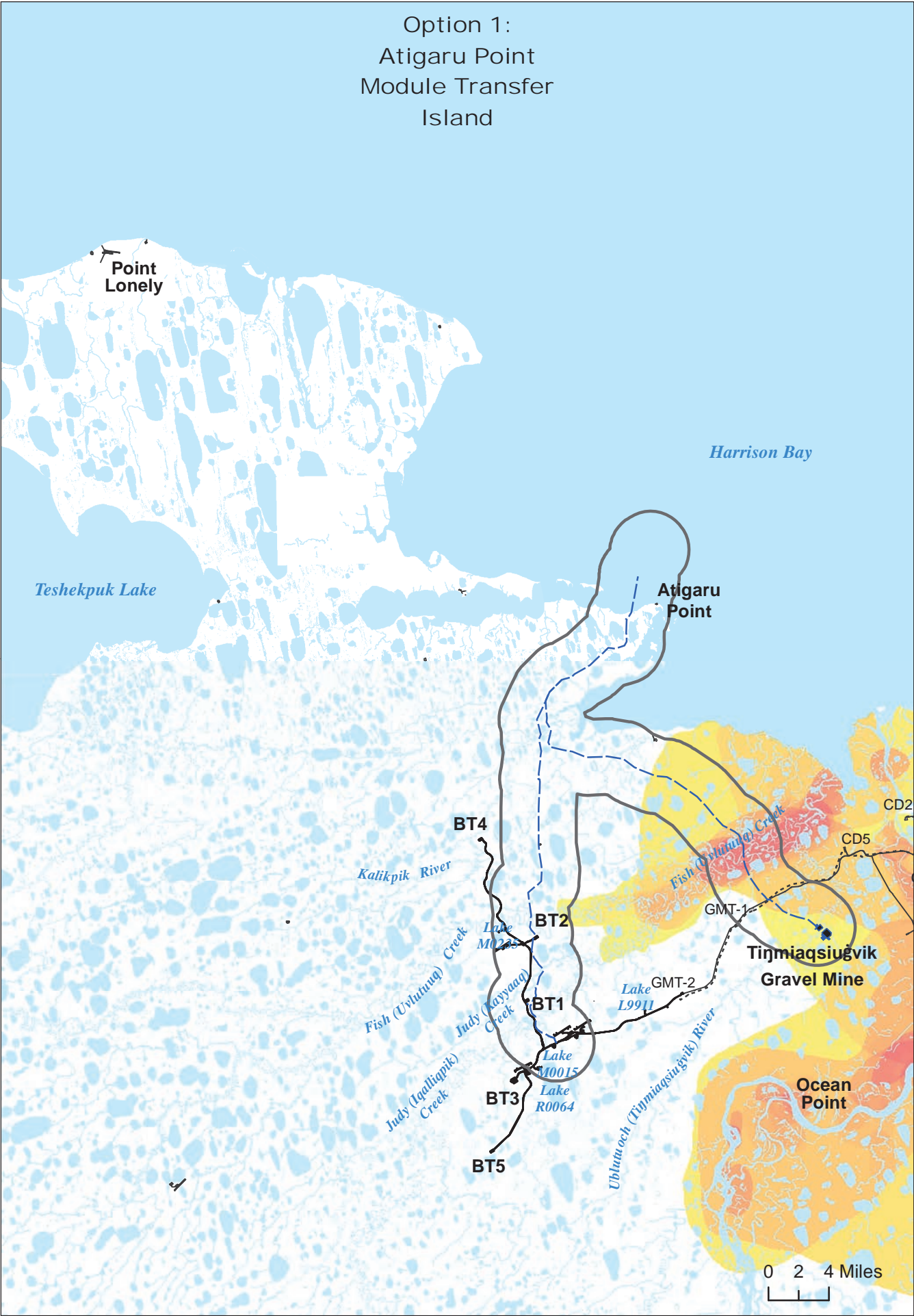
Existing Infrastructure

Map prepared by
Stephen R. Braund & Associates

Source
a. SRB&A 2010b

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Figure 3.16.19



Subsistence Data

High Overlapping Subsistence Use Areas
Low Goose, 1995-2006^a

Willow Proposed Development Features

Module Transport Analysis Area
Ice Road
Ice Pad
Gravel Footprint

Other Infrastructure

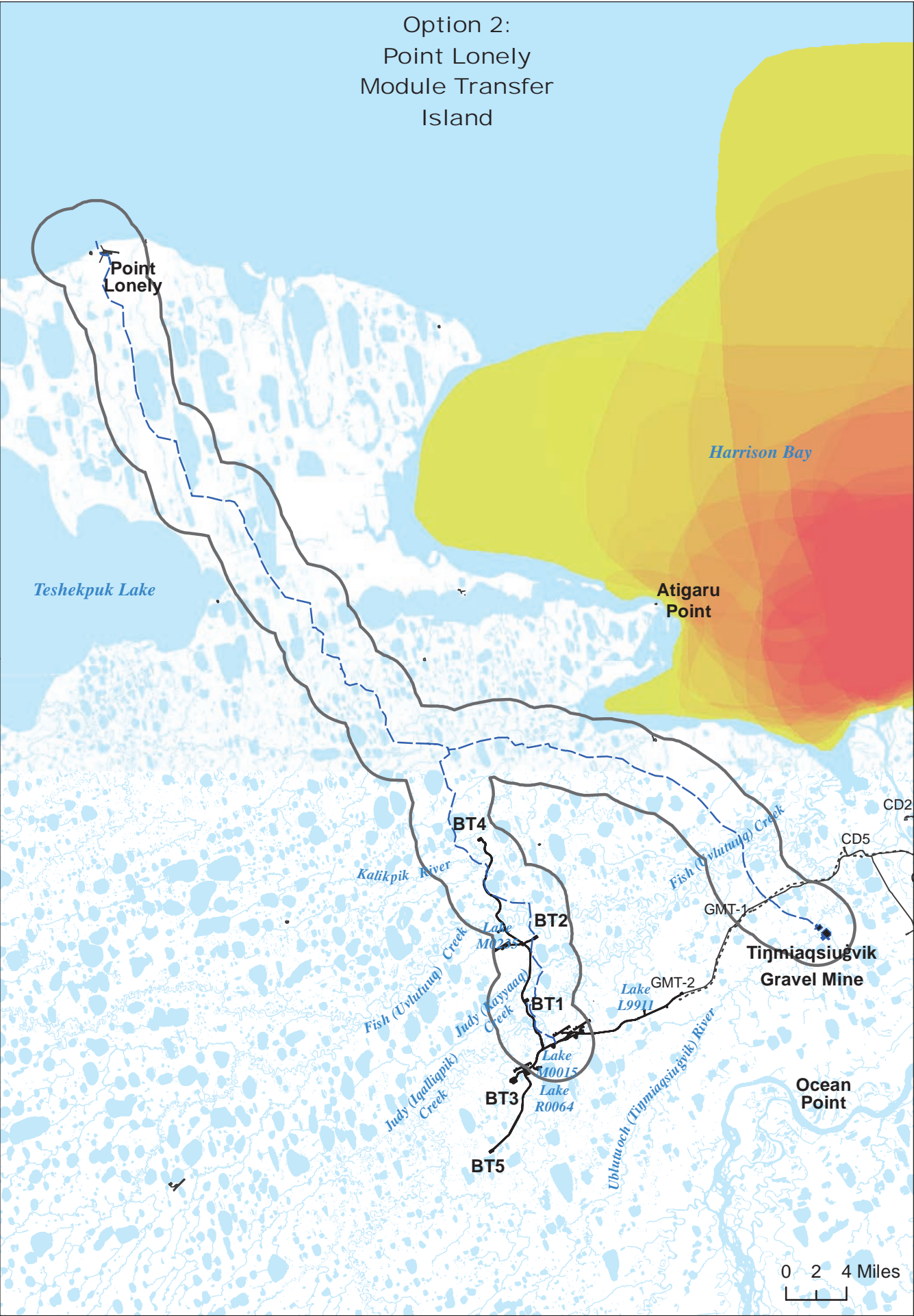
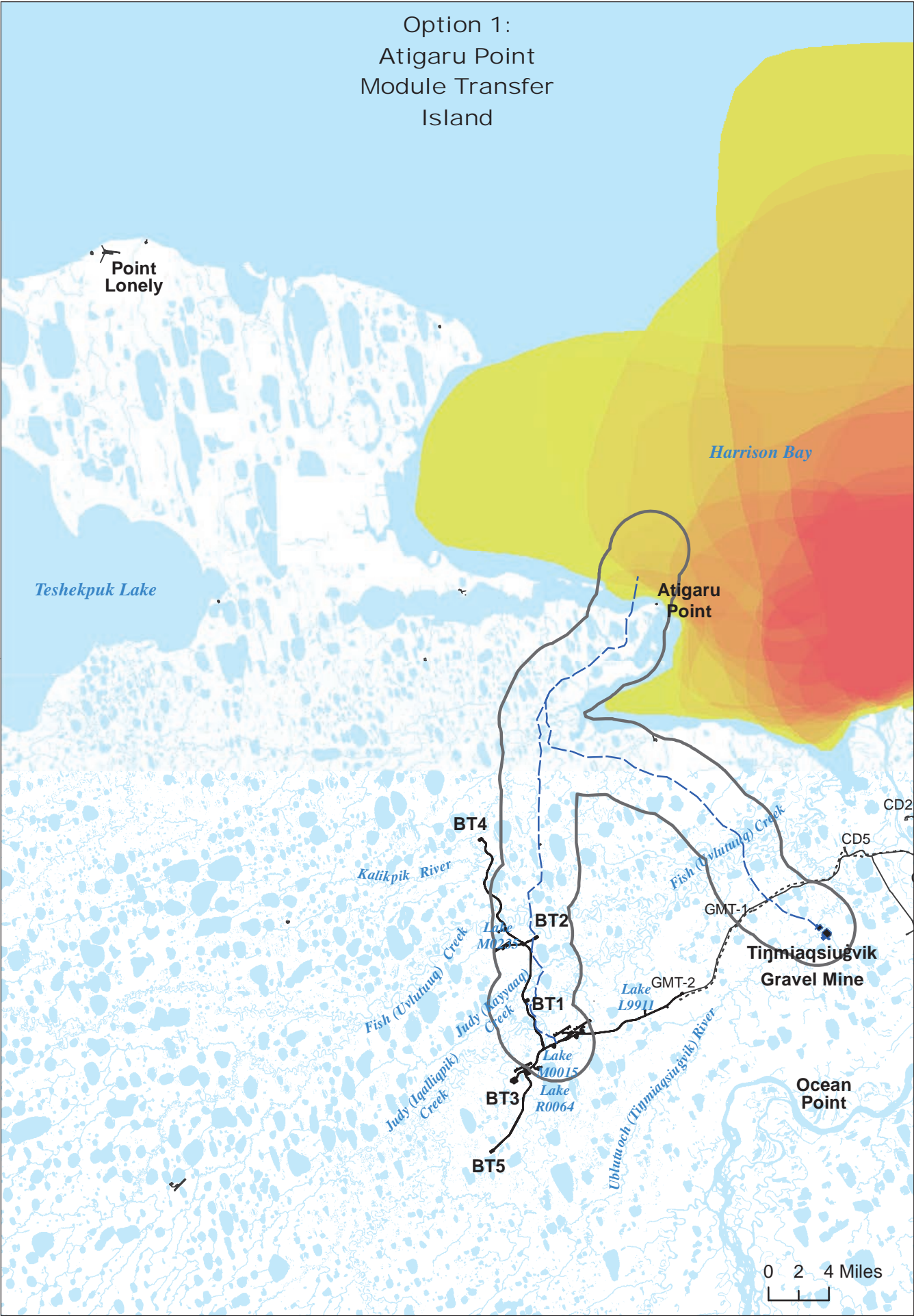
Existing Road
Existing Pipeline
Existing Infrastructure

Map prepared by
Stephen R. Braund & Associates

Source
a. SRB&A 2010b

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Figure 3.16.20



Subsistence Data

High Overlapping Subsistence Use Areas Bearded and Ringed Seal, 1995-2006^a

Low

Willow Proposed Development Features

Module Transport Analysis Area

Ice Road

Ice Pad

Gravel Footprint

Other Infrastructure

Existing Road

Existing Pipeline

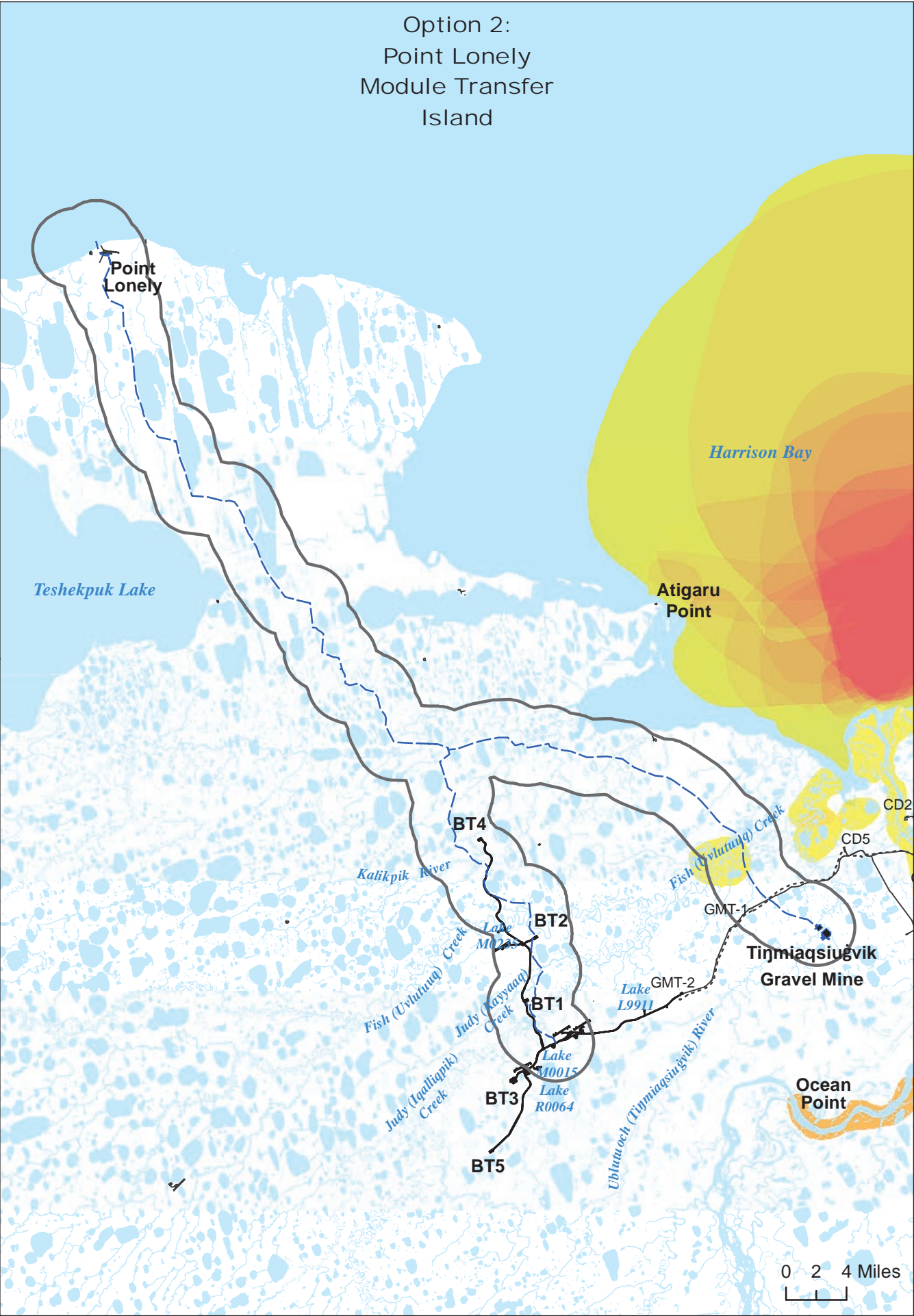
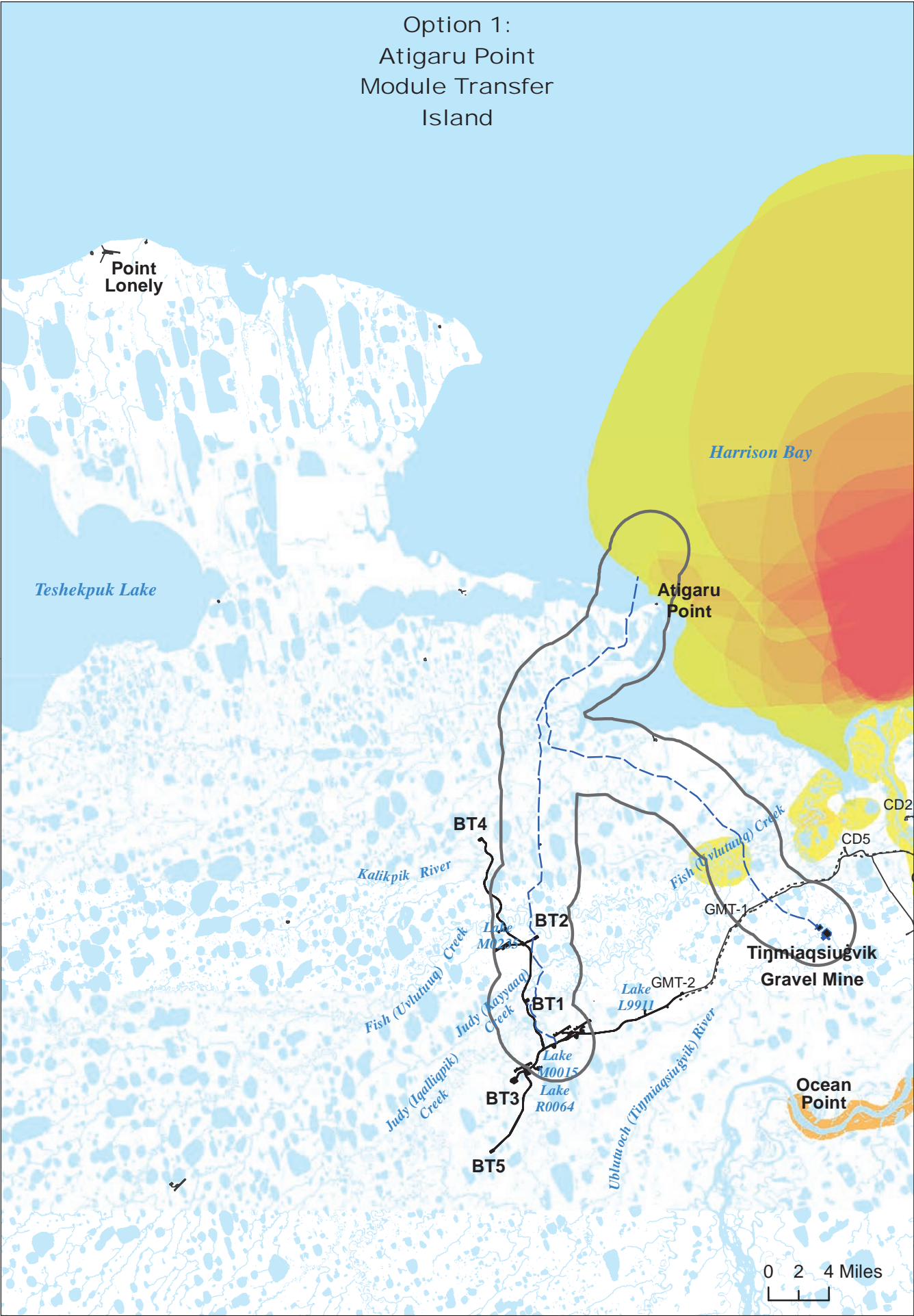
Existing Infrastructure

Map prepared by
Stephen R. Braund & Associates

Source
a. SRB&A 2010b

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Figure 3.16.21



Subsistence Data

High Overlapping Subsistence Use Areas Eider, 1995-2006^a

Low

Willow Proposed Development Features

Module Transport Analysis Area

Ice Road

Ice Pad

Gravel Footprint

Other Infrastructure

Existing Road

Existing Pipeline

Existing Infrastructure

Map prepared by
Stephen R. Braund & Associates

Source
a. Source: SRB&A 2010b

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Figure 3.16.22



Subsistence Data

Fish, 1995-2006 ^a

Willow Proposed Development Features

Module Transport Analysis Area

Ice Road

Ice Pad

Gravel Footprint

Other Infrastructure

Existing Road

Existing Pipeline

Existing Infrastructure

Map prepared by
Stephen R. Braund & Associates

Source
a. SRB&A 2010b

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Figure 3.16.23



Subsistence Data

High Overlapping Subsistence Use Areas Moose, 1995-2006^a

Low

Willow Proposed Development Features

Module Transport Analysis Area

Ice Road

Ice Pad

Gravel Footprint

Other Infrastructure

Existing Road

Existing Pipeline

Existing Infrastructure

Map prepared by
Stephen R. Braund & Associates

Source
a. SRB&A 2010b

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Figure 3.16.24



Subsistence Data

- High Overlapping Subsistence Use Areas All Resources, 1997-2006^a
- Low

Willow Proposed Development Features

- Module Transport Analysis Area
- Ice Road
- Ice Pad
- Gravel Footprint

Other Infrastructure

- Existing Road
- Existing Pipeline
- Existing Infrastructure

Map prepared by
Stephen R. Braund & Associates

Source
a. SRB&A 2010b

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Figure 3.16.25



Subsistence Data

High Overlapping Subsistence Use Areas Caribou, 1997-2006^a

Low

Willow Proposed Development Features

Module Transport Analysis Area

Ice Road

Ice Pad

Gravel Footprint

Other Infrastructure

Existing Road

Existing Pipeline

Existing Infrastructure

Map prepared by
Stephen R. Braund & Associates

Source
a. SRB&A 2010b

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Figure 3.16.26



Subsistence Data

High Overlapping Subsistence Use Areas Wolf and Wolverine, 1997-2006^a

Low

Willow Proposed Development Features

Module Transport Analysis Area

Ice Road

Ice Pad

Gravel Footprint

Other Infrastructure

Existing Road

Existing Pipeline

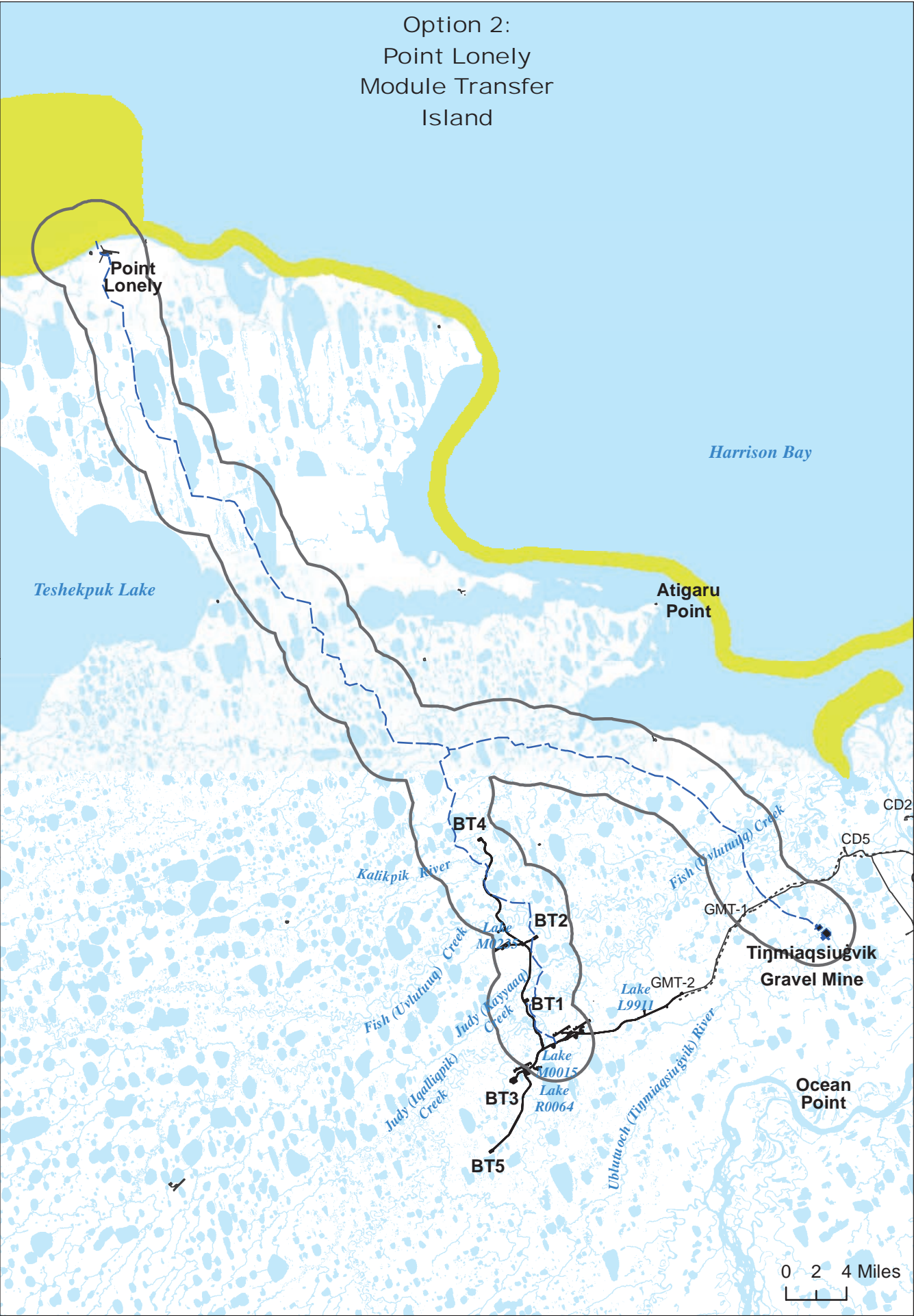
Existing Infrastructure

Map prepared by
Stephen R. Braund & Associates

Source
a. SRB&A 2010b

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Figure 3.16.27



Subsistence Data

High Overlapping Subsistence Use Areas Bearded and Ringed Seal, 1997-2006^a

Low

Willow Proposed Development Features

Module Transport Analysis Area

Ice Road

Ice Pad

Gravel Footprint

Other Infrastructure

Existing Road

Existing Pipeline

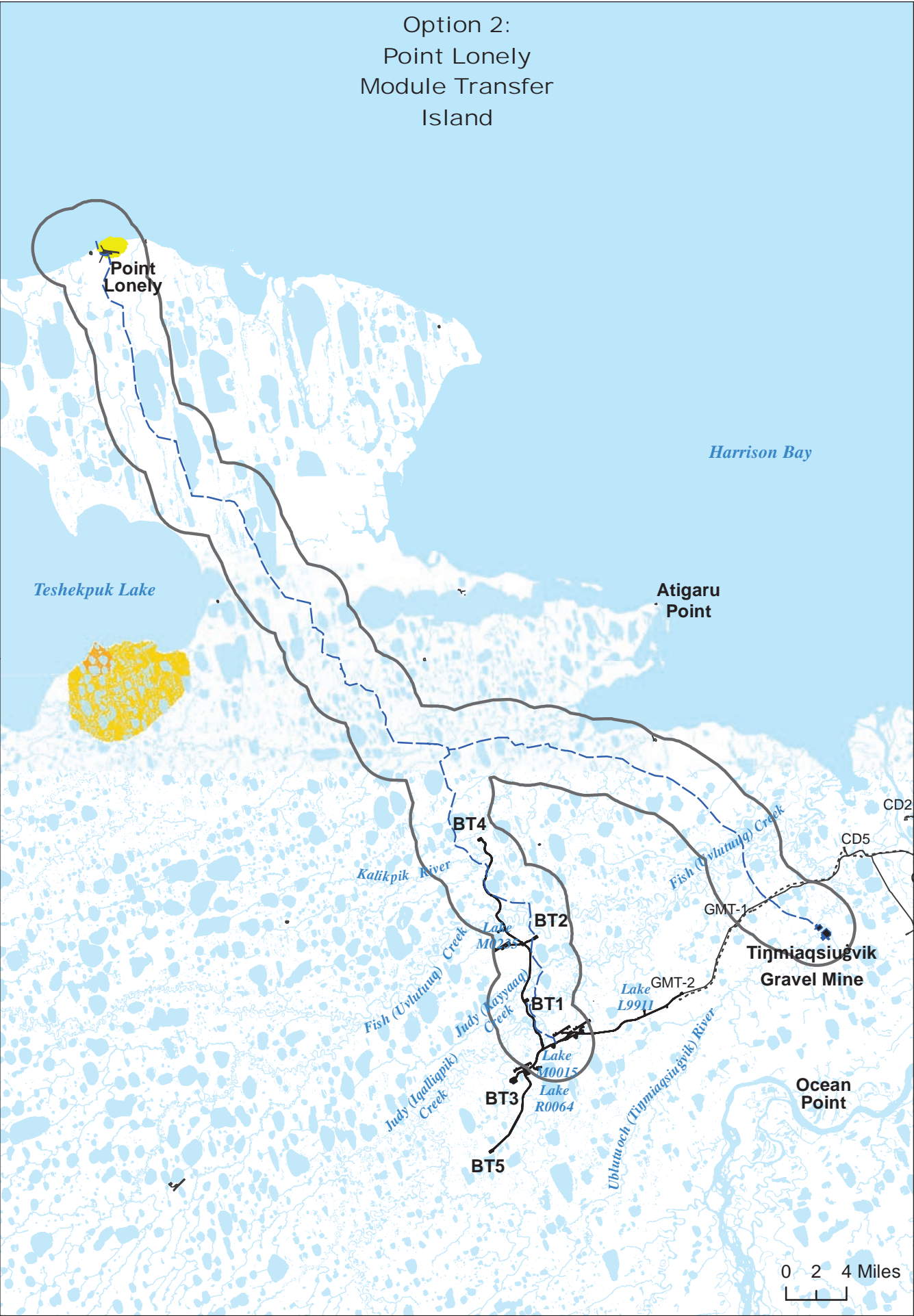
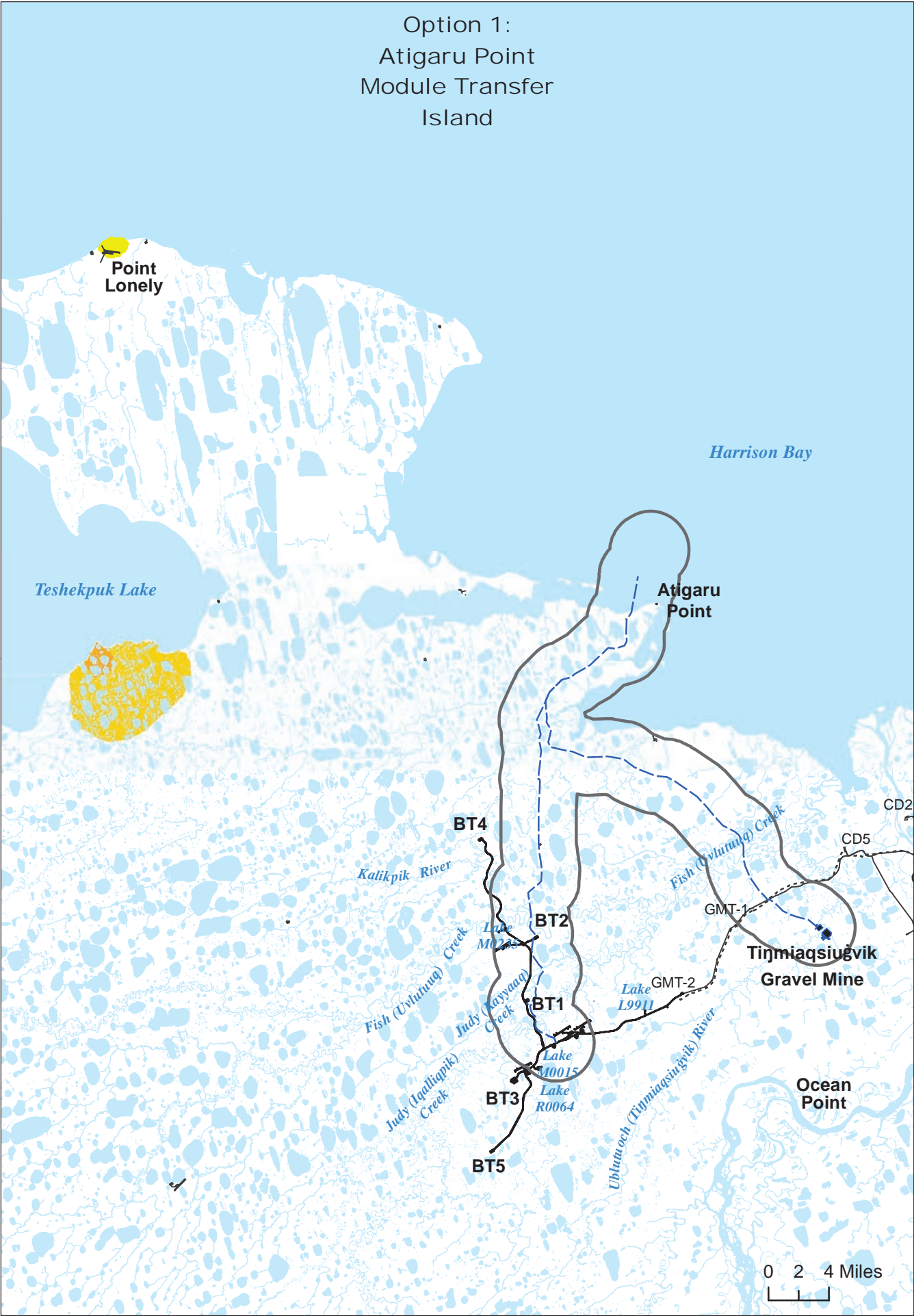
Existing Infrastructure

Map prepared by
Stephen R. Braund & Associates

Source
a. SRB&A 2010b

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Figure 3.16.28



Subsistence Data

High

Low

Overlapping Subsistence Use Areas Geese, 1997-2006^a

Willow Proposed Development Features

Module Transport Analysis Area
Ice Road
Ice Pad
Gravel Footprint

Other Infrastructure

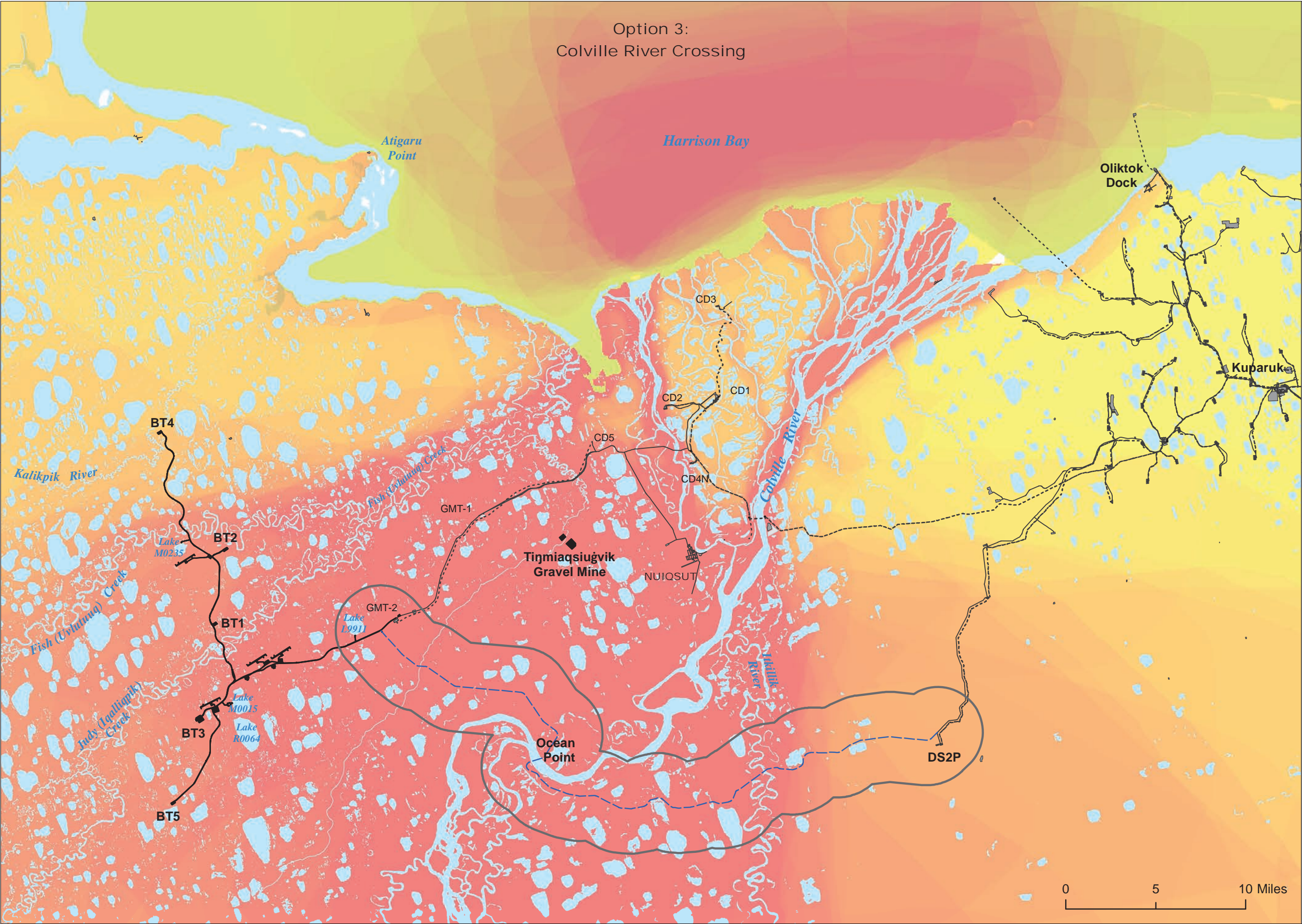
Existing Road
Existing Pipeline
Existing Infrastructure

Map prepared by
Stephen R. Braund & Associates

Source
a. SRB&A 2010b

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Figure 3.16.29



Subsistence Data

- High Overlapping Subsistence Use Areas
- Low All Resources, 1995-2006 ^a

Willow Proposed Development Features

- Module Transport Analysis Area
- Ice Road
- Ice Pad
- Gravel Footprint

Other Infrastructure

- Existing Road
- Existing Pipeline
- Existing Infrastructure

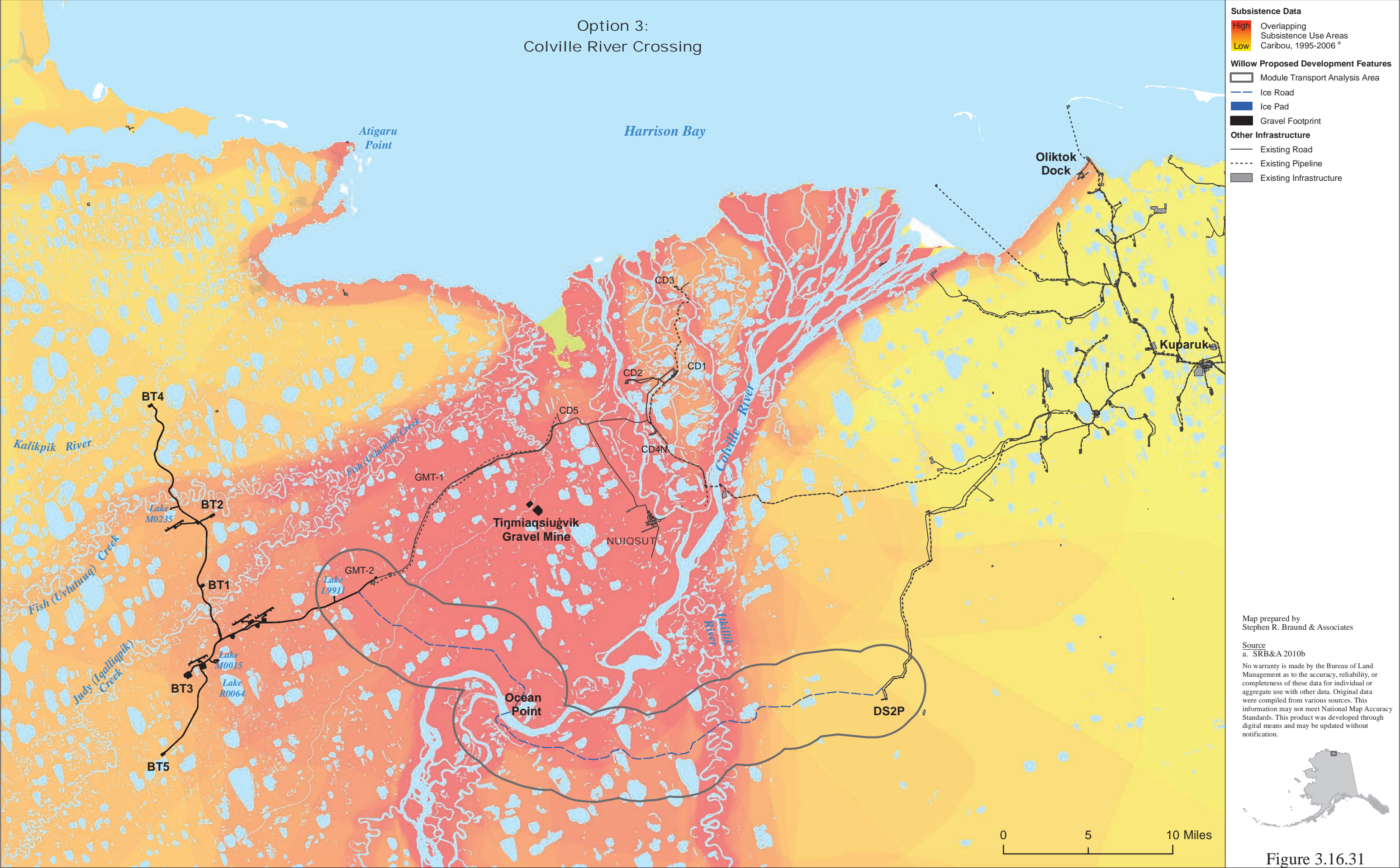
Map prepared by
Stephen R. Braund & Associates

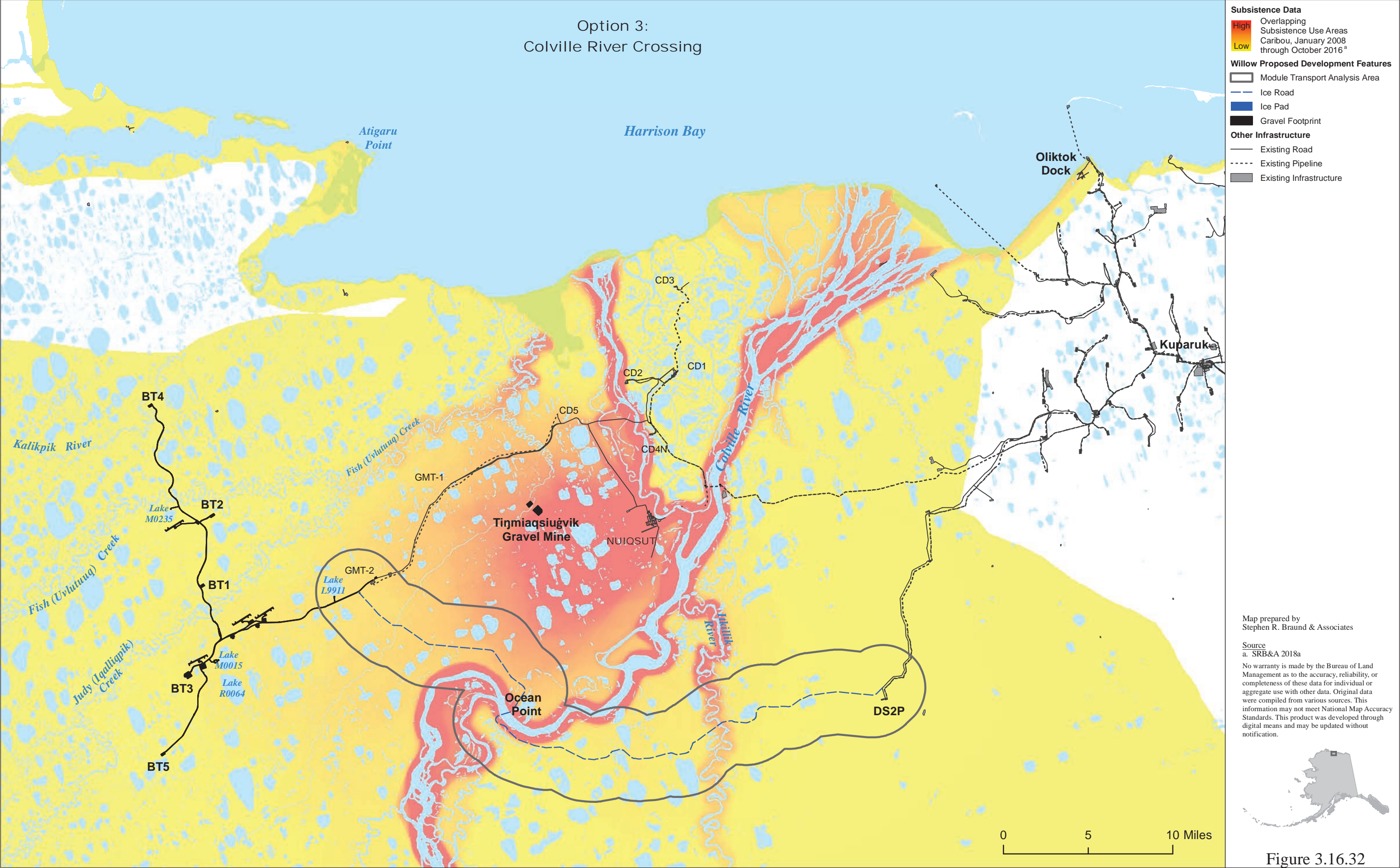
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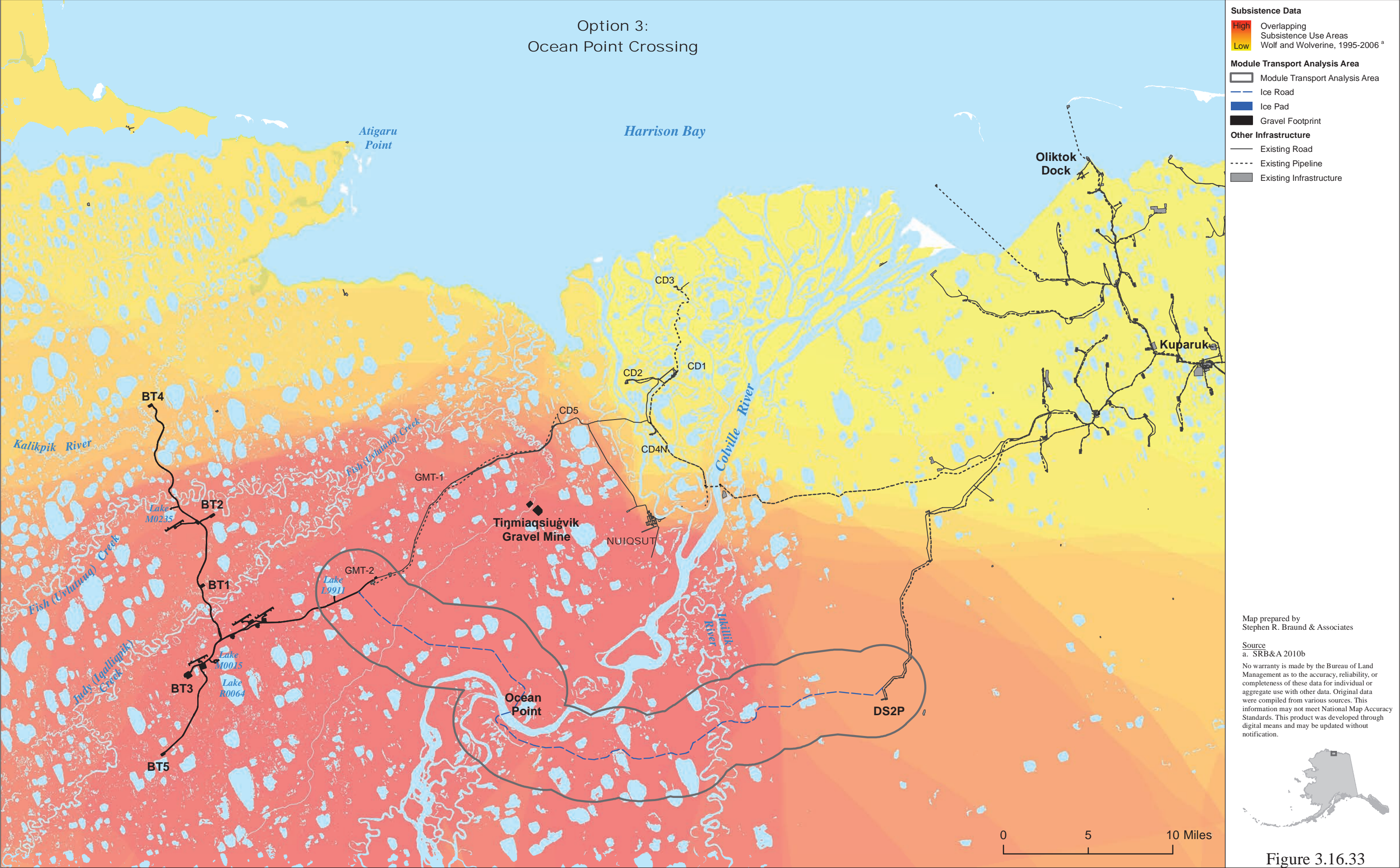
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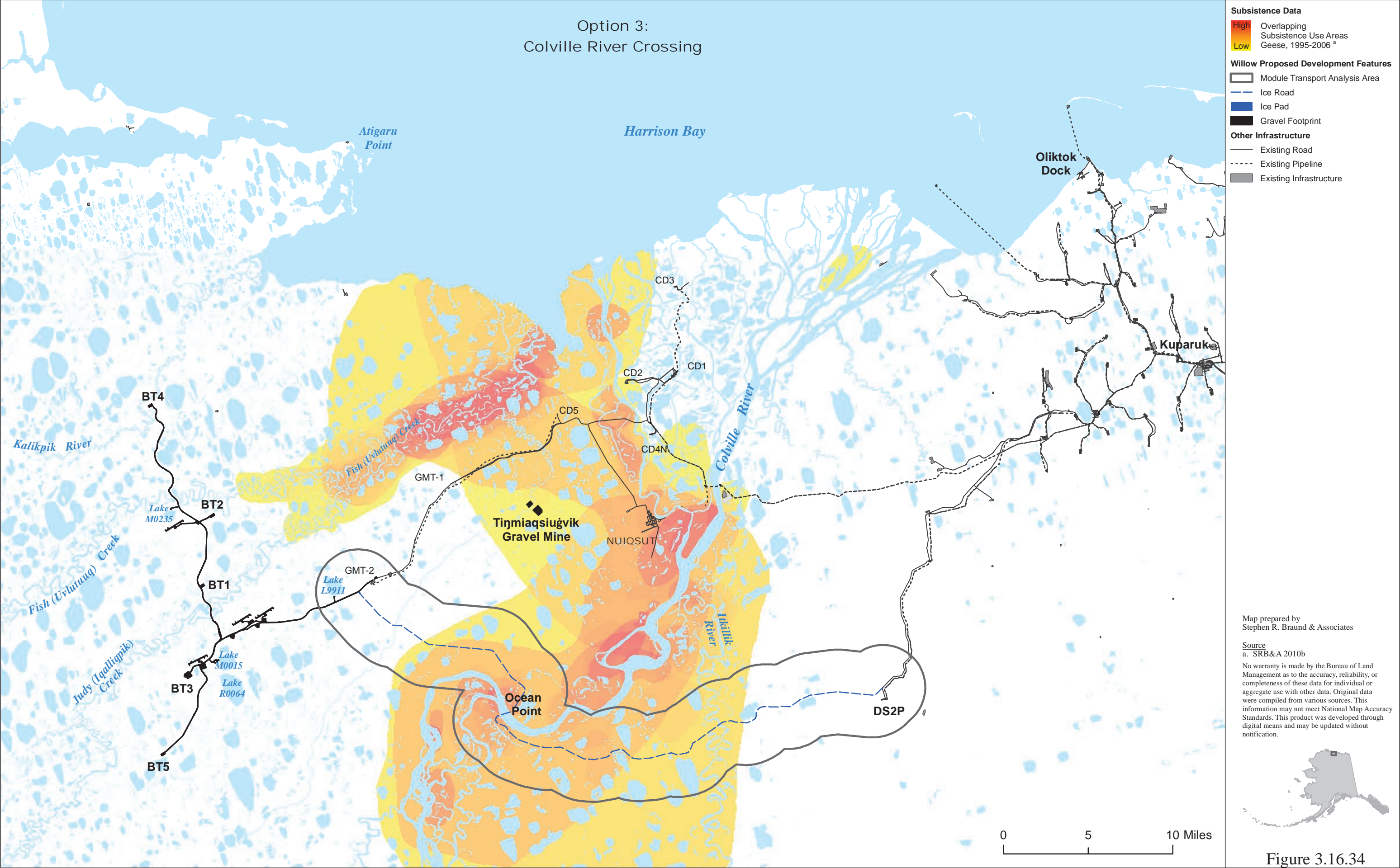


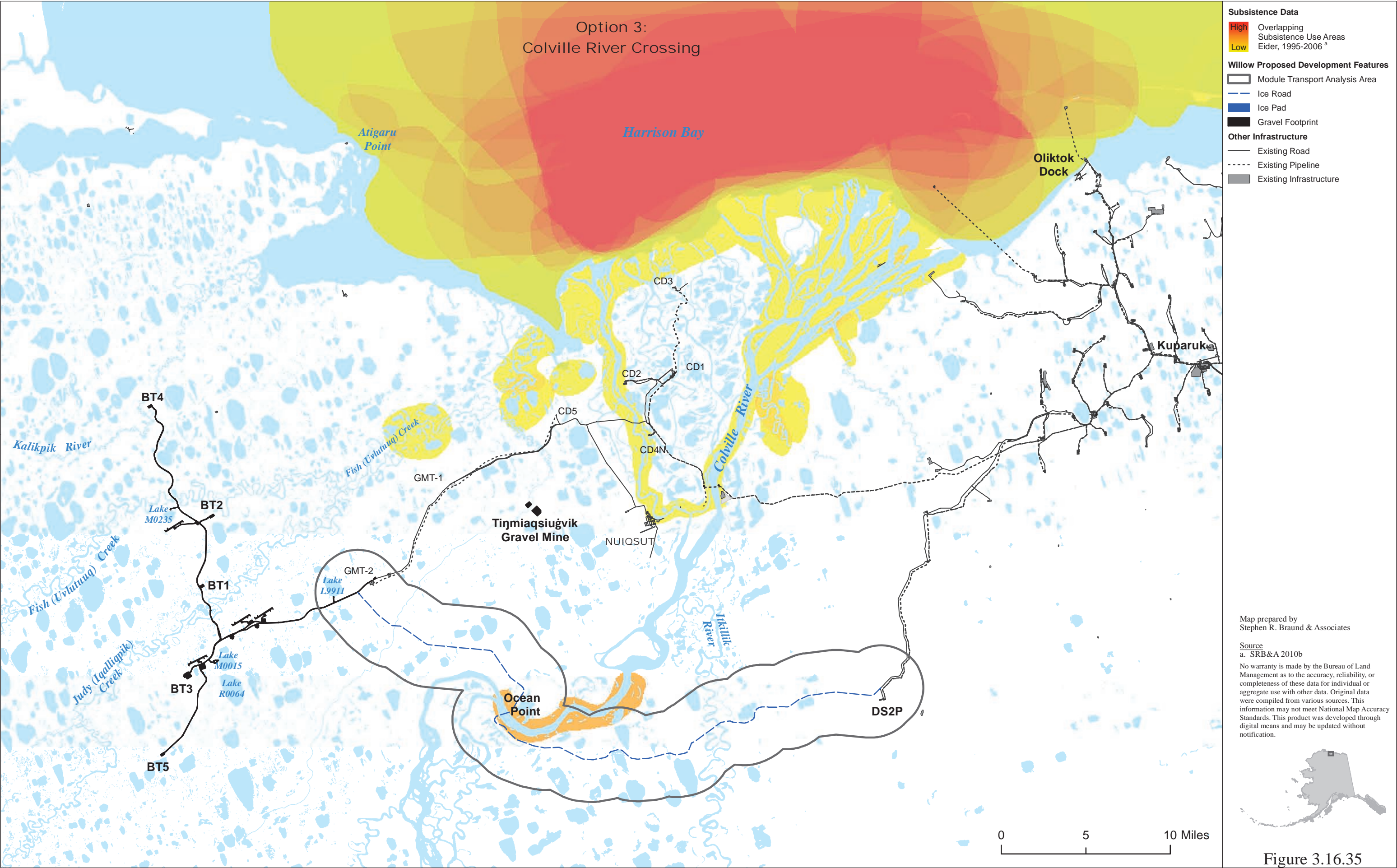
Figure 3.16.30













Subsistence Data

- Fish, 1995-2006 ^a

Willow Proposed Development Features

- Module Transport Analysis Area
- Ice Road
- Ice Pad
- Gravel Footprint

Other Infrastructure

- Existing Road
- Existing Pipeline
- Existing Infrastructure

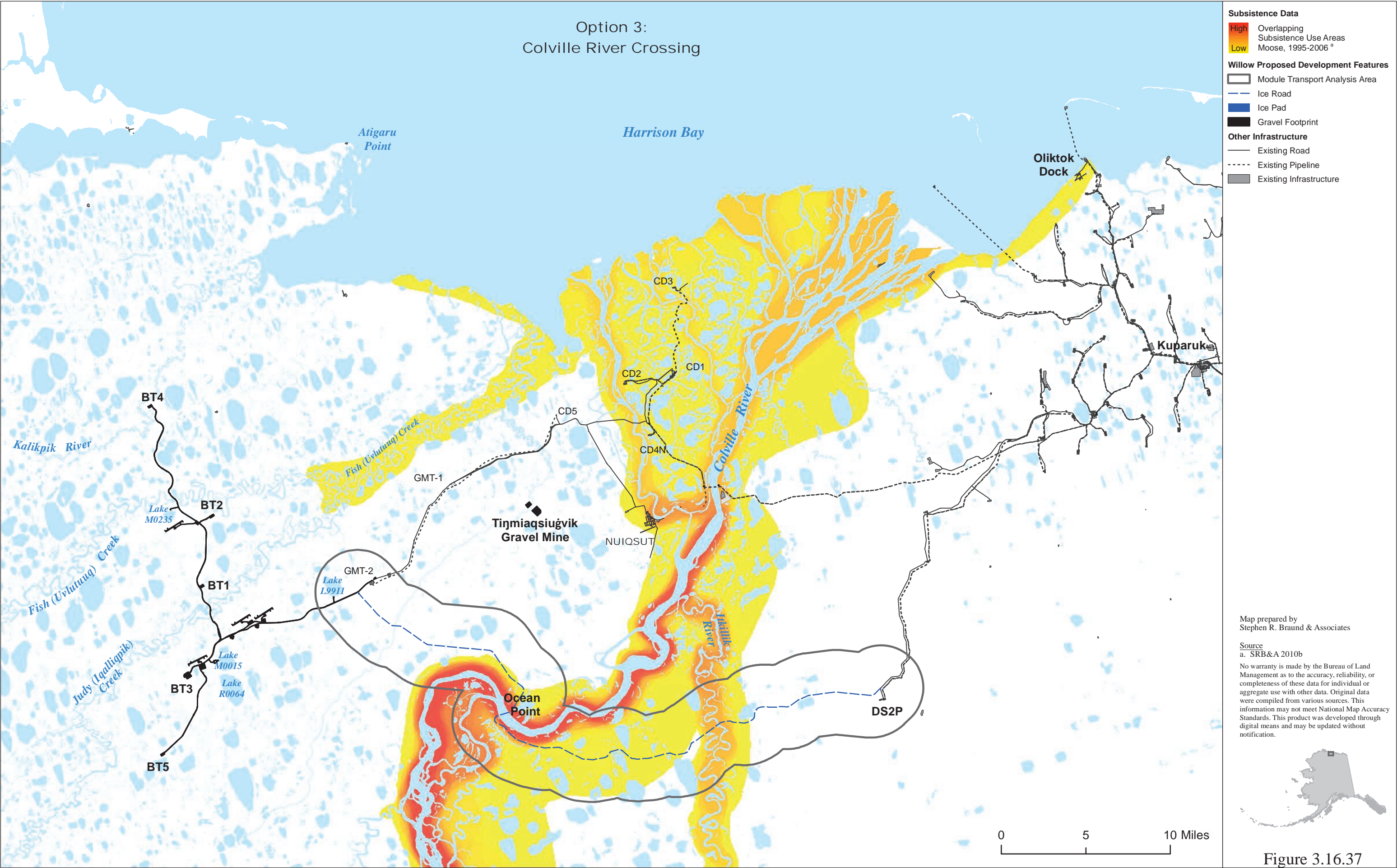
Map prepared by
Stephen R. Braund & Associates

Source
a. SRB&A 2010b

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Figure 3.16.36



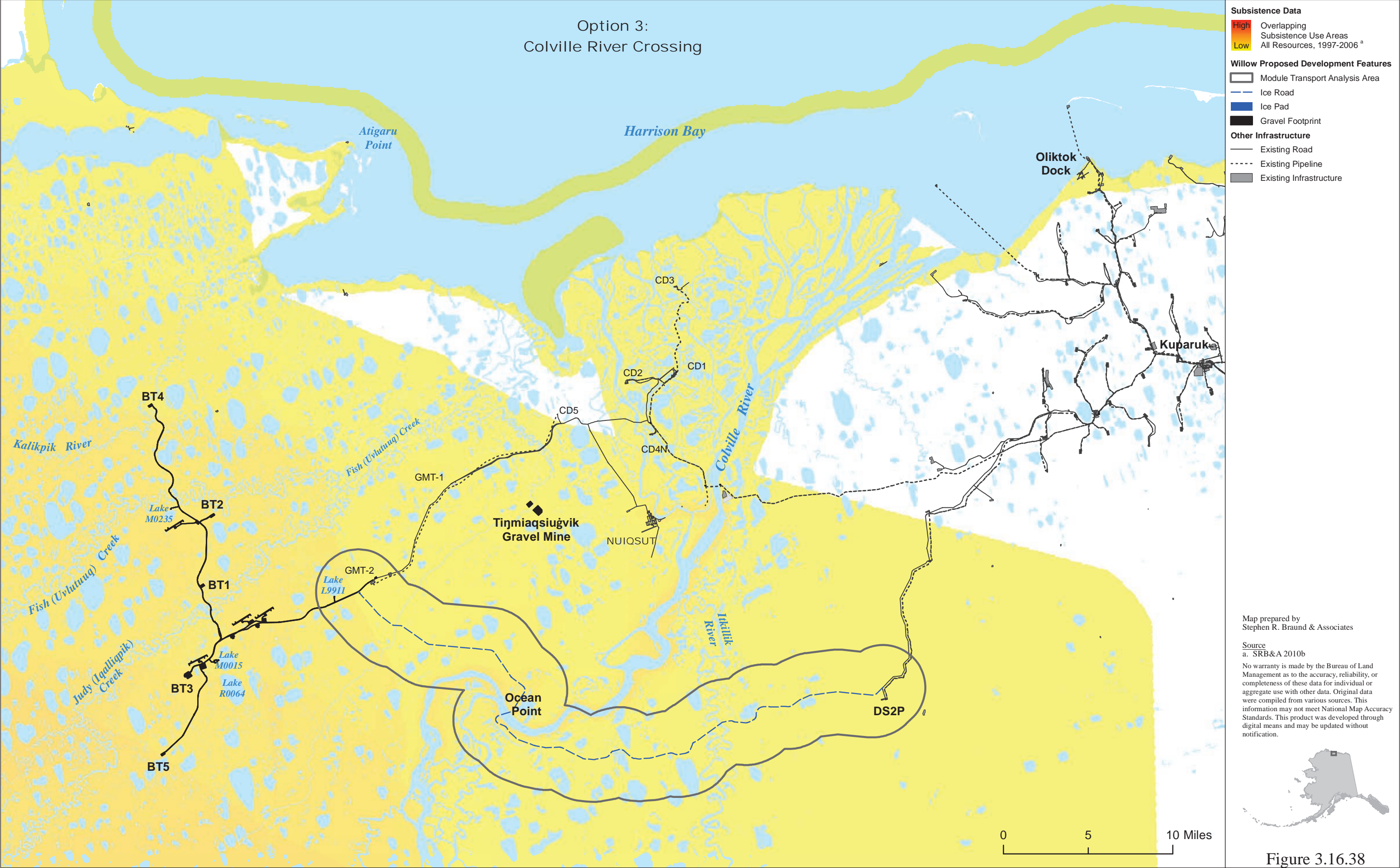


Figure 3.16.38



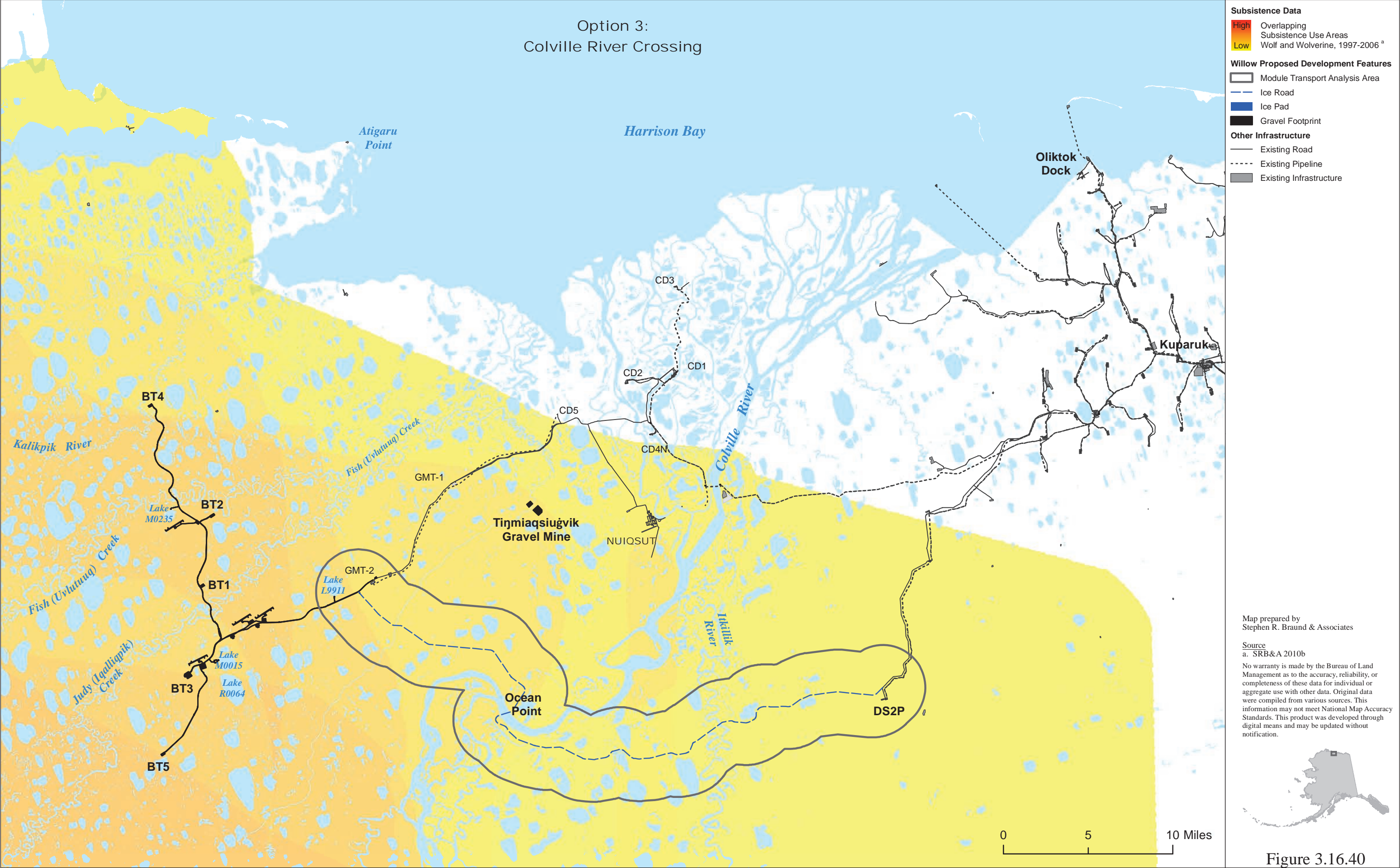
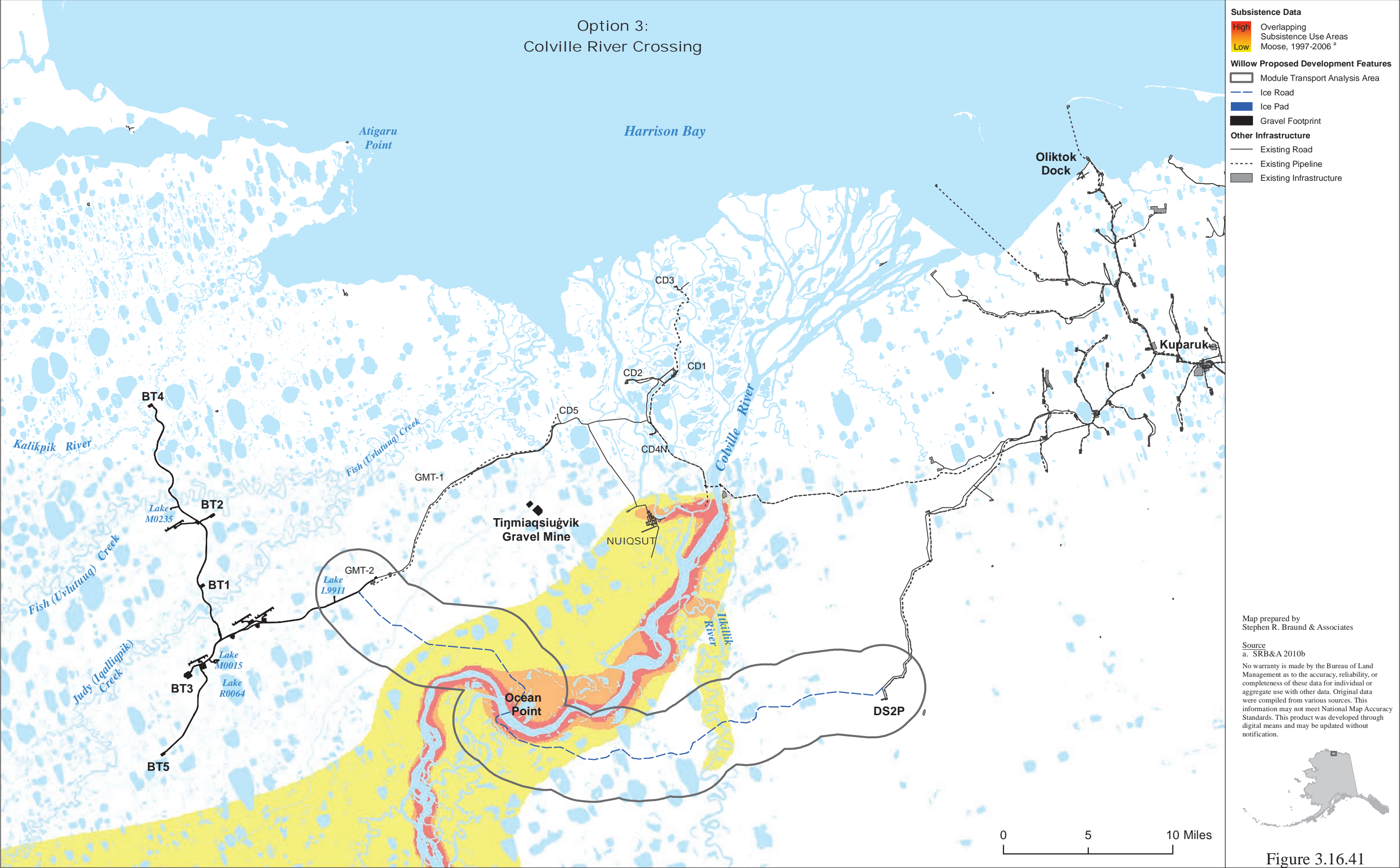
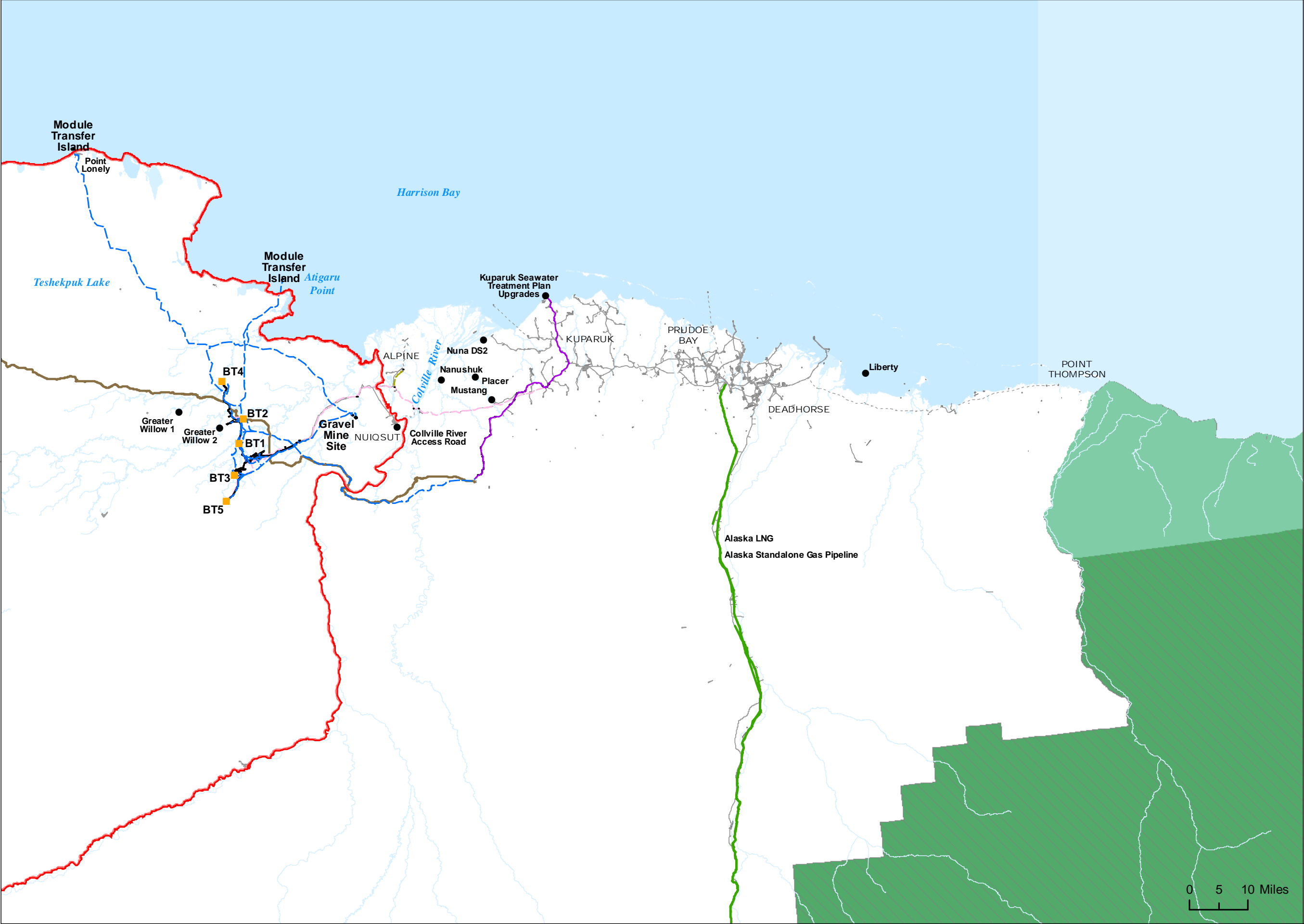


Figure 3.16.40





Reasonably Foreseeable Future Action

- Projects
- Linear Projects

Willow Proposed Development Features

- Drill Site (Not to Scale)
- Option 3 Existing Road
- New Pipeline Existing VSM
- New Pipeline New VSM
- Gravel Footprint

Other Infrastructure

- Existing Road
- - - Existing Pipeline
- Community Winter Access Trail
- Existing Infrastructure

Land Designation

- National Petroleum Reserve in Alaska
- Arctic National Wildlife Refuge
- 1002 Area Coastal Plain
- Arctic National Wildlife Refuge

Projects Not Shown:
Miscellaneous Seismic Exploration
Arctic Strategic Transportation and Resources (ASTAR)
NPR-A Integrated Activity Plan Revisions

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Figure 3.19.1

