



# FINAL

## SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT for the Alpine Satellite Development Plan for the Proposed Greater Mooses Tooth One Development Project

### Volume 2: Chapter 7 Maps

October 2014

Alaska



#### Cooperating Agencies:

U.S. Bureau of Ocean Energy Management • U.S. Environmental Protection Agency • U.S. Fish and Wildlife Service  
U.S. Army Corps of Engineers, Alaska District • State of Alaska • North Slope Borough • Native Village of Nuiqsut

# The Bureau of Land Management Today

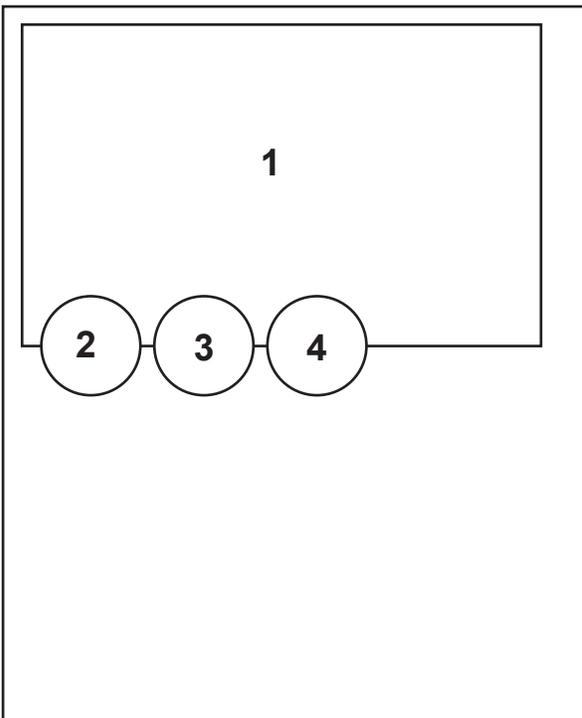
## *Our Vision*

To enhance the quality of life for all citizens through the balanced stewardship of America's public lands and resources.

## *Our Mission*

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

**DOI-BLM-AK-0000-2013-0001-EIS  
BLM/AK/PL-15/002+5101+AK9300**



## **Cover Photos:**

1. Aerial of Blackfish Creek downstream from GMT1 Drilling pad, National Petroleum Reserve in Alaska.
2. Caribou, North Slope, Alaska
3. Ice road construction, National Petroleum Reserve in Alaska.
4. Aerial of production pad, North Slope, Alaska.  
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# Alpine Satellite Development Plan GMT1 Development Project

**Final**

Supplemental Environmental  
Impact Statement

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## **Volume 2: Chapter 7 Maps**

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. DOI Fish and Wildlife Service  
U.S. DOI Bureau of Ocean Energy Management  
State of Alaska  
Native Village of Nuiqsut  
North Slope Borough

October 2014



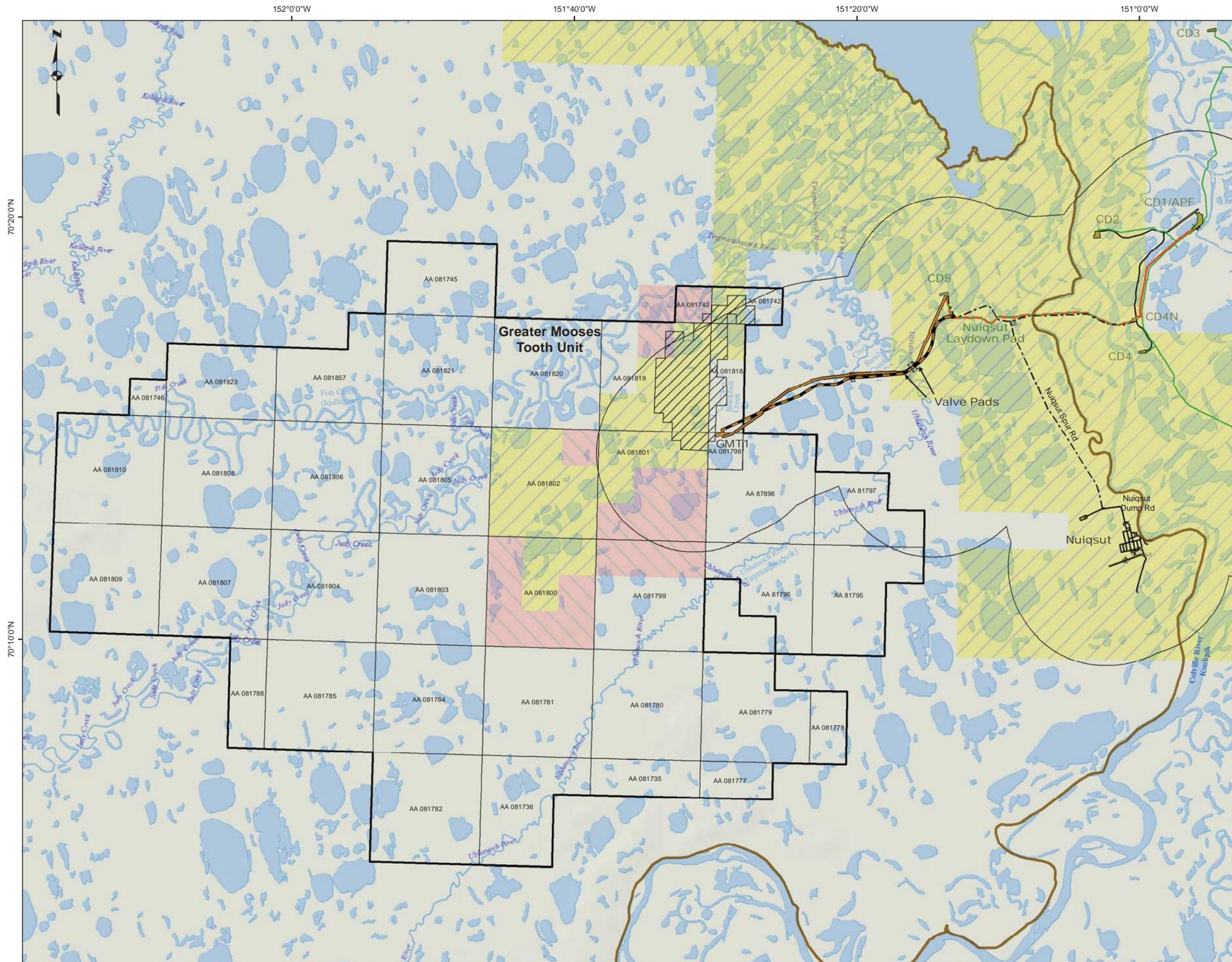
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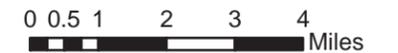


Map 1.1-1  
**Greater Mooses Tooth and  
 CPAI Proposed Project**

- |  |   |
|--|---|
| <b>DSEIS<br/>Proposed<br/>Infrastructure</b> | <b>Proposed or Permitted<br/>(not part of GMT1)</b> |
| Road   | Pipeline  |
| Pipeline                                     | Road  |
| Facility                                     | Facility  |
| 14 inch Water <sup>1</sup><br>Injection Line | Existing<br>Pipeline                                |
| Bridge                                       | Existing<br>Road                                    |
| Bridge                                       | Existing<br>Facility                                |
| <b>Boundary</b>                              | <b>Surface Land<br/>Ownership</b>                   |
| Lookout PA                                   | Conveyed  |
| Project Study<br>Area                        | Selected  |
| Unit Boundary                                |   |
| Lease Tracts                                 |   |
| NPR-A  |   |

Footnote:  
 1: 14 inch Water Injection line from CD1/APF to CD4N will be constructed on a new pipe rack. From CD4N to CD5 the 14-inch Water Injection line will be placed on the already proposed or permitted pipe rack (not part of GMT1).  
 2: Background layer is from Delorme World Imagery 2013

Date: 10/20/2014



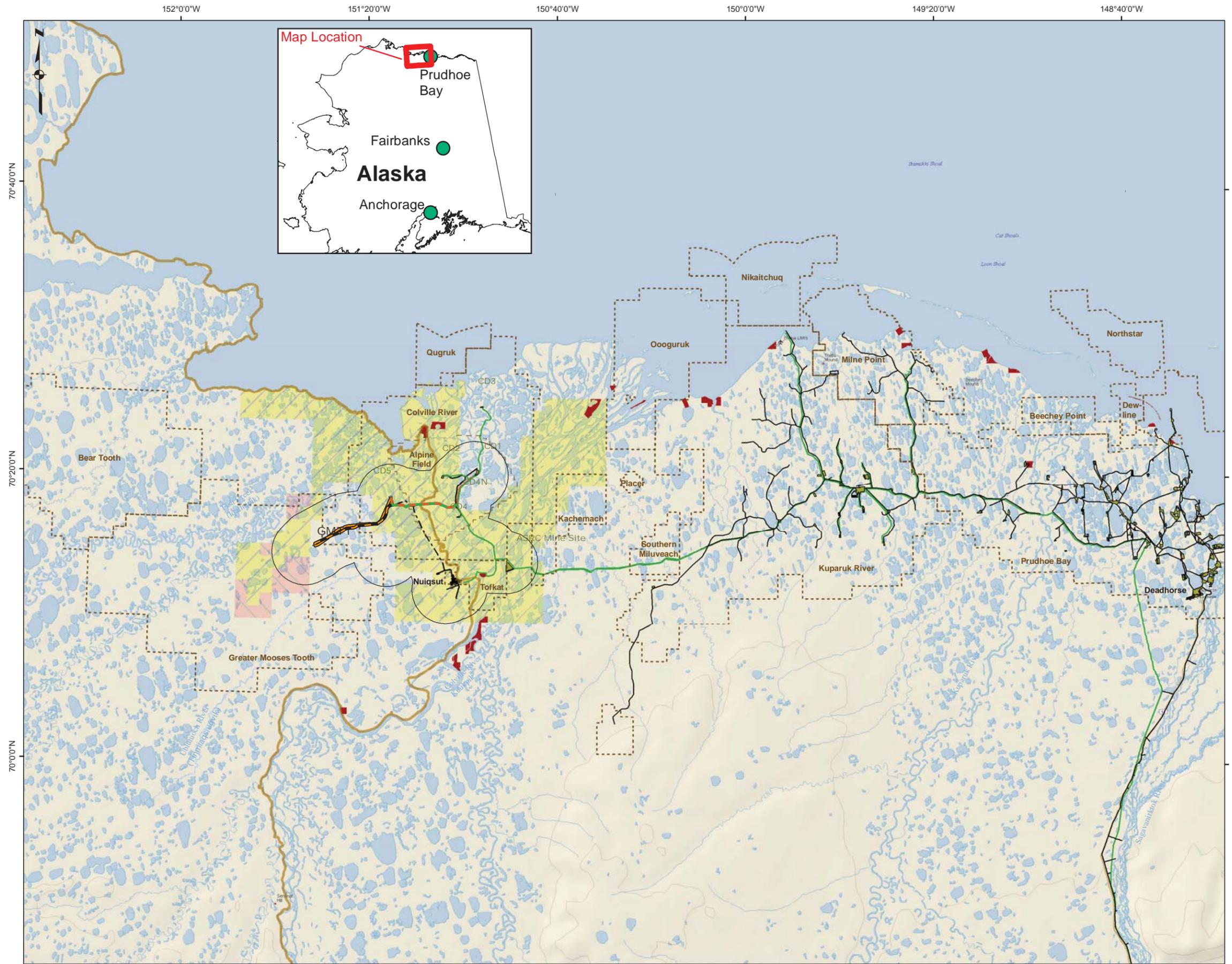
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**Map 2.5-1**  
**GMT1 Project Vicinity**

- |   |   |
|---|---|
| <b>DSEIS Proposed Infrastructure</b>      | <b>Proposed or Permitted (not part of GMT1)</b> |
| Road                                      | Pipeline  |
| Pipeline                                  | Road  |
| Facility                                  | Facility  |
| 14 inch Water <sup>1</sup> Injection Line | Existing Pipeline                               |
| Bridge                                    | Existing Road                                   |
| <b>Boundary</b>                           | Facility  |
| Project Study Area                        | <b>Surface Land Ownership</b>                   |
| Oil & Gas Unit                            | Kuukpik Lands                                   |
| NPR-A                                     | Conveyed  |
|   | Selected  |
|   | <b>Native Allotments</b>                        |
|   | Private   |

Footnote:  
 1: 14 inch Water Injection line from CD1/APF to CD4N will be constructed on a new pipe rack. From CD4N to CD5 the 14-inch Water Injection line will be placed on the already proposed or permitted pipe rack (not part of GMT1).  
 2: Background layer is from Delorme World Imagery 2013.  
 Date: 10/20/2014

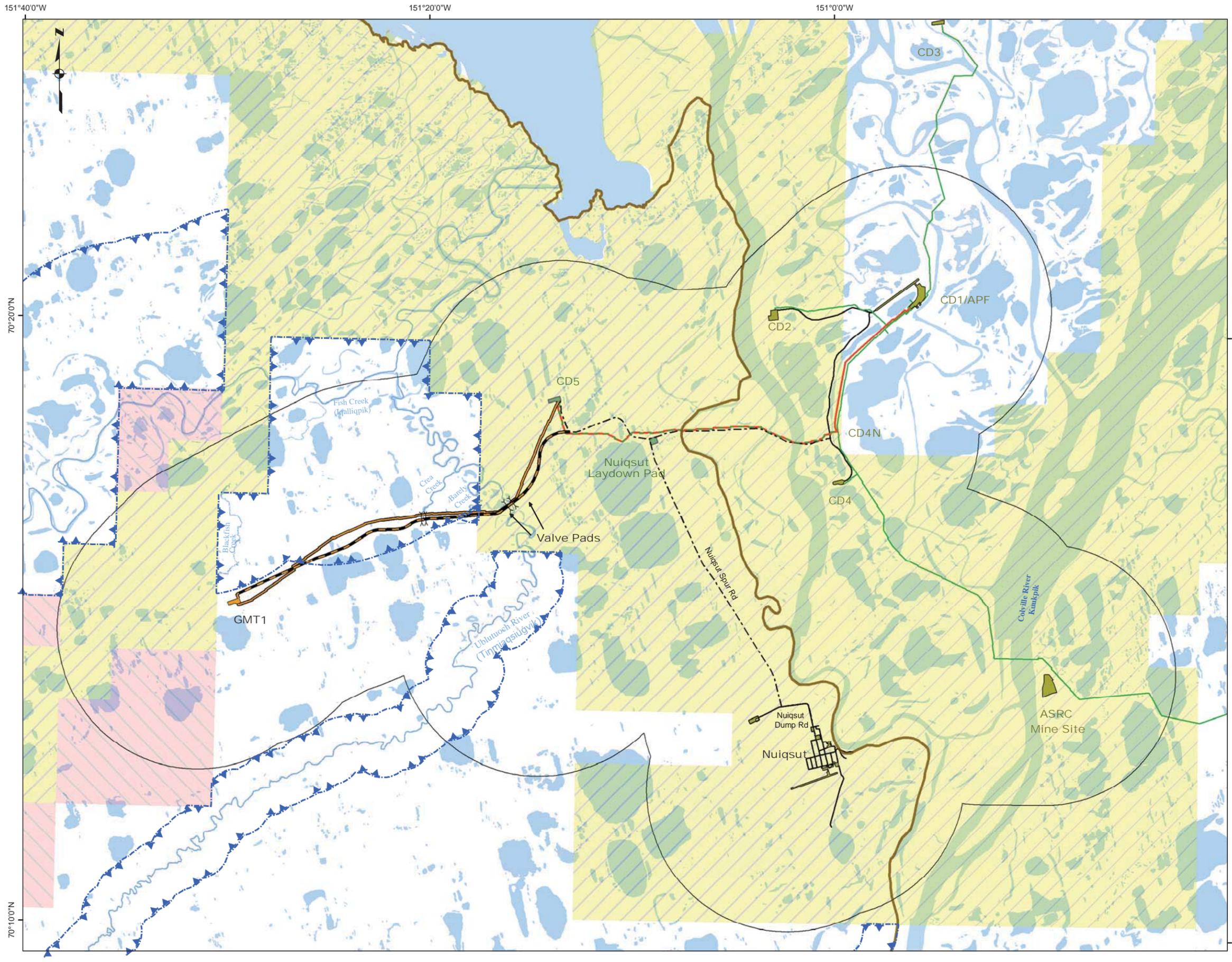


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Map 2.5-2  
Alternative A: CPAI  
Proposed Project Layout

- |   |   |
|---|---|
| <b>Alternative A Infrastructure</b>       | <b>Proposed or Permitted (not part of GMT1)</b> |
| Road                                      | Pipeline  |
| Pipeline                                  | Road  |
| Facility                                  | Facility  |
| 14 inch Water <sup>1</sup> Injection Line | <b>Existing</b>                                 |
| Bridge                                    | Pipeline  |
| <b>Boundaries</b>                         | Road  |
| NPR-A Project Study Area                  | Facility  |
| Project Study Area                        | <b>Surface Land Ownership</b>                   |
| <b>Setback Areas</b>                      | Conveyed  |
| Fish Creek 3mi Ublutuoch River 0.5mi      | Selected  |

Footnote:  
1: 14 inch Water Injection line from CD1/APF to CD4N will be constructed on a new pipe rack. From CD4N to CD5 the 14-inch Water Injection line will be placed on the already proposed or permitted pipe rack (not part of GMT1).

Date: 9/26/2014



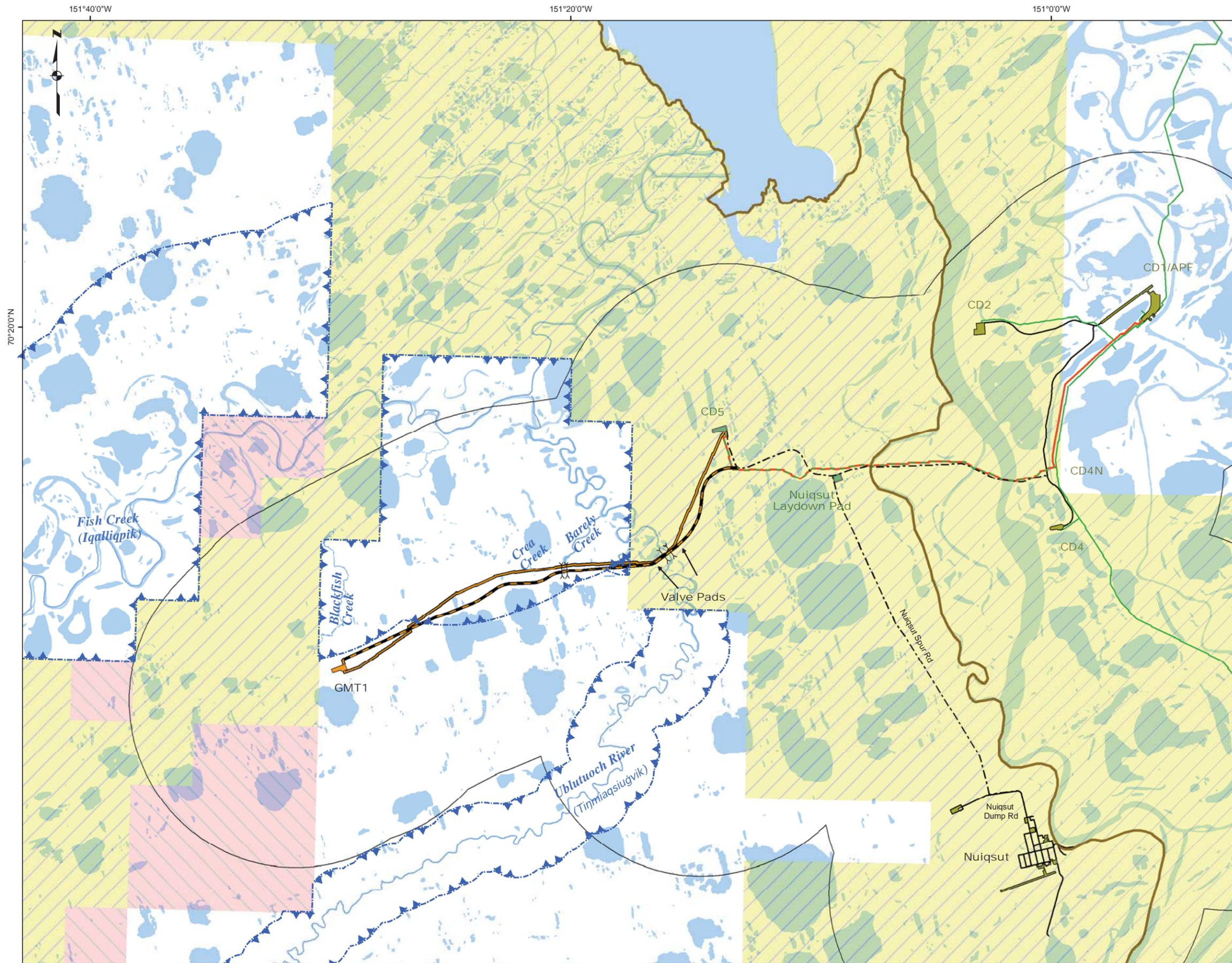
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Map 2.5-3  
**Fish Creek and Tinmiaqsigvik (Ublutuoch) River Setback Areas**

<b>Alternative A Infrastructure</b>	<b>Proposed or Permitted (not part of GMT1)</b>
Road	Pipeline
Pipeline	Road
Facility	Facility
14 inch Water <sup>1</sup> Injection Line	<b>Existing</b>
Bridge	Pipeline
	Road
	Facility
<b>Boundaries</b>	<b>Surface Land Ownership</b>
NPR-A Project Study Area	Conveyed
	Selected
<b>Setback Areas</b>	
Fish Creek 3mi Ublutuoch River 0.5mi	

Footnote:  
 1: 14 inch Water Injection line from CD1/APF to CD4N will be constructed on a new pipe rack. From CD4N to CD5 the 14-inch Water Injection line will be placed on the already proposed or permitted pipe rack (not part of GMT1).  
 2: Background layer is from Delorme World Imagery 2013

Date: 10/21/2014



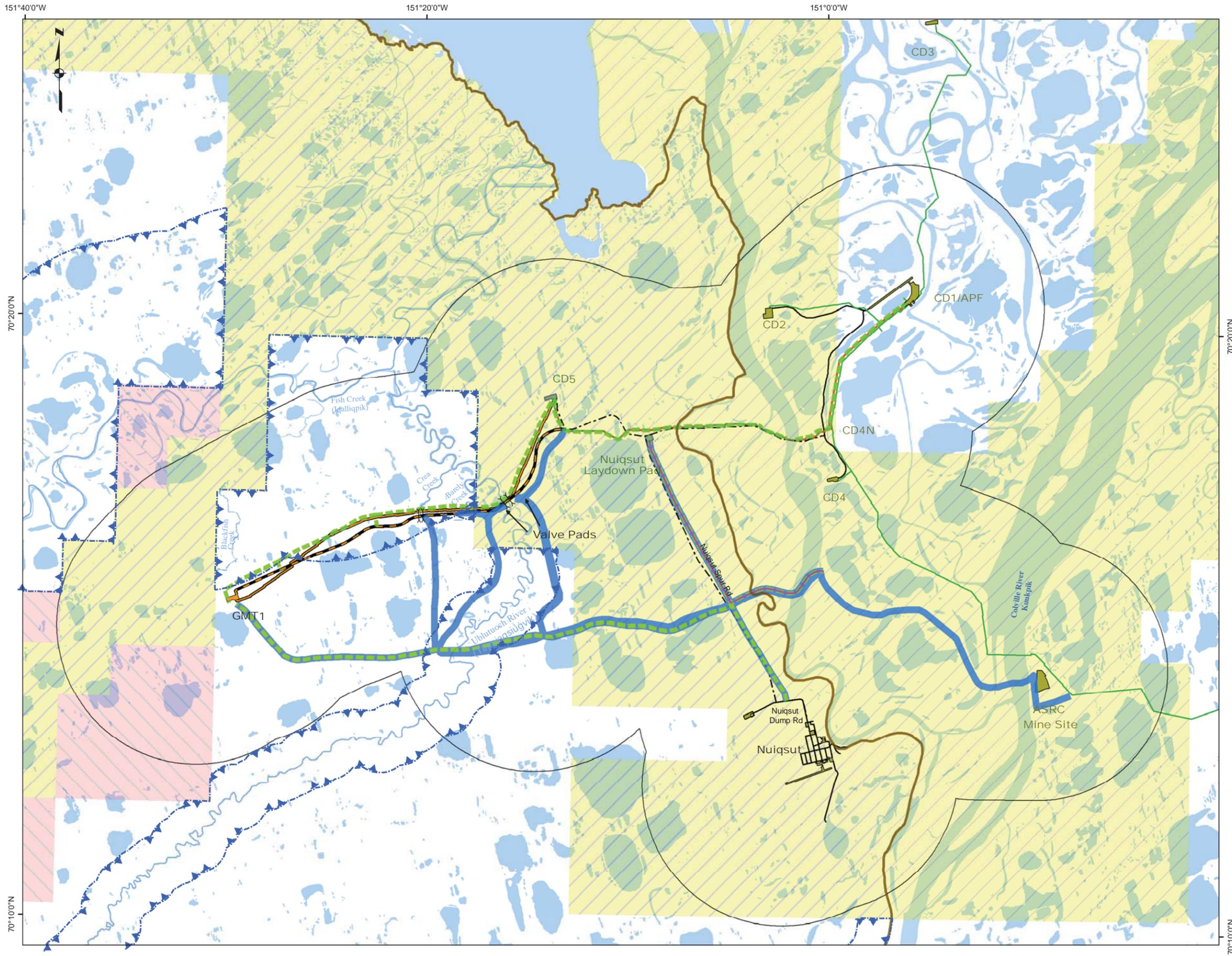
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**Map 2.5-4**  
**Alternative A:**  
**CPAI Proposed**  
**Project Ice Roads**

- |   |   |
|---|---|
| <b>Alternative A Infrastructure</b>       | <b>Proposed or Permitted (not part of GMT1)</b> |
| Road                                      | Pipeline  |
| Pipeline                                  | Road  |
| Facility                                  | Facility  |
| Facility                                  | <b>Existing</b>                                 |
| 14 inch Water <sup>1</sup> Injection Line | Pipeline  |
| 14 inch Water <sup>1</sup> Injection Line | Road  |
| Bridge                                    | Facility  |
| <b>Alternative A Ice Roads</b>            | <b>Surface Land Ownership</b>                   |
| First Year                                | Conveyed  |
| Second Year                               | Selected  |
| Annual resupply Route                     |   |

- Boundaries**
- NPR-A Project Study Area
  - GMT1

- Setback Areas**
- Fish Creek 3mi
  - Ublutuoch River 0.5mi

**Footnote:**  
 1: 14 inch Water Injection line from CD1/APF to CD4N will be constructed on a new pipe rack. From CD4N to CD5 the 14-inch Water Injection line will be placed on the already proposed or permitted pipe rack (not part of GMT1).



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Map 2.5-5

Historic Flights in the Eastern NPR-A, 2008-2013

Legend

- Aircraft Take-offs and Landings
- Village
- Analysis Area
- NPR-A

Year	Number of Flights
2008	1202
2009	1120
2010	1487
2011	1933
2012	777
2013	1758
<b>Total</b>	<b>8277</b>

Source: BLM 2013b

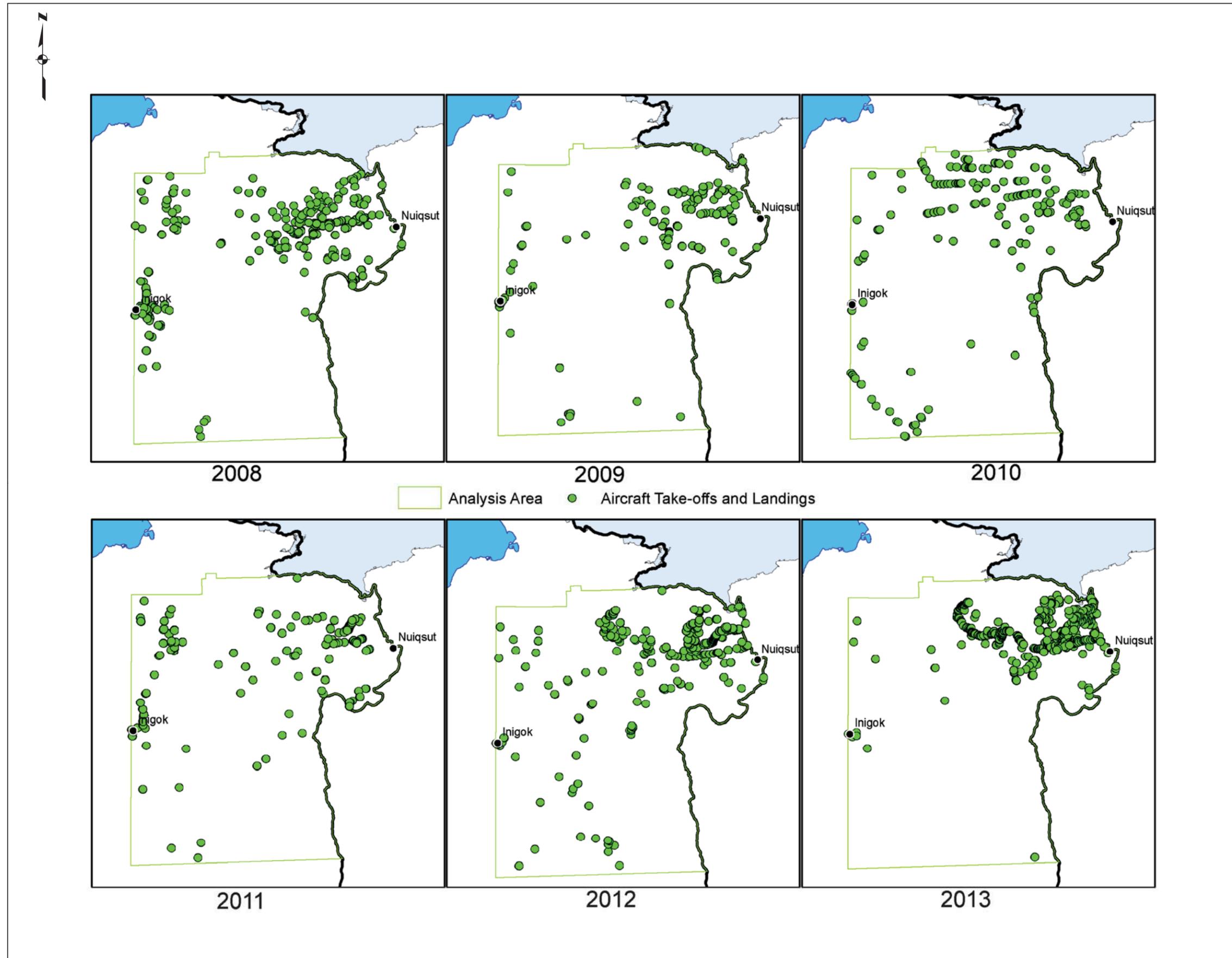
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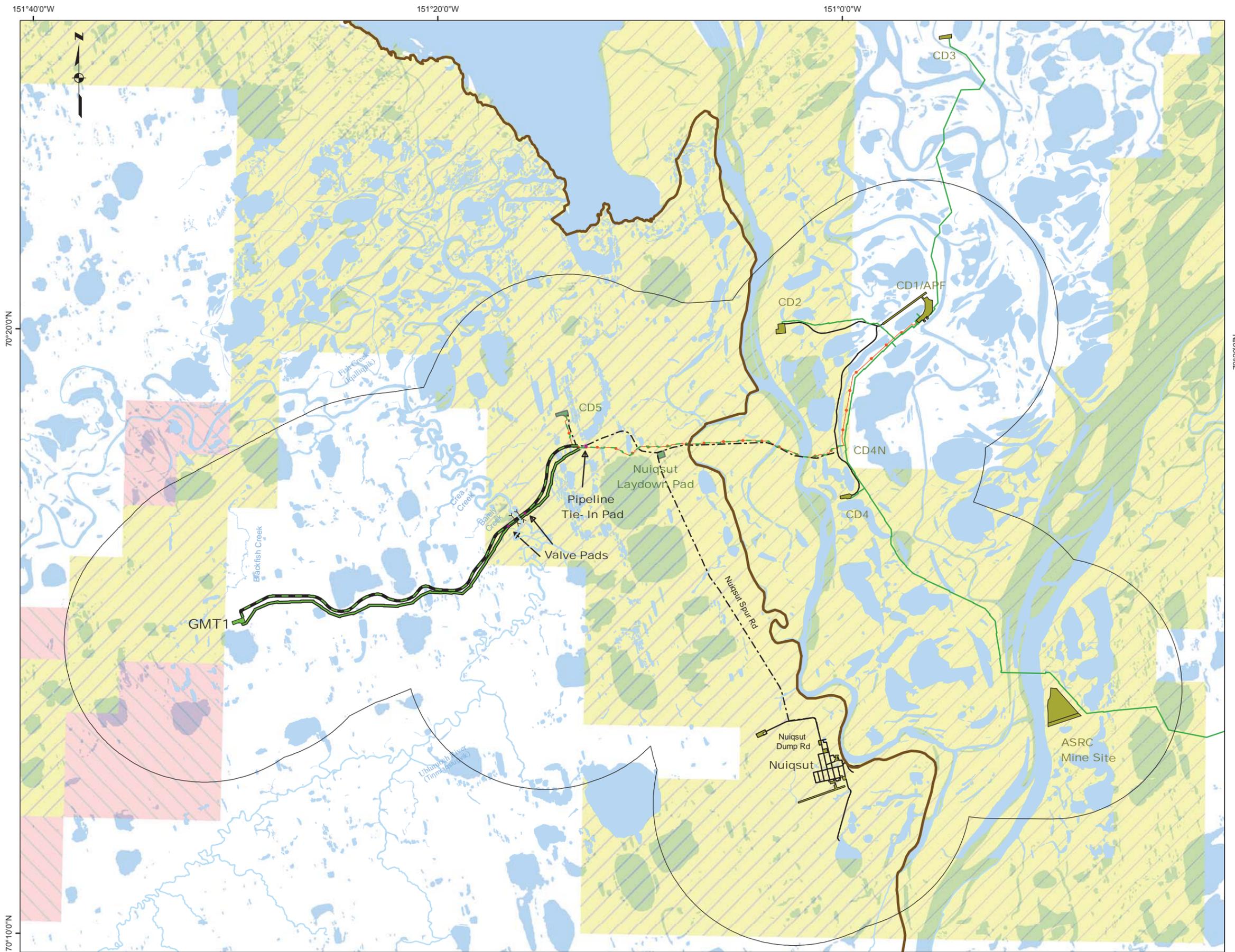
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Map 2.6-1

Alternative B Layout

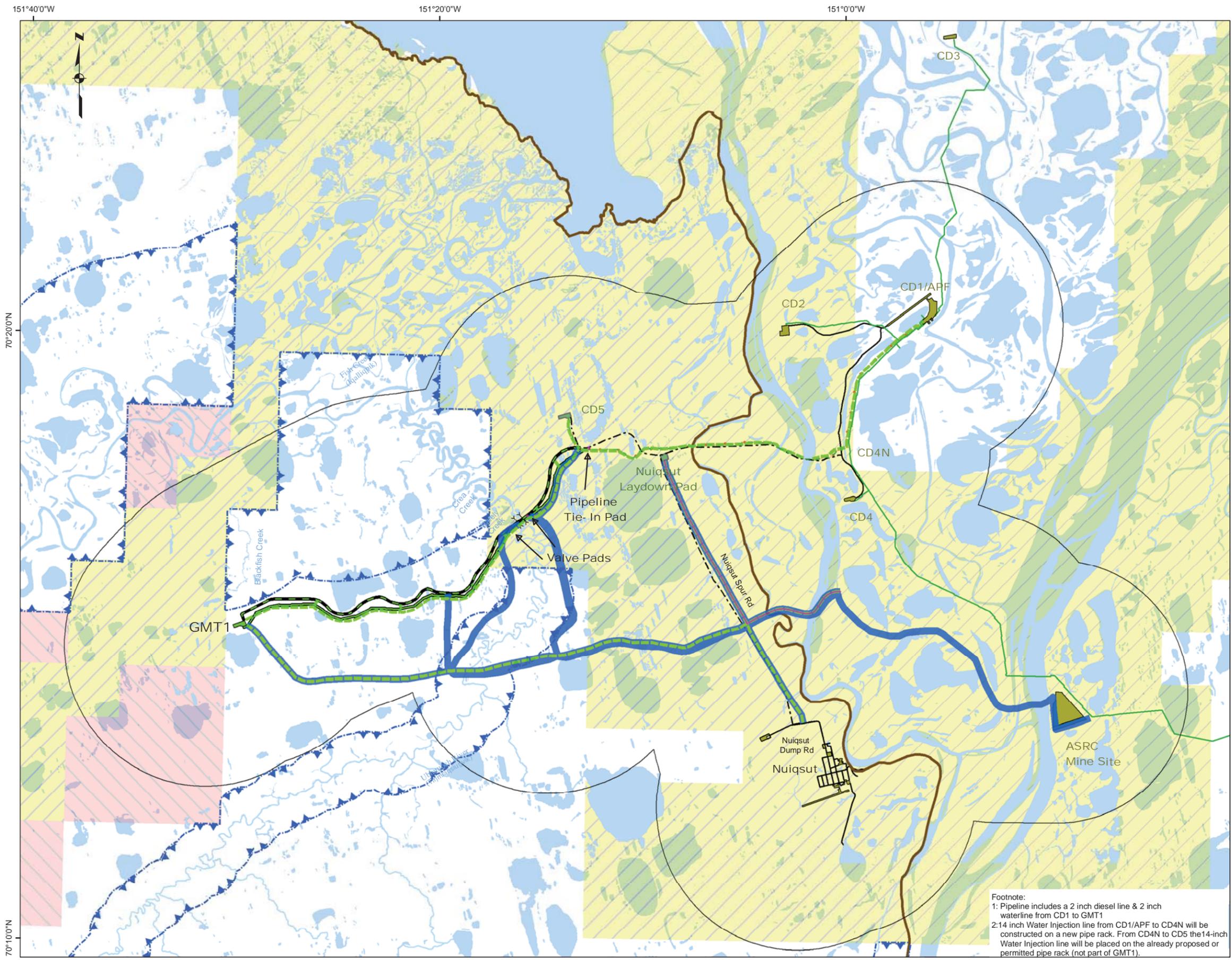
- |   |  |
|---|--|
| Alternative B Infrastructure              | Proposed or Permitted (not part of GMT1) |
| Road                                      | Road                                     |
| Pipeline                                  | Facility                                 |
| Facility                                  | Existing                                 |
| 14 inch Water <sup>1</sup> Injection Line | Pipeline                                 |
| Bridge                                    | Road                                     |
| Boundary                                  | Facility                                 |
| Project Study Area                        | Surface Land Ownership                   |
| NPR-A                                     | Kuukpik Lands                            |
|   | Conveyed                                 |
|   | Selected                                 |

Footnote:  
 1: 14 inch Water Injection line from CD1/APF to CD4N will be constructed on a new pipe rack. From CD4N to CD5 the 14-inch Water Injection line will be placed on the already proposed or permitted pipe rack (not part of GMT1).

Date: 9/28/2014  
 Miles

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Map 2.6-2

Alternative B Ice Roads

- |   |  |
|---|--|
| Alternative B Infrastructure              | Proposed or Permitted (not part of GMT1) |
| Road                                      | Road                                     |
| Pipeline                                  | Facility                                 |
| Facility                                  | Existing                                 |
| 14 inch Water <sup>2</sup> Injection Line | Pipeline                                 |
| Bridge                                    | Road                                     |
|   | Facility                                 |
| Boundary                                  | Surface Land Ownership                   |
| Project Study Area                        | Kuukpik Lands                            |
| NPR-A                                     | Conveyed                                 |
|   | Selected                                 |

- Alternative B Ice Roads
- First Year
  - Second Year
  - Annual resupply Route

- Setback Area
- Fish Creek 3 mi
  - Ublutuoch River 0.5 mi

Date: 9/27/2014

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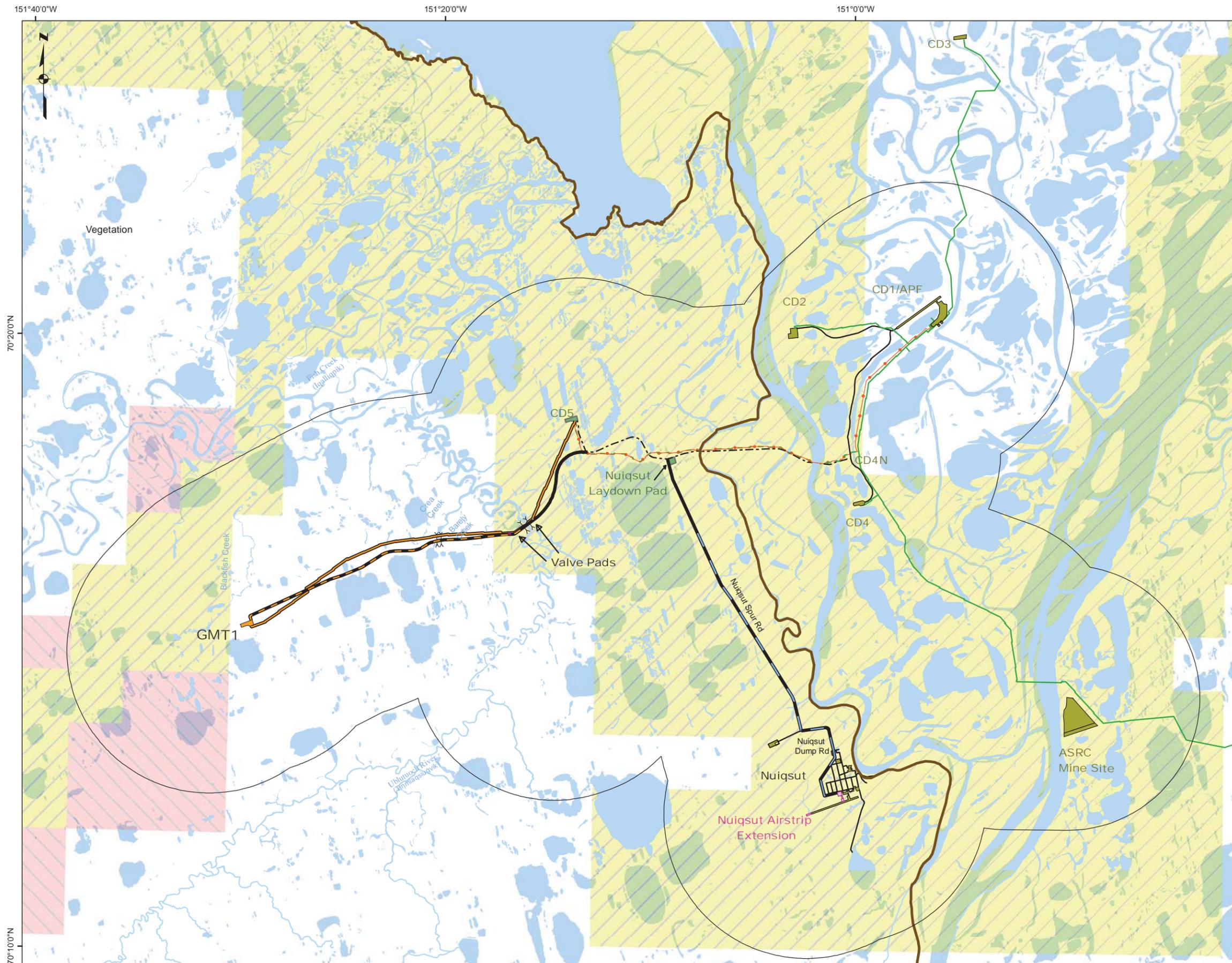
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Footnote:  
 1: Pipeline includes a 2 inch diesel line & 2 inch waterline from CD1 to GMT1  
 2: 14 inch Water Injection line from CD1/APF to CD4N will be constructed on a new pipe rack. From CD4N to CD5 the 14-inch Water Injection line will be placed on the already proposed or permitted pipe rack (not part of GMT1).



Map 2.7-1

### Alternative C Layout

Alternative C Infrastructure		Proposed or Permitted (not part of GMT1)	
	Road		Road
	Pipeline		Facility
	Facility		Existing Pipeline
	Nuiqsut Road		Existing Road
	Nuiqsut Airport Upgrade Facilities		Existing Facility
	14 inch Water <sup>1</sup> Injection Line		Surface Land Ownership Kuukpik Lands Conveyed
	Bridge		Selected
	Boundary		Project Study Area
	NPR-A		

Footnote:  
 1: 14 inch Water Injection line from CD1/APF to CD4N will be constructed on a new pipe rack. From CD4N to CD5 the 14-inch Water Injection line will be placed on the already proposed or permitted pipe rack (not part of GMT1).  
 2: Nuiqsut Laydown Pad is a 10 acre gravel storage pad.

Date: 9/27/2014

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Map 2.7-2

### Alternative C Nuiqsut Airport Facilities

- Alternative C Proposed  
Nuiqsut Infrastructure
-  Nuiqsut Dump and Spur Road Upgrade
  -  Nuiqsut Airport Access Road (new)
  -  Nuiqsut Airport Upgrade Facilities
- Existing
-  Road
  -  Facility
- Surface Land Ownership
-  Kuukpik Lands
  -  Conveyed

Date: 9/26/2014

0 0.050.1 0.2 0.3 0.4 0.5 Miles

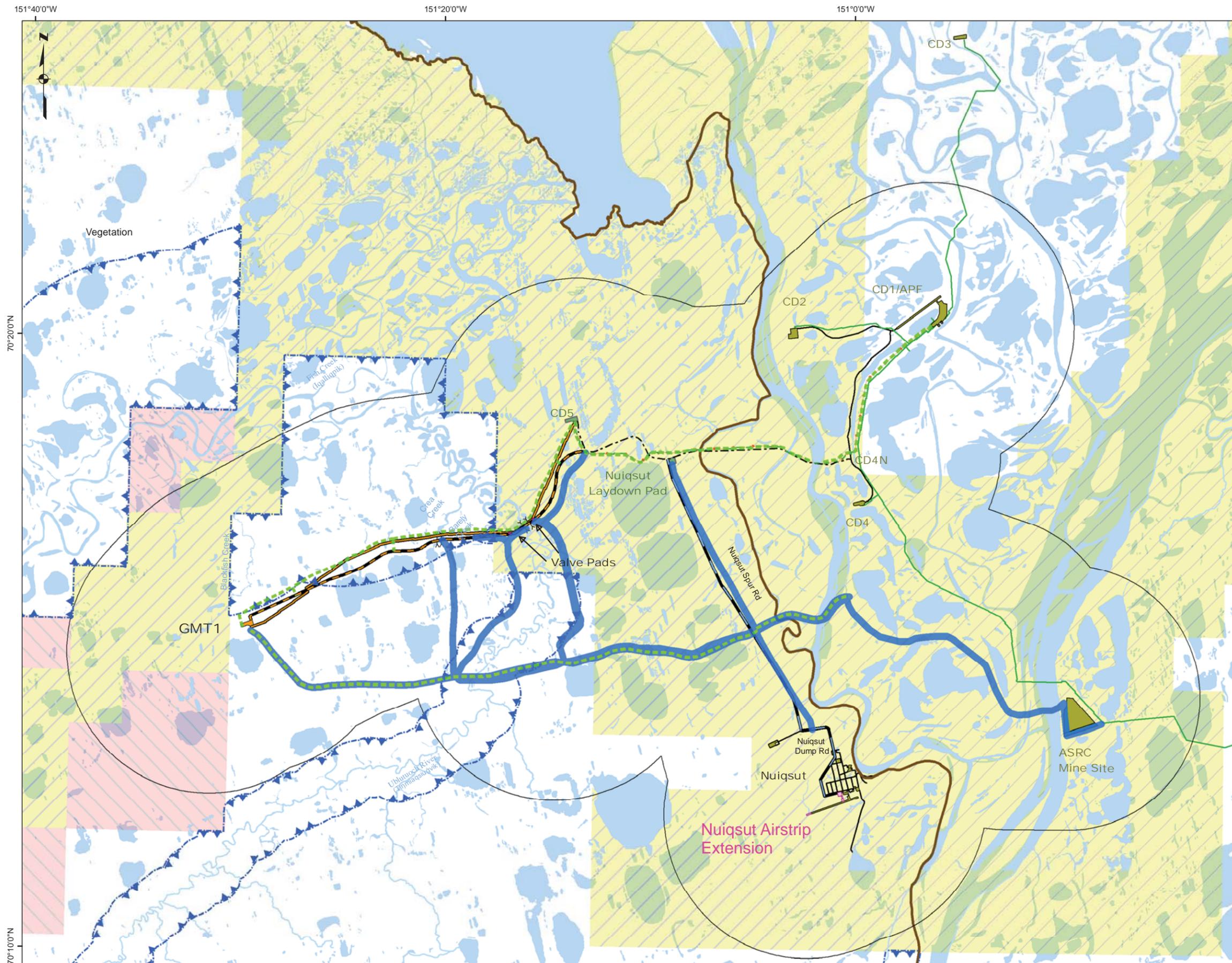
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**Map 2.7-3**  
**Alternative C Ice Roads**

<b>Alternative C Infrastructure</b>	<b>Proposed or Permitted (not part of GMT1)</b>
Road	Road
Pipeline	Facility
Facility	<b>Existing</b>
Nuiqsut Road	Pipeline
Nuiqsut Airport Upgrade Facilities	Road
14 inch Water <sup>1</sup> Injection Line	Facility
Bridge	<b>Surface Land Ownership</b>
<b>Boundary</b>	Conveyed
Project Study	Selected
NPR-A	
Year One Proposed Ice Road	
Year Two Proposed Ice Road	
<b>Setback Area</b>	
Fish Creek 3 mi	
Ubluoch River 0.5 mi	

**Footnote:**  
1: 14 inch Water Injection line from CD1/APF to CD4N will be constructed on a new pipe rack. From CD4N to CD5 the 14-inch Water Injection line will be placed on the already proposed or permitted pipe rack (not part of GMT1).  
2: Nuiqsut Laydown Pad is a 10 acre gravel storage pad.

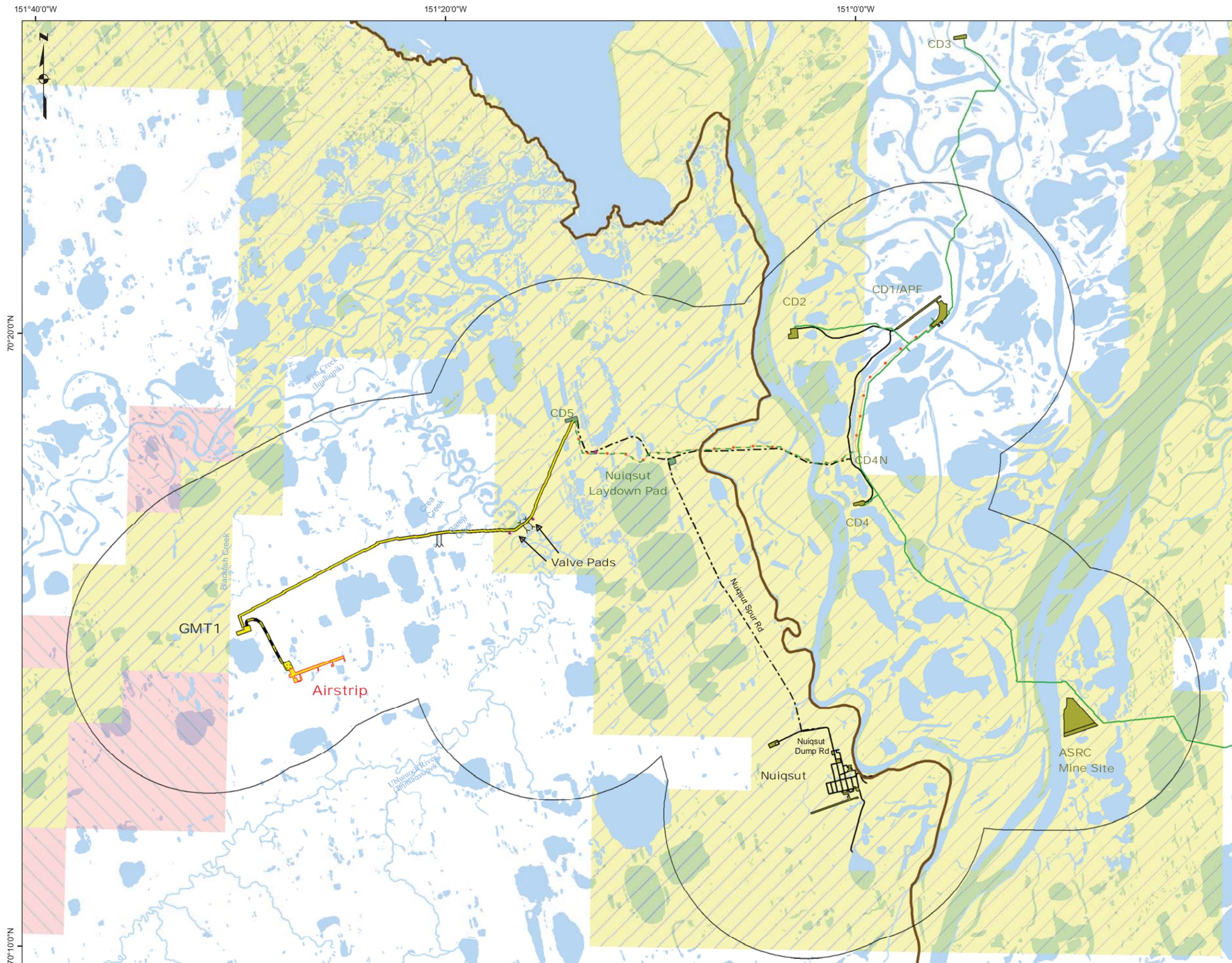
**Date:** 10/20/2014

0 0.5 1 2 3 Miles

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Map 2.8-1

### Alternative D1 and D2 Layout

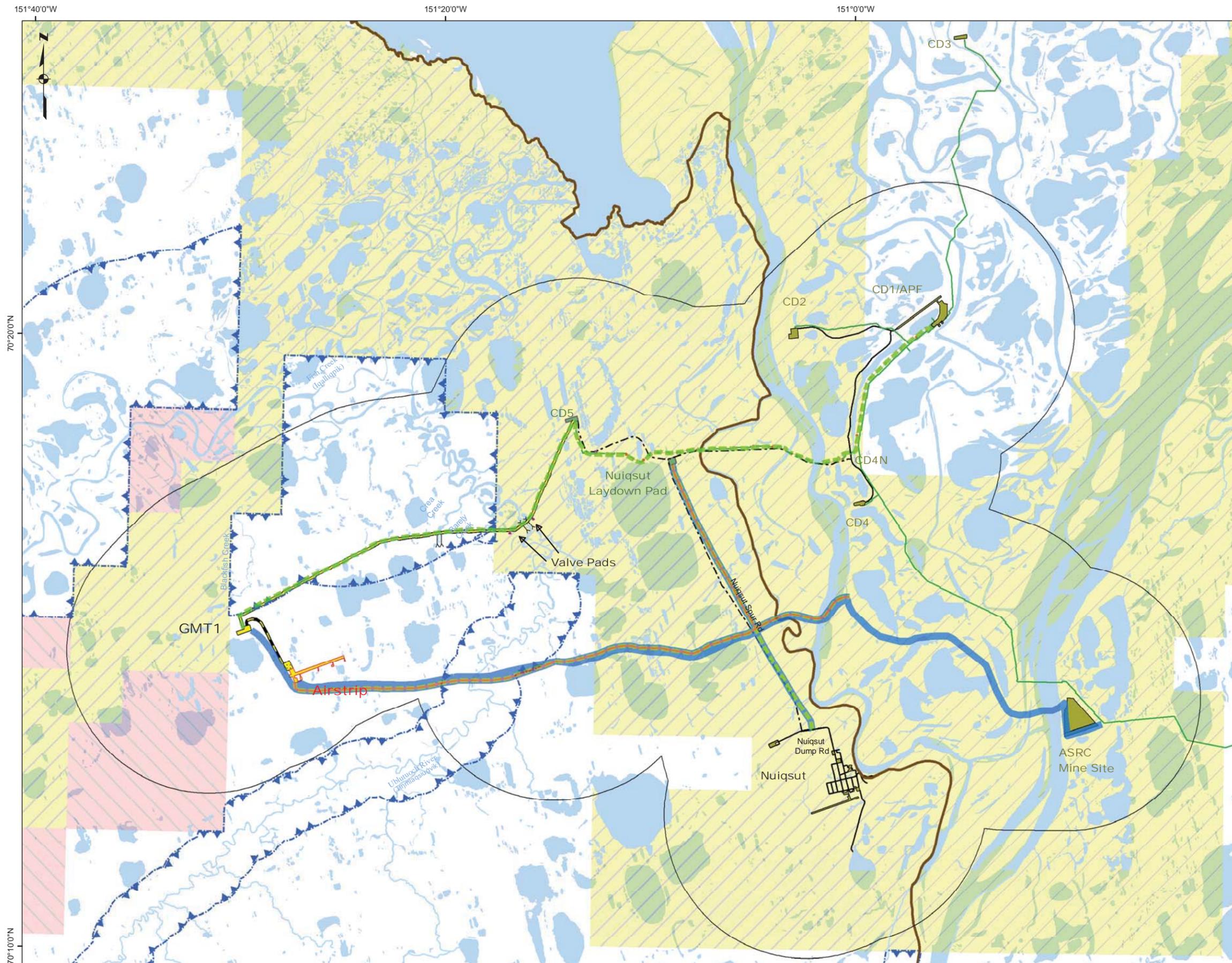
<b>Alternative D1/D2 Infrastructure</b>		<b>Proposed or Permitted (not part of GMT1)</b>	
	Road		Road
	Pipeline		Facility
	Facility		Existing Pipeline
	Airstrip		Road
	Airstrip Occupied Pad common to D1 and D 2		Facility
	AirStrip additional Occupied Pad-for D1	<b>Surface Land Ownership Kuukpiik Lands</b>	
	14 inch Water <sup>1,2</sup> Injection Line		Conveyed
	Bridge		Selected
<b>Boundary</b>			
	Project Study Area		
	NPR-A		

Footnote:  
 1: Pipeline includes a 2 inch diesel line & 2 inch waterline from CD1 to GMT1  
 2: 14 inch Water Injection line from CD1/APF to CD4N will be constructed on a new pipe rack. From CD4N to CD5 the 14-inch Water Injection line will be placed on the already proposed or permitted pipe rack (not part of GMT1).

Date: 9/27/2014  
 0 0.5 1 2 3 Miles

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NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet



**Map 2.8-2**  
**Alternative D1 and D2**  
**Ice Roads**

<b>Alternative D1/D2 Infrastructure</b>	<b>Proposed or Permitted (not part of GMT1)</b>
Road	Road
Pipeline	Facility
Facility	<b>Existing</b>
Airstrip	Pipeline
Airstrip Occupied Pad common to D1 and D 2	Road
Airstrip additional Occupied Pad-for D1	Facility
14 inch Water <sup>1,2</sup> Injection Line	<b>Surface Land Ownership</b>
Bridge	<b>Kuukpiik Lands</b>
<b>Ice Roads</b>	Conveyed
First Year	Selected
Second Year	
Annual Resupply Road	
<b>Boundary</b>	
Project Study Area	
NPR-A	
<b>Setback Area</b>	
Fish Creek 3 mi	
Ublutuoch River 0.5 mi	

**Footnote:**  
1: Pipeline includes a 2 inch diesel line & 2 inch waterline from CD1 to GMT1  
2: 14 inch Water Injection line from CD1/APF to CD4N will be constructed on a new pipe rack. From CD4N to CD5 the 14-inch Water Injection line will be placed on the already proposed or permitted pipe rack (not part of GMT1).

**Date:** 9/27/2014

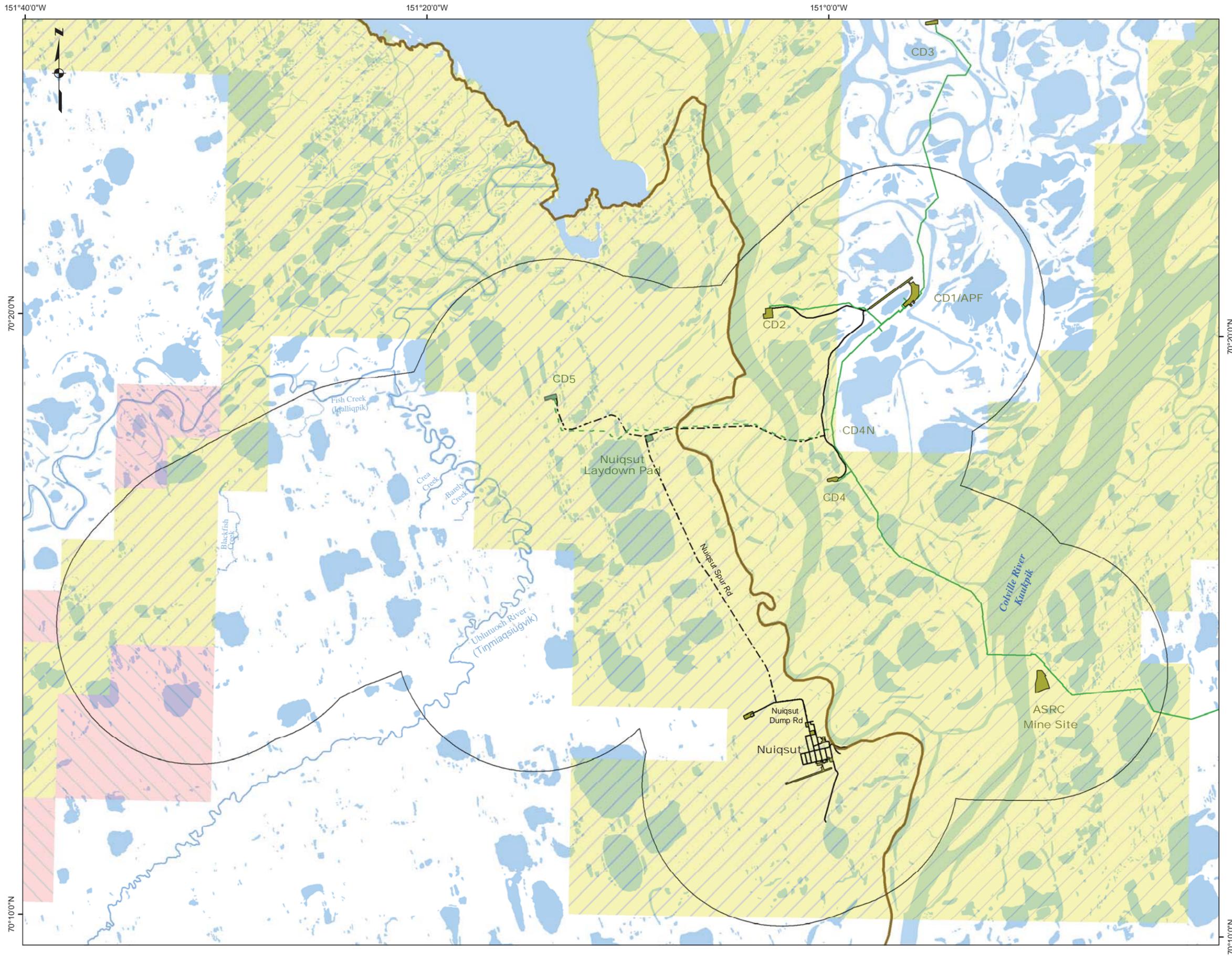
**Scale:** 0 0.5 1 2 3 Miles

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NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet

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**Map 2.10-1**  
**Alternative E:**  
**No Action**

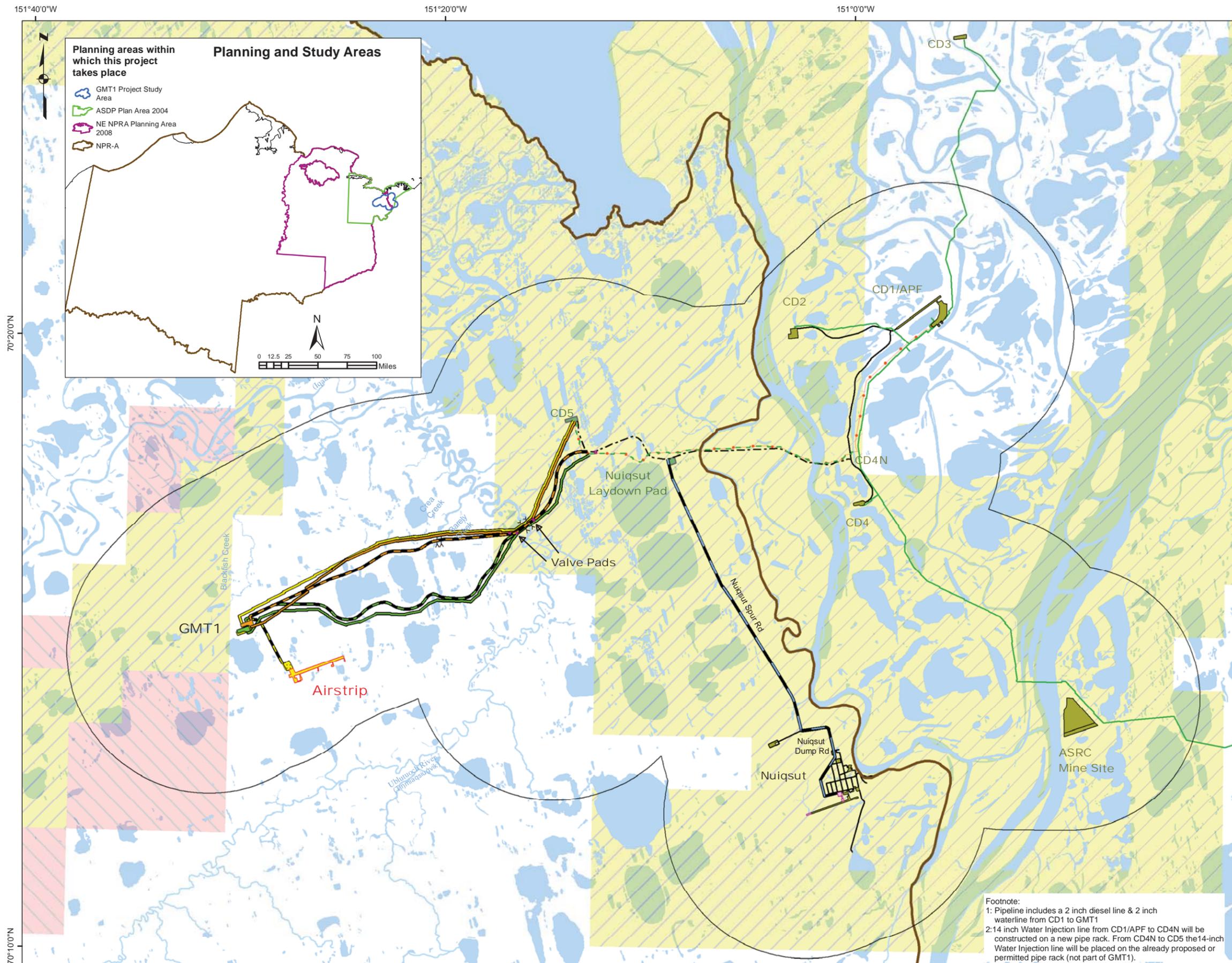
- |   |                               |
|---|-------------------------------|
| <b>Proposed or Permitted (not part of GMT1)</b> | <b>Existing</b>               |
| Pipeline  | Pipeline                      |
| Road  | Road                          |
| Facility  | Facility                      |
| <b>Boundaries</b>                               |                               |
| NPR-A   | <b>Surface Land Ownership</b> |
| Project Study Area                              | Kuukpik Lands                 |
|   | Conveyed                      |
|   | Selected                      |

Date: 10/21/2014

0 0.5 1 2 3 Miles

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NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet



**Planning areas within which this project takes place**

- GMT1 Project Study Area
- ASDP Plan Area 2004
- NE NPR-A Planning Area 2008
- NPR-A

**Planning and Study Areas**

0 12.5 25 50 75 100 Miles

**Map 3.1-1**

**Project Study Area**

<b>Alternative A Infrastructure</b>	<b>Alternative B Infrastructure</b>
Road	Road
Pipeline	Pipeline
Facility	Facility
14 inch Water <sup>2</sup> Injection Line	14 inch Water <sup>2</sup> Injection Line
Bridge	Bridge
<b>Alternative C Infrastructure</b>	<b>Alternative D1/D2 Infrastructure</b>
Road	Road
Pipeline	Pipeline
Facility	Facility
Nuiqsut Road	AirStrip
Nuiqsut Airport Upgrade Facilities	AirStrip Occupied Pad common to D1 and D2
14 inch Water <sup>2</sup> Injection Line	AirStrip additional Occupied Pad-for D1
Bridge	14 inch Water <sup>1,2</sup> Injection Line
Boundary	Bridge
Project Study Area	Proposed or Permitted (not part of GMT1)
NPR-A	Road
Surface Land Ownership	Facility
Kuukpik Lands	Existing
Conveyed	Pipeline
Selected	Road
	Facility

Date: 9/29/2014

0 0.5 1 2 3 Miles

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NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet

Footnote:  
1: Pipeline includes a 2 inch diesel line & 2 inch waterline from CD1 to GMT1  
2: 14 inch Water Injection line from CD1/APF to CD4N will be constructed on a new pipe rack. From CD4N to CD5 the 14-inch Water Injection line will be placed on the already proposed or permitted pipe rack (not part of GMT1).

151°40'0"W

151°20'0"W

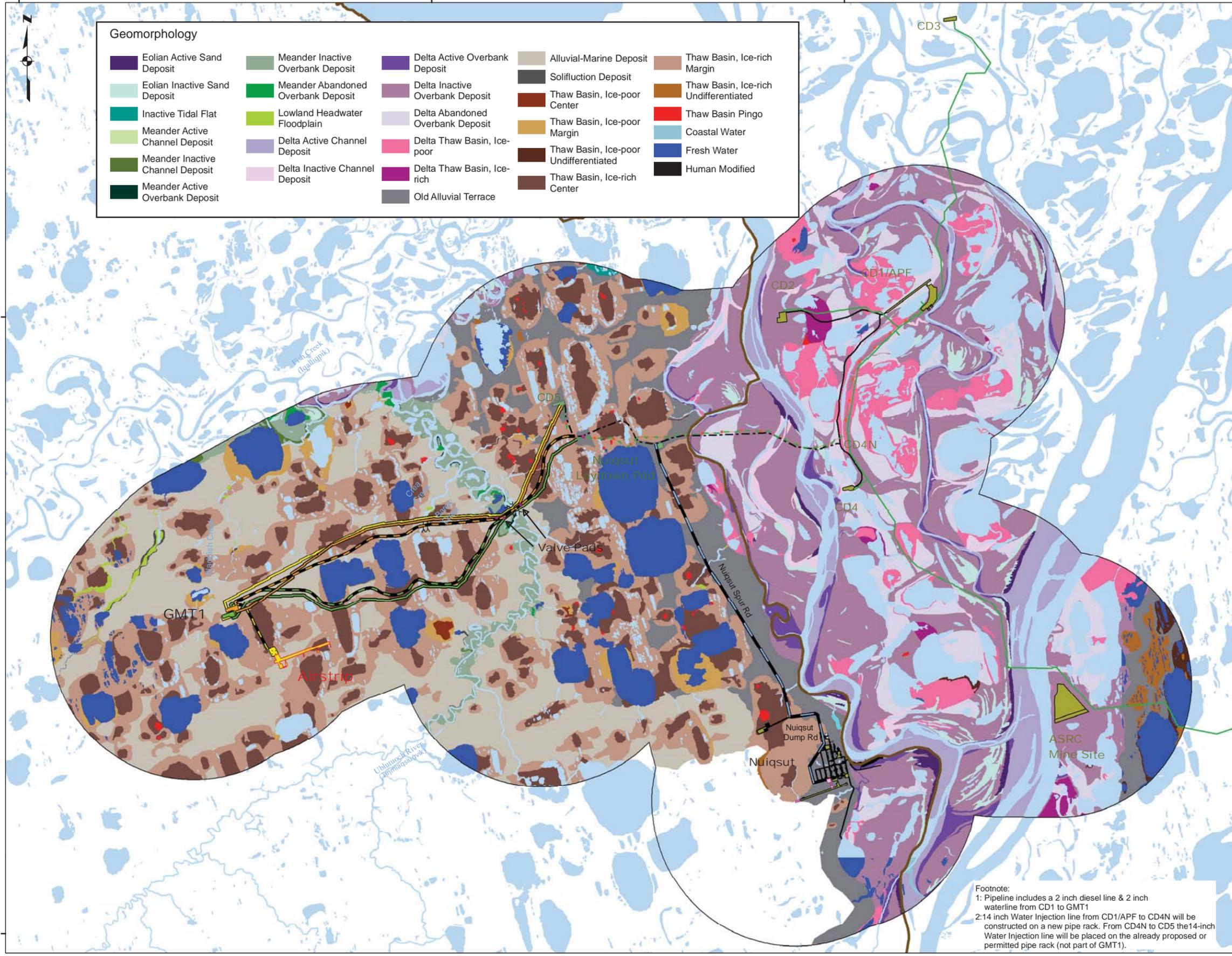
151°0'0"W

70°20'0"N

70°20'0"N

70°10'0"N

Geomorphology			



Map 3.2-1

### Geomorphology

Alternative A Infrastructure	Alternative B Infrastructure
Alternative C Infrastructure	Alternative D1/D2 Infrastructure

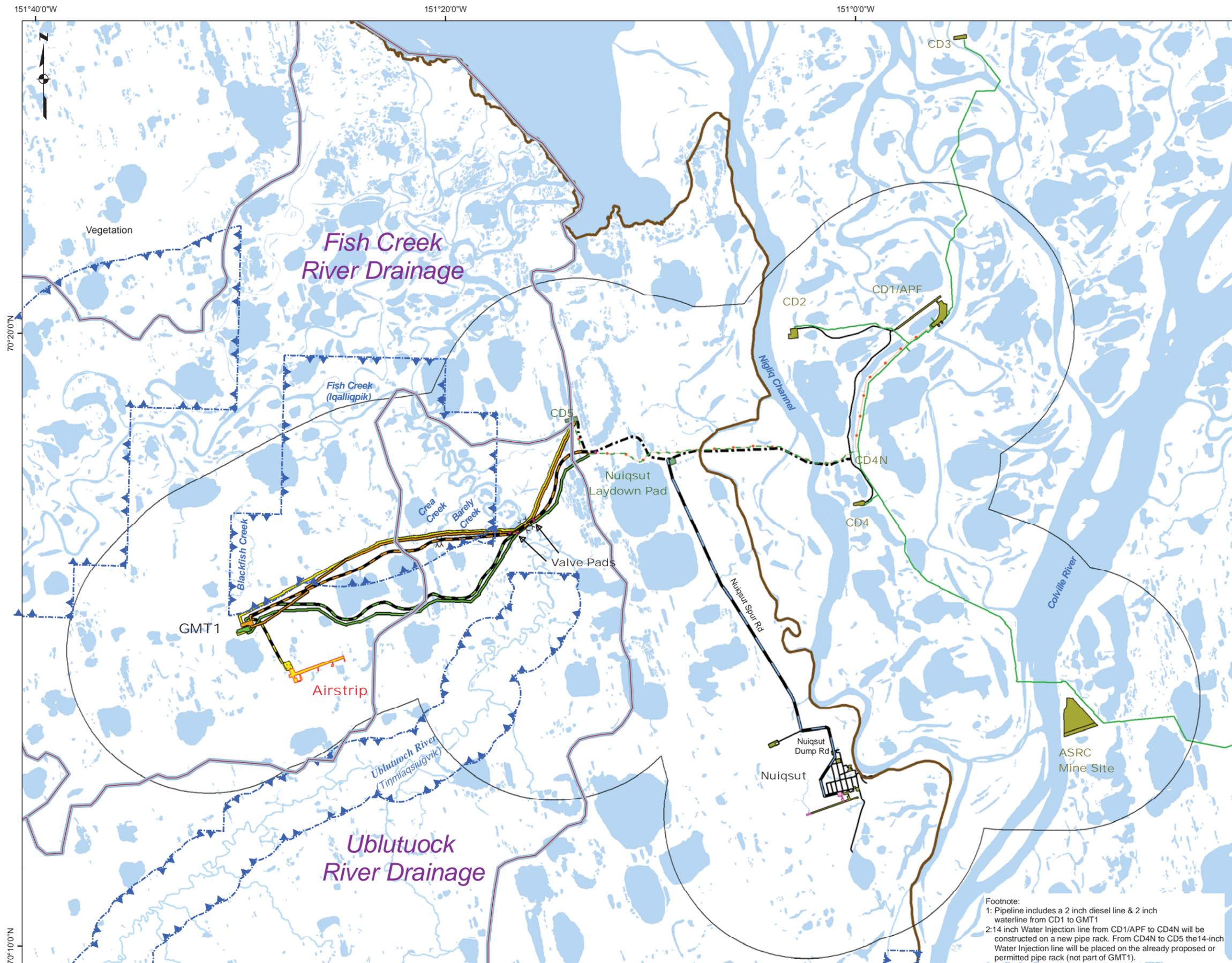
Date: 9/27/2014

0 0.5 1 2 3 Miles

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NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet

Footnote:  
 1: Pipeline includes a 2 inch diesel line & 2 inch waterline from CD1 to GMT1  
 2: 14 inch Water Injection line from CD1/APF to CD4N will be constructed on a new pipe rack. From CD4N to CD5 the 14-inch Water Injection line will be placed on the already proposed or permitted pipe rack (not part of GMT1).



**Map 3.2-2**  
**Drainage Basins**

Alternative A Infrastructure		Alternative B Infrastructure	
	Road		Road
	Pipeline		Pipeline
	Facility		Facility
	14 inch Water <sup>2</sup> Injection Line		14 inch Water <sup>2</sup> Injection Line
	Bridge		Bridge
Alternative C Infrastructure		Alternative D1/D2 Infrastructure	
	Road		Road
	Pipeline		Pipeline
	Facility		Facility
	Nuiqsut Road		AirStrip
	Nuiqsut Airport Upgrade Facilities		AirStrip Occupied Pad common to D1 and D2
	14 inch Water <sup>2</sup> Injection Line		AirStrip additional Occupied Pad-for D1
	Bridge		14 inch Water <sup>1,2</sup> Injection Line
	Proposed or Permitted (not part of GMT1)		Bridge
	Facility		Boundary
	Existing Pipeline		Project Study Area
	Existing Road		NPR-A
	Facility		

**Drainage Basins**  
 Fish Creek 3mi  
 Ublutuock River 0.5mi

Date: 10/21/2014

0 0.5 1 2 3 Miles

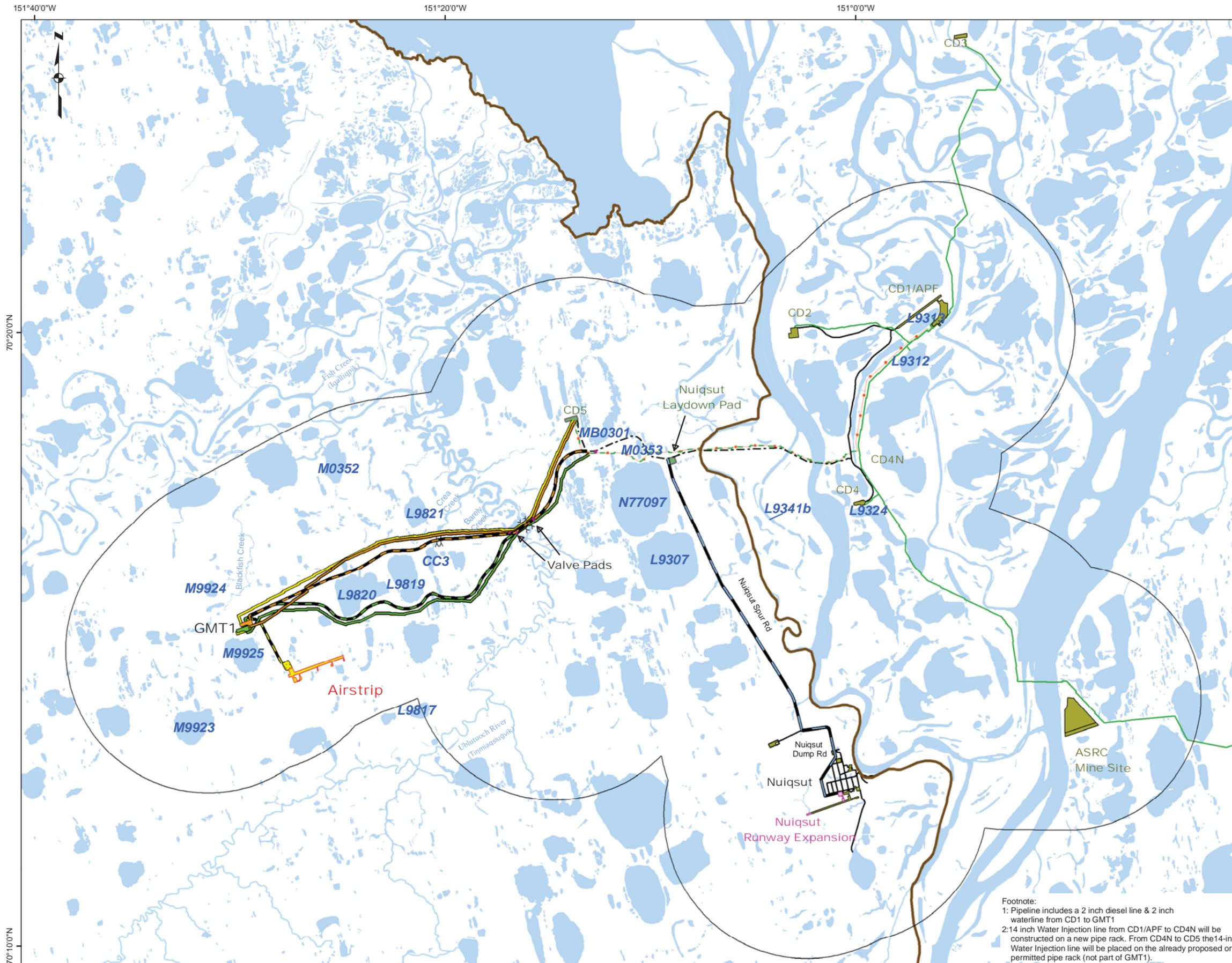
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NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet

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Footnote:  
1: Pipeline includes a 2 inch diesel line & 2 inch waterline from CD1 to GMT1  
2: 14 inch Water Injection line from CD1/APF to CD4N will be constructed on a new pipe rack. From CD4N to CD5 the 14-inch Water Injection line will be placed on the already proposed or permitted pipe rack (not part of GMT1).



**Map 3.2-3**  
**Surface Water Bodies**

Alternative A Infrastructure	Alternative B Infrastructure
Road	Road
Pipeline	Pipeline
Facility	Facility
14 inch Water <sup>2</sup> Injection Line	14 inch Water <sup>2</sup> Injection Line
Bridge	Bridge
Alternative C Infrastructure	Alternative D1/D2 Infrastructure
Road	Road
Pipeline	Pipeline
Facility	Facility
Nuiqsut Road	AirStrip
Nuiqsut Airport Upgrade Facilities	AirStrip Occupied Pad common to D1 and D2
14 inch Water <sup>2</sup> Injection Line	AirStrip additional Occupied Pad-for D1
Bridge	14 inch Water <sup>1,2</sup> Injection Line
Proposed or Permitted (not part of GMT1) Road	Bridge
Facility	
Existing Pipeline	Boundary
Existing Road	Project Study Area
Facility	NPR-A

Date: 10/21/2014  
 0 0.5 1 2 3 Miles

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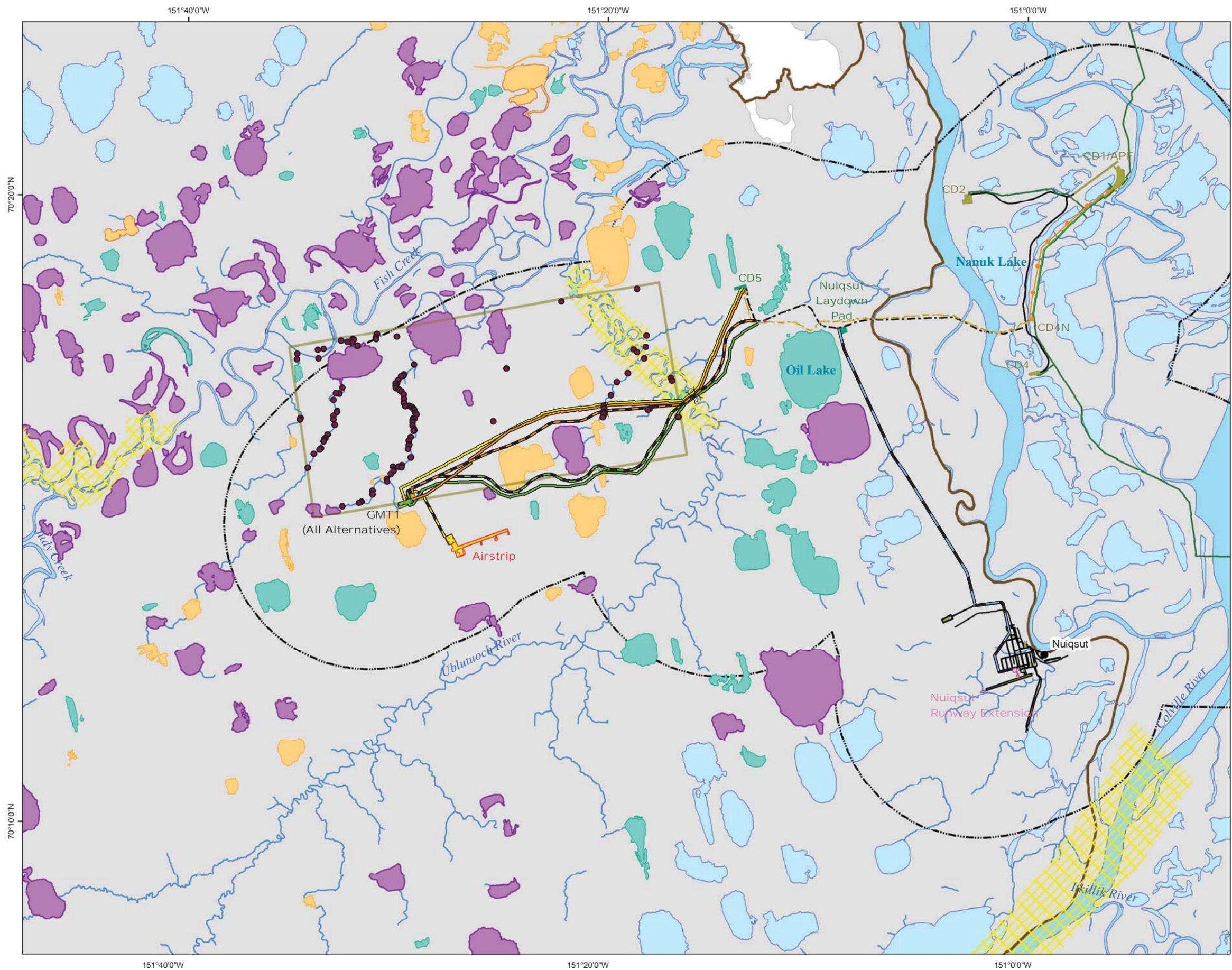
NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet



Bureau of Land Management - Alaska  
National Petroleum Reserve - Alaska

GMT1 Development Project Supplemental Environmental Impact Statement 2014

Footnote:  
 1: Pipeline includes a 2 inch diesel line & 2 inch waterline from CD1 to GMT1  
 2: 14 inch Water Injection line from CD1/APF to CD4N will be constructed on a new pipe rack. From CD4N to CD5 the 14-inch Water Injection line will be placed on the already proposed or permitted pipe rack (not part of GMT1).



Map 3.3-1

### Potential and Known Fish Overwintering Habitat

- Fish Wintering Areas
- Bedfast Ice Regime
- Transitional Ice Regime
- Floating Ice Regime
- stream pool features with floating ice
- Waterbodies not analyzed
- Jones Project Extent

Alternative A Infrastructure	Alternative B Infrastructure
Pipeline	Pipeline
Road	Road
Facility	Facility
Alternative C Infrastructure	Alternative D1/D2 Infrastructure
Pipeline	Pipeline
Road	Road
Nuiqsut Spur/Dump/Airport Roads	Facility
Facility	Airstrip

Proposed or Permitted (not part of GMT1)	Existing
Pipeline	Pipeline
Road	Road
Facility	Facility

GMT1 SEIS Project Areas

- Project Study Area
- NPR-A

Data sources:  
 Morris 2003,  
 Arp et al. 2012,  
 Jones et al. 2013

0 0.5 1 2 3 Miles

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NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet

151°40'0"W

151°20'0"W

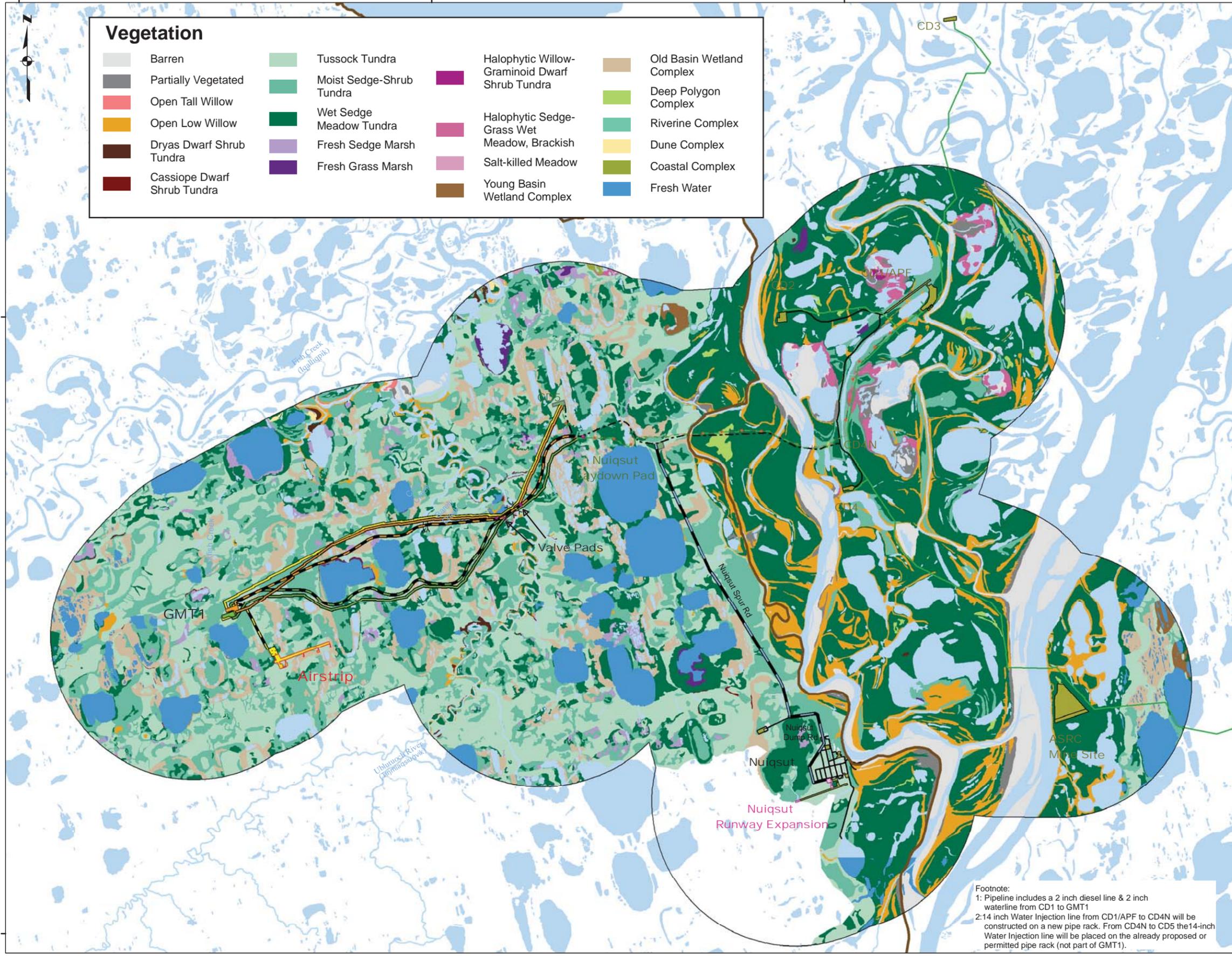
151°0'0"W

70°20'0"N

70°10'0"N

### Vegetation

	Barren		Tussock Tundra		Halophytic Willow-Graminoid Dwarf Shrub Tundra		Old Basin Wetland Complex
	Partially Vegetated		Moist Sedge-Shrub Tundra		Halophytic Sedge-Grass Wet Meadow, Brackish		Deep Polygon Complex
	Open Tall Willow		Wet Sedge Meadow Tundra		Salt-killed Meadow		Riverine Complex
	Open Low Willow		Fresh Sedge Marsh		Young Basin Wetland Complex		Dune Complex
	Dryas Dwarf Shrub Tundra		Fresh Grass Marsh		Fresh Water		Coastal Complex
	Cassiope Dwarf Shrub Tundra						



Map 3.3-2

### Vegetation

	Alternative A Infrastructure Road		Alternative B Infrastructure Road
	Alternative A Infrastructure Pipeline		Alternative B Infrastructure Pipeline
	Alternative A Infrastructure Facility		Alternative B Infrastructure Facility
	Alternative A Infrastructure 14 inch Water <sup>2</sup> Injection Line		Alternative B Infrastructure 14 inch Water <sup>2</sup> Injection Line
	Alternative A Infrastructure Bridge		Alternative B Infrastructure Bridge
	Alternative C Infrastructure Road		Alternative D1/D2 Infrastructure Road
	Alternative C Infrastructure Pipeline		Alternative D1/D2 Infrastructure Pipeline
	Alternative C Infrastructure Facility		Alternative D1/D2 Infrastructure Facility
	Alternative C Infrastructure Nuiqsut Road		Alternative D1/D2 Infrastructure AirStrip
	Alternative C Infrastructure Nuiqsut Airport Upgrade Facilities		Alternative D1/D2 Infrastructure AirStrip Occupied Pad common to D1 and D2
	Alternative C Infrastructure 14 inch Water <sup>2</sup> Injection Line		Alternative D1/D2 Infrastructure AirStrip additional Occupied Pad-for D1
	Alternative C Infrastructure Bridge		Alternative D1/D2 Infrastructure 14 inch Water <sup>1,2</sup> Injection Line
	Alternative C Infrastructure Bridge		Alternative D1/D2 Infrastructure Bridge
	Boundary Project Study Area		Proposed or Permitted (not part of GMT1) Road
	Boundary NPR-A		Proposed or Permitted (not part of GMT1) Facility
			Existing Pipeline
			Existing Road
			Existing Facility

Date: 9/27/2014



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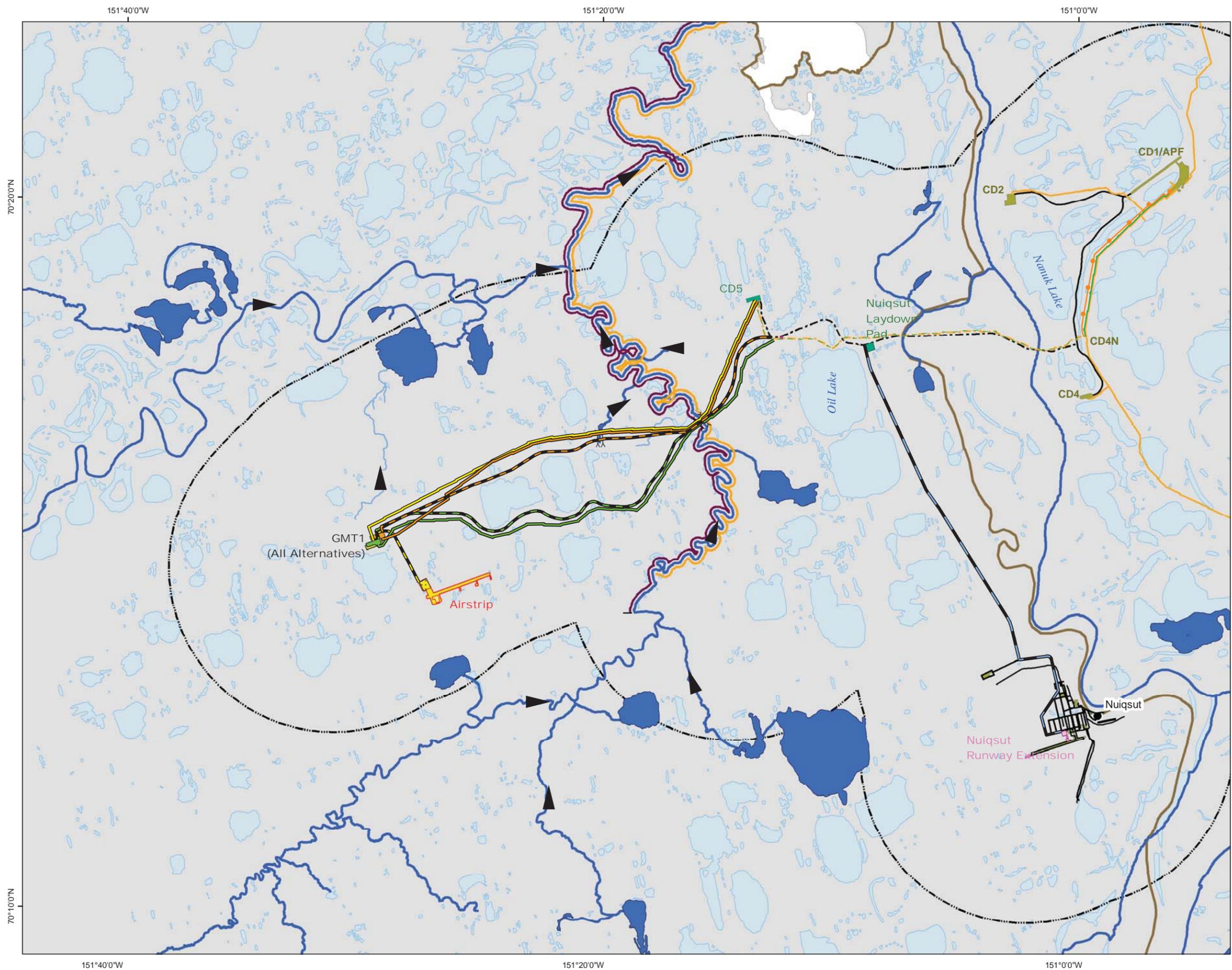
NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet



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Environmental Impact Statement 2014

Footnote:  
1: Pipeline includes a 2 inch diesel line & 2 inch waterline from CD1 to GMT1  
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Map 3.3-3

### Anadromous Waters and Essential Fish Habitat

**Anadromous Waters**

- Streams (black arrows indicate stream flow direction)
- Lakes

**Essential Fish Habitat**

- KSp- King salmon present upstream extent
- CSp- Chum salmon & PSp- Pink salmon present upstream extent

**Waterbodies**

- Lake/Pond

<b>Alternative A Infrastructure</b>	<b>Alternative B Infrastructure</b>
Pipeline	Pipeline
Road	Road
Facility	Facility
<b>Alternative C Infrastructure</b>	<b>Alternative D1/D2 Infrastructure</b>
Pipeline	Pipeline
Road	Road
Nuiqsut Spur/Dump/Airport Roads	Facility
Facility	Airstrip
<b>Proposed or Permitted (not part of GMT1)</b>	<b>Existing</b>
Pipeline	Pipeline
Road	Road
Facility	Facility

GMT1 SEIS Project Areas

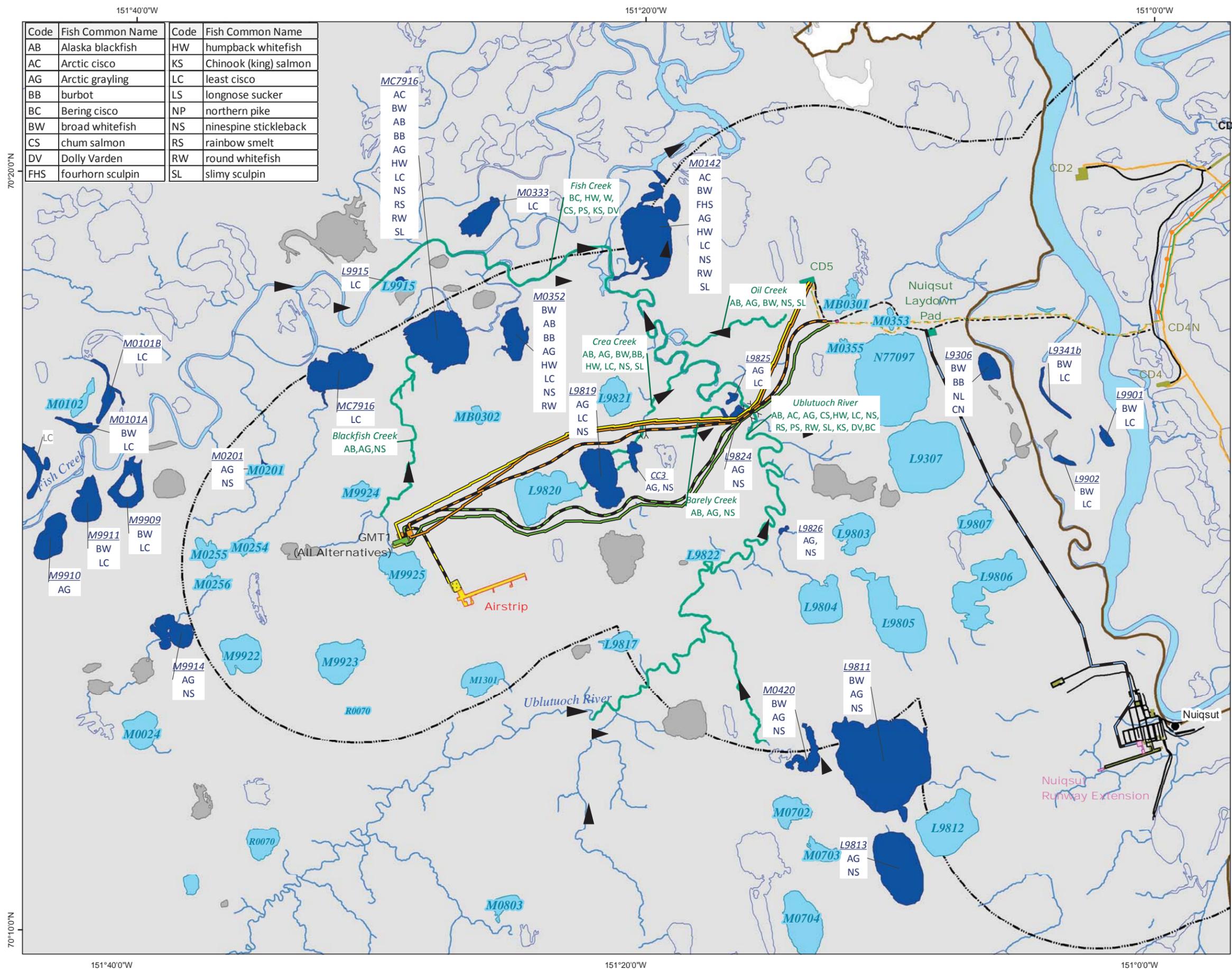
- Project Study Area
- NPR-A

Data Sources:  
Anadromous Waters Catalog (ADFG), 2013a

0 1 2 Miles

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NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet



Code	Fish Common Name	Code	Fish Common Name
AB	Alaska blackfish	HW	humpback whitefish
AC	Arctic cisco	KS	Chinook (king) salmon
AG	Arctic grayling	LC	least cisco
BB	burbot	LS	longnose sucker
BC	Bering cisco	NP	northern pike
BW	broad whitefish	NS	ninespine stickleback
CS	chum salmon	RS	rainbow smelt
DV	Dolly Varden	RW	round whitefish
FHS	fourhorn sculpin	SL	slimy sculpin

**Map 3.3-4**

### Fish Species Distribution

- Multiple fish species present in river/stream (black arrows indicate stream flow direction)
- Species other than ninespine stickleback seen
- Only ninespine stickleback seen
- Waterbody surveyed - no fish seen
- Waterbody not surveyed

**Alternative A Infrastructure**

- Pipeline
- Road
- Facility

**Alternative B Infrastructure**

- Pipeline
- Road
- Facility

**Alternative C Infrastructure**

- Pipeline
- Road
- Nuiqsut Spurr/Dump/Airport Roads
- Facility

**Alternative D1/D2 Infrastructure**

- Pipeline
- Road
- Facility
- Airstrip

**Proposed or Permitted (not part of GMT1)**

- Pipeline
- Road
- Facility

**Existing**

- Pipeline
- Road
- Facility

**GMT1 SEIS Project Areas**

- Project Study Area
- NPR-A

**Data Sources:**  
 Anadromous Waters Catalog (ADFG) 2013a,  
 BLM 2014a,  
 CPAI 2013f

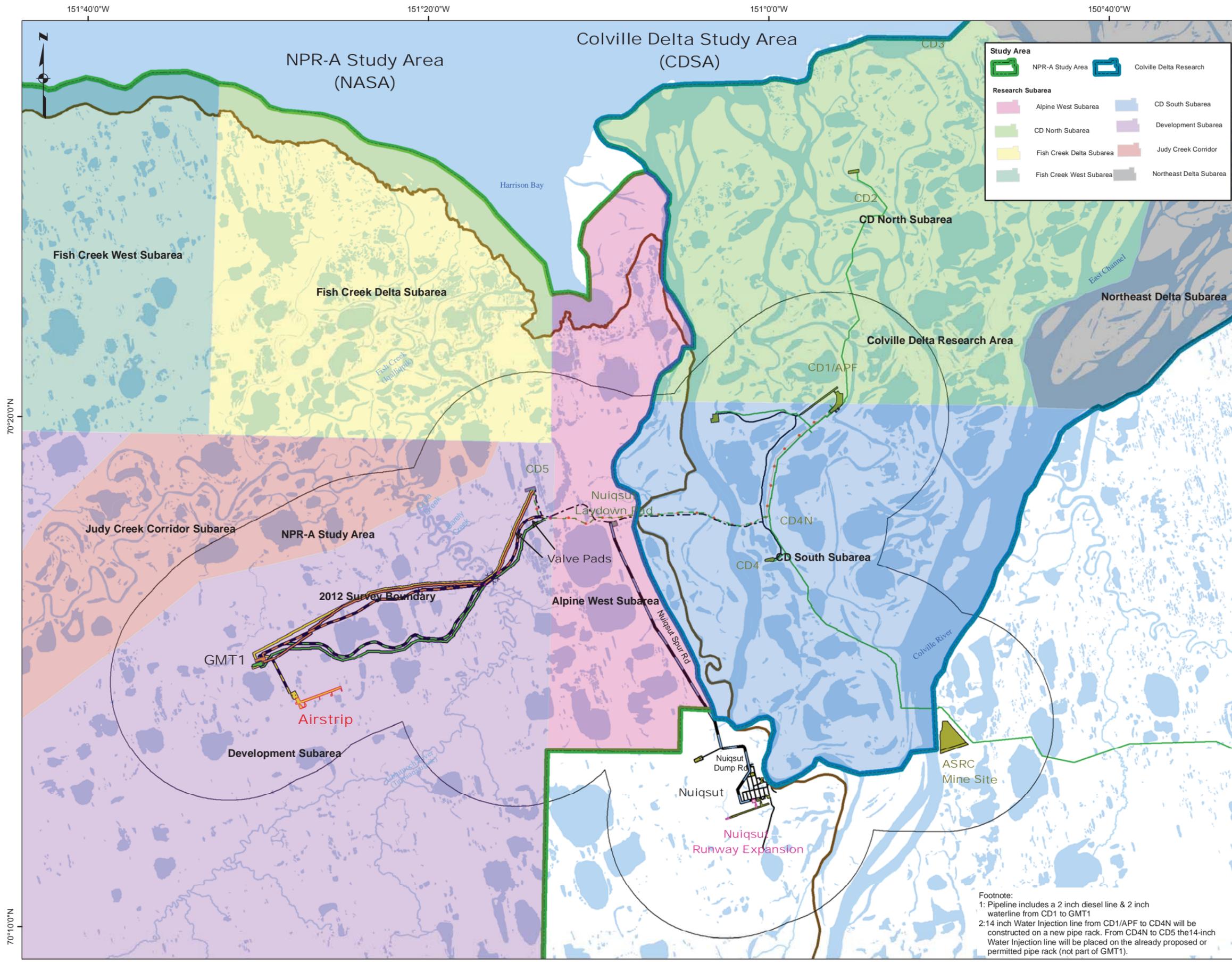
0 0.4 0.8 1.6 2.4 Miles

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NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet

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**Study Area**

- NPR-A Study Area
- Colville Delta Research

**Research Subarea**

- Alpine West Subarea
- CD North Subarea
- Fish Creek Delta Subarea
- Fish Creek West Subarea
- CD South Subarea
- Development Subarea
- Judy Creek Corridor
- Northeast Delta Subarea

Map 3.3-5  
Avian Study Areas

<b>Alternative A Infrastructure</b>	<b>Alternative B Infrastructure</b>
Road	Road
Pipeline	Pipeline
Facility	Facility
14 inch Water <sup>2</sup> Injection Line	14 inch Water <sup>2</sup> Injection Line
Bridge	Bridge
<b>Alternative C Infrastructure</b>	<b>Alternative D1/D2 Infrastructure</b>
Road	Road
Pipeline	Pipeline
Facility	Facility
Nuiqsut Road	AirStrip
Nuiqsut Airport Upgrade Facilities	AirStrip Occupied Pad common to D1 and D2
14 inch Water <sup>2</sup> Injection Line	AirStrip additional Occupied Pad-for D1
Bridge	14 inch Water <sup>1,2</sup> Injection Line
	Bridge
<b>Boundary</b>	<b>Proposed or Permitted (not part of GMT1)</b>
Project Study Area	Road
NPR-A	Facility
	<b>Existing</b>
	Pipeline
	Road
	Facility

Date: 9/27/2014

0 0.5 1 2 3 Miles

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151°40'0"W

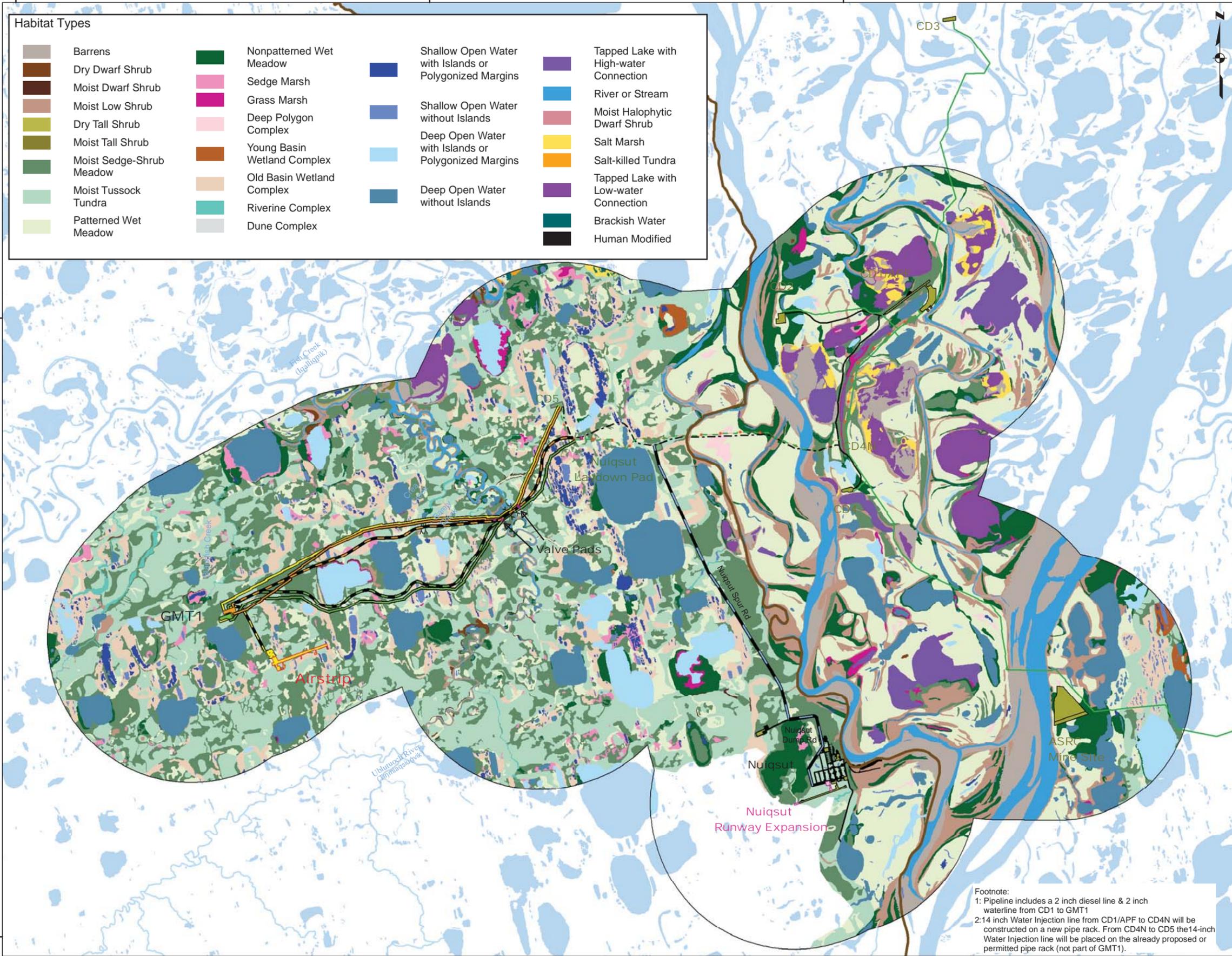
151°20'0"W

151°0'0"W

70°20'0"N

70°10'0"N

Habitat Types			
	Barrens		Nonpatterned Wet Meadow
	Dry Dwarf Shrub		Sedge Marsh
	Moist Dwarf Shrub		Grass Marsh
	Moist Low Shrub		Deep Polygon Complex
	Dry Tall Shrub		Young Basin Wetland Complex
	Moist Tall Shrub		Old Basin Wetland Complex
	Moist Sedge-Shrub Meadow		Riverine Complex
	Moist Tussock Tundra		Dune Complex
	Patterned Wet Meadow		Shallow Open Water with Islands or Polygonized Margins
			Shallow Open Water without Islands
			Deep Open Water with Islands or Polygonized Margins
			Deep Open Water without Islands
			Tapped Lake with High-water Connection
			River or Stream
			Moist Halophytic Dwarf Shrub
			Salt Marsh
			Salt-killed Tundra
			Tapped Lake with Low-water Connection
			Brackish Water
			Human Modified



Map 3.3-6

### Wildlife Habitat

Alternative A Infrastructure	Alternative B Infrastructure
Alternative C Infrastructure	Alternative D1/D2 Infrastructure

Date: 9/29/2014

0 0.5 1 2 3 Miles

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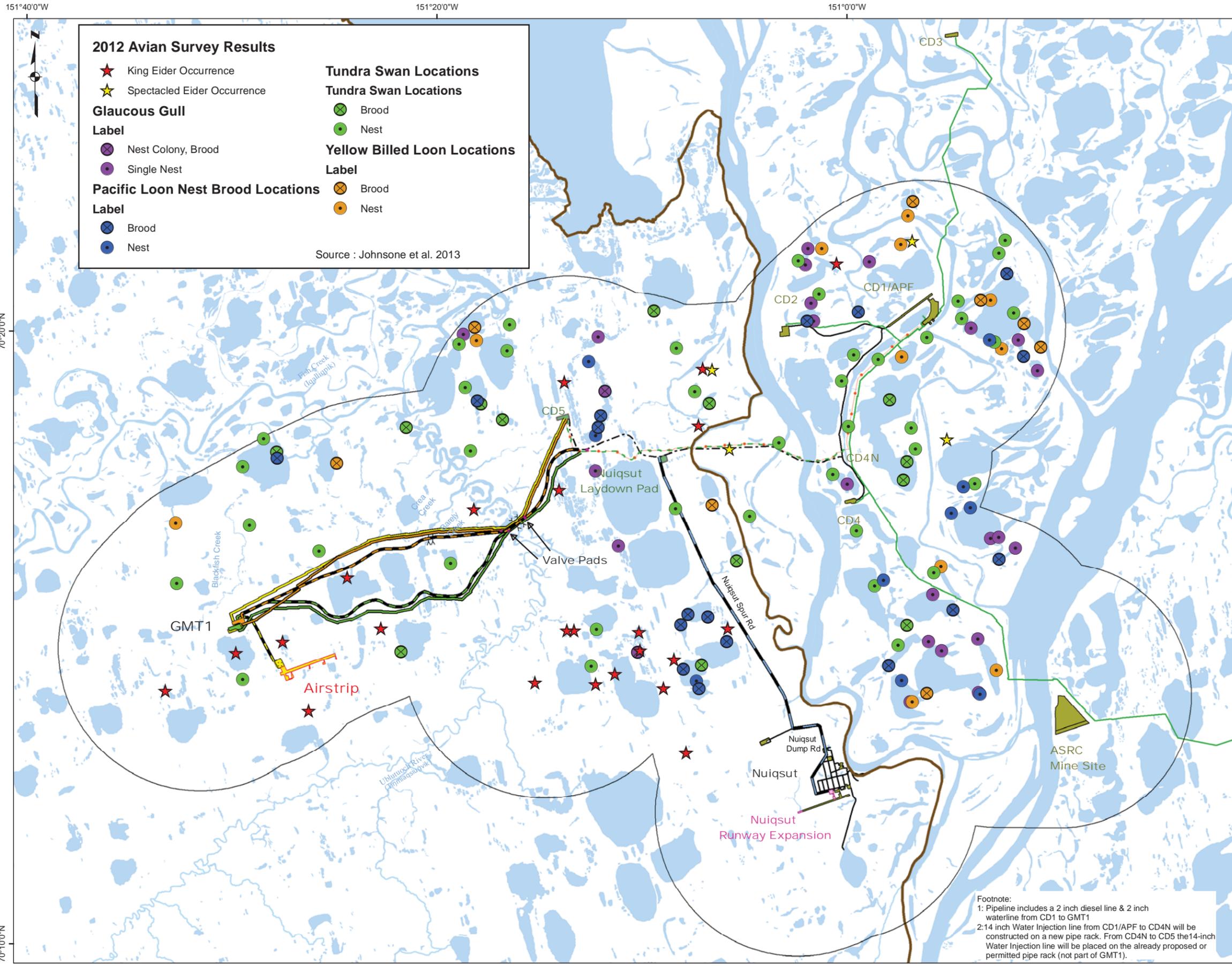
NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet



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**2012 Avian Survey Results**

- ★ King Eider Occurrence
- ★ Spectacled Eider Occurrence

**Glaucous Gull**

**Label**

- ⊗ Nest Colony, Brood
- ⊙ Single Nest

**Pacific Loon Nest Brood Locations**

**Label**

- ⊗ Brood
- ⊙ Nest

**Tundra Swan Locations**

**Tundra Swan Locations**

- ⊗ Brood
- ⊙ Nest

**Yellow Billed Loon Locations**

**Label**

- ⊗ Brood
- ⊙ Nest

Source : Johnstone et al. 2013

Map 3.3-7  
2012 Avian Survey

<b>Alternative A Infrastructure</b>	<b>Alternative B Infrastructure</b>
— Road	— Road
— Pipeline	— Pipeline
■ Facility	■ Facility
~ 14 inch Water <sup>2</sup> Injection Line	~ 14 inch Water <sup>2</sup> Injection Line
⌵ Bridge	⌵ Bridge
<b>Alternative C Infrastructure</b>	<b>Alternative D1/D2 Infrastructure</b>
— Road	— Road
— Pipeline	— Pipeline
■ Facility	■ Facility
— Nuiqsut Road	— AirStrip
■ Nuiqsut Airport Upgrade Facilities	■ AirStrip Occupied Pad common to D1 and D2
~ 14 inch Water <sup>2</sup> Injection Line	~ 14 inch Water <sup>1,2</sup> Injection Line
⌵ Bridge	⌵ Bridge
<b>Boundary</b>	<b>Proposed or Permitted (not part of GMT1)</b>
☁ Project Study Area	⌵ Road
⊗ NPR-A	■ Facility
	<b>Existing</b>
	— Pipeline
	⌵ Road
	■ Facility

Date: 9/27/2014

0 0.5 1 2 3 Miles

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NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet

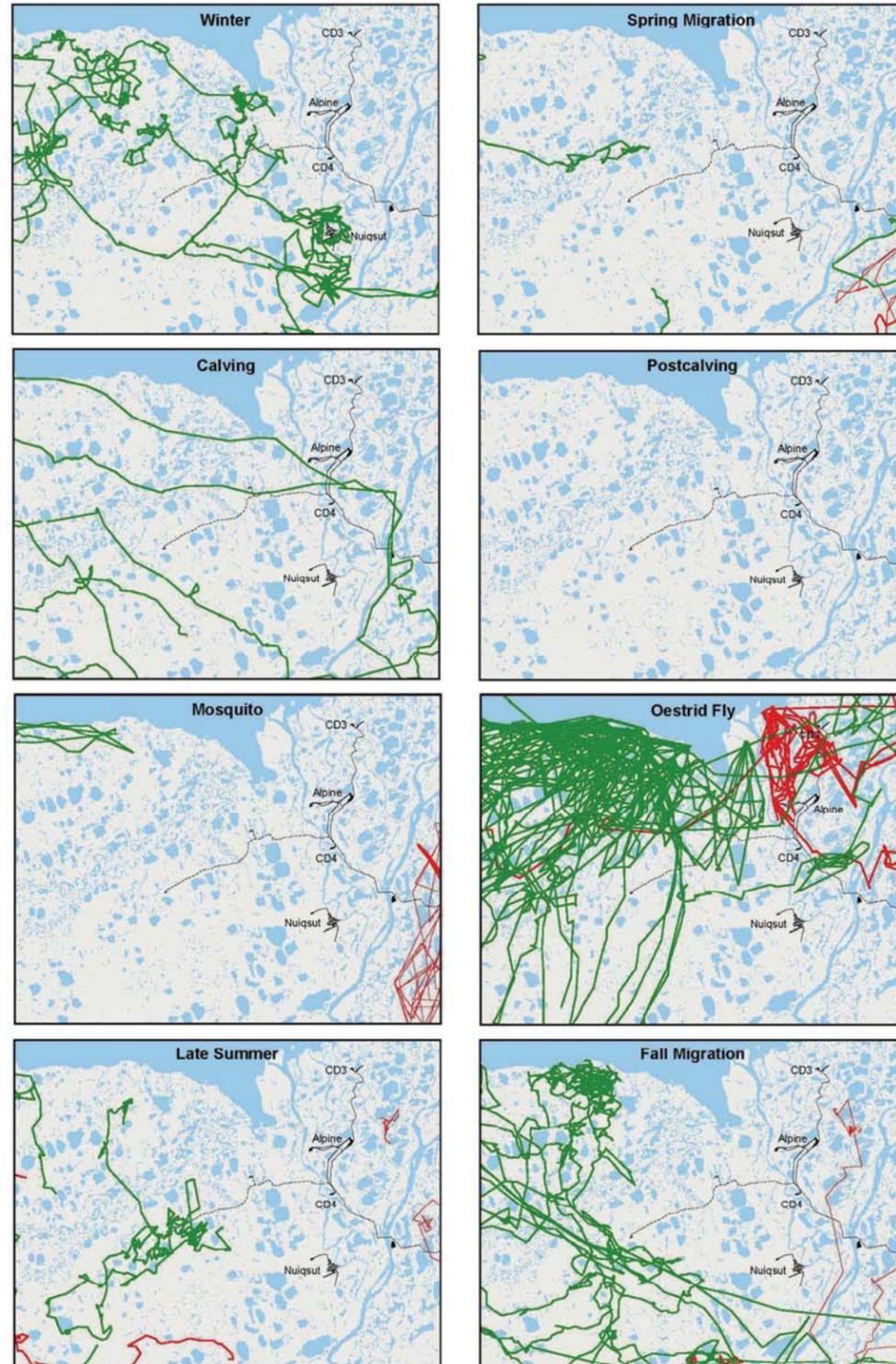


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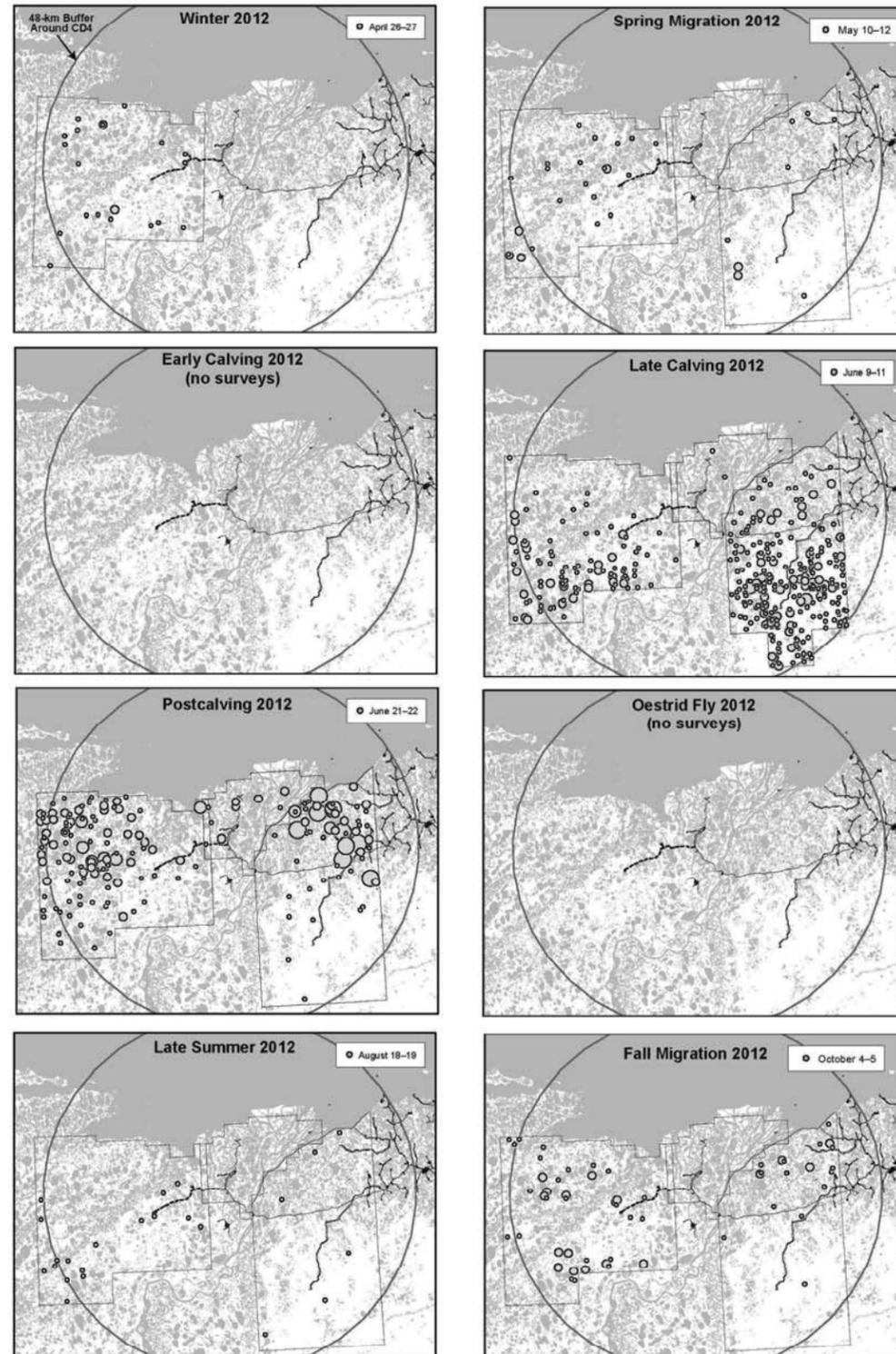
GMT1 Development Project Supplemental Environmental Impact Statement 2014

Footnote:  
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2: 14 inch Water Injection line from CD1/APF to CD4N will be constructed on a new pipe rack. From CD4N to CD5 the 14-inch Water Injection line will be placed on the already proposed or permitted pipe rack (not part of GMT1).

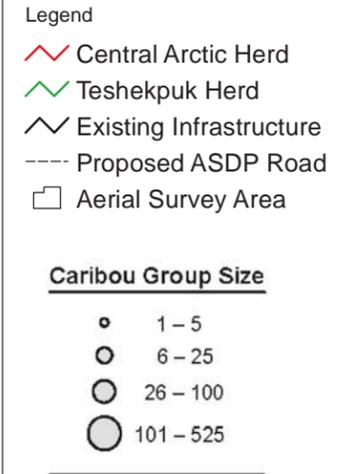
Movements of GPS-collared caribou from the Teshekpuk Herd (2004-2012) and Central Arctic Herd (2003-2006 and 2008-2012) in the vicinity of the proposed ASDP road during 8 different seasons.



Distribution and size of caribou groups during different seasons in the NPR-A, Colville River Delta, and Colville East survey areas, April-October 2012.



Map 3.3-8  
 Ranges of the Teshekpuk and Central Arctic Caribou Herds, GPS and Aerial



— Existing Infrastructure  
 - - - Proposed ASDP Road  
 Source: Lawhead et al. 2012

Date: 10/21/2014

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NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet



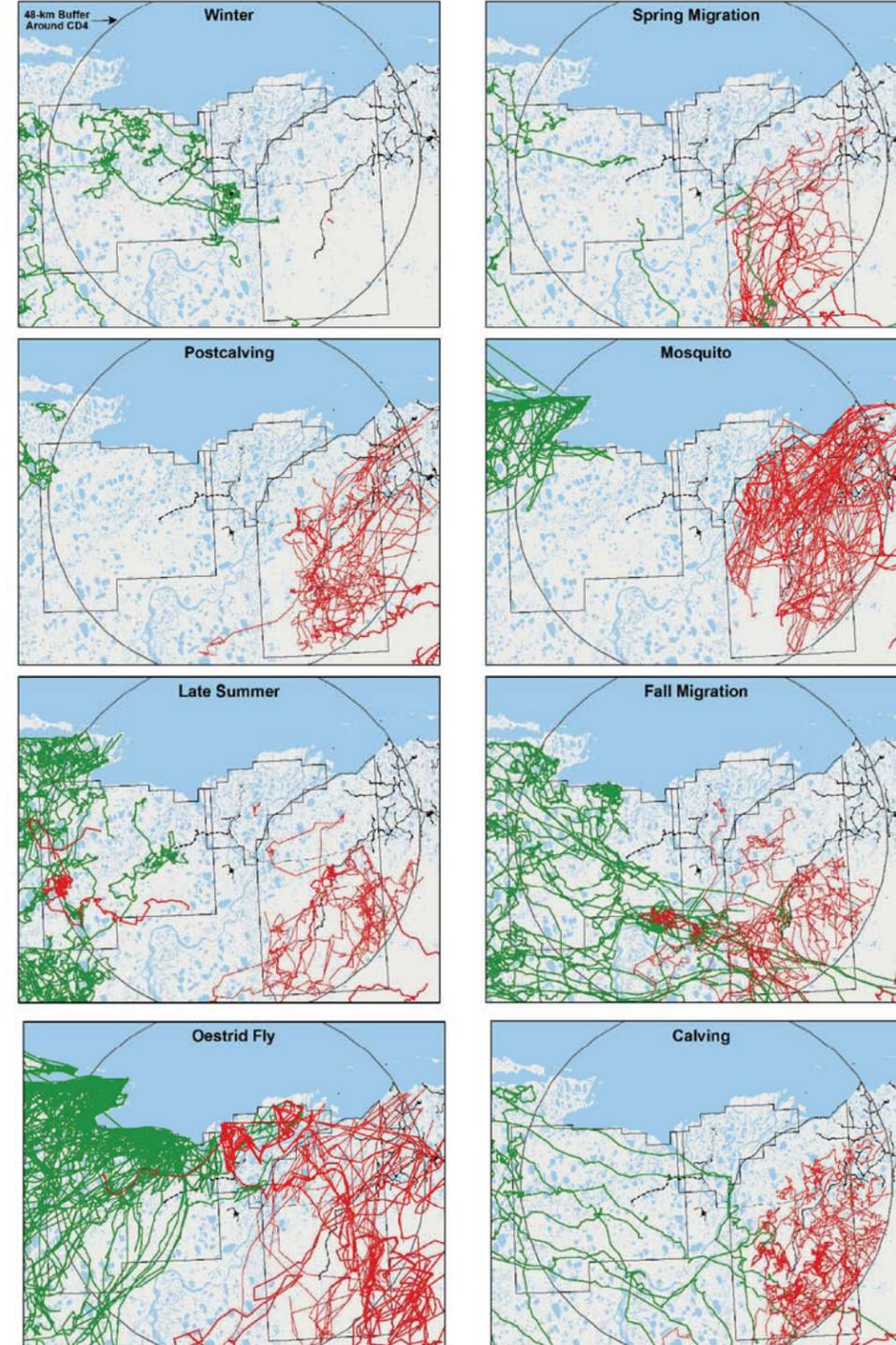
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GMT1 Development Project Supplemental  
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Movements of satellite-collared caribou from the Teshekpuk Herd (1990-2012 and Central Arctic Herd (1986-1990 and 2001-2009) in the ASDP study area during 8 different seasons.



Movements of GPS-collared caribou from the Teshekpuk Herd (2004-2012) and Central Arctic Herd (2003-2006, 2008-2012) in the ASDP study area during 8 different seasons.



Map 3.3-9  
 Ranges of the Teshekpuk and Central Arctic Caribou Herds, Satellite and GPS

Legend  
 ✓ Central Arctic Herd  
 ✓ Teshekpuk Herd  
 \ Existing Infrastructure  
 - - - Proposed ASDP Road  
 □ Aerial Survey Area  
 Source: Lawhead et al. 2012

Date: 10/21/2014

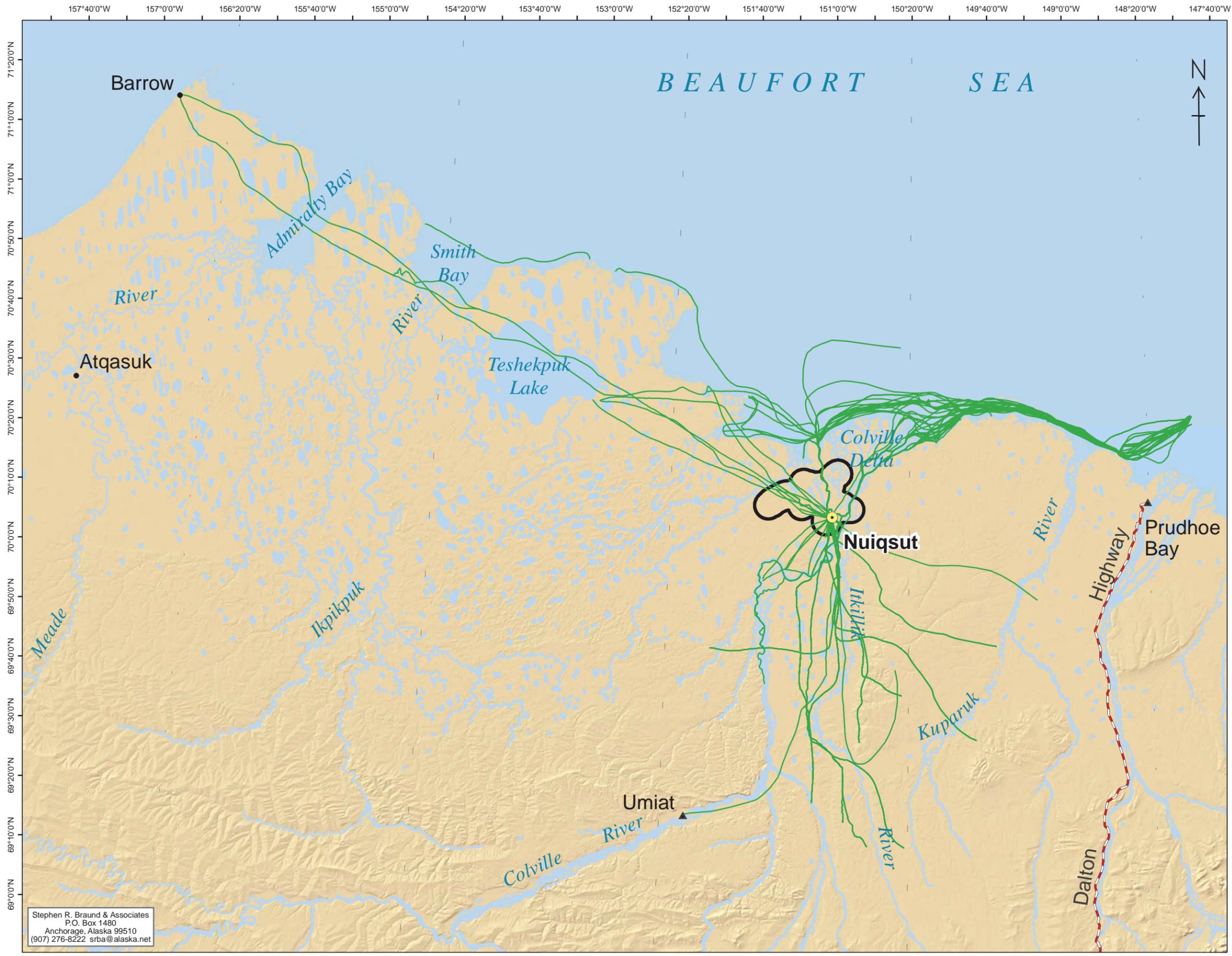
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NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet



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Map 3.3-10

### Nuiqsut Travel Routes

**Legend**

- Nuiqsut Travel Route (Source: SRBA 2010a)
- Project Study Area
- Subsistence Study Community
- Other Community
- ▲ Other Place

Draft Date: 12/6/2013



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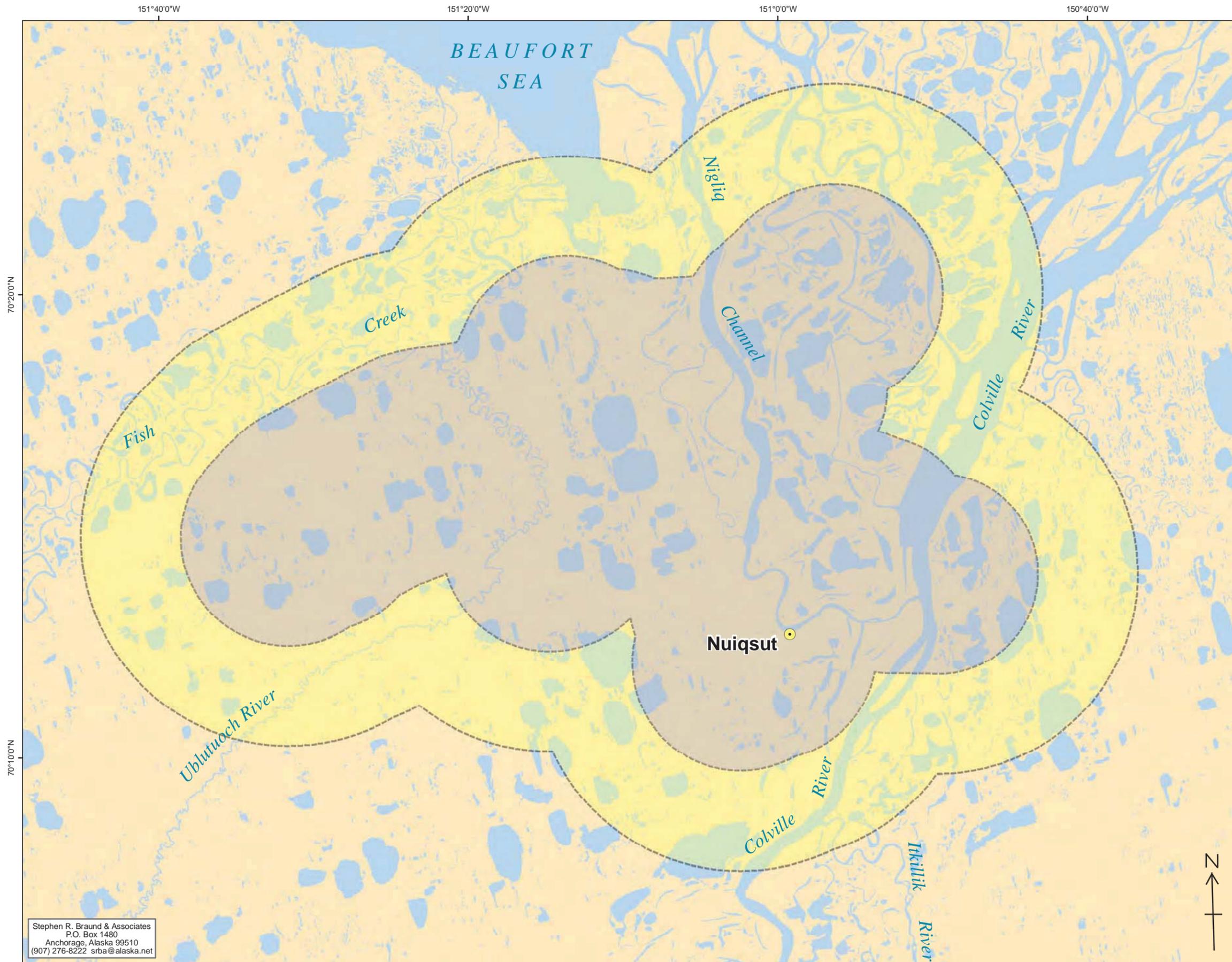
NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet



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Map 3.3-11  
**Visual and Noise  
 Impact Analysis Areas**

- Legend
-  Indirect Impacts Analysis Area (i.e., Project Study Area)
  -  Visual and Noise Impacts Analysis Area
  -  Nuiqsut



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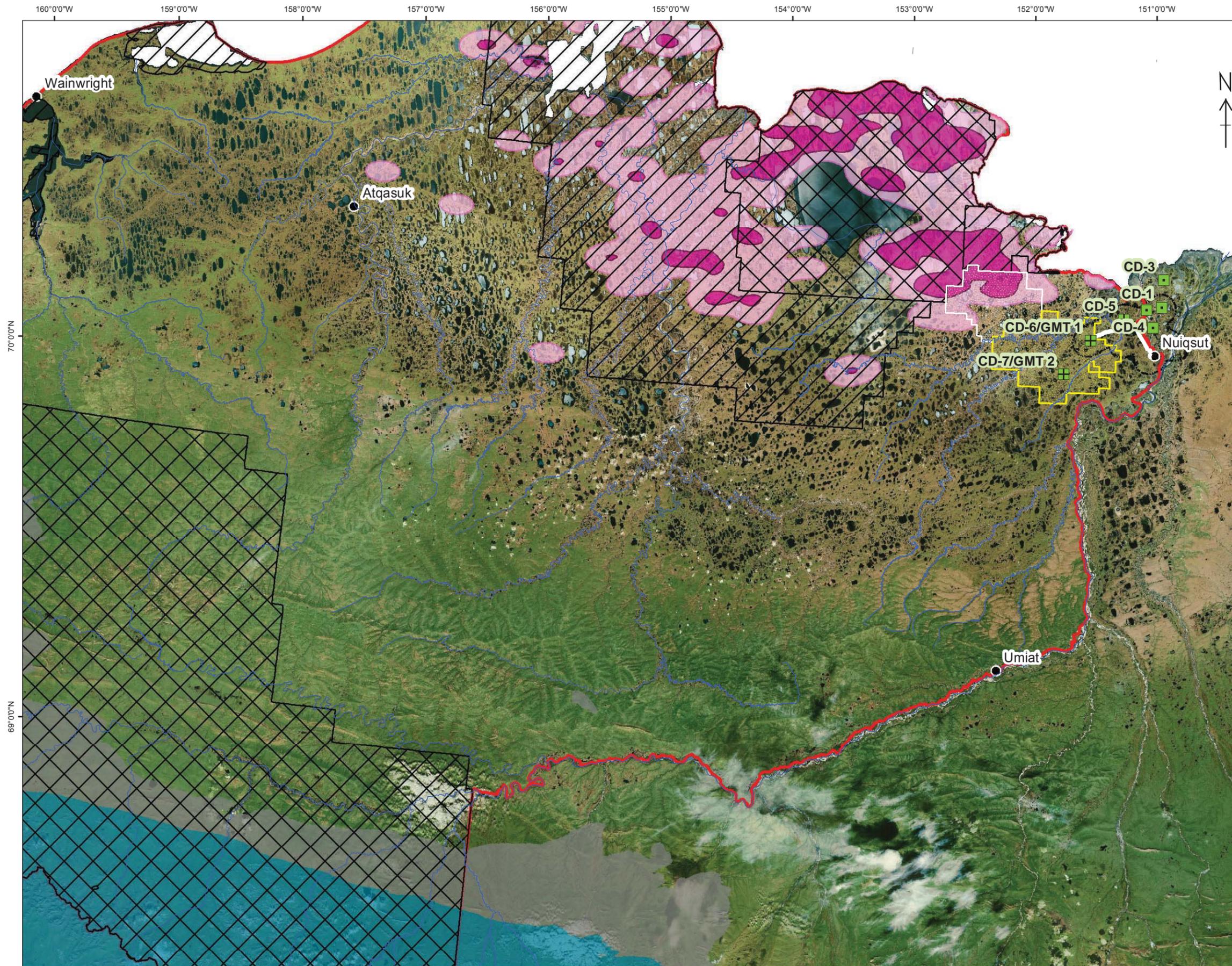
NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet



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Map 3.3-12

**Caribou Summer Areas**

**Teshkepkuk Lake Caribou Herd  
Mosquito Relief Areas**  
(1990-2010 Satellite Telemetry Data)  
**1-15 July**  
Kernel Density Analysis - Density Contour

- 50 %
- 95 %

**Western Arctic Caribou Herd  
Summer Line Density**  
(1988 - 2010)

- 1-2 movement lines crossing each 200 sq mi grid
- >2 movement lines crossing each 200 sq mi grid

**Oil & Gas Leasing**

- Unavailable
- Unavailable- no new non-subsistence infrastructure
- Greater Mooses Tooth Unit
- Bears Tooth Unit

**CONOCO PHILLIPS**

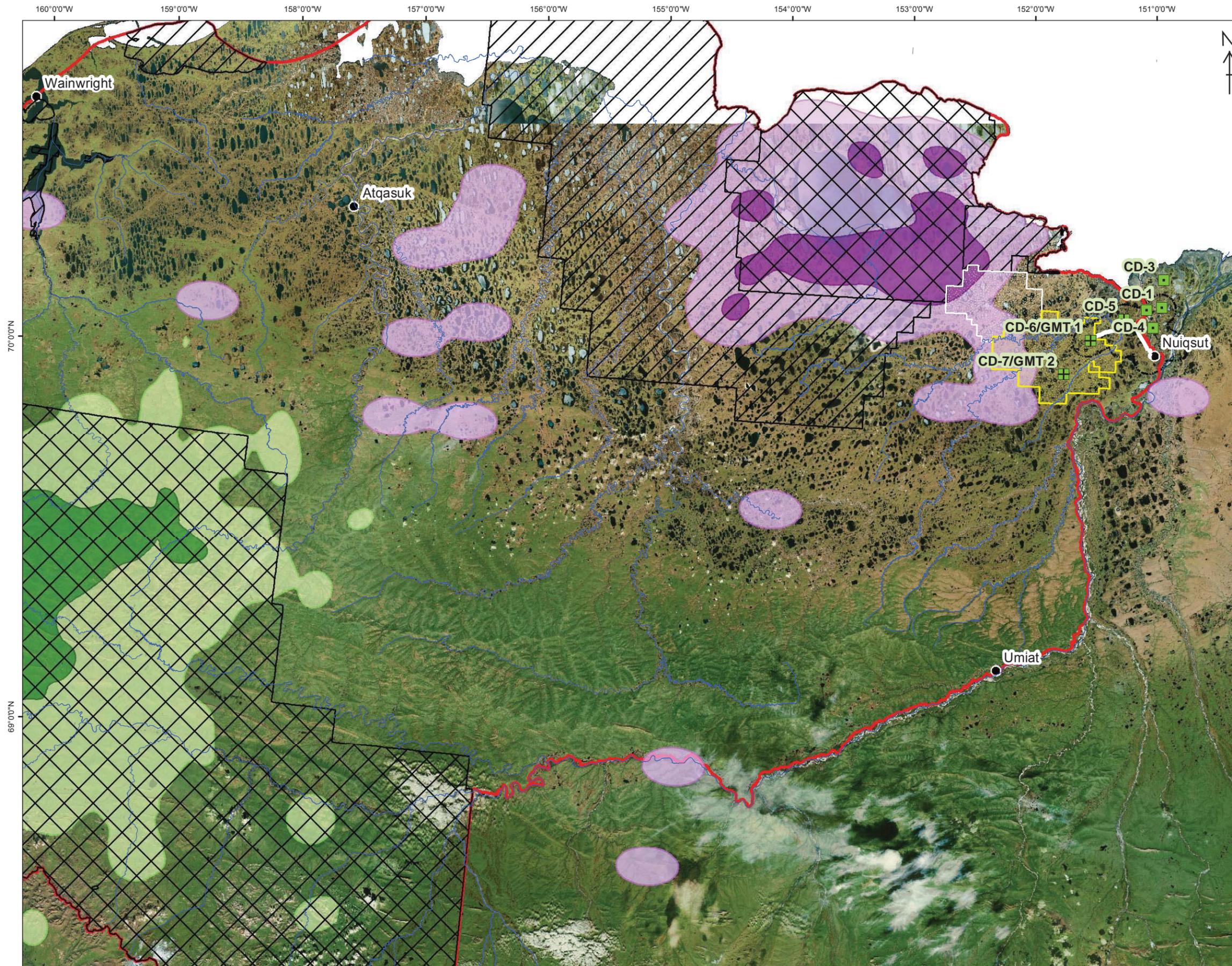
- Existing Facility
- Proposed Facility
- Proposed Roads

NPR-A Boundary

0 5 10 20 30 Miles

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NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet

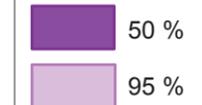


Map 3.3 -13

Caribou Calving Areas

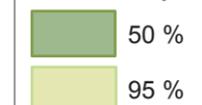
**Teshekpuk Lake Caribou Herd Calving Areas**

(1990-2010 Satellite Telemetry Data)  
**Successful Females Only, 1-15 July**  
 Kernel Density Analysis - Density Contour

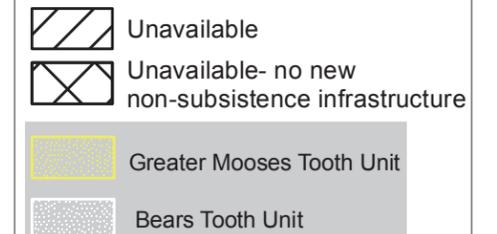


**Western Arctic Caribou Herd Calving Areas**

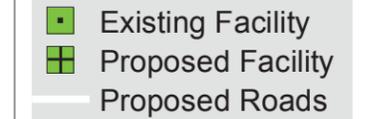
(1987 - 2010, excluding 1990-1991)  
 Kernel Density Analysis - Density Contour



**Oil & Gas Leasing**



**CONOCO PHILLIPS**



NPR-A Boundary



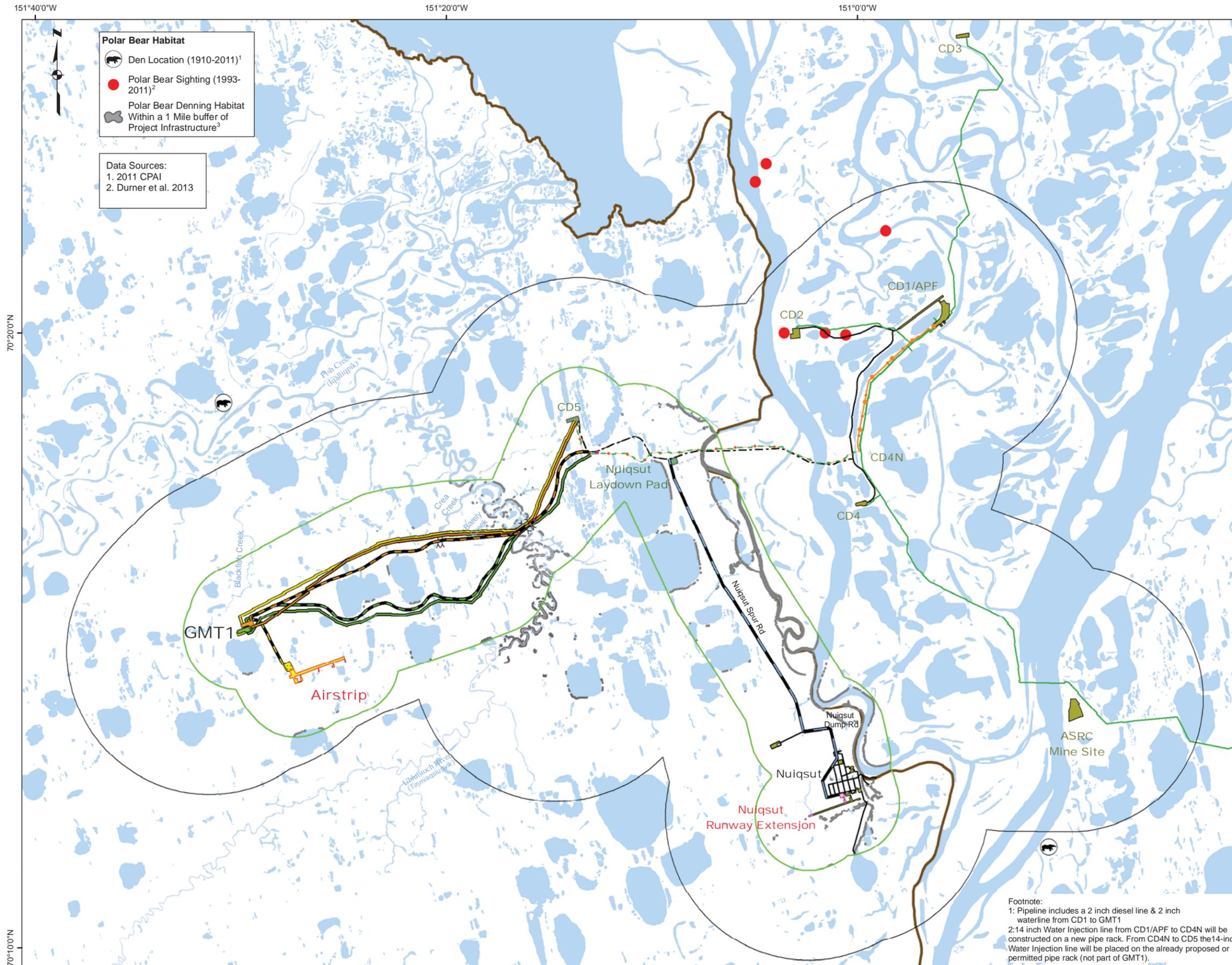
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NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet



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Map 3.3-14

Polar Bear Habitat

Alternative A Infrastructure	Alternative B Infrastructure
Road	Road
Pipeline	Pipeline
Facility	Facility
14 inch Water <sup>2</sup> Injection Line	14 inch Water <sup>2</sup> Injection Line
Bridge	Bridge
Alternative C Infrastructure	Alternative D1/D2 Infrastructure
Road	Road
Pipeline	Pipeline
Facility	Facility
Nuiqsut Road	AirStrip
Nuiqsut Airport Upgrade Facilities	AirStrip additional Occupied Pad-for D1
14 inch Water <sup>1,2</sup> Injection Line	14 inch Water <sup>1,2</sup> Injection Line
Bridge	Bridge
Existing Pipeline	Proposed or Permitted (not part of GMT1) Road
Existing Road	Proposed or Permitted (not part of GMT1) Facility
Existing Facility	
Boundary	
Project Study Area	
NPR-A	
1 Mile Infrastructure Buffer	

Date: 10/21/2014

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NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet

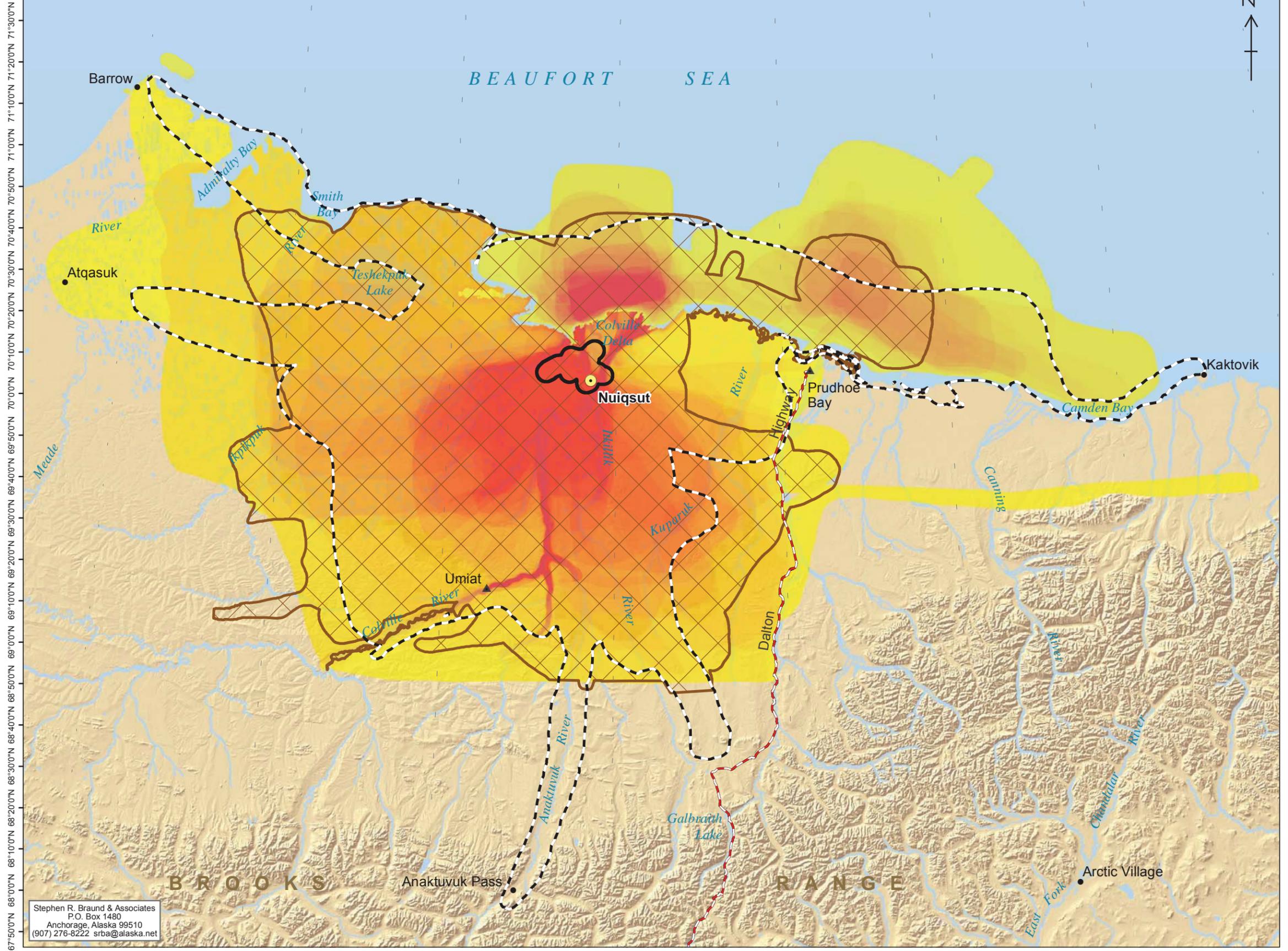


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Footnote:  
1: Pipeline includes a 2 inch diesel line & 2 inch waterline from CD1 to GMT1  
2: 14 inch Water Injection line from CD1/APF to CD4N will be constructed on a new pipe rack. From CD4N to CD5 the 14-inch Water Injection line will be placed on the already proposed or permitted pipe rack (not part of GMT1).

158°20'0"W 157°40'0"W 157°0'0"W 156°20'0"W 155°40'0"W 155°0'0"W 154°20'0"W 153°40'0"W 153°0'0"W 152°20'0"W 151°40'0"W 151°0'0"W 150°20'0"W 149°40'0"W 149°0'0"W 148°20'0"W 147°40'0"W 147°0'0"W 146°20'0"W 145°40'0"W 145°0'0"W 144°20'0"W 143°40'0"W 143°0'0"W 142°20'0"W



Map 3.4-1  
**Nuiqsut Contemporary Subsistence Use Areas, All Resources**

- Legend
- All Resources, 1973-1986 (Source: Pedersen 1986)
  - All Resources, 1994-2003 (Source: SRBA 2003)
- Nuiqsut Combine Subsistence Use Areas
- Heavy Use
  - Moderate Use
- Project Study Area

Date: 12/6/2013



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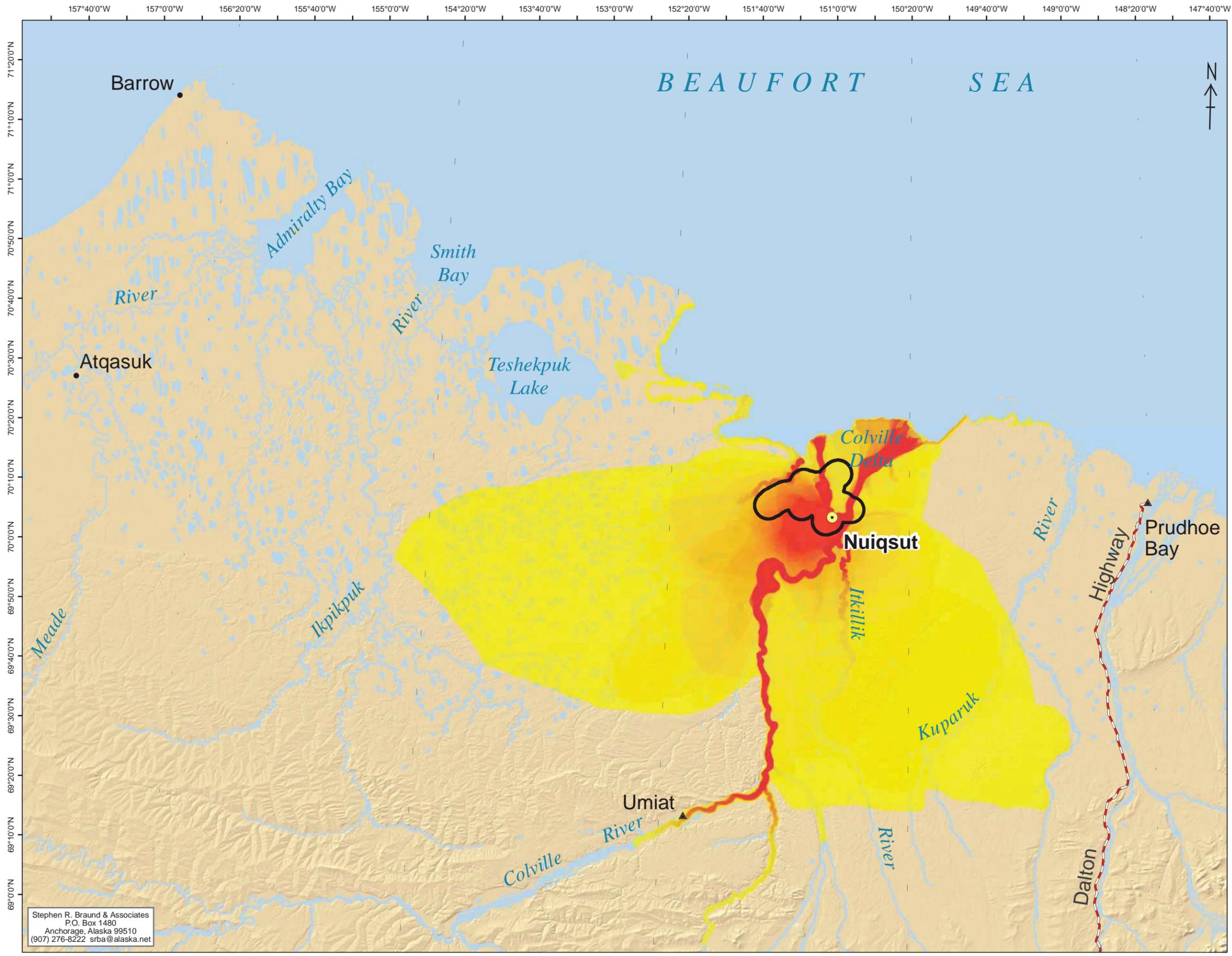
NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet



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71°30'0"N 71°10'0"N 71°0'0"N 70°50'0"N 70°40'0"N 70°30'0"N 70°20'0"N 70°10'0"N 70°0'0"N 69°50'0"N 69°40'0"N 69°30'0"N 69°20'0"N 69°10'0"N 69°0'0"N 68°50'0"N 68°40'0"N 68°30'0"N 68°20'0"N 68°10'0"N 68°0'0"N



Map 3.4-2  
**Nuiqsut Caribou Subsistence  
 Use Areas, 2008-2011**

**Legend**

Caribou Subsistence Use Areas

- Heavy Use
- Moderate Use

Project Study Area

Date: 12/6/2013

0 5 10 20 30 Miles

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158°20'0"W 157°40'0"W 157°0'0"W 156°20'0"W 155°40'0"W 155°0'0"W 154°20'0"W 153°40'0"W 153°0'0"W 152°20'0"W 151°40'0"W 151°0'0"W 150°20'0"W 149°40'0"W 149°0'0"W 148°20'0"W 147°40'0"W 147°0'0"W 146°20'0"W 145°40'0"W 145°0'0"W 144°20'0"W 143°40'0"W 143°0'0"W 142°20'0"W



Map 3.4-3  
**Nuiqsut Historic and Lifetime  
 Subsistence Use Areas,  
 All Resources**

- Legend
- All Resources, Lifetime  
(Source: Pedersen 1979)
  - All Resources, Early 1970s  
(Source: Brown 1979)

- Project Study Area
- Subsistence Study Community
- Other Community
- Other Place

Date: 12/6/2013



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NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet

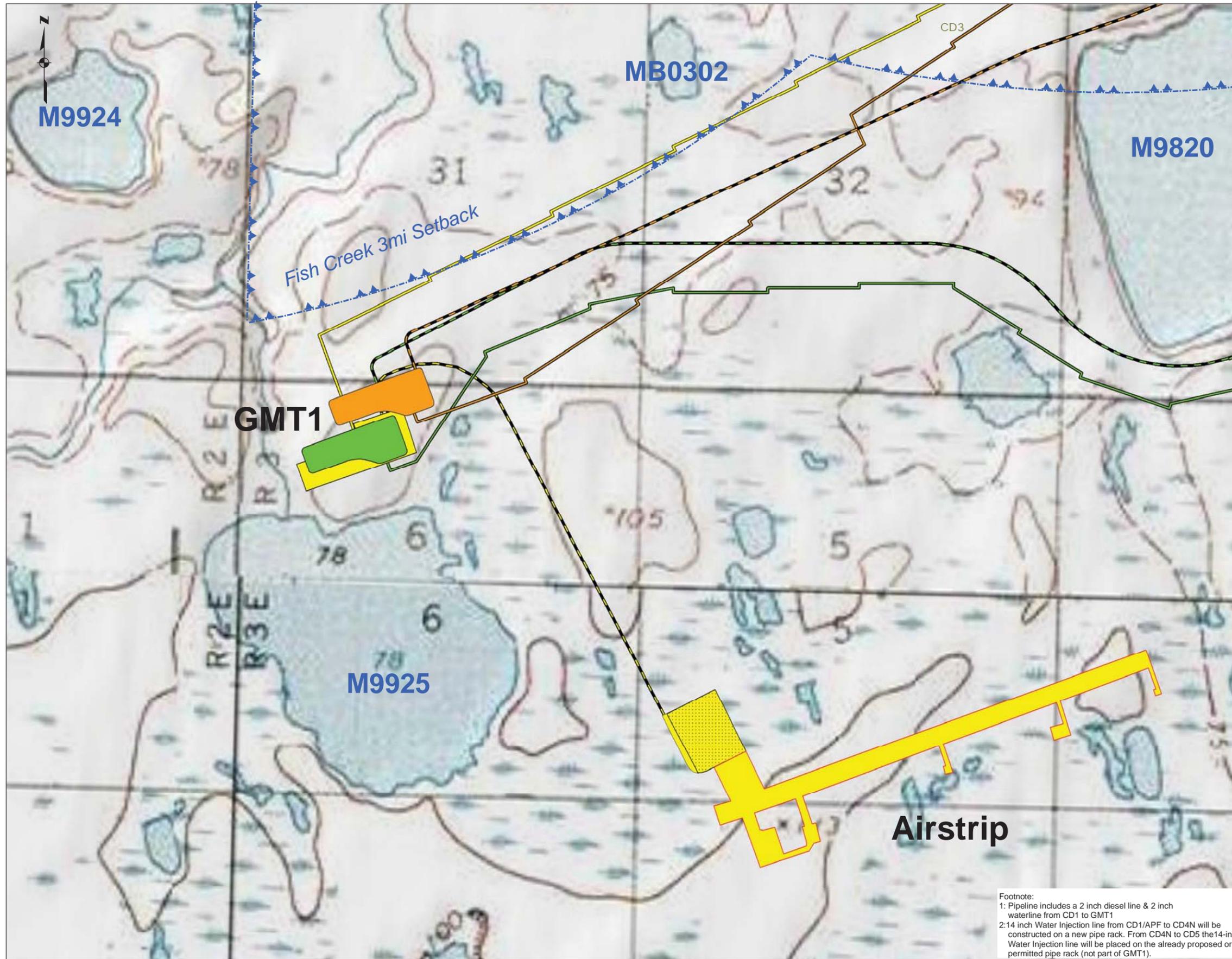


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71°30'0"N 71°20'0"N 71°10'0"N 71°0'0"N 70°50'0"N 70°40'0"N 70°30'0"N 70°20'0"N 70°10'0"N 70°0'0"N 69°50'0"N 69°40'0"N 69°30'0"N 69°20'0"N 69°10'0"N 69°0'0"N 68°50'0"N 68°40'0"N 68°30'0"N 68°20'0"N 68°10'0"N 68°0'0"N 67°50'0"N



Map 4.2-1  
Water Resources  
Near the GMT1 Pad

Alternative A Infrastructure		Alternative B Infrastructure	
	Road		Road
	Pipeline		Pipeline
	Facility		Facility
Alternative C Infrastructure		Alternative D1/D2 Infrastructure	
	Road		Pipeline
	Pipeline		Road
	Facility		Facility
			AirStrip
			AirStrip Occupied Pad-D1
			AirStrip Occupied Pad-D2

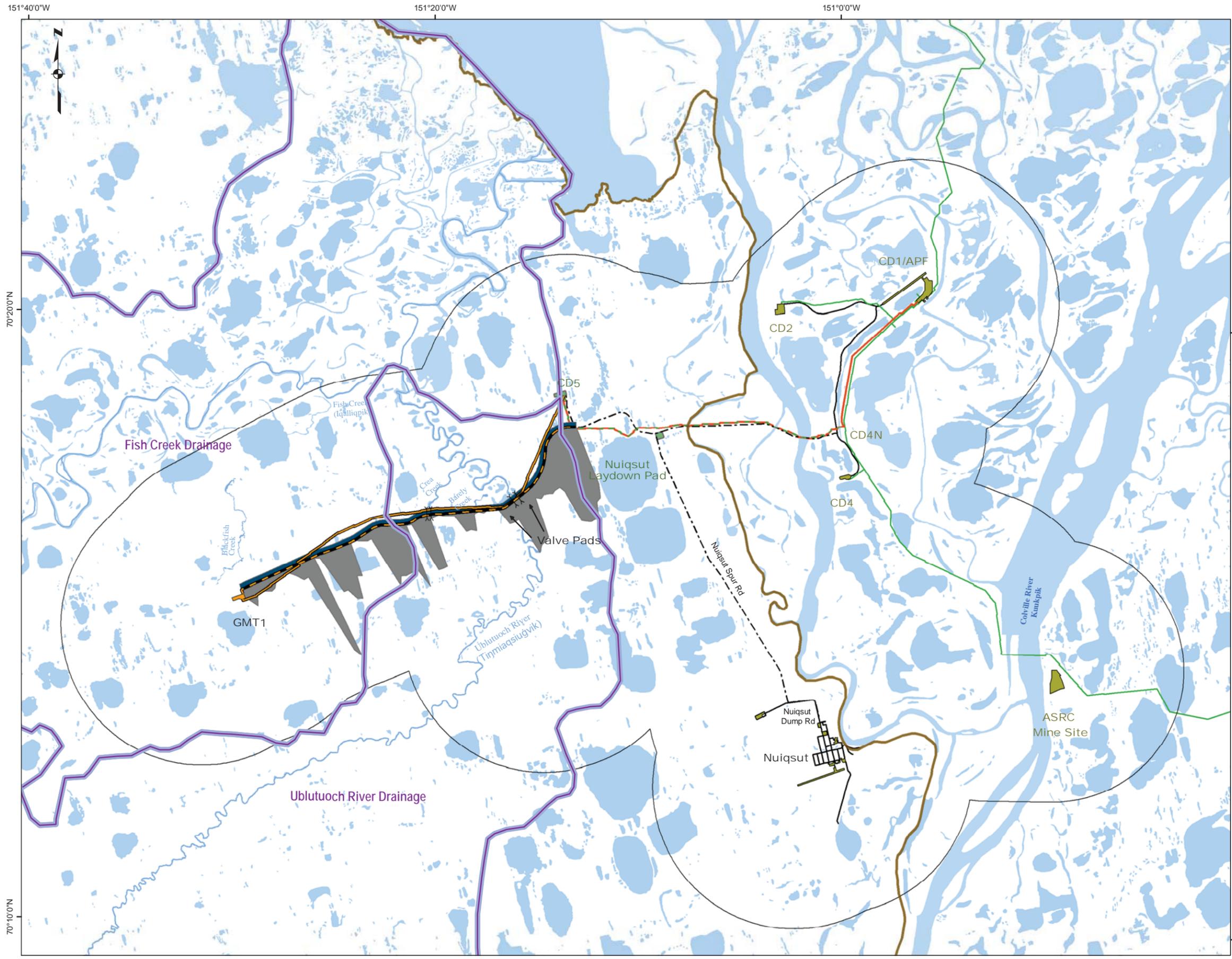
Setback Area  
Fish Creek 3mi

Date: 9/27/2014  
0 400 800 1,600 2,400 Feet

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NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet

Footnote:  
1: Pipeline includes a 2 inch diesel line & 2 inch waterline from CD1 to GMT1  
2: 14 inch Water Injection line from CD1/APF to CD4N will be constructed on a new pipe rack. From CD4N to CD5 the 14-inch Water Injection line will be placed on the already proposed or permitted pipe rack (not part of GMT1).



**Map 4.2-2**  
**Alternatives A and C**  
**Potential Inundation Analysis**

- |   |   |
|---|---|
| <b>Alternative A Infrastructure</b>       | <b>Proposed or Permitted (not part of GMT1)</b> |
| Road                                      | Pipeline  |
| Pipeline                                  | Road  |
| Facility                                  | Facility  |
| 14 inch Water <sup>1</sup> Injection Line | Existing Pipeline                               |
| Bridge                                    | Existing Road                                   |
|   | Existing Facility                               |

- Boundaries**
- NPR-A
  - Project Study Area
  - Drainage Basins

- Potential Inundation Area**
- Decreased Inundation Area
  - Potential Inundation Area

**Footnote:**  
 1: 14 inch Water Injection line from CD1/APF to CD4N will be constructed on a new pipe rack. From CD4N to CD5 the 14-inch Water Injection line will be placed on the already proposed or permitted pipe rack (not part of GMT1).

Date: 9/29/2014



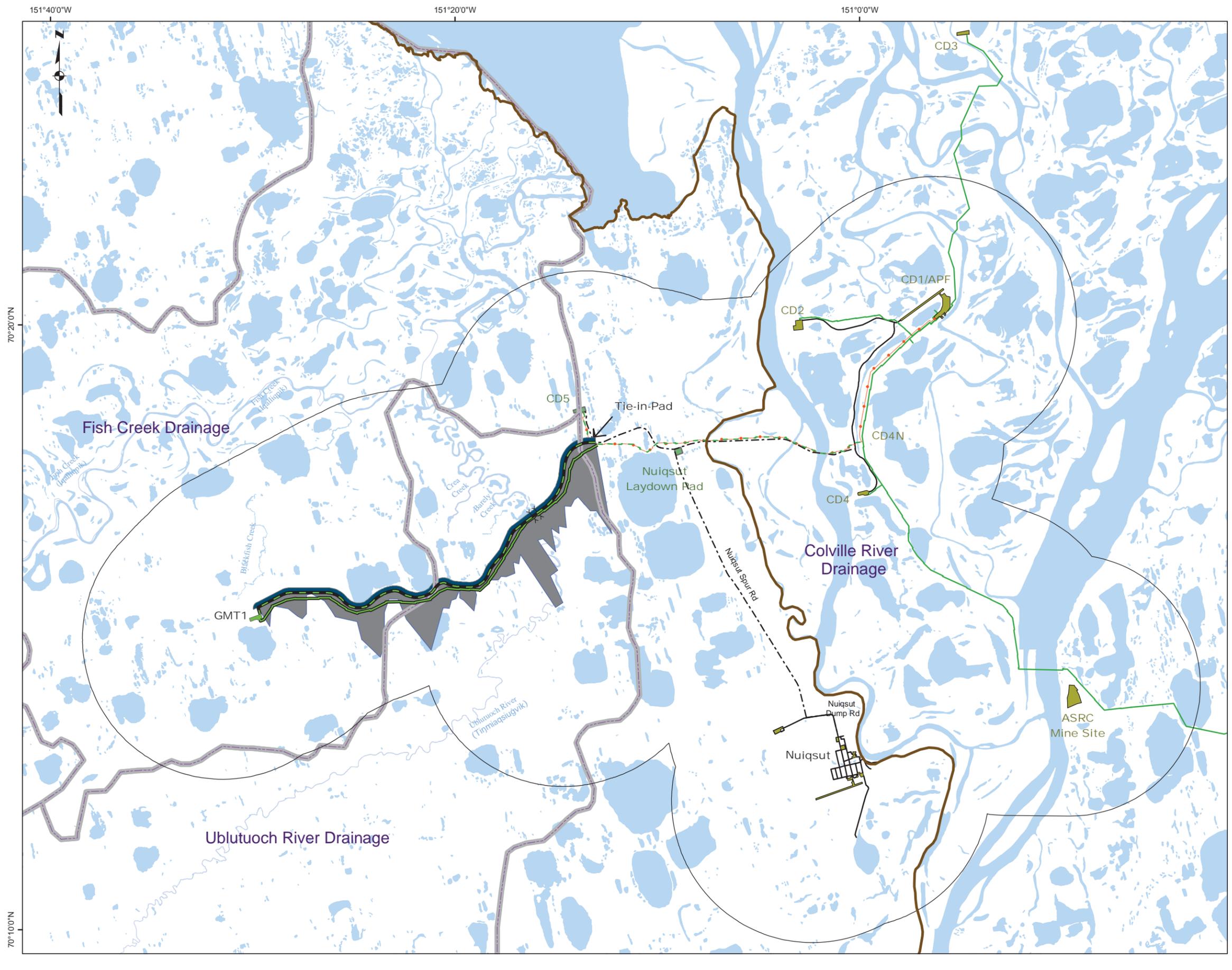
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NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet



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**Map 4.2-3**  
**Alternative B**  
**Potential**  
**Inundation Analysis**

- |   |   |
|---|---|
| <b>Alternative B Infrastructure</b>       | <b>Proposed or Permitted (not part of GMT1)</b> |
| Road                                      | Pipeline  |
| Pipeline                                  | Road  |
| Facility                                  | Facility  |
| 14 inch Water <sup>1</sup> Injection Line | <b>Boundary</b>                                 |
| Bridge                                    | Drainage Basin                                  |
| <b>Existing</b>                           | Project Study Area                              |
| Pipeline                                  | NPR-A   |
| Road                                      |   |
| Facility                                  |   |

**Potential Inundation Area**

- Decreased Inundation Area
- Potential Inundation Area

NOTE: ROUGH ORDER OF MAGNITUDE ESTIMATE OF MAXIMUM INUNDATION

Footnote:  
 1: 14 inch Water Injection line from CD1/APF to CD4N will be constructed on a new pipe rack. From CD4N to CD5 the 14-inch Water Injection line will be placed on the already proposed or permitted pipe rack (not part of GMT1).

Draft Date: 9/28/2014



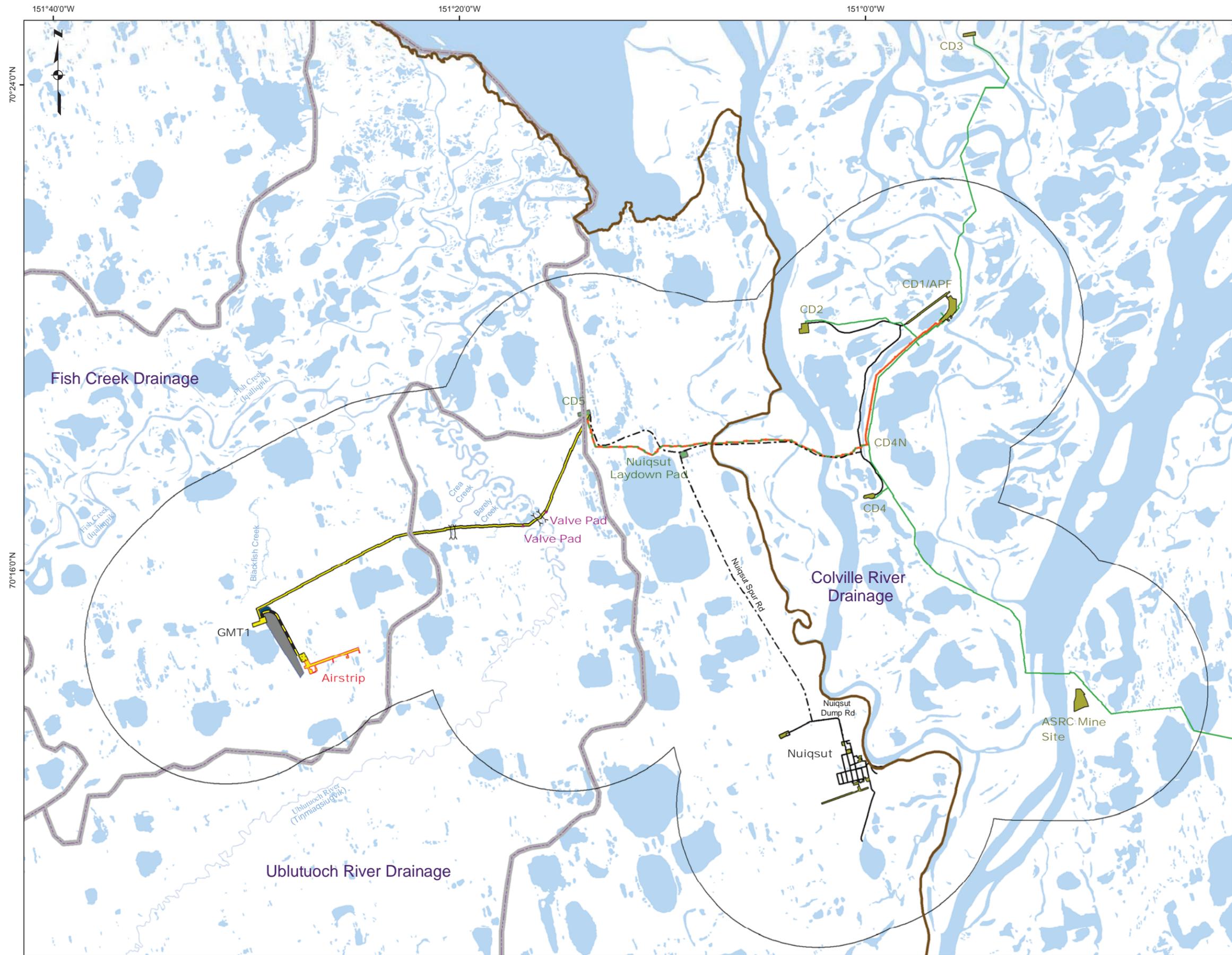
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NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet



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Map 4.2-4  
**Alternatives D1 and D2  
 Potential Inundation Analysis**

- |   |   |
|---|---|
| <b>Alternative D1/D2 Infrastructure</b>     | <b>Proposed or Permitted (not part of GMT1)</b> |
| Road  | Pipeline  |
| Pipeline                                    | Road  |
| Facility                                    | Facility  |
| Facility                                    | <b>Existing</b>                                 |
| Facility                                    | Pipeline  |
| Facility                                    | Road  |
| Facility                                    | Facility  |
| 14 inch Water <sup>1,2</sup> Injection Line | <b>Boundary</b>                                 |
| Bridge                                      | Drainage Basin                                  |
|   | Project Study Area                              |
|   | NPR-A   |

- Potential Inundation Area**
- Decreased Inundation Area
  - Potential Inundation Area

NOTE: ROUGH ORDER OF MAGNITUDE ESTIMATE OF MAXIMUM INUNDATION

Footnote:  
 1: Pipeline includes a 2 inch diesel line & 2 inch waterline from CD1 to GMT1  
 2: 14 inch Water Injection line from CD1/APF to CD4N will be constructed on a new pipe rack. From CD4N to CD5 the 14-inch Water Injection line will be placed on the already proposed or permitted pipe rack (not part of GMT1).

Date: 9/29/2014



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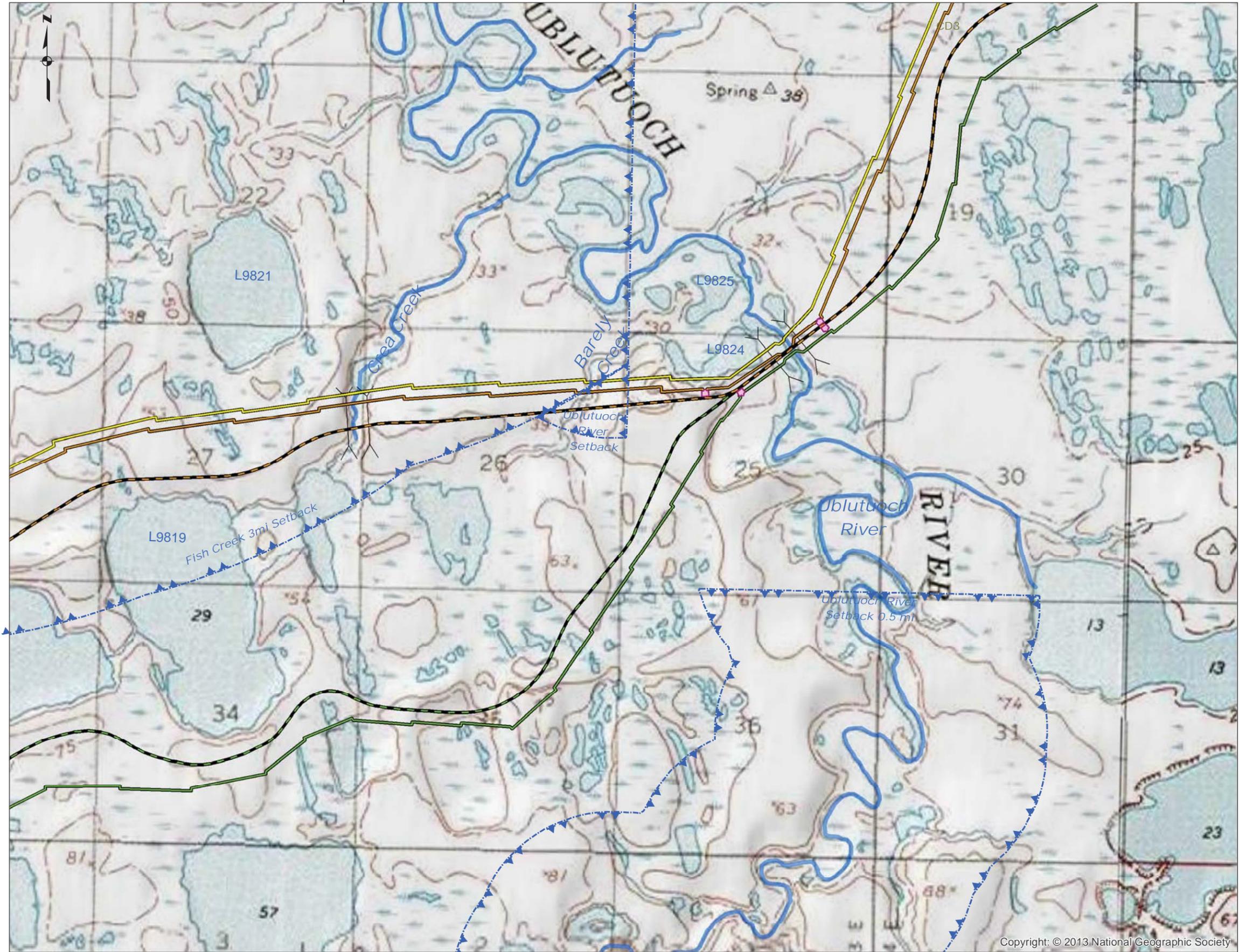
NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet



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151°20'0"W



Map 4.2-5  
 Road and Pipeline Crossings:  
 Tinġmiaqsġvik (Ublutuoch) River,  
 Crea Creek and Barely Creek

Alternative A Infrastructure	Alternative B Infrastructure
Road	Road
Pipeline	Pipeline
Pipeline Valvepad	Facility
Bridge	Bridge
	Pipeline Valvepad
Alternative C Infrastructure	Alternative D1/D2 Infrastructure
Road	Pipeline
Pipeline	Pipeline Valvepad
Pipeline Valvepad	Bridge
Bridge	

**Setback Area**  
 Fish Creek 3mi  
 Ublutuoch River 0.5mi

Date: 10/21/2014  
 0 0.125 0.25 0.5 0.75 Miles

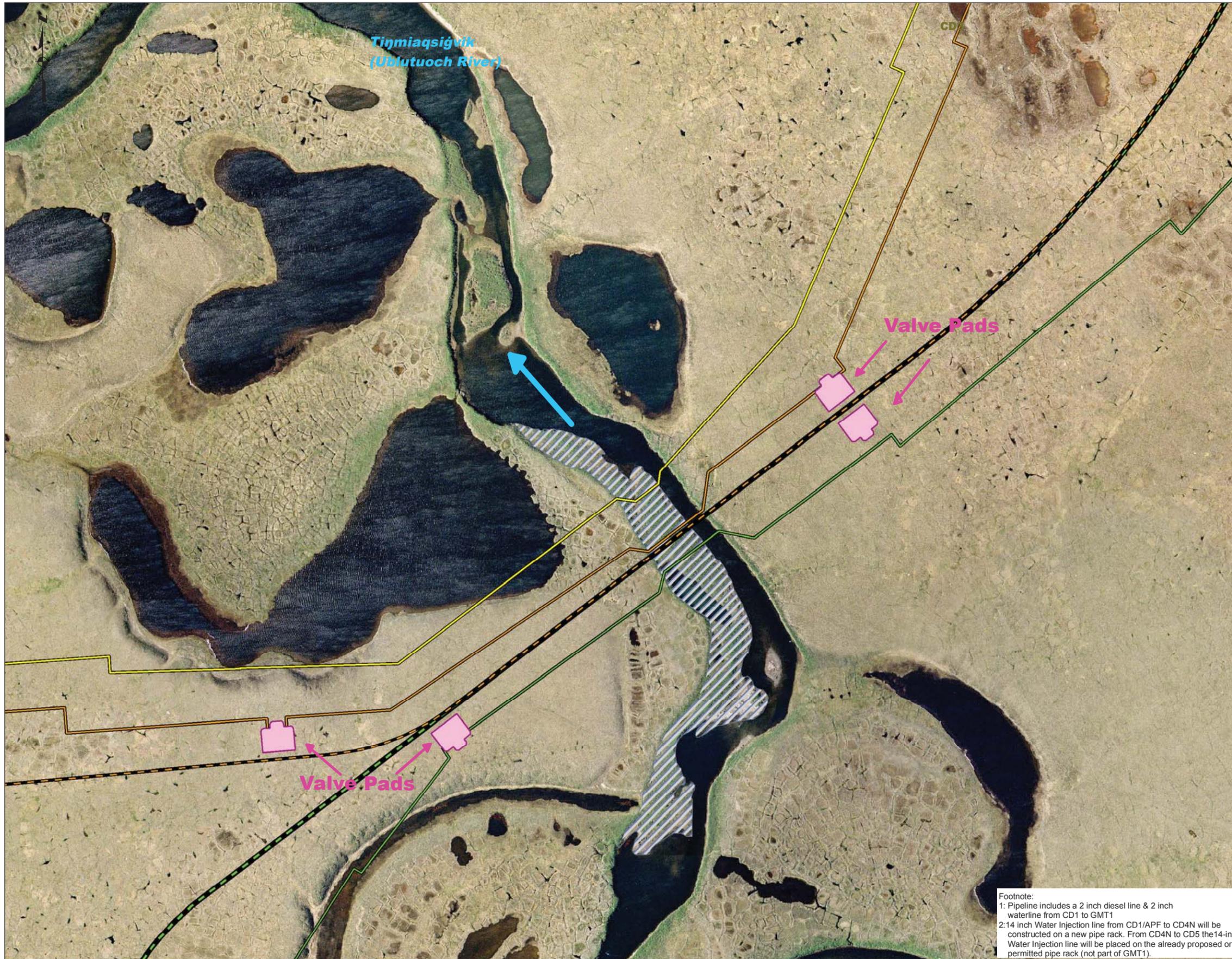
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NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet



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Map 4.2-6  
 Road and Pipeline Crossings:  
 Tinmiaqsigvik (Ublutuoch)  
 River Crossing

<b>Alternative A Infrastructure</b>	<b>Alternative B Infrastructure</b>
Road	Road
Pipeline	Pipeline
Pipeline Valvepad	Pipeline Valvepad
<b>Alternative C Infrastructure</b>	<b>Alternative D1/D2 Infrastructure</b>
Road	Pipeline
Pipeline	Pipeline Valvepad
Pipeline Valvepad	

**Hydrology**

Water Flow Direction of Gradient

Lower Flood Plain Area

Date: 9/29/2014

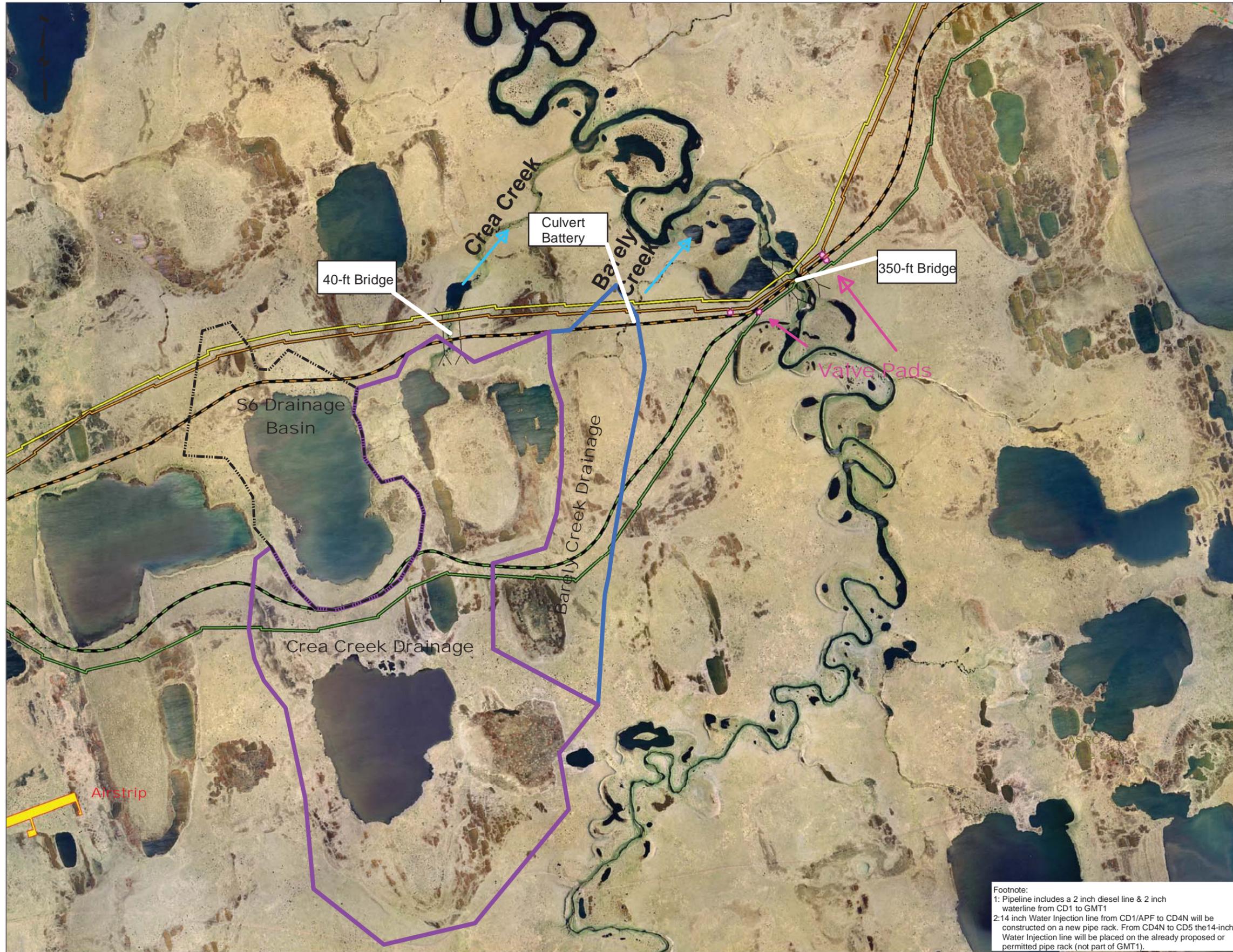
0 140 280 560 840 Feet

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NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet

Footnote:  
 1: Pipeline includes a 2 inch diesel line & 2 inch waterline from CD1 to GMT1  
 2: 14 inch Water Injection line from CD1/APF to CD4N will be constructed on a new pipe rack. From CD4N to CD5 the 14-inch Water Injection line will be placed on the already proposed or permitted pipe rack (not part of GMT1).

151°20'0"W



Map 4.2-7  
Crea Creek and Barely Creek Drainage Basins

- |                                     |                                     |
|-------------------------------------|-------------------------------------|
| <b>Alternative A Infrastructure</b> | <b>Alternative B Infrastructure</b> |
| Road                                | Road                                |
| Pipeline                            | Pipeline                            |
| Bridge                              | Bridge                              |

- |                                     |   |
|-------------------------------------|---|
| <b>Alternative C Infrastructure</b> | <b>Alternative D1/D2 Infrastructure</b> |
| Road                                | Pipeline                                |
| Pipeline                            | AirStrip                                |
| Bridge                              | Bridge                                  |

- Creek\_Drainage**
- Barely Creek Drainage
  - Crea Creek Drainage
  - S6 Drainage Basin
- Direction of water flow

Date: 9/27/2014  
 0 0.125 0.25 0.5 0.75 Miles

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NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet



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Footnote:  
 1: Pipeline includes a 2 inch diesel line & 2 inch waterline from CD1 to GMT1  
 2: 14 inch Water Injection line from CD1/APF to CD4N will be constructed on a new pipe rack. From CD4N to CD5 the 14-inch Water Injection line will be placed on the already proposed or permitted pipe rack (not part of GMT1).

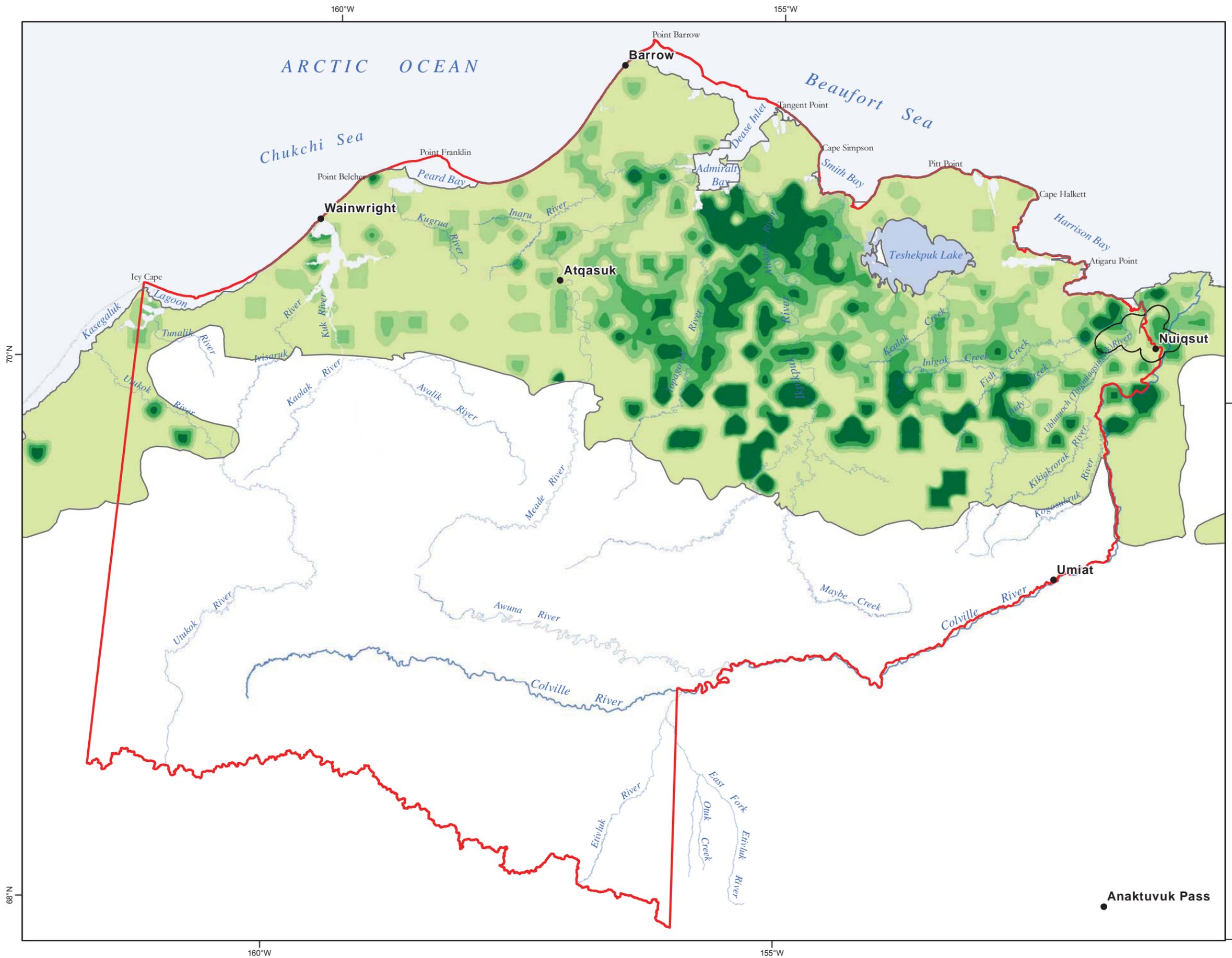


Figure 4.3-1  
 Yellow Billed Loon Estimated Relative Onshore Density Within The Arctic Coastal Plain, 1993-2010

Source: USFWS - 2010b

**YELLOW-BILLED LOON**  
**Estimated Relative Onshore Density (1993-2010)**

Birds per Square Kilometer

- 0.19 - 0.38
- 0.11 - 0.18
- 0.06 - 0.10
- 0.02 - 0.05
- 0.00 - 0.01

- Survey Area Boundary
- GMT1 Project Study Area
- NPR-A Boundary

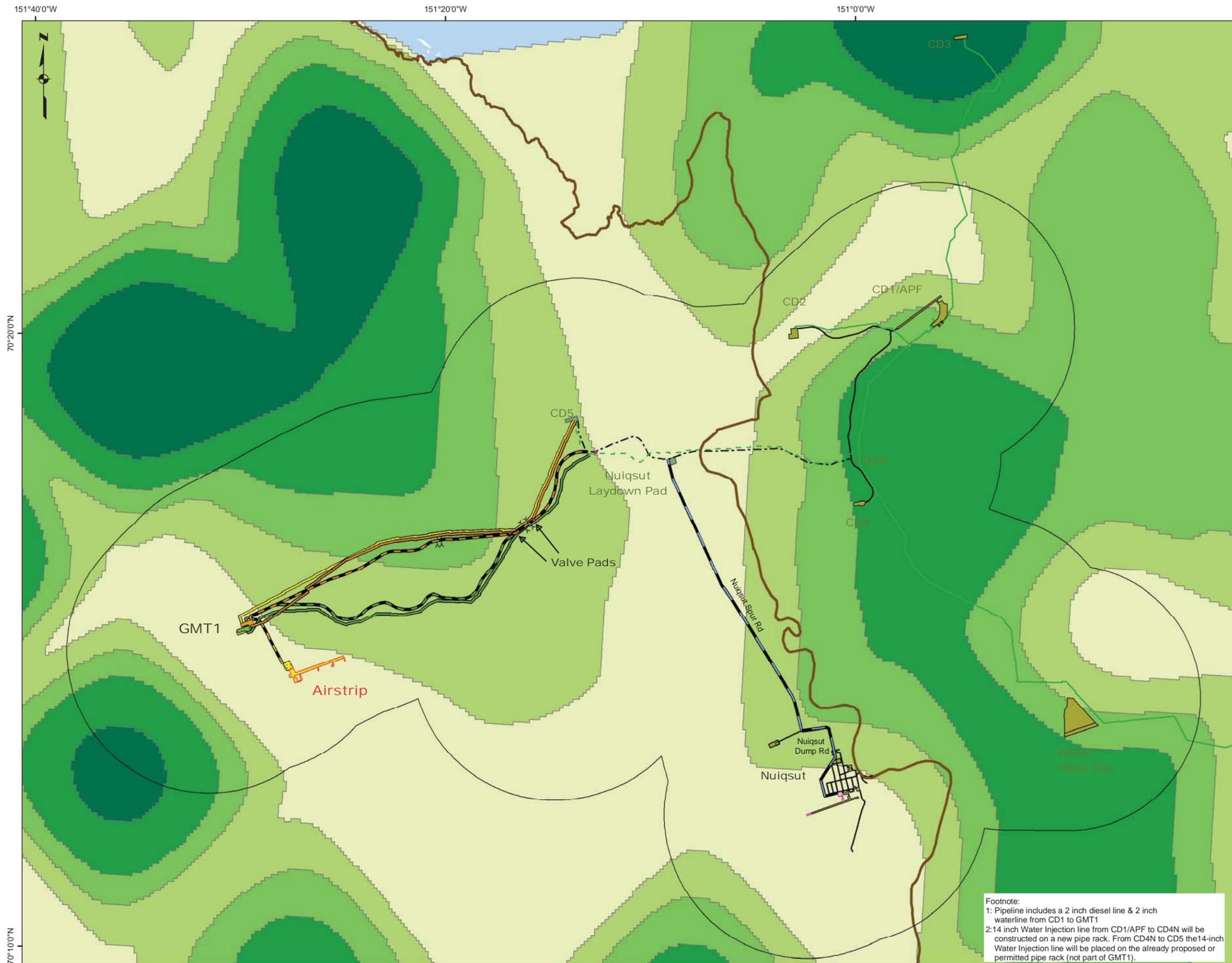


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Projection: Albers Conic Equal Area referencing NAD83



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**Map 4.3-2**  
**Yellow-billed Loon**  
**Estimated Relative Onshore**  
**Density within the**  
**Project Study Area, 1993-2010**

<b>Alternative A Infrastructure</b>	<b>Alternative B Infrastructure</b>
Road	Road
Pipeline	Pipeline
Facility	Facility
14 inch Water <sup>2</sup> Injection Line	14 inch Water <sup>2</sup> Injection Line
Bridge	Bridge
<b>Alternative C Infrastructure</b>	<b>Alternative D1/D2 Infrastructure</b>
Road	Road
Pipeline	Pipeline
Facility	Facility
Nuiqsut Road	AirStrip
Nuiqsut Airport Upgrade Facilities	AirStrip Occupied Pad common to D1 and D2
14 inch Water <sup>2</sup> Injection Line	AirStrip additional Occupied Pad-for D1
Bridge	14 inch Water <sup>1,2</sup> Injection Line
Boundary	Bridge
Project Study Area	

**Yellow Billed Loons**  
**Estimated Relative**  
**Onshore Density**  
**(1993-2010)**

	0.00-0.01
	0.02-0.05
	0.06-0.10
	0.11-0.18
	0.19-0.38

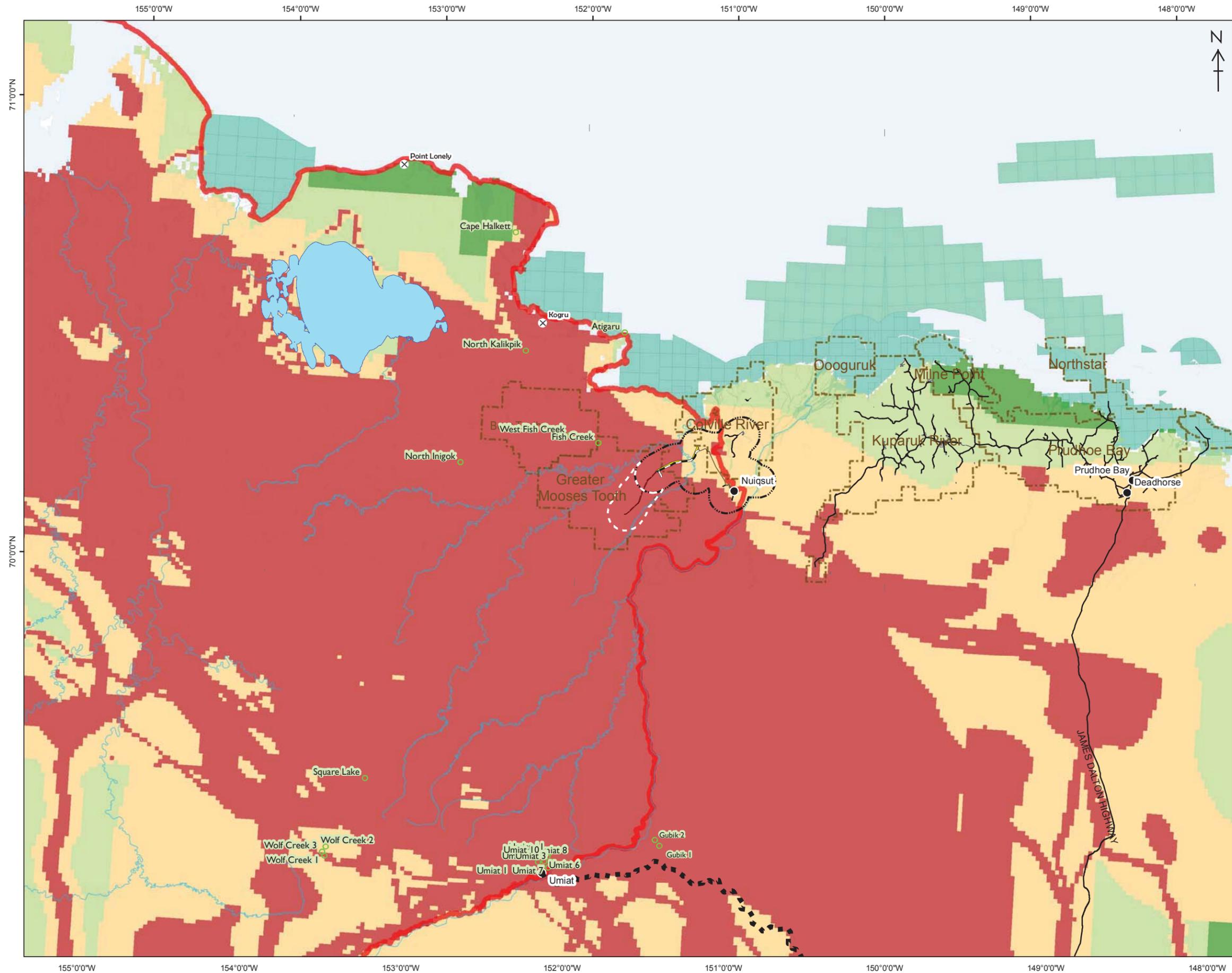
Date: 9/29/2014      Source: USFWS 2010b

0 0.5 1 2 3 Miles

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NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet

**Footnote:**  
1: Pipeline includes a 2 inch diesel line & 2 inch waterline from CD1 to GMT1  
2: 14 inch Water Injection line from CD1/APF to CD4N will be constructed on a new pipe rack. From CD4N to CD5 the 14-inch Water Injection line will be placed on the already proposed or permitted pipe rack (not part of GMT1).



Map 4.3-3  
**Teshekpuk Caribou Herd Females: Fall Migration Movements Relative to Potential New Infrastructure**

**Teshekpuk Caribou Herd Males Fall Migration Movements**  
 Brownian Bridge Analysis

- Low use
- Moderately-low use
- Moderately-high use
- High use

Data analysis by Lincoln Parrett of ADF&G  
 Data gathered cooperatively by ADF&G, NSB, and BLM

**Existing Oil & Gas Infrastructure**

- Above Ground
- Existing Facility
- Oil & Gas Unit

**Proposed Infrastructure**

GMT-1 Alt. A	GMT-2
Pipeline	Road
Access Road	Pipeline
Nuiqsut Spur Road	

**GMT1 SEIS Project Areas**

- Project Study Area
- GMT2 2.5-Mile Buffer

- Proposed Foothills West Route (Road to Umiat)
- Offshore Leases- BOEM
- Offshore Leases- State of Alaska
- Formerly Used Military Sites
- Legacy Wells NPR-A
- NPR-A

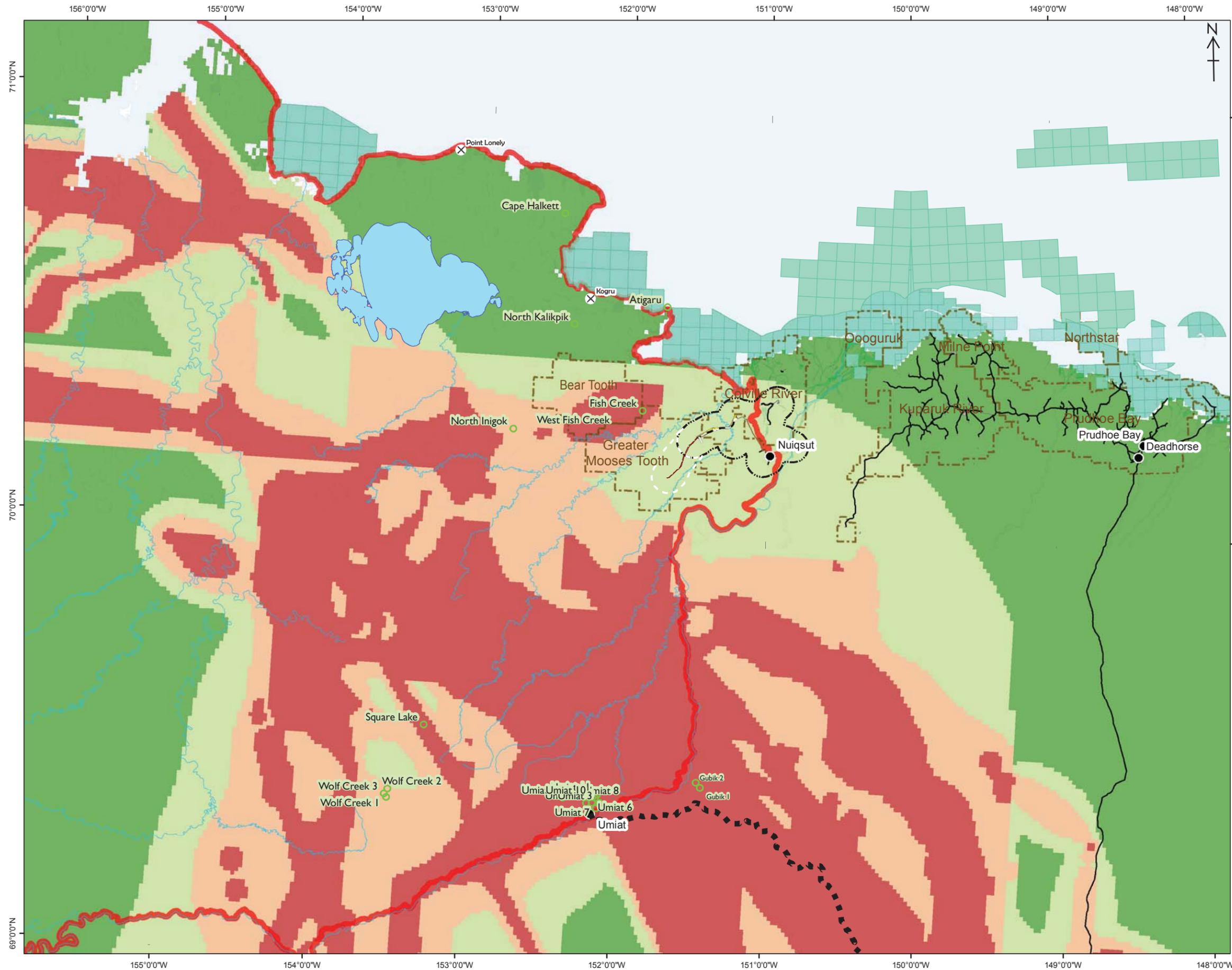


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NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet



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Map 4.3-4  
**Teshekpuk Caribou Herd Males: Fall Migration Movements Relative to Potential New Infrastructure**

**Teshekpuk Caribou Herd Males Fall Migration Movements**  
 Brownian Bridge Analysis

- Low use
- Moderately-low use
- Moderately-high use
- High use

Data analysis by Lincoln Parrett of ADF&G  
 Data gathered cooperatively by ADF&G, NSB, and BLM

**Existing Oil & Gas Infrastructure**

- Above Ground
- Existing Facility
- Oil & Gas Unit

**Proposed Infrastructure**

<p><b>GMT-1 Alt. A</b></p> <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 20px; border-bottom: 2px solid yellow; margin-right: 5px;"></span> Pipeline</li> <li><span style="display: inline-block; width: 20px; border-bottom: 2px dashed black; margin-right: 5px;"></span> Access Road</li> <li><span style="display: inline-block; width: 20px; border-bottom: 2px solid black; margin-right: 5px;"></span> Nuiqsut Spur Road</li> </ul>	<p><b>GMT-2</b></p> <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 20px; border-bottom: 2px solid red; margin-right: 5px;"></span> Road</li> <li><span style="display: inline-block; width: 20px; border-bottom: 2px dashed red; margin-right: 5px;"></span> Pipeline</li> </ul>
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**GMT1 SEIS Project Areas**

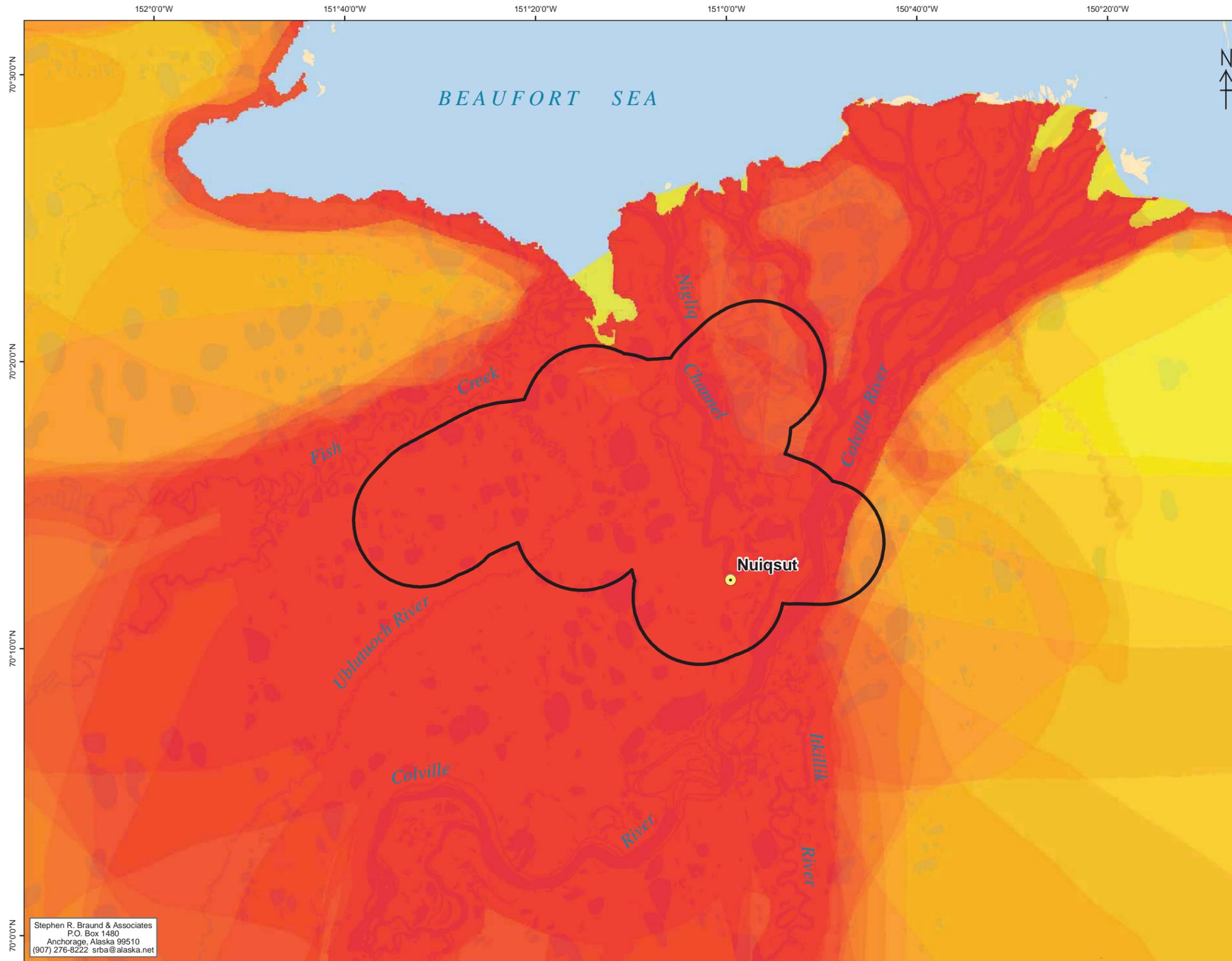
- Project Study Area
- GMT2 2.5-Mile Buffer

- Proposed Foothills West Route (Road to Umiat)
- Offshore Leases- BOEM
- Offshore Leases- State of Alaska
- Formerly Used Military Sites
- Legacy Wells NPR-A
- NPR-A



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NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet



Map 4.4-1  
 Caribou Subsistence Use Areas In  
 The Project Study Area, 1995-2006

Legend  
 High Overlapping Subsistence Use  
 Areas, Caribou, 1995-2006  
 Low (Source: SRBA 2010a)

In Nuiqsut, 94 caribou use areas  
 were reported by 32 respondents.  
 Use areas extend beyond the  
 extent of this map.

Project Study Area  
 Subsistence Study Community



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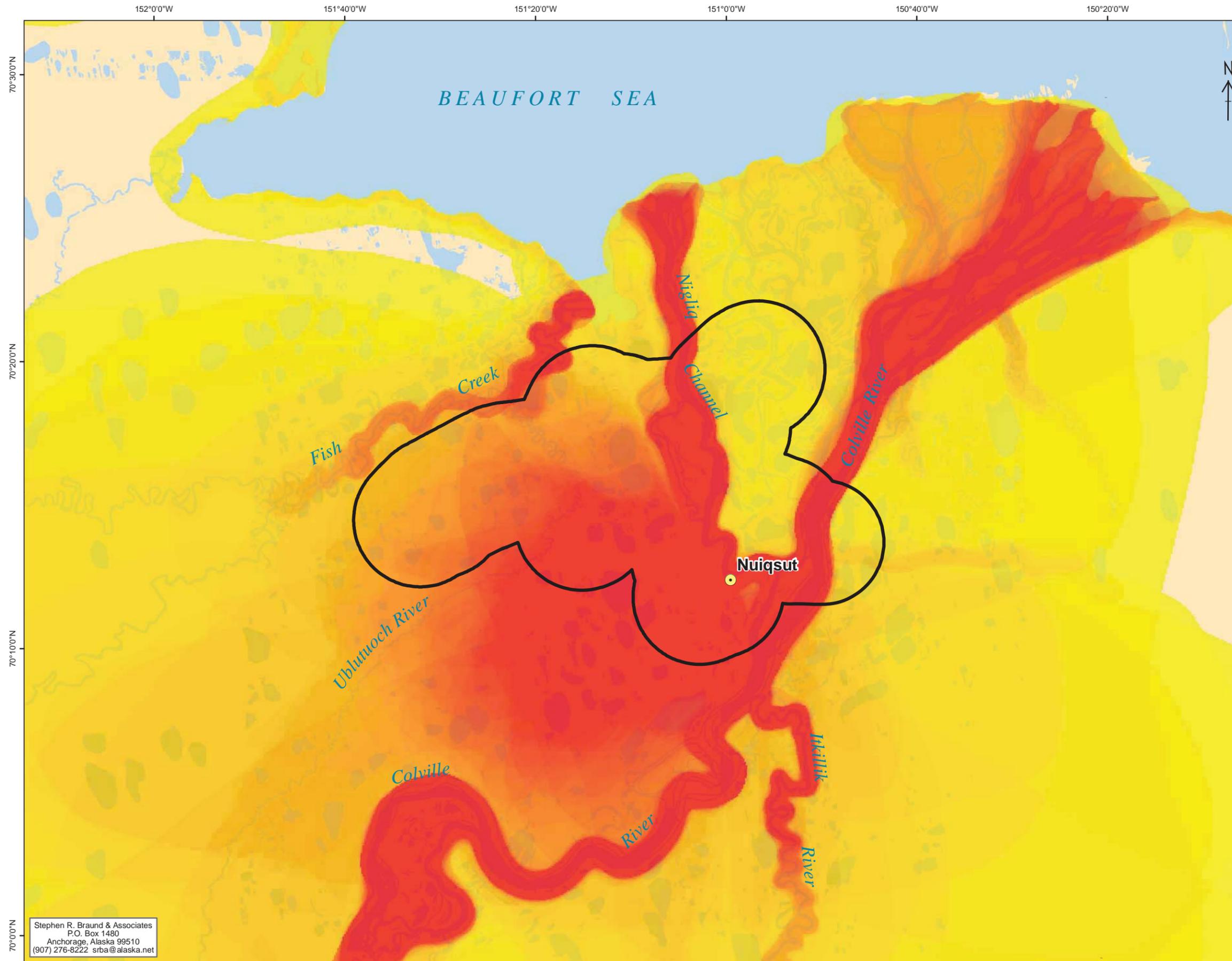
NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet



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Map 4.4-2  
 Caribou Subsistence Use Areas In  
 The Project Study Area, 2008-2011

Legend  
 High Overlapping Subsistence Use  
 Low Areas, Caribou, 2008-2011

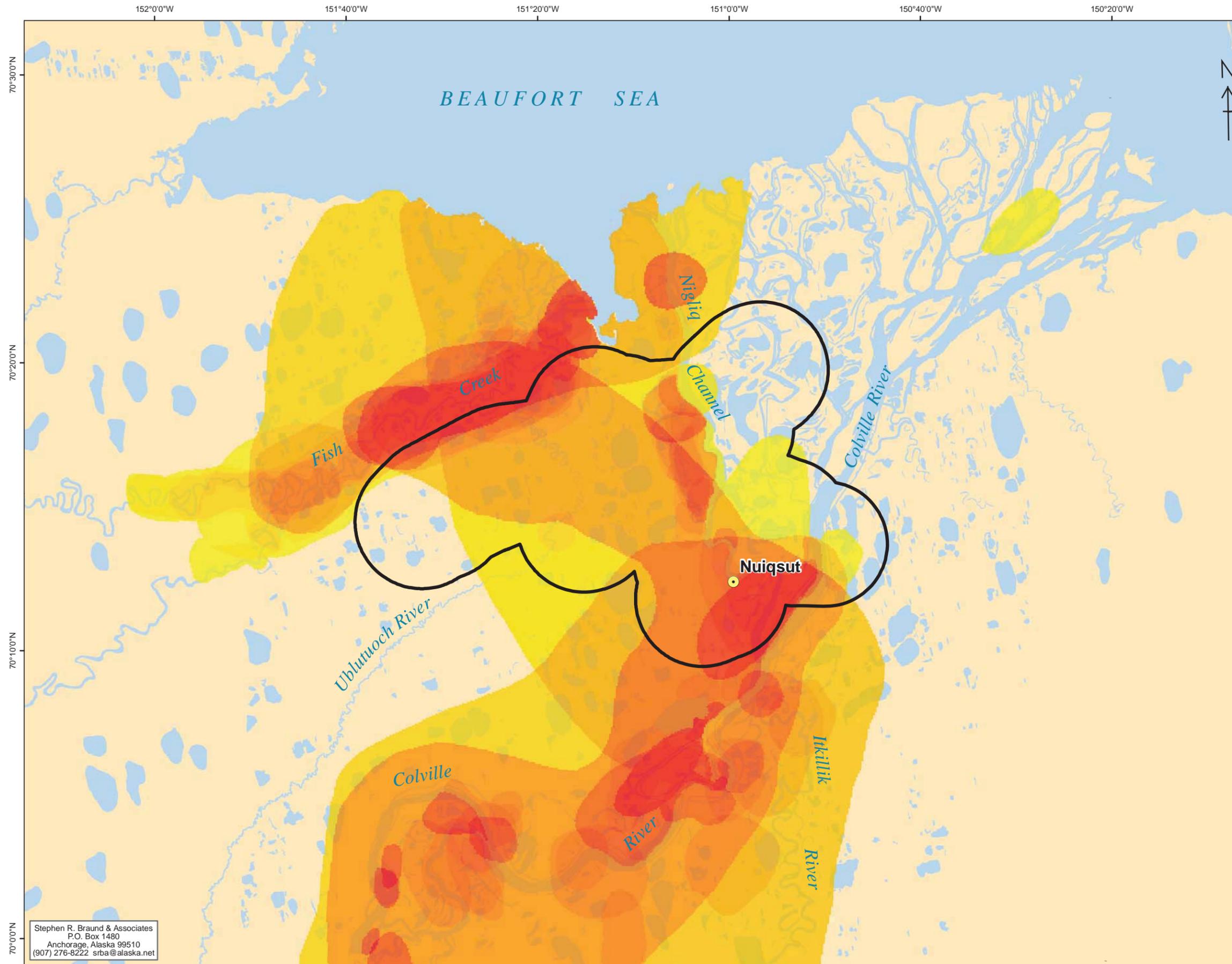
Source: SRBA 2010b, 2011a,  
 2012, 2013b  
 SRB&A interviewed 96 active  
 harvesters from March 2009 through  
 November of 2011. The harvesters  
 reported 731 use areas. Use areas  
 extend beyond the extent of this map.

Project Study Area  
 Subsistence Study Community

Date: 12/9/2013  
 0 1 2 4 6 Miles

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 NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet

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Map 4.4-3  
 Geese Subsistence Use Areas in  
 the Project Study Area, 1995-2006

Legend  
 High Overlapping Subsistence Use  
 Areas, Geese, 1995-2006  
 Low (Source: SRBA 2010a)

In Nuiqsut, 179 geese use areas  
 were reported by 33 respondents.  
 Use areas extend beyond the  
 extent of this map.

Project Study Area  
 Subsistence Study Community

Draft Date: 12/9/2013

0 1 2 4 6 Miles

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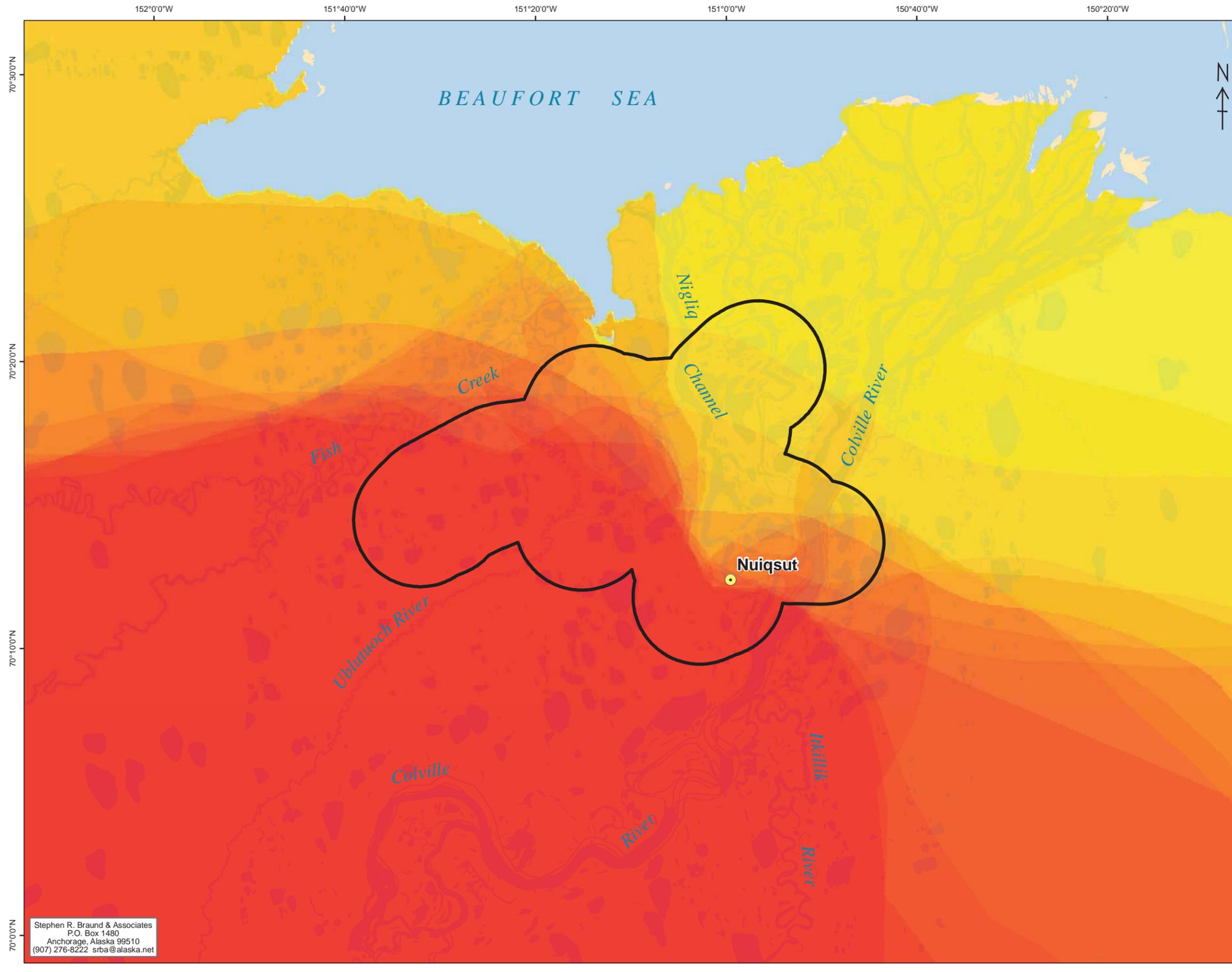
NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet



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Map 4.4-4  
 Wolf and Wolverine Subsistence  
 Use Areas in the Project Study  
 Area, 1995-2006

Legend  
 High Overlapping Subsistence Use  
 Areas, Wolf and Wolverine,  
 1995-2006  
 Low (Source: SRBA 2010a)

In Nuiqsut, 69 wolf and wolverine  
 use areas were reported by  
 24 respondents. Use areas extend  
 beyond the extent of this map.

- Project Study Area
- Subsistence Study Community

Draft Date: 12/9/2013



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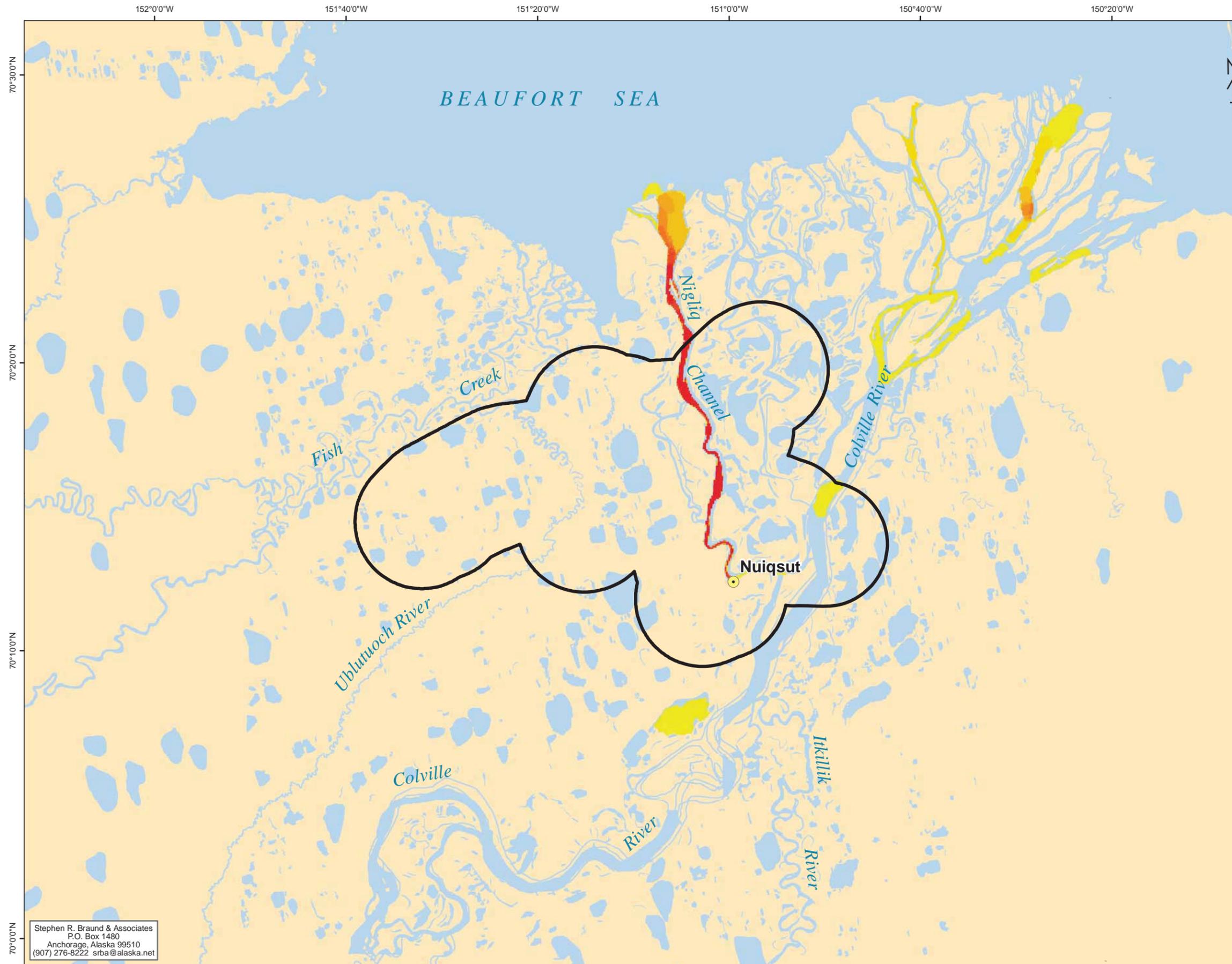
NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet



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Map 4.4-5  
 Arctic Cisco Subsistence  
 Use Areas in the Project  
 Study Area, 1995-2006

Legend  
 High Overlapping Subsistence Use  
 Areas, Arctic Cisco, 1995-2006  
 Low (Source: SRBA 2010a)

In Nuiqsut, 66 Arctic Cisco use areas  
 were reported by 33 respondents.  
 Use areas extend beyond the  
 extent of this map.

Project Study Area  
 Subsistence Study Community

Draft Date: 12/9/2013



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 plats, Master Title Plats and land status case-files.

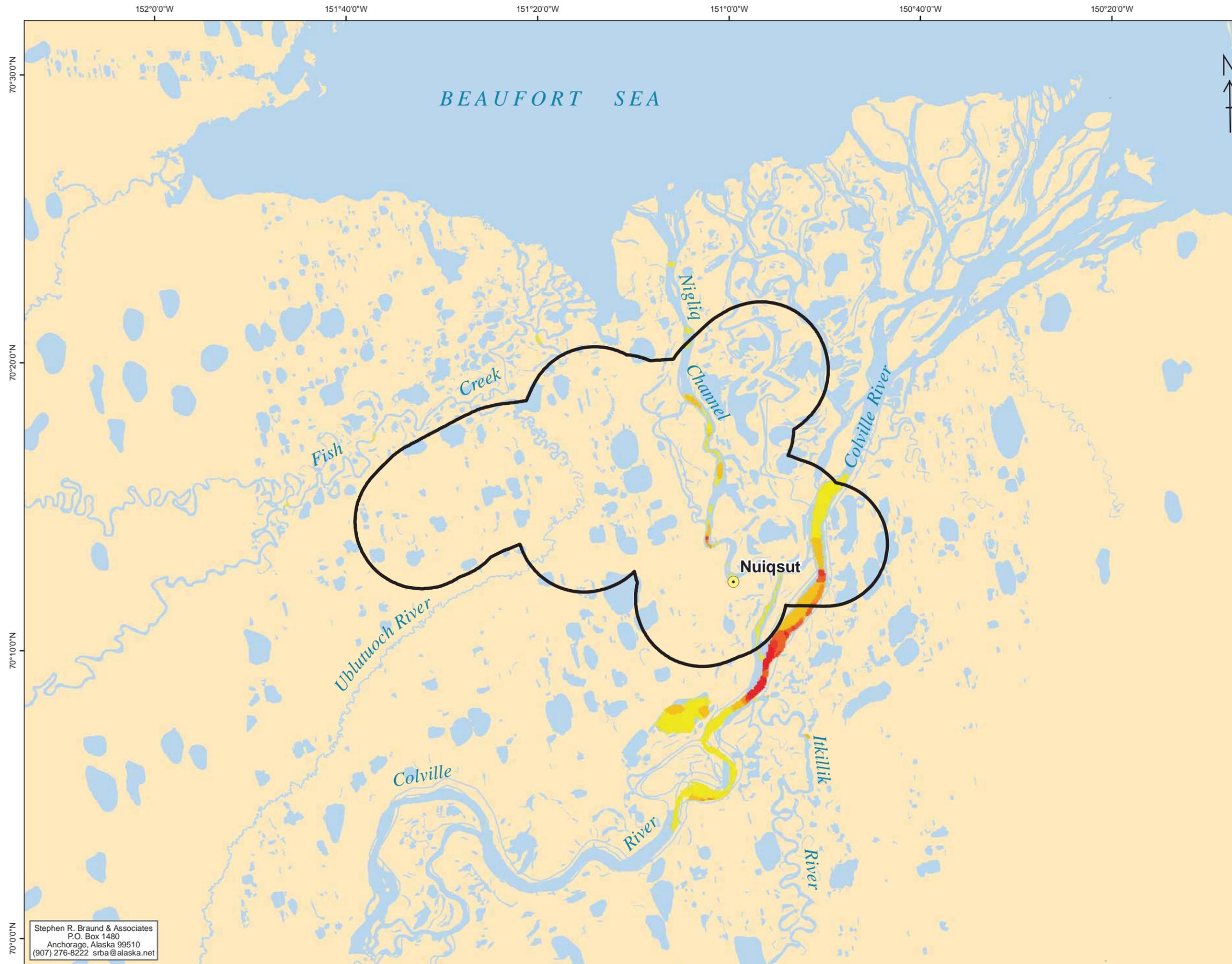
NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet



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Map 4.4-6  
 Burbot Subsistence Use Areas in  
 the Project Study Area, 1995-2006

Legend  
 High Overlapping Subsistence Use  
 Areas, Burbot, 1995-2006  
 Low (Source: SRBA 2010a)

In Nuiqsut, 62 burbot use areas  
 were reported by 30 respondents.  
 Use areas extend beyond the  
 extent of this map.

Project Study Area  
 Subsistence Study Community

Draft Date: 12/9/2013



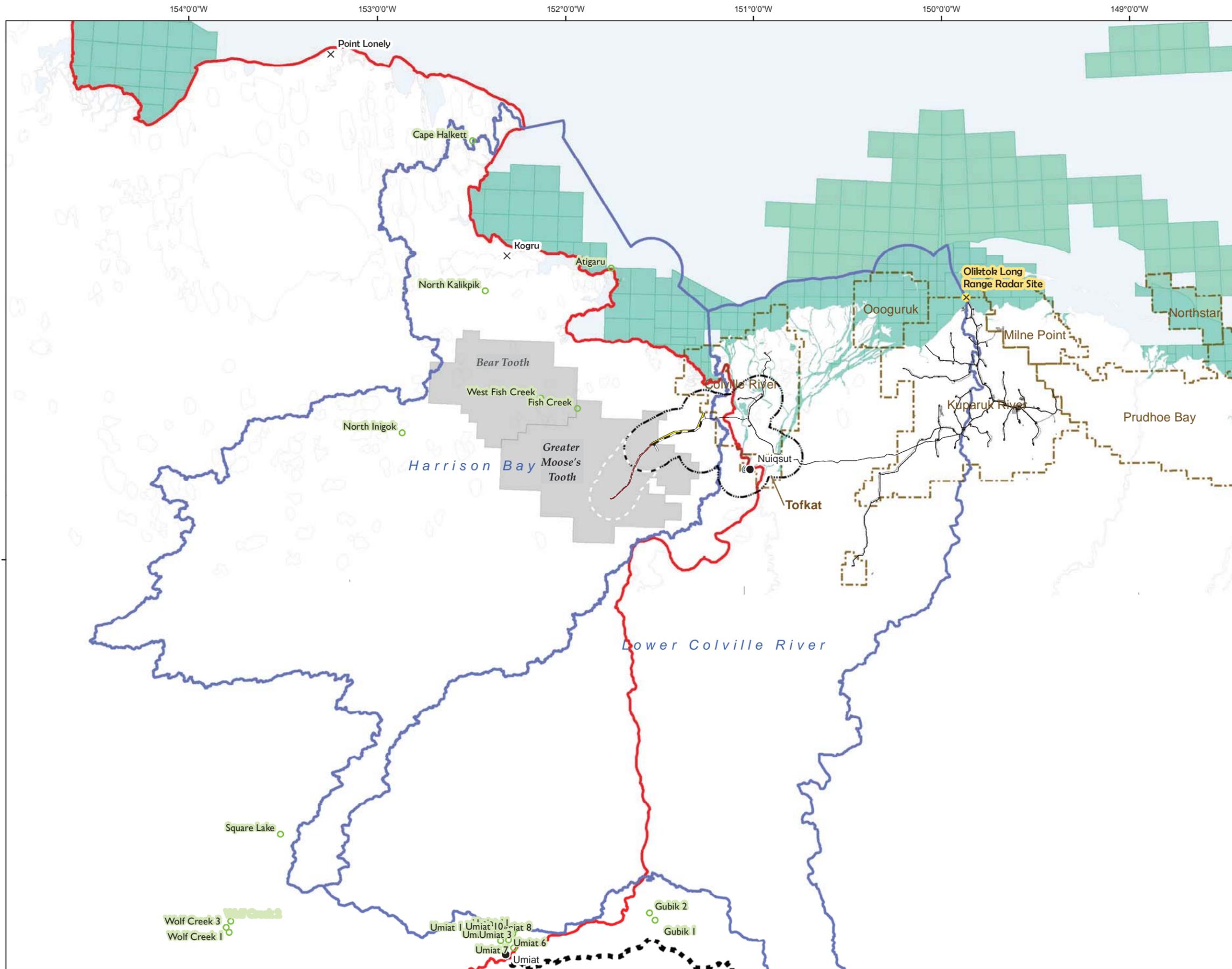
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NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet



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Map 4.6-1

### Oil & Gas Infrastructure

#### Existing Oil & Gas Infrastructure

- Above Ground
- Existing Facility

#### Oil & Gas Producing Units

- Production Status
- Not Producing
  - Producing

#### Proposed Infrastructure

- | GMT-1 Alt. A |                   | GMT-2 |          |
|--------------|-------------------|-------|----------|
|              | Pipeline          |       | Road     |
|              | Access Road       |       | Pipeline |
|              | Nuiqsut Spur Road |       |          |

#### GMT1 SEIS Project Areas

- Project Study Area
- GMT2 2.5-Mile Buffer

■ Proposed Foothills West Route (Road to Umiat)

- Offshore Leases- BOEM
- Offshore Leases- State of Alaska

- ⊗ Active Military Site
- ⊗ Formerly Used Military Sites
- Legacy Wells NPR-A
- ⬢ Hydrologic Units (HUC8)
- ⬢ NPR-A



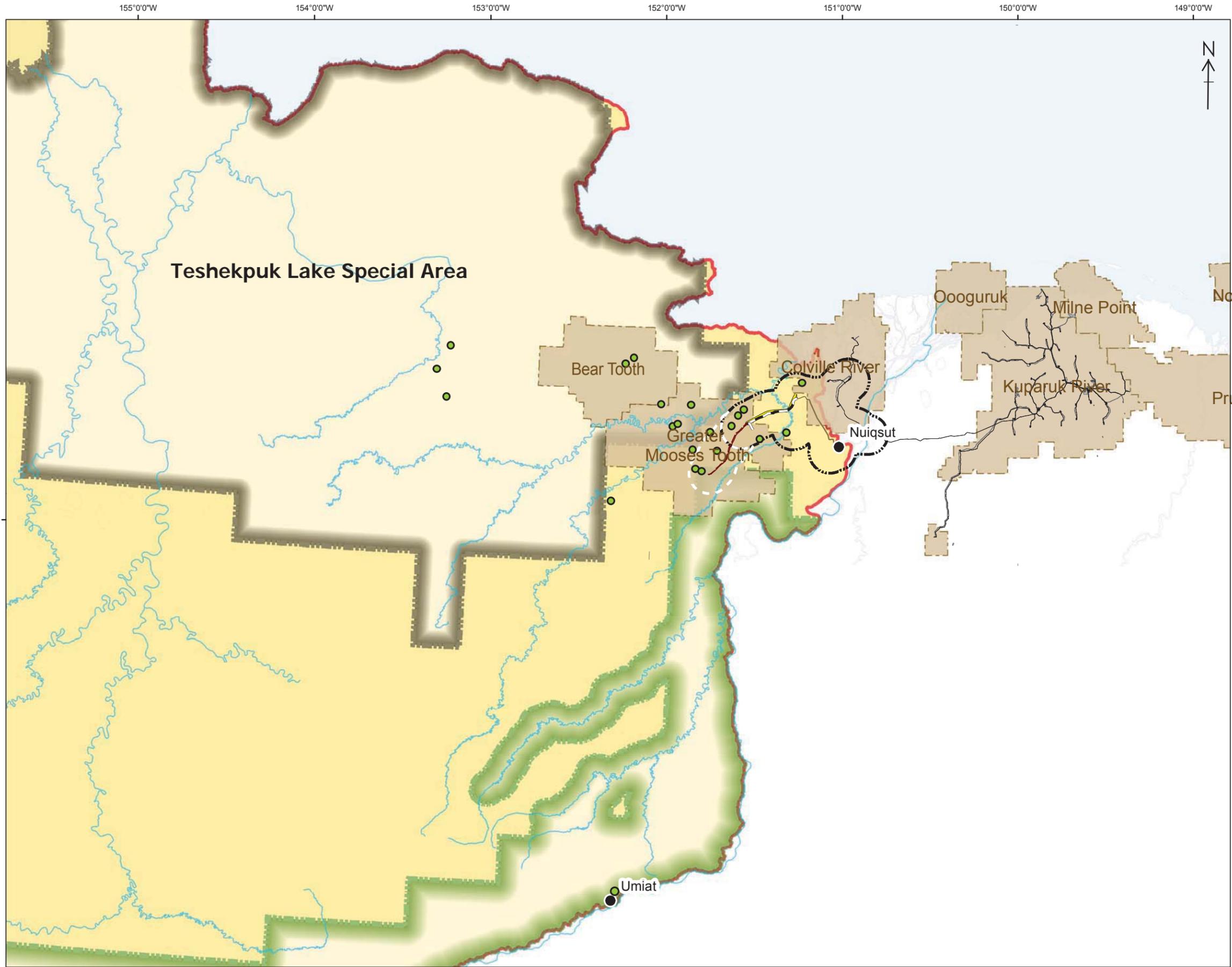
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NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet



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Map 4.6-2  
**Oil and Gas  
 Exploratory Wells  
 and NPR-A Special Areas**

- Exploratory Well
- NPR-A Special Areas**
  - Colville River Special Area
  - Teshekpuk Lake Special Area
- Existing Oil & Gas Infrastructure**
  - Above Ground
  - Existing Facility
- Oil & Gas Producing Units**
- Proposed Infrastructure**
  - GMT-1 Alt. A
    - Pipeline
    - Access Road
    - Nuiqsut Spur Road
  - GMT-2
    - Road
    - Pipeline
- GMT1 SEIS Project Areas**
  - Project Study Area
  - GMT2 2.5-Mile Buffer

 NPR-A

0      8      16  
 Miles

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NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet