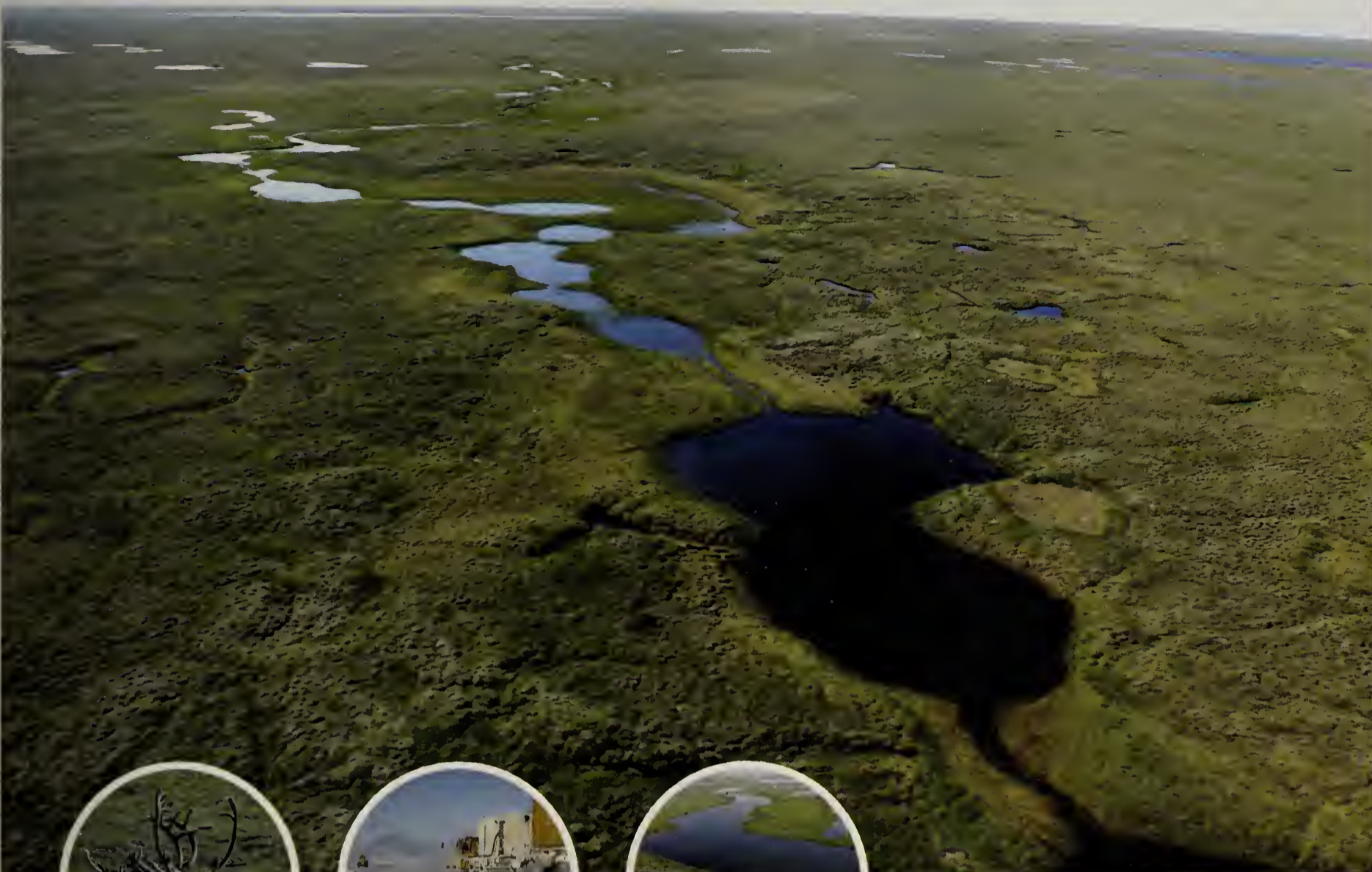


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SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT for the Alpine Satellite Development Plan for the Proposed Greater Mooses Tooth One Development Project

Volume 2: Chapter 7

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195
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A475
2014
v. 2
c. 3

2014

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

Alaska



The Bureau of Land Management Today

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

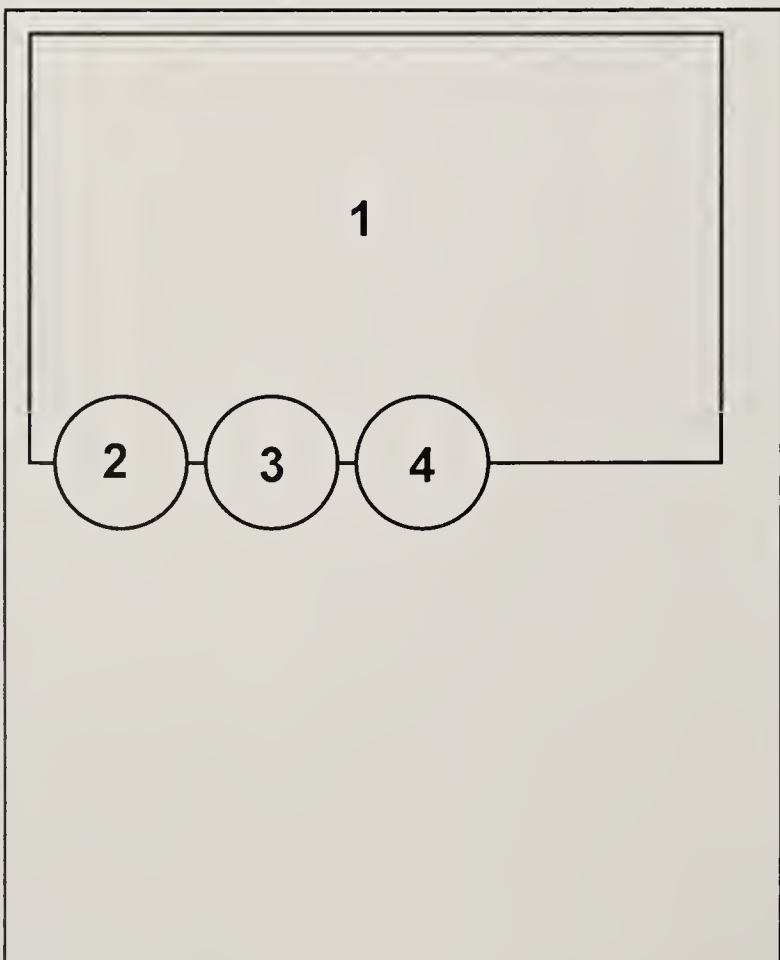
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Cover Photos:

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

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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2. Methodology

3. Results

4. Discussion

5. Conclusion

6. References

7. Appendix

8. Acknowledgements

9. Contact Information

10. Author Biographies

11. Declaration of Interest

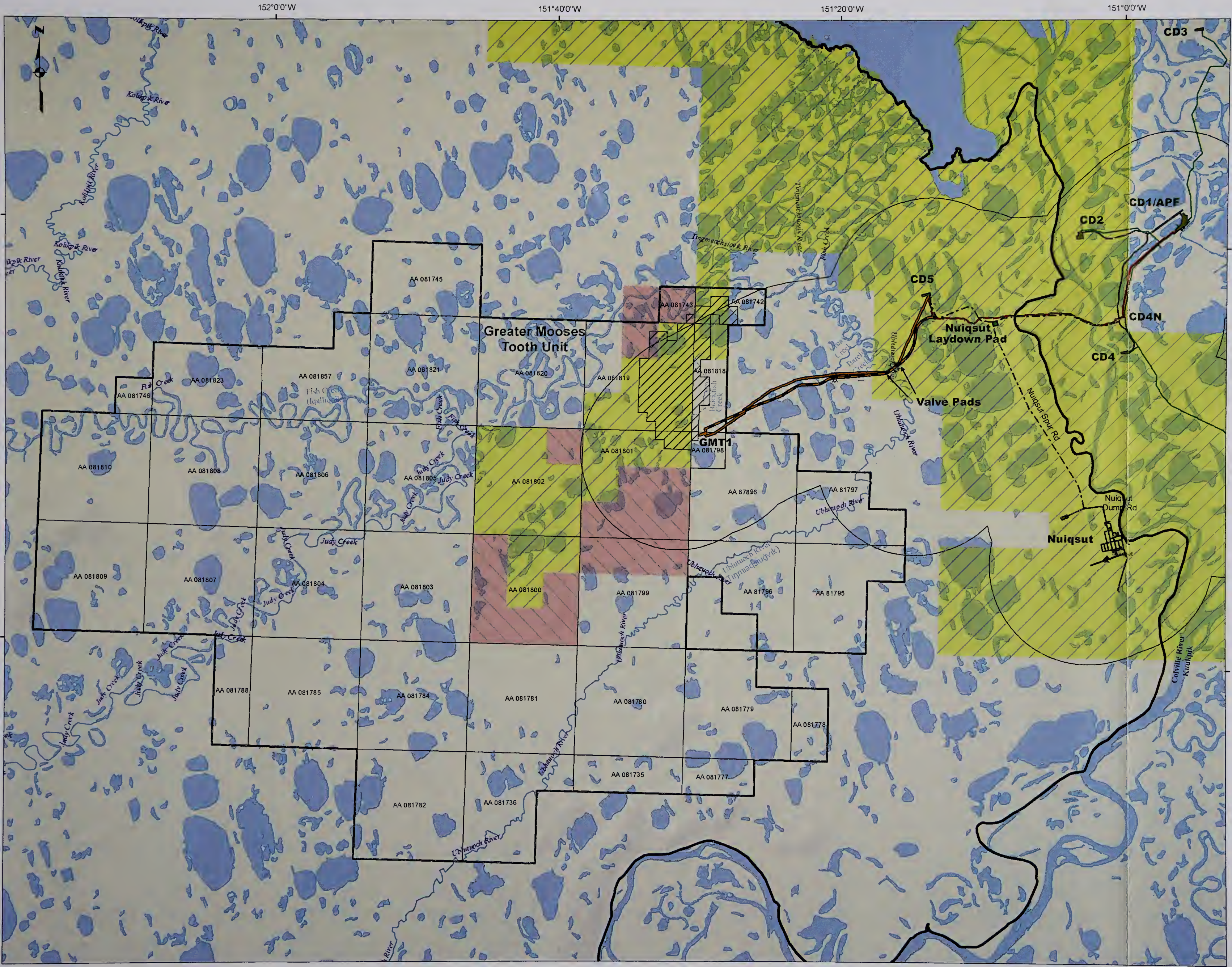
Contents of Volume 2

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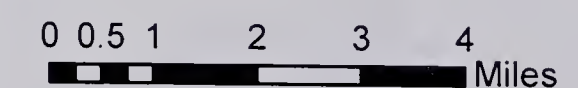


Map 1.1-1
**Greater Mooses Tooth and
 CPAI Proposed Project**

- | | |
|--|---|
| DSEIS
Proposed
Infrastructure | Proposed or Permitted
(not part of GMT1) |
| Road | Pipeline |
| Pipeline | Road |
| Facility | Facility |
| 14 inch Water ¹
Injection Line | Existing
Pipeline |
| Bridge | Existing
Road |
| Boundary | Facility |
| Lookout PA | Surface Land
Ownership
Kuukpik Lands |
| Project Study
Area | Conveyed |
| Unit Boundary | Selected |
| 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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152°0'0"W 151°20'0"W 150°40'0"W 150°0'0"W 149°20'0"W 148°40'0"W



Map 2.5-1
GMT1 Project Vicinity

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



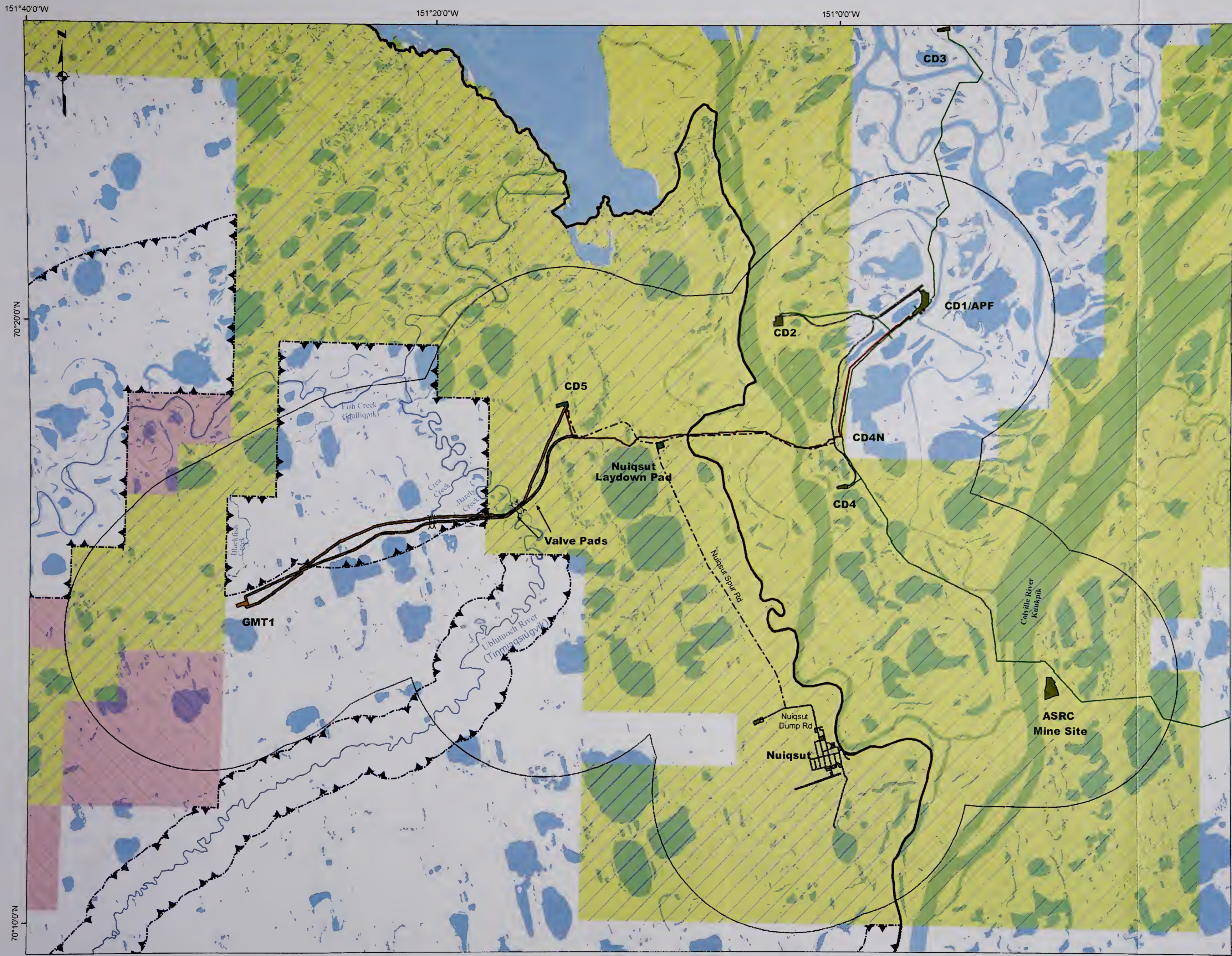
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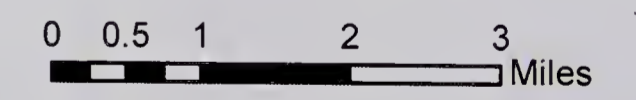


Map 2.5-2
Alternative A: CPAI
Proposed Project Layout

- | | |
|---|---|
| Alternative A Infrastructure | Proposed or Permitted (not part of GMT1) |
| Road | Pipeline |
| Pipeline | Road |
| Facility | Facility |
| 14 inch Water ¹ Injection Line | Existing |
| Bridge | Pipeline |
| Boundaries | Surface Land Ownership |
| NPR-A Project Study Area | Kuukpik Lands |
| Setback Areas | 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



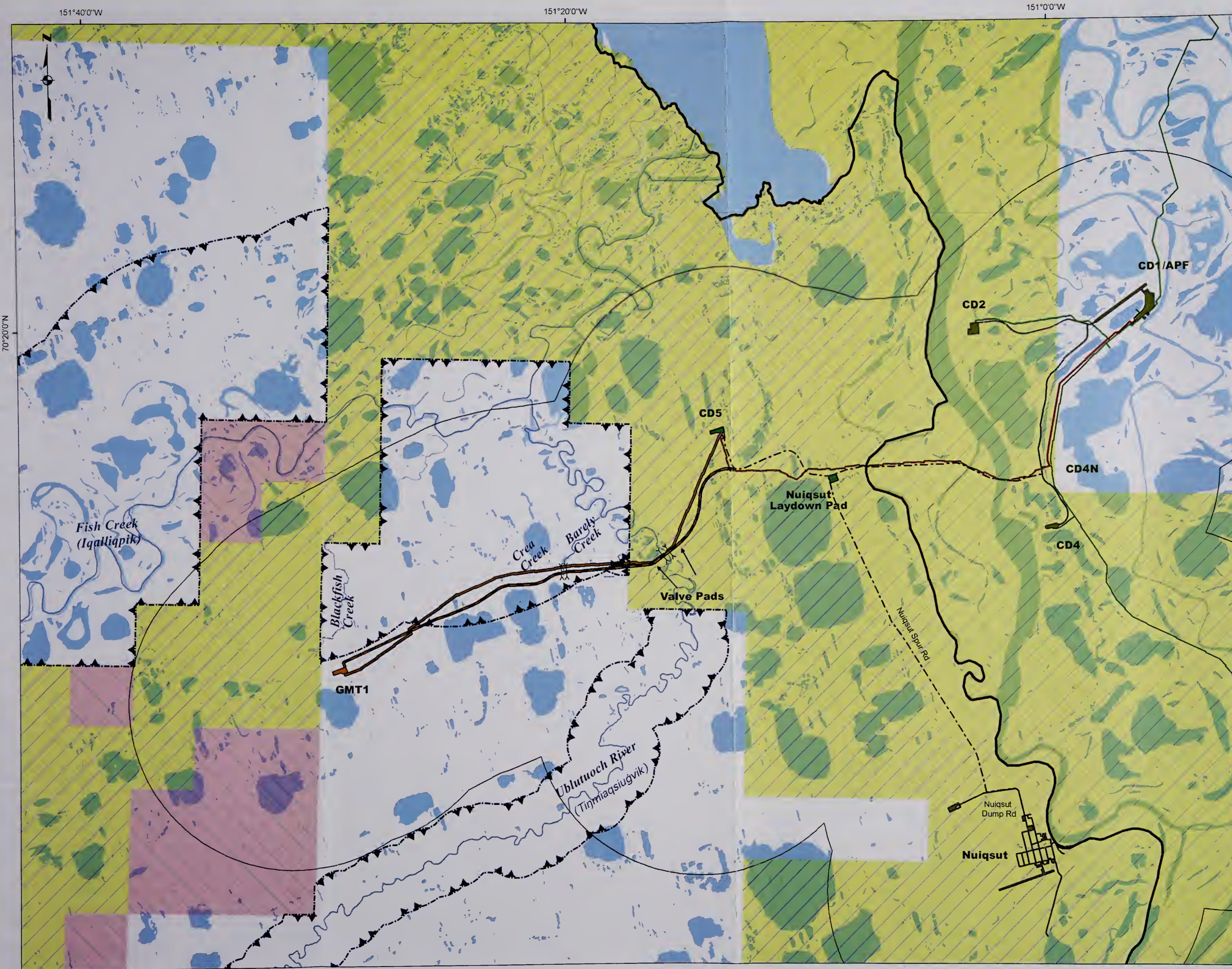
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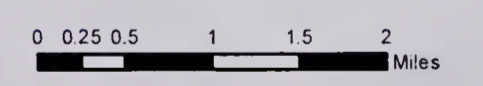


Map 2.5-3
Fish Creek and Tinjmiaqsugvik (Ublutuoch) River Setback Areas

- | | |
|---|--|
| Alternative A Infrastructure | Proposed or Permitted (not part of GMT1) |
| Road | Pipeline |
| Pipeline | Road |
| Facility | Facility |
| 14 inch Water ¹ Injection Line | Existing |
| Bridge | Pipeline |
| | Road |
| | Facility |
| Boundaries | Surface Land Ownership |
| NPR-A Project Study Area | Kuukpik Lands |
| | Conveyed |
| | Selected |
| 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).
 2: Background layer is from Delorme World Imagery 2013

Date: 10/21/2014



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151°40'0"W

151°20'0"W

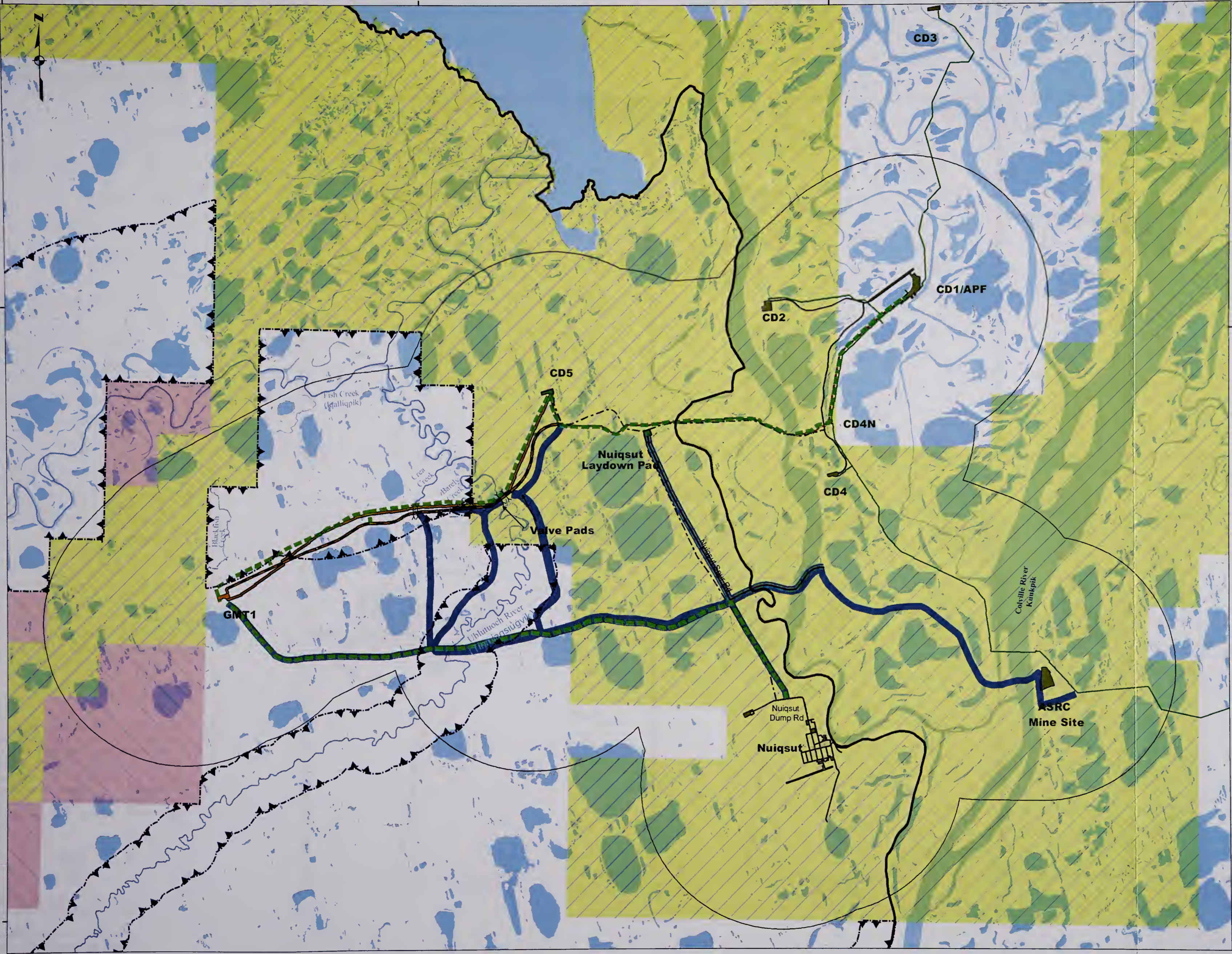
151°0'0"W

70°20'0"N

70°20'0"N

70°10'0"N

70°10'0"N



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

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

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

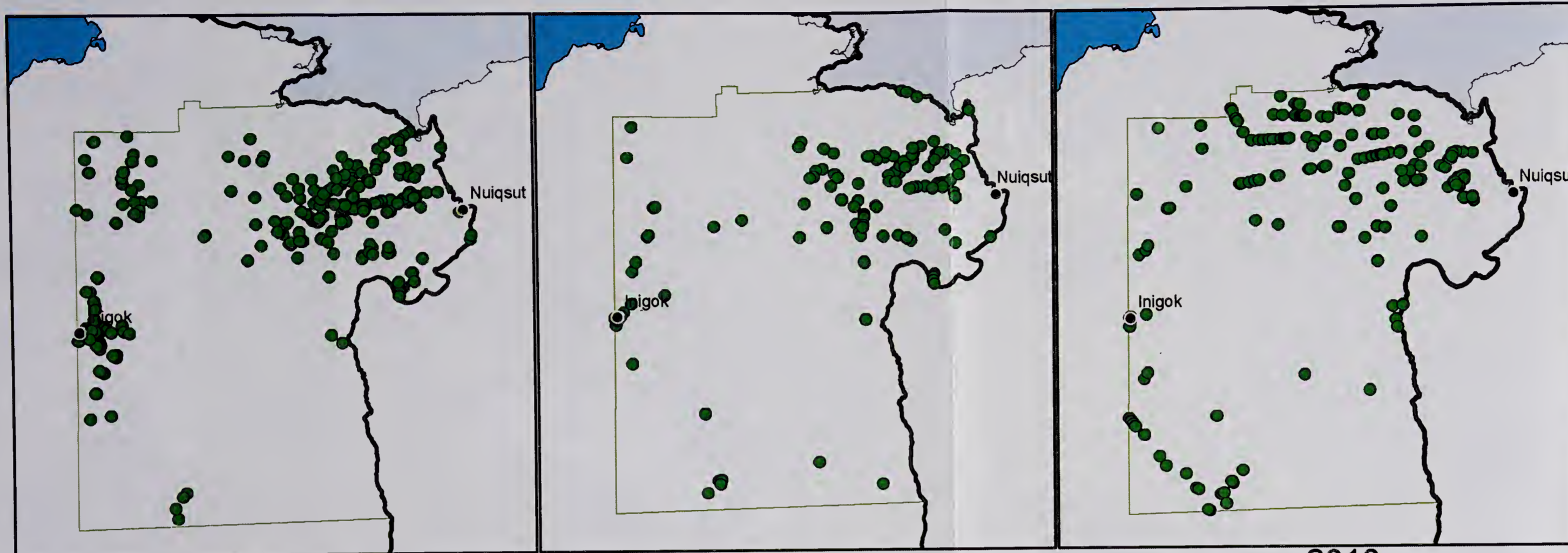
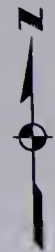
- Setback Areas**
- Fish Creek 3mi
 - Ubluoch River 0.5mi

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).

Date: 10/20/2014

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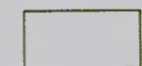

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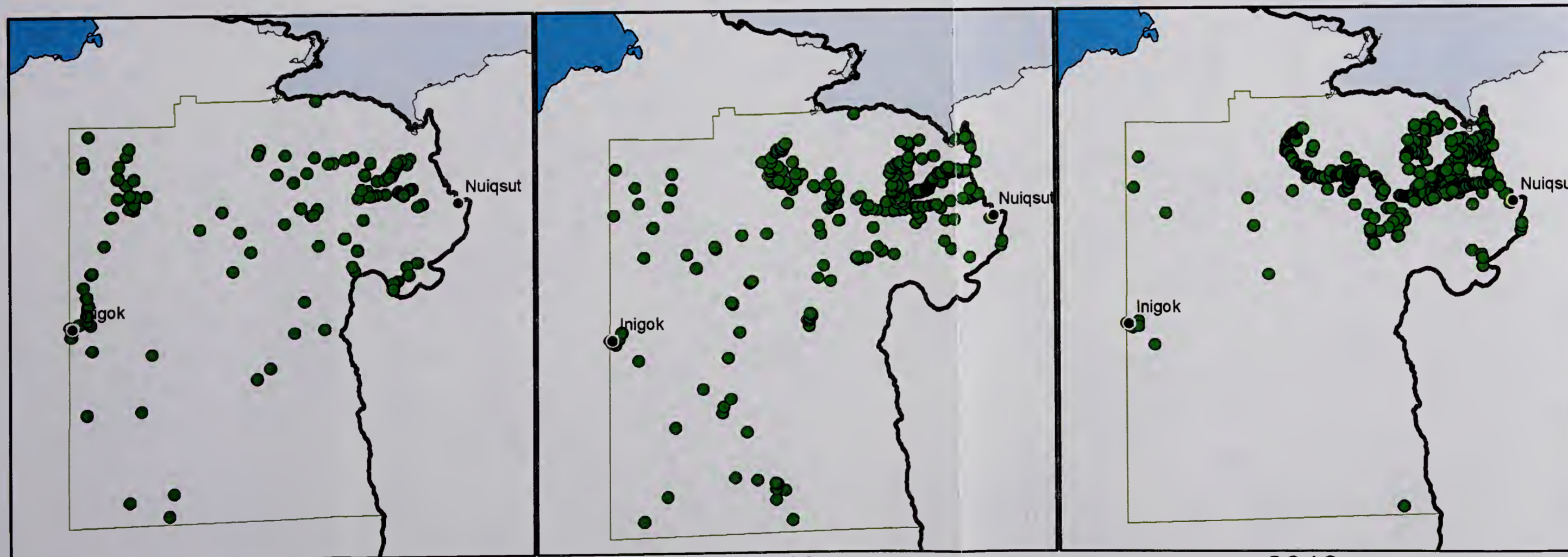


2008

2009

2010

 Analysis Area
  Aircraft Take-offs and Landings



2011





2012

2013

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
Total	8277

Source: BLM 2013b

Date: 10/21/2014

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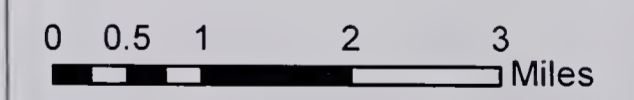
Map 2.6-1

Alternative B Layout

Alternative B Infrastructure		Proposed or Permitted (not part of GMT1)	
Road	Road	Facility	Facility
Pipeline		Facility	
Facility	14 inch Water ¹ Injection Line	Facility	Facility
Bridge		Facility	
Boundary		Existing	
Project Study Area	Pipeline	Road	Facility
NPR-A			
		Surface Land Ownership	
		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



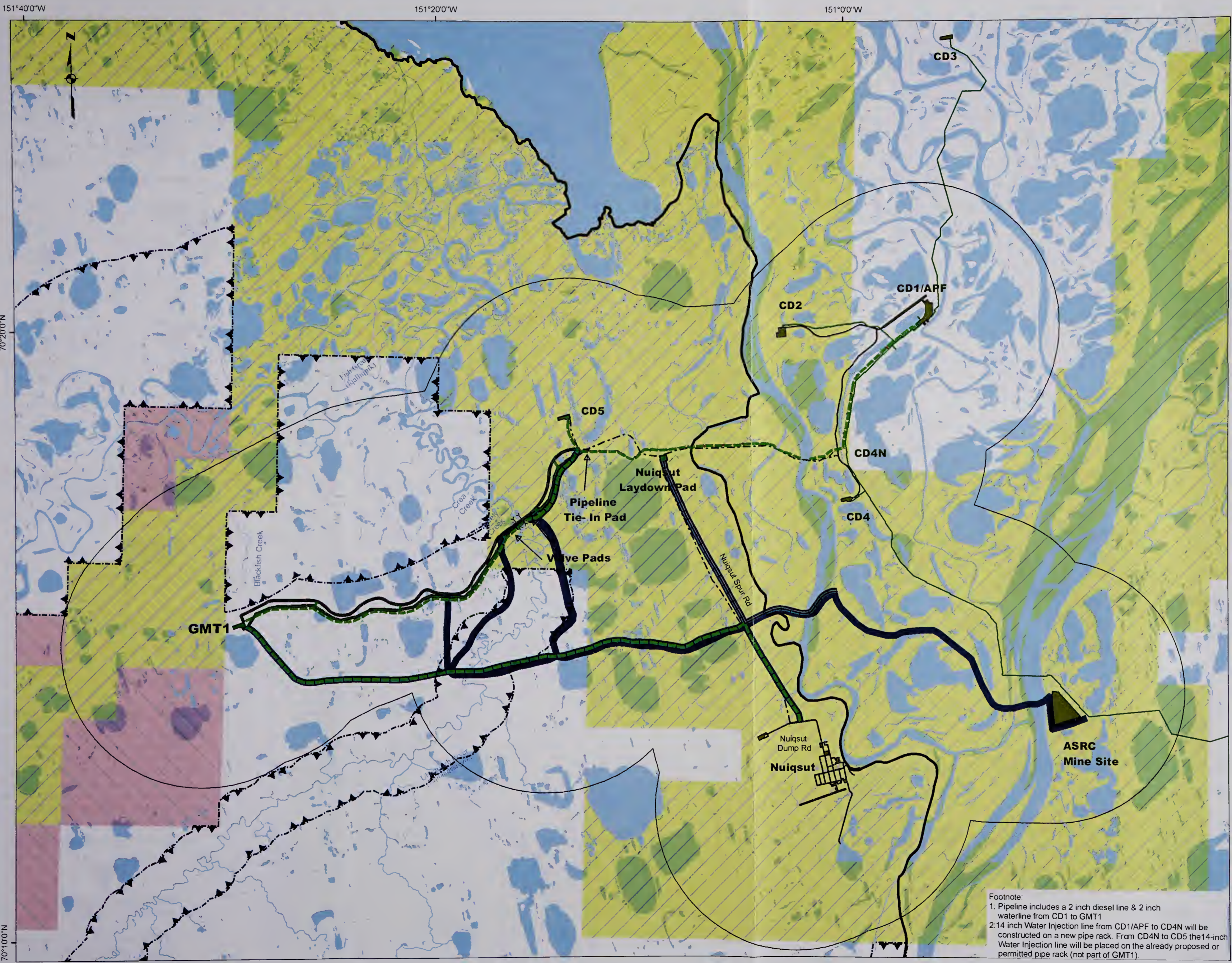
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Map 2.6-2

Alternative B Ice Roads

- | | |
|---|---|
| Alternative B Infrastructure | Proposed or Permitted (not part of GMT1) |
| — Road | — Road |
| — Pipeline | — Pipeline |
| ■ Facility | ■ Facility |
| — 14 inch Water ² Injection Line | — Road |
| — Bridge | ■ 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

0 0.5 1 2 3 Miles

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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).

151°40'0"W

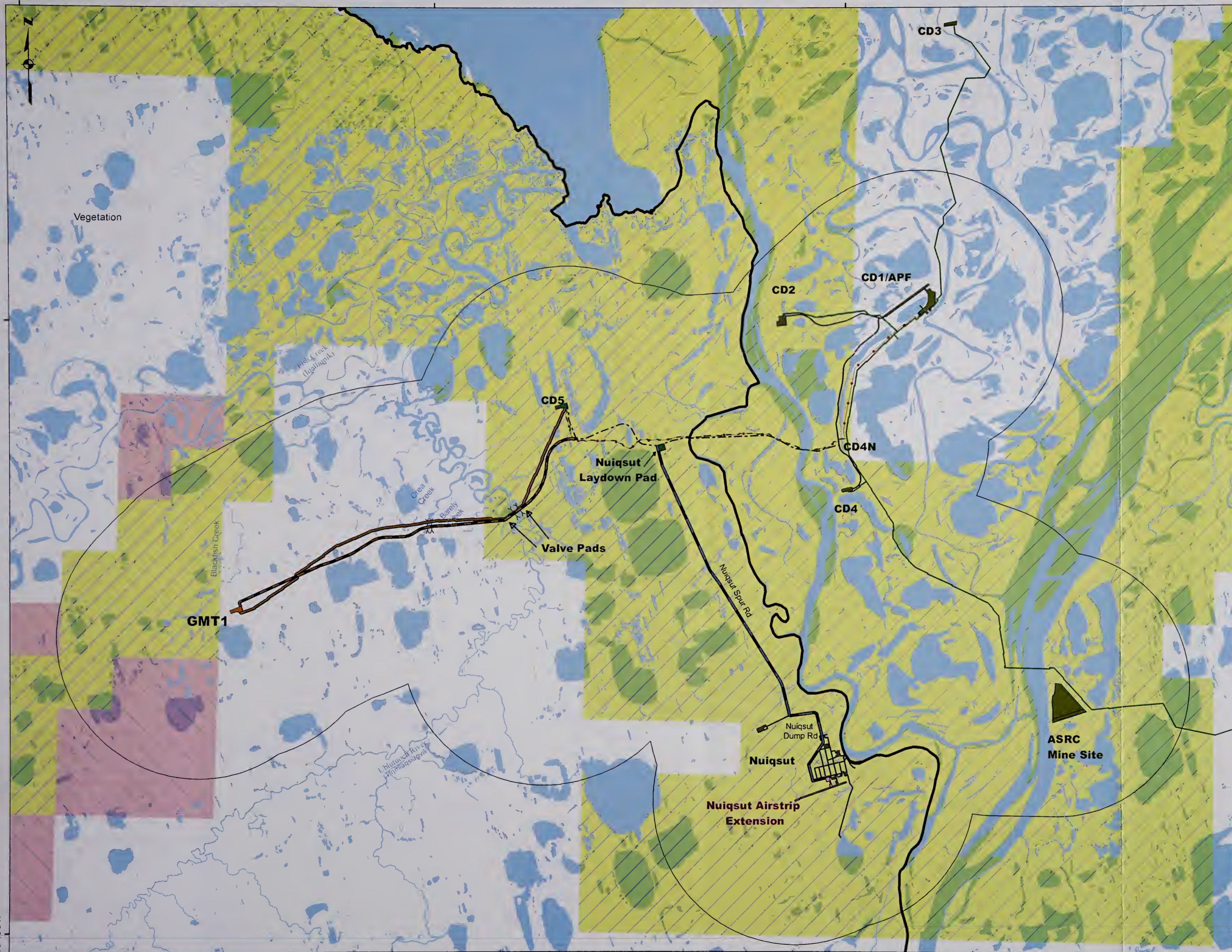
151°20'0"W

151°0'0"W

70°20'0"N

70°20'0"N

70°10'0"N



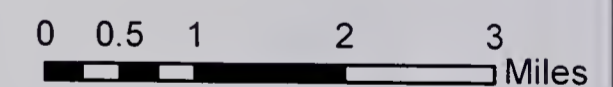
Map 2.7-1

Alternative C Layout

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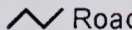
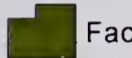


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Map 2.7-2
**Alternative C
 Nuiqsut Airport Facilities**

- 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
-  Conveyed
 -  Kuukpik Lands

Date: 9/26/2014

0 0.05 0.1 0.2 0.3 0.4 0.5 Miles

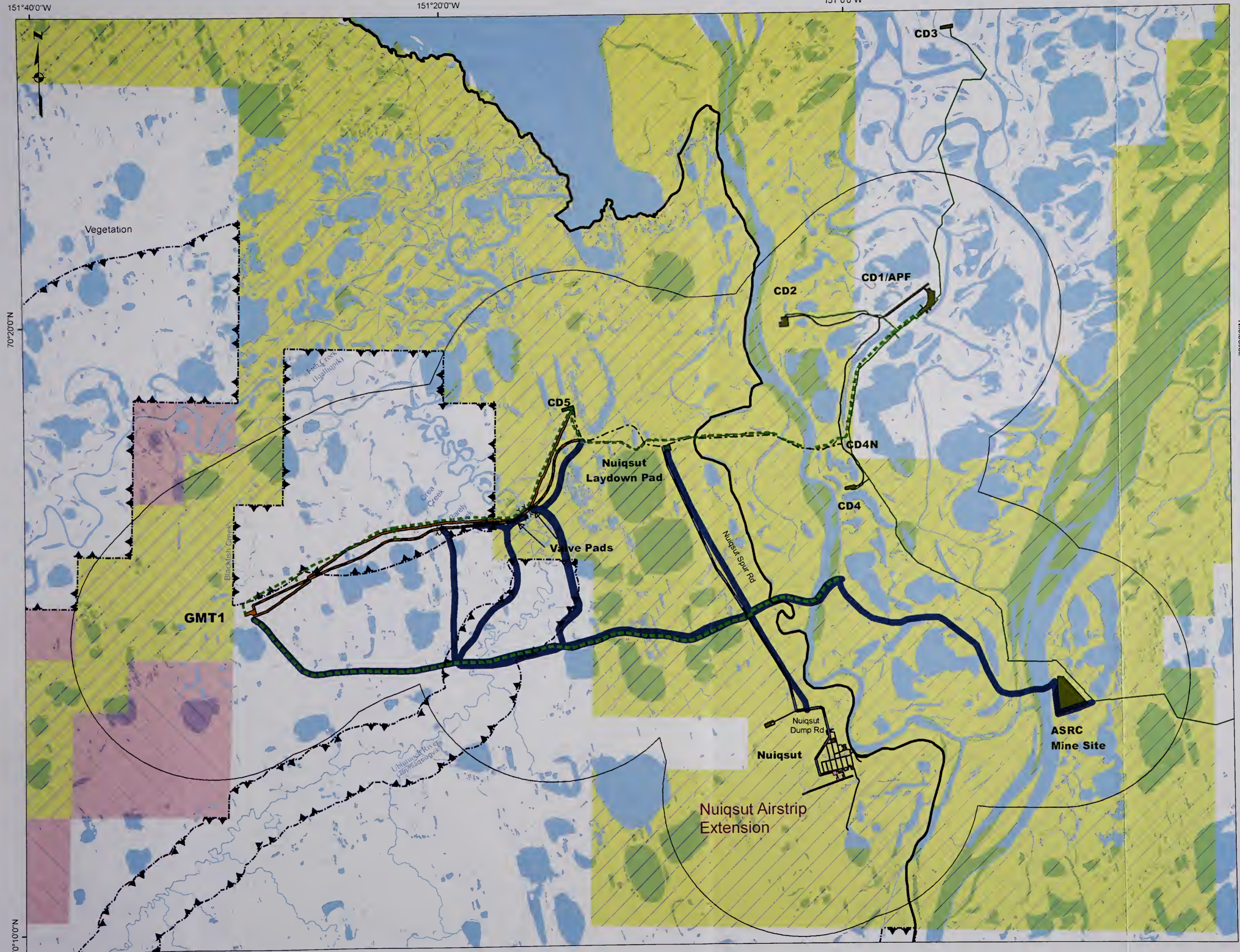
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Map 2.7-3
Alternative C Ice Roads

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

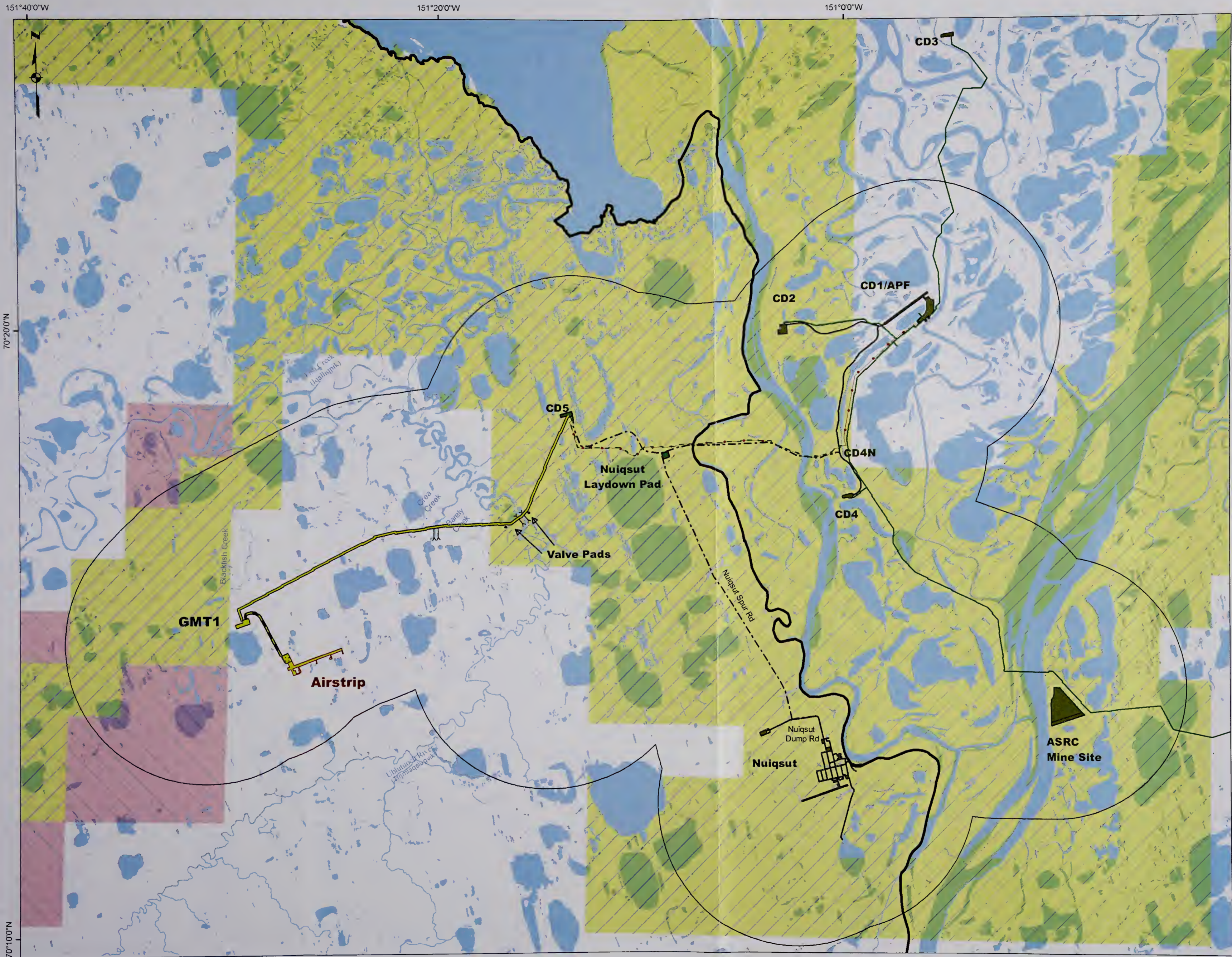
0 0.5 1 2 3 Miles

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Map 2.8-1
Alternative D1 and D2 Layout

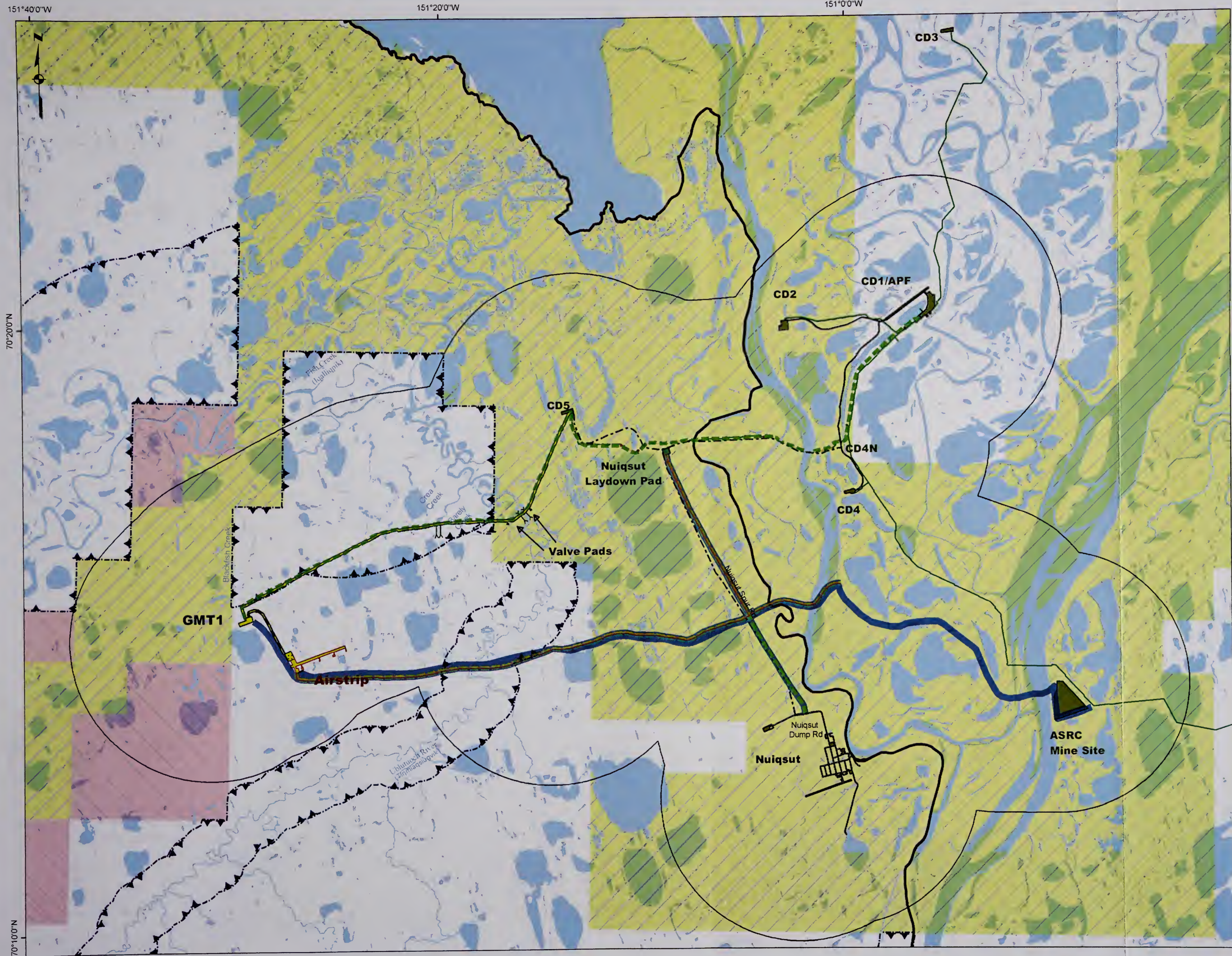
- | | | | |
|---|---|---|-------------------------------|
| Alternative D1/D2 Infrastructure | | Proposed or Permitted (not part of GMT1) | |
| Road | Pipeline | Road | Facility |
| Facility | Airstrip | Existing | |
| Airstrip Occupied Pad common to D1 and D2 | Airstrip additional Occupied Pad-for D1 | Pipeline | Road |
| 14 inch Water ^{1,2} Injection Line | | Facility | Surface Land Ownership |
| Bridge | | Conveyed | Selected |
| Boundary | | | |
| 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

<p>Alternative D1/D2 infrastructure</p> <ul style="list-style-type: none"> Road Pipeline Facility Airstrip Airstrip Occupied Pad common to D1 and D2 Airstrip additional Occupied Pad-for D1 14 inch Water^{1,2} Injection Line Bridge 	<p>Proposed or Permitted (not part of GMT1)</p> <ul style="list-style-type: none"> Road Facility <p>Existing</p> <ul style="list-style-type: none"> Pipeline Road Facility <p>Surface Land Ownership</p> <ul style="list-style-type: none"> Conveyed Selected
--	---

Ice Roads

- First Year
- Second Year
- Annual Resupply Road

Boundary

- Project Study Area
- NPR-A

Setback Area

- 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

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

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151°40'0"W

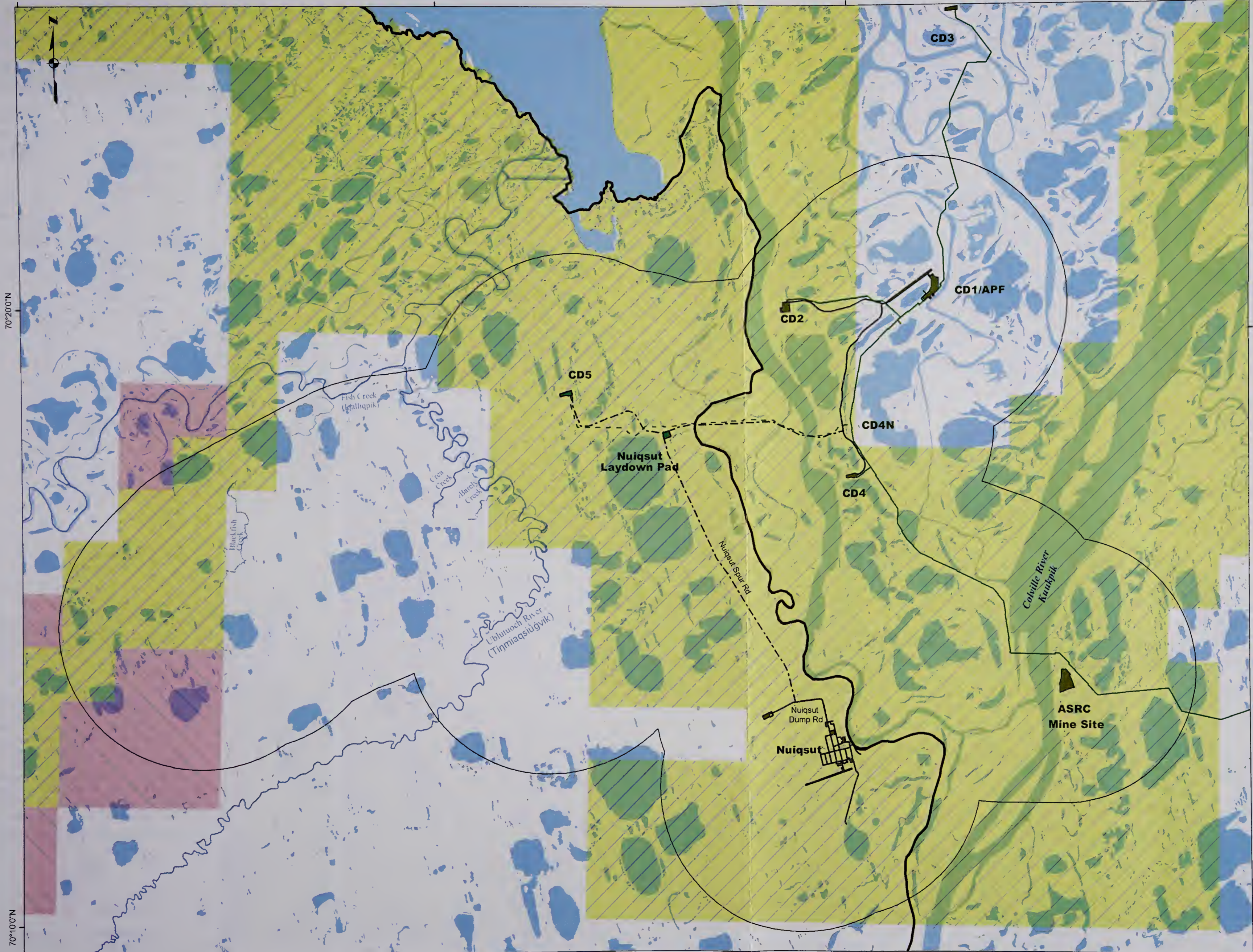
151°20'0"W

151°0'0"W

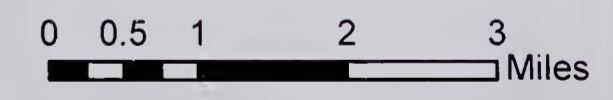
Map 2.10-1

Alternative E: No Action

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



Date: 10/21/2014



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NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet



Bureau of Land Management - Alaska
National Petroleum Reserve - Alaska

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Environmental Impact Statement 2014

151°40'0"W

151°20'0"W

151°0'0"W

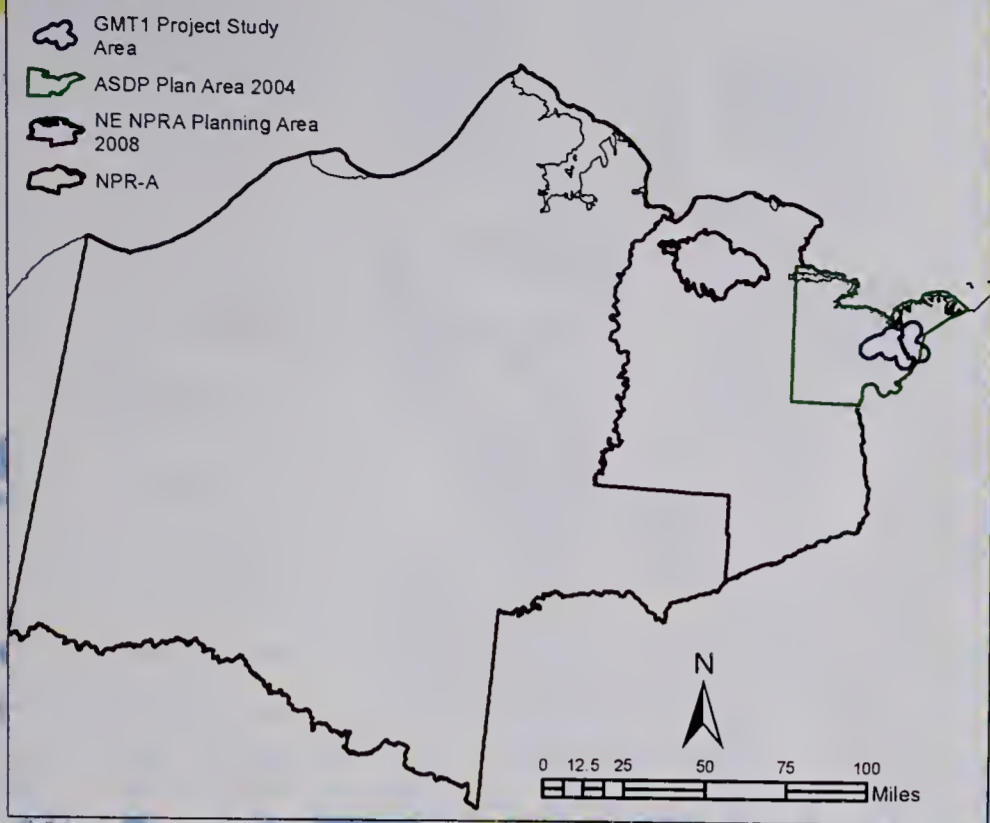
70°20'0"N

70°20'0"N

70°10'0"N

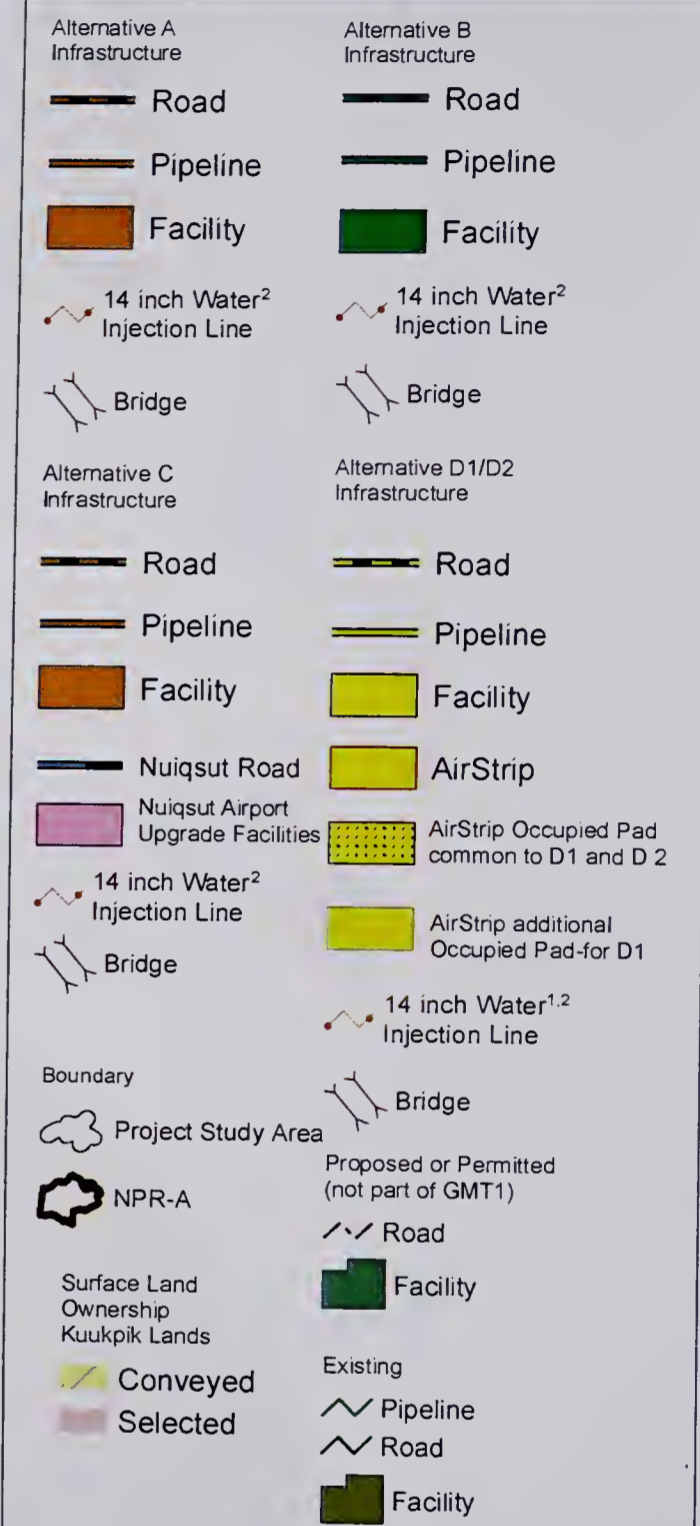
Planning and Study Areas

Planning areas within which this project takes place

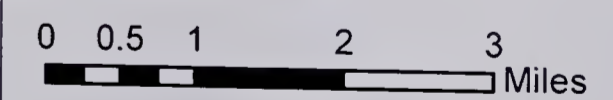


Map 3.1-1

Project Study Area



Date: 9/29/2014



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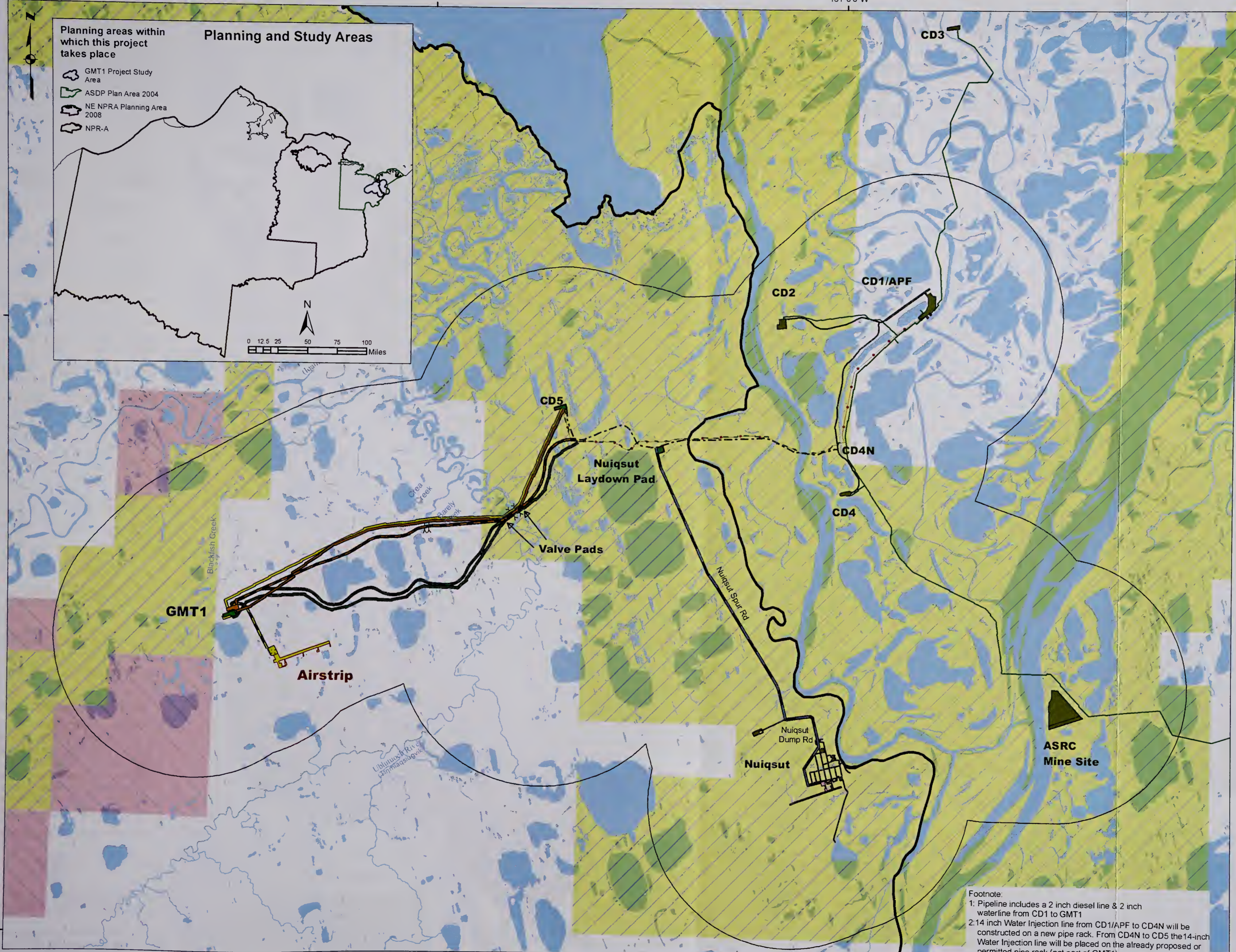
NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet



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National Petroleum Reserve - Alaska

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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).



151°40'0"W 151°20'0"W 151°0'0"W

70°20'0"N

70°10'0"N

Geomorphology

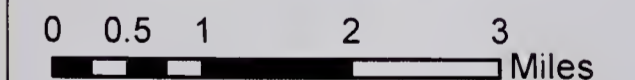
Eolian Active Sand Deposit	Meander Inactive Overbank Deposit	Delta Active Overbank Deposit	Alluvial-Marine Deposit	Thaw Basin, Ice-rich Margin
Eolian Inactive Sand Deposit	Meander Abandoned Overbank Deposit	Delta Inactive Overbank Deposit	Solifluction Deposit	Thaw Basin, Ice-rich Undifferentiated
Inactive Tidal Flat	Lowland Headwater Floodplain	Delta Abandoned Overbank Deposit	Thaw Basin, Ice-poor Center	Thaw Basin Pingo
Meander Active Channel Deposit	Delta Active Channel Deposit	Delta Thaw Basin, Ice-poor	Thaw Basin, Ice-poor Undifferentiated	Coastal Water
Meander Inactive Channel Deposit	Delta Inactive Channel Deposit	Delta Thaw Basin, Ice-rich	Thaw Basin, Ice-rich Center	Fresh Water
Meander Active Overbank Deposit		Old Alluvial Terrace		Human Modified

Map 3.2-1

Geomorphology

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

Date: 9/27/2014



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NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet



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National Petroleum Reserve - Alaska

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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 3.2-2
Drainage Basins

Alternative A Infrastructure		Alternative B Infrastructure	
	Road		Road
	Pipeline		Pipeline
	Facility		Facility
	14 inch Water ² Injection Line		14 inch Water ² 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 ² Injection Line		AirStrip additional Occupied Pad-for D1
	Bridge		14 inch Water ^{1,2} Injection Line
	Proposed or Permitted (not part of GMT1)		Bridge
	Road		Boundary
	Facility		Project Study Area
	Existing Pipeline		NPR-A
	Existing Road		
	Facility		
	Drainage Basins		

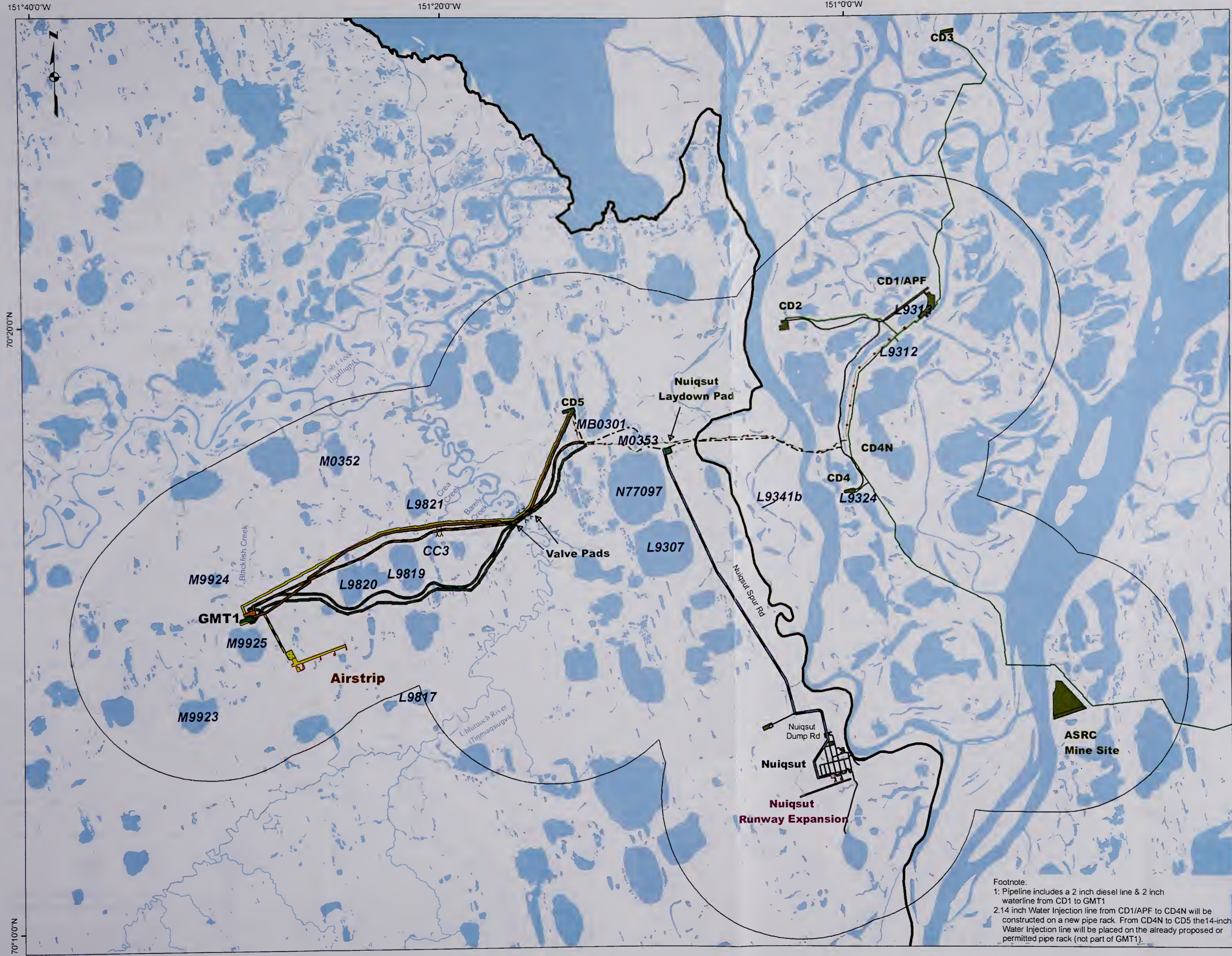
Setback Areas
 Fish Creek 3mi
 Ublutuock River 0.5mi
 Date: 10/21/2014
 0 0.5 1 2 3 Miles

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NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet



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

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

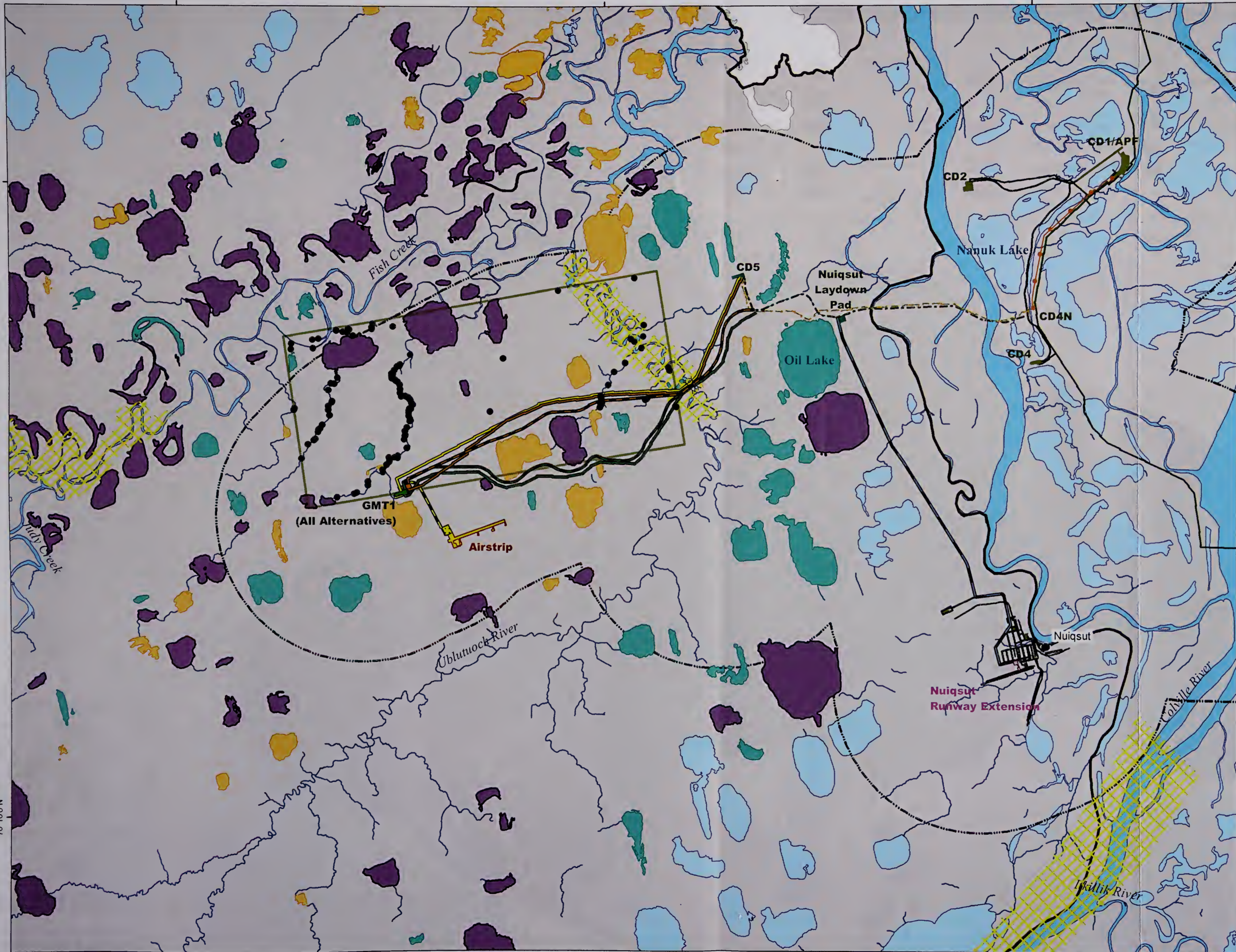
70°10'0"N

70°10'0"N

151°40'0"W

151°20'0"W

151°0'0"W



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

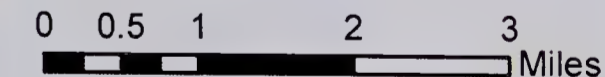
- | | |
|-------------------------------------|---|
| Alternative A Infrastructure | Alternative B Infrastructure |
| Pipeline | Pipeline |
| Road | Road |
| Facility | Facility |
| Alternative C Infrastructure | Alternative D1/D2 Infrastructure |
| Pipeline | Pipeline |
| Road | Road |
| Nuiqsut Spur/Dump/Airport 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



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NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet



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151°40'0"W

151°20'0"W

151°00'0"W

70°20'0"N

70°10'0"N

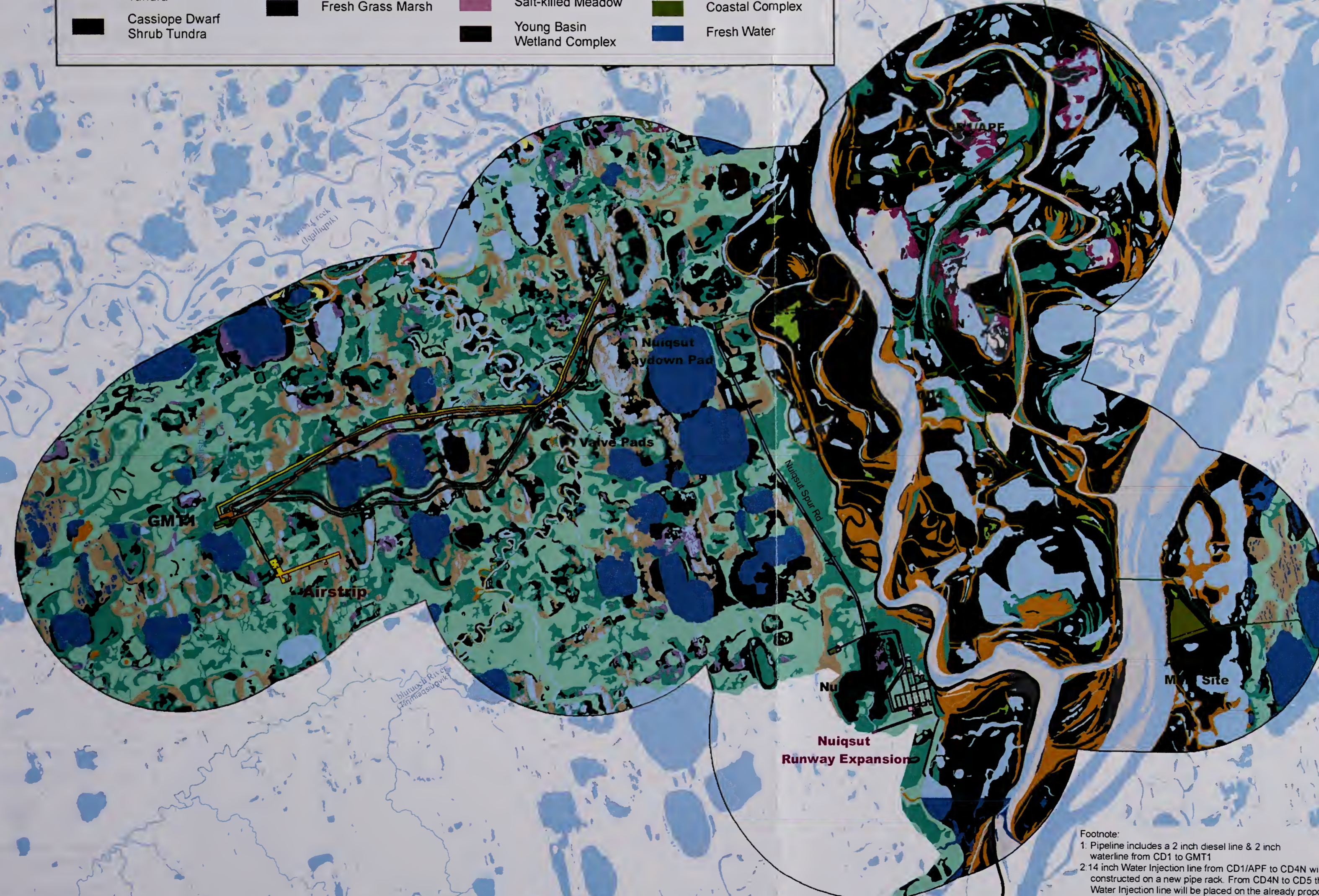
Vegetation

	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		Coastal Complex		Fresh Water
	Cassiope Dwarf Shrub Tundra						

Map 3.3-2

Vegetation

Alternative A Infrastructure		Alternative B Infrastructure	
	Road		Road
	Pipeline		Pipeline
	Facility		Facility
	14 inch Water ² Injection Line		14 inch Water ² 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 ² Injection Line		AirStrip additional Occupied Pad-for D1
	Bridge		14 inch Water ^{1,2} Injection Line
	Bridge		Bridge
Boundary		Proposed or Permitted (not part of GMT1)	
	Project Study Area		Road
	NPR-A		Facility
		Existing	
			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



Bureau of Land Management - Alaska
National Petroleum Reserve - Alaska

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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 3.3-3
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
- | | |
|-------------------------------------|---|
| 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

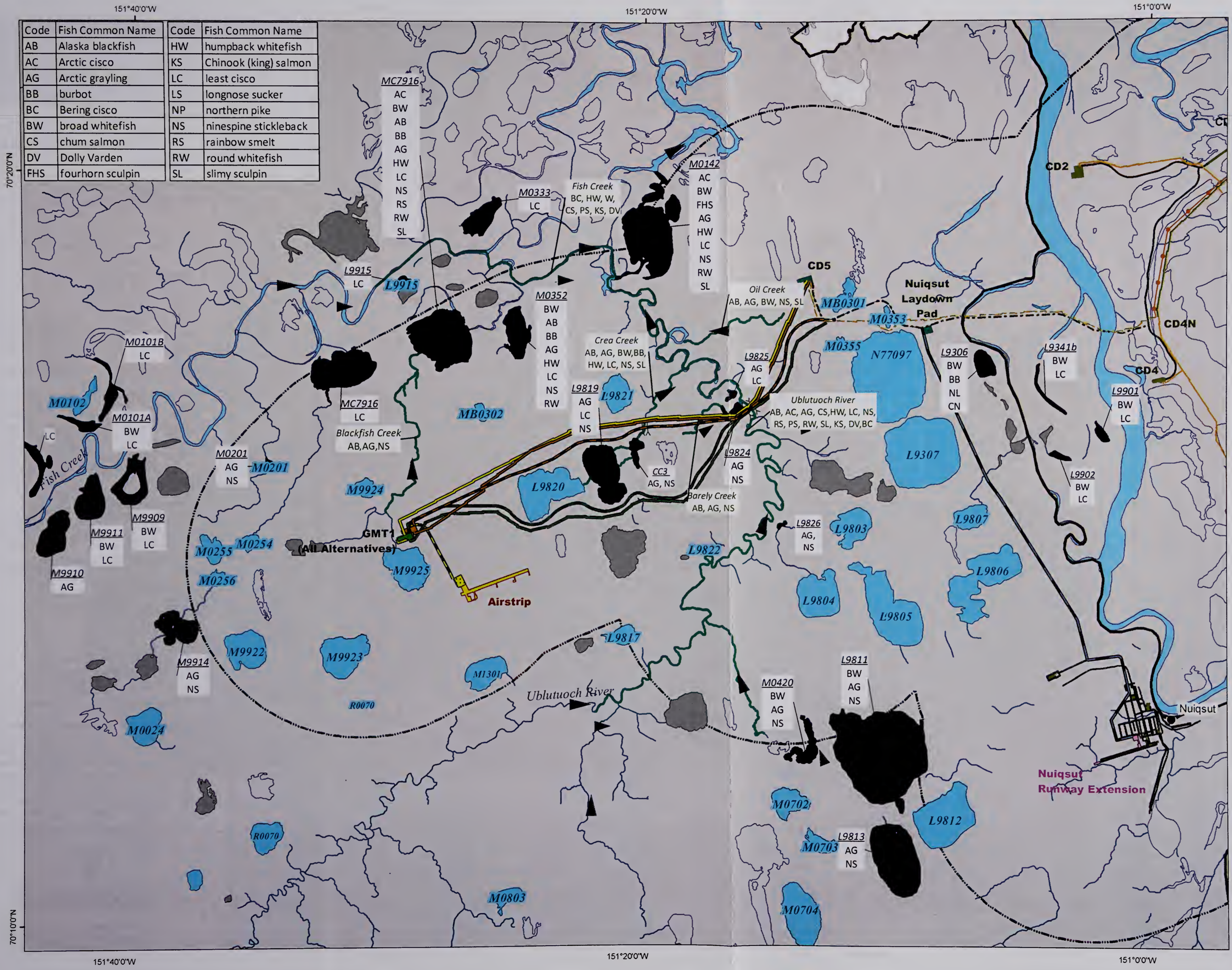
- Project Study Area
- NPR-A

Data Sources:
 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 Spur/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

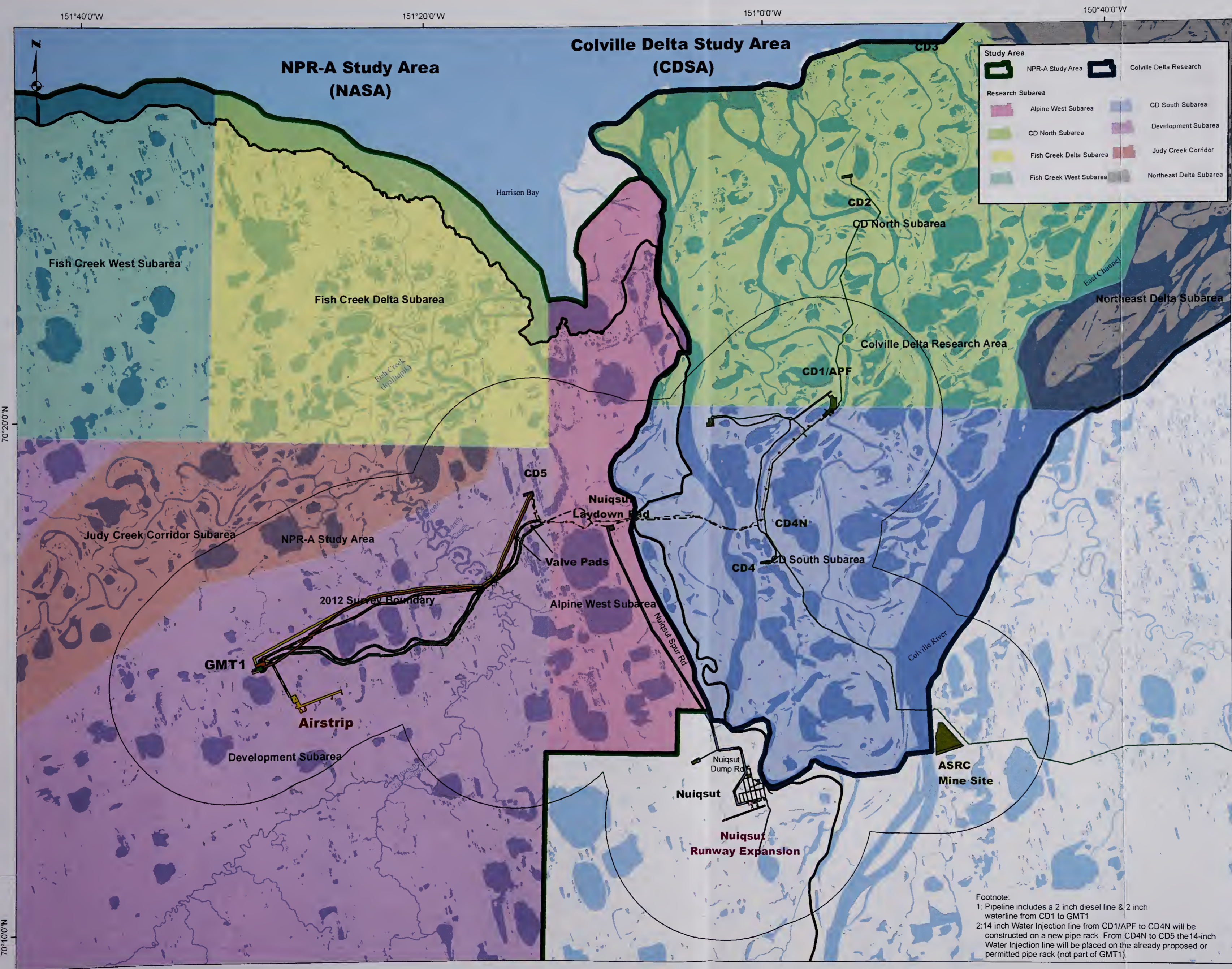
0 0.4 0.8 1.6 2.4 Miles

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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

Alternative A Infrastructure

- Road
- Pipeline
- Facility
- 14 inch Water² Injection Line
- Bridge

Alternative B Infrastructure

- Road
- Pipeline
- Facility
- 14 inch Water² Injection Line
- Bridge

Alternative C Infrastructure

- Road
- Pipeline
- Facility
- Nuiqsut Road
- Nuiqsut Airport Upgrade Facilities
- 14 inch Water² Injection Line
- Bridge

Alternative D1/D2 Infrastructure

- Road
- Pipeline
- Facility
- AirStrip
- AirStrip Occupied Pad common to D1 and D 2
- AirStrip additional Occupied Pad-for D1
- 14 inch Water^{1,2} Injection Line
- Bridge

Boundary

- Project Study Area
- NPR-A
- Proposed or Permitted (not part of GMT1)
- Road
- Facility
- Existing Pipeline
- Existing Road
- Existing Facility

Date: 9/27/2014

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:
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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).

151°40'0"W

151°20'0"W

151°0'0"W

70°20'0"N

70°10'0"N

Habitat Types

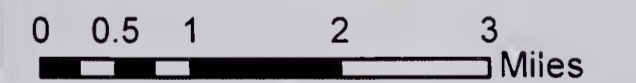
	Barrens		Nonpatterned Wet Meadow		Shallow Open Water with Islands or Polygonized Margins		Tapped Lake with High-water Connection
	Dry Dwarf Shrub		Sedge Marsh		Shallow Open Water without Islands		River or Stream
	Moist Dwarf Shrub		Grass Marsh		Deep Open Water with Islands or Polygonized Margins		Moist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

Map 3.3-6

Wildlife Habitat

Alternative A Infrastructure		Alternative B Infrastructure	
	Road		Road
	Pipeline		Pipeline
	Facility		Facility
	14 inch Water ² Injection Line		14 inch Water ² 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 ² Injection Line		AirStrip additional Occupied Pad-for D1
	Bridge		14 inch Water ^{1,2} Injection Line
			Bridge
Boundary		Proposed or Permitted (not part of GMT1)	
	Project Study Area		Road
	NPR-A		Facility
Existing			
	Pipeline		Road
	Facility		Facility

Date: 9/29/2014



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GMT1 Development Project Supplemental
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Footnote:

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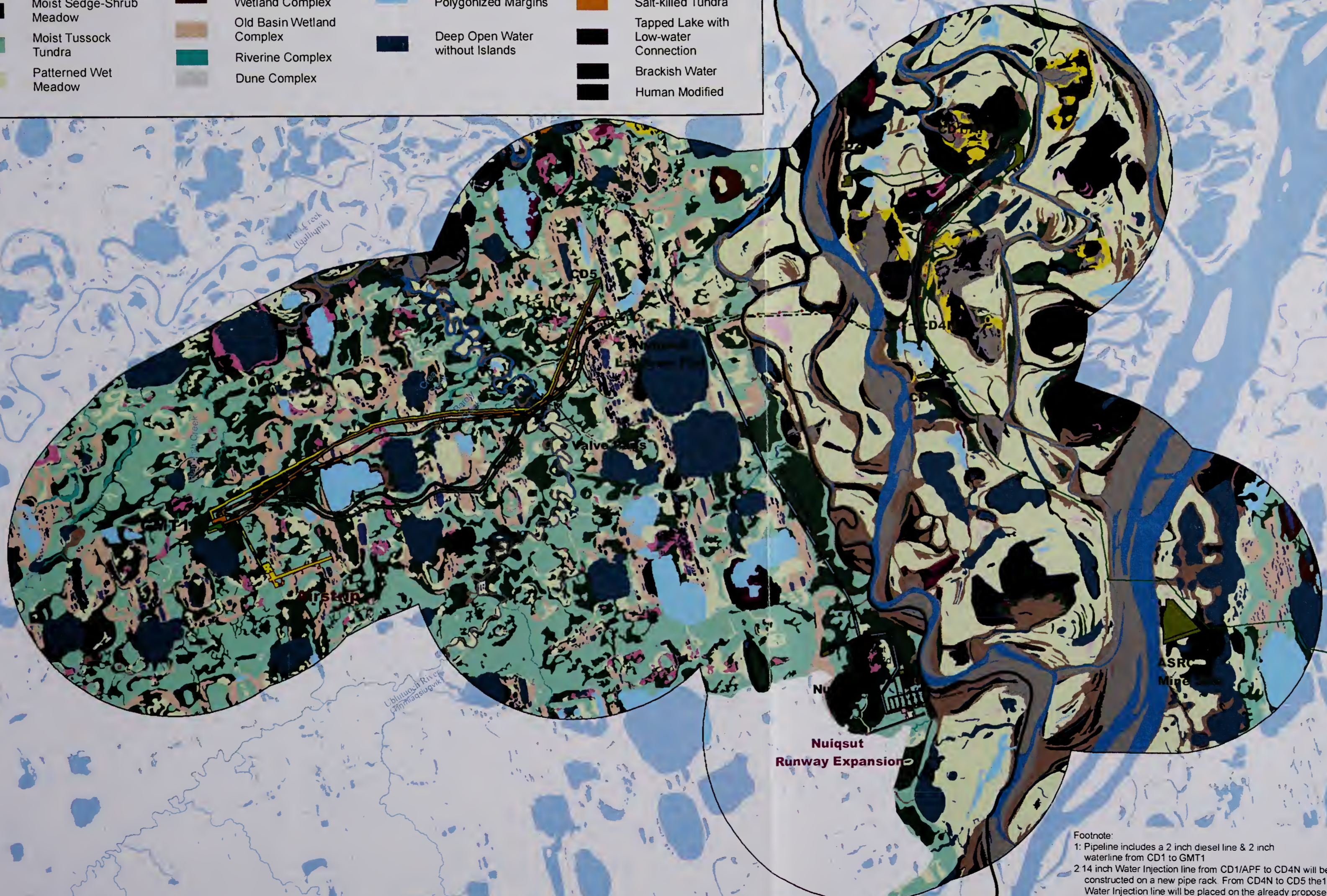
CD3

CD5

CD4

Nuiqsut
Runway Expansion

ASRC
Mine



151°40'0"W

151°20'0"W

151°0'0"W

70°20'0"N

70°10'0"N

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

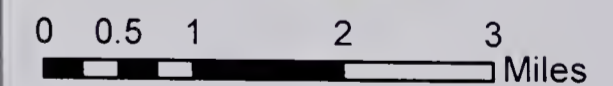
Source : Johnstone et al. 2013

Map 3.3-7

2012 Avian Survey

- | | |
|---|---|
| Alternative A Infrastructure | Alternative B Infrastructure |
| — Road | — Road |
| — Pipeline | — Pipeline |
| ■ Facility | ■ Facility |
| ~ 14 inch Water ² Injection Line | ~ 14 inch Water ² 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 ² Injection Line | ~ 14 inch Water ^{1,2} Injection Line |
| ≡ Bridge | ≡ Bridge |
| Boundary | Proposed or Permitted (not part of GMT1) |
| ☁ Project Study Area | — Road |
| ⬢ NPR-A | ■ Facility |
| Existing | — Pipeline |
| | — Road |
| | ■ Facility |

Date: 9/27/2014



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NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet

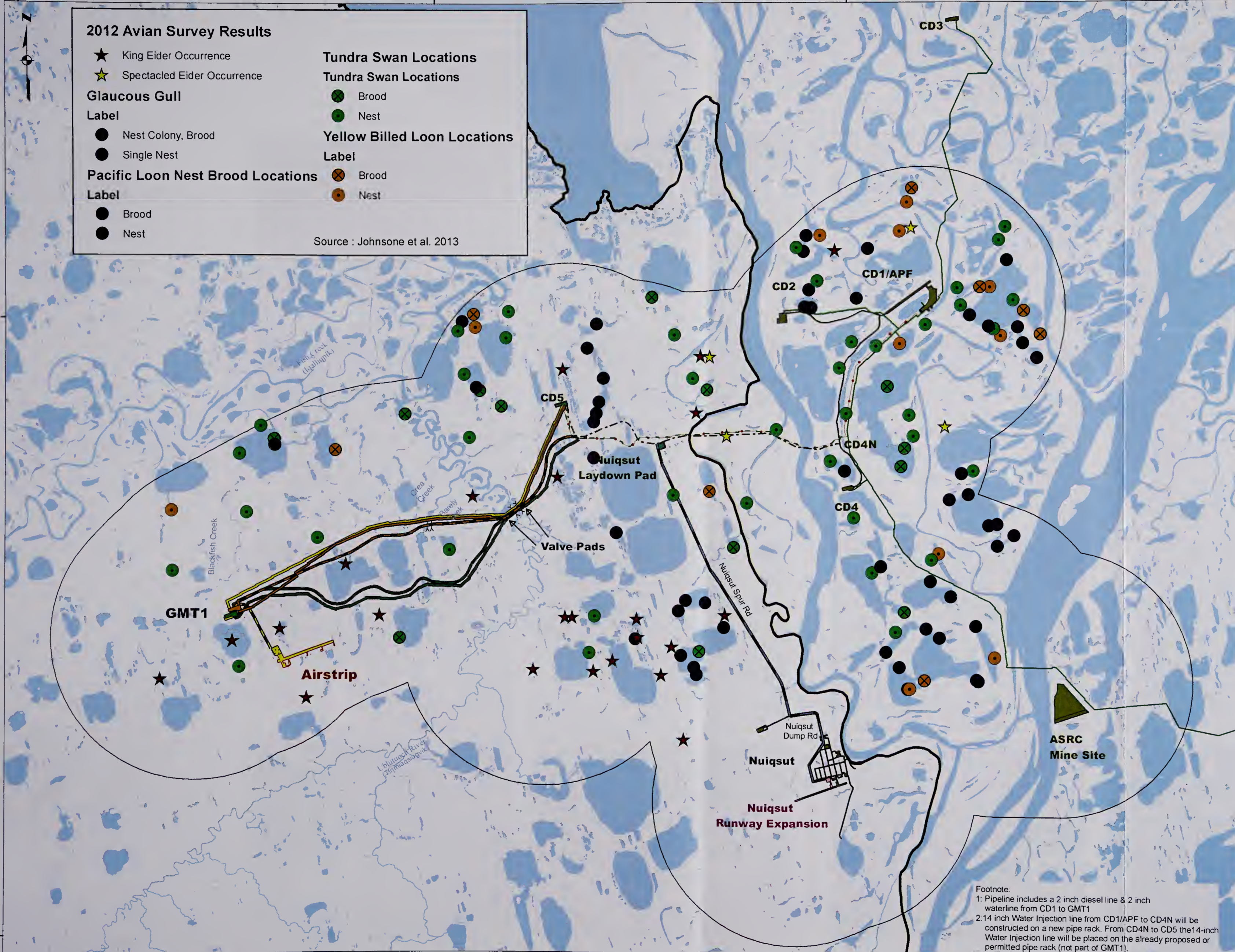


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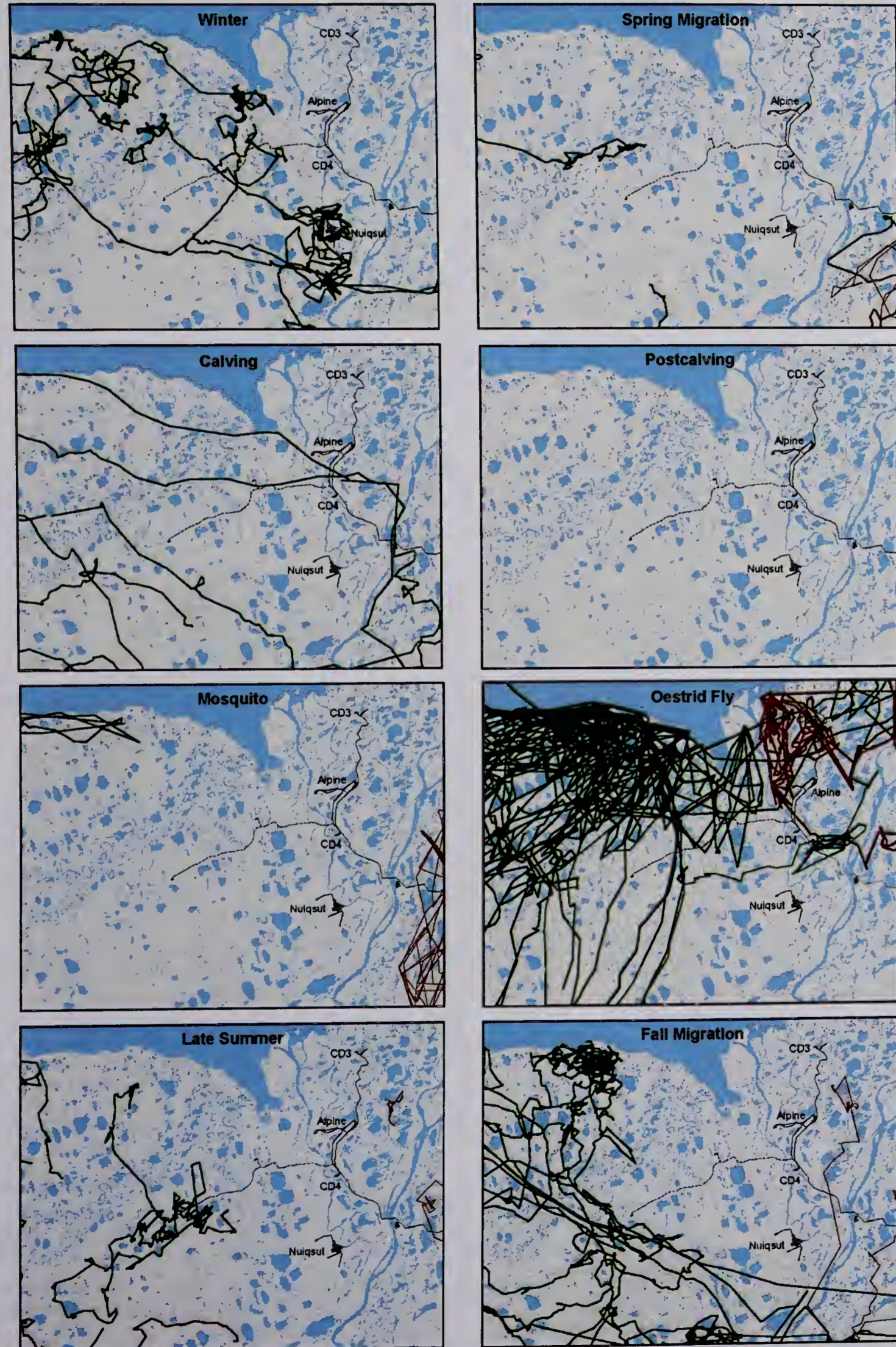
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Footnote:

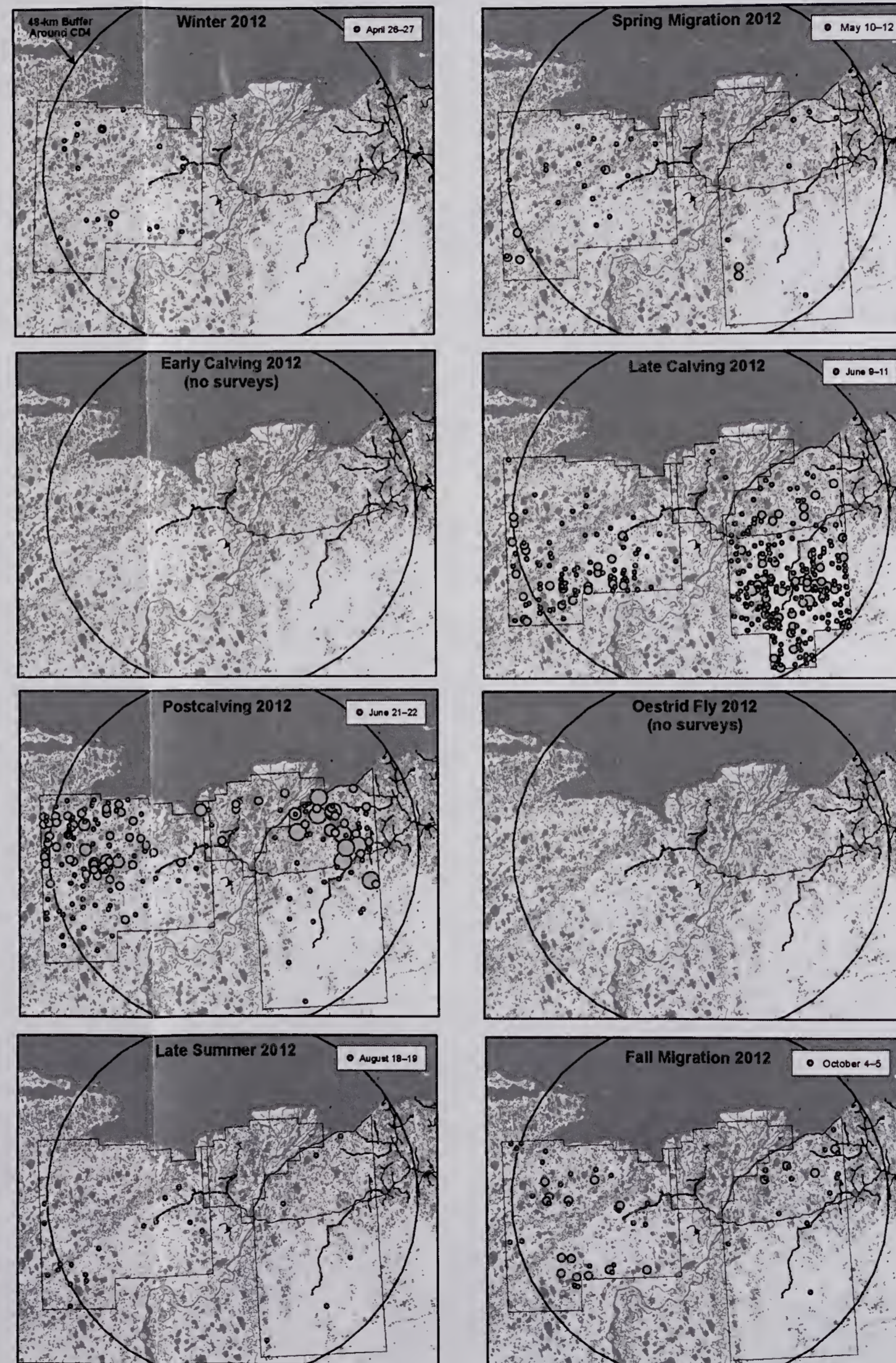
- 1: Pipeline includes a 2 inch diesel line & 2 inch waterline from CD1 to GMT1
- 2: 14 inch Water Injection line from CD1/APF to CD4N will be constructed on a new pipe rack. From CD4N to CD5 the 14-inch Water Injection line will be placed on the already proposed or permitted pipe rack (not part of GMT1).



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

Legend

- Central Arctic Herd
- Teshekpuk Herd
- Existing Infrastructure
- Proposed ASDP Road
- Aerial Survey Area

Caribou Group Size

- 1 - 5
- 6 - 25
- 26 - 100
- 101 - 525

- Existing Infrastructure
- Proposed ASDP Road

Source: Lawhead et al. 2012

Date: 10/21/2014

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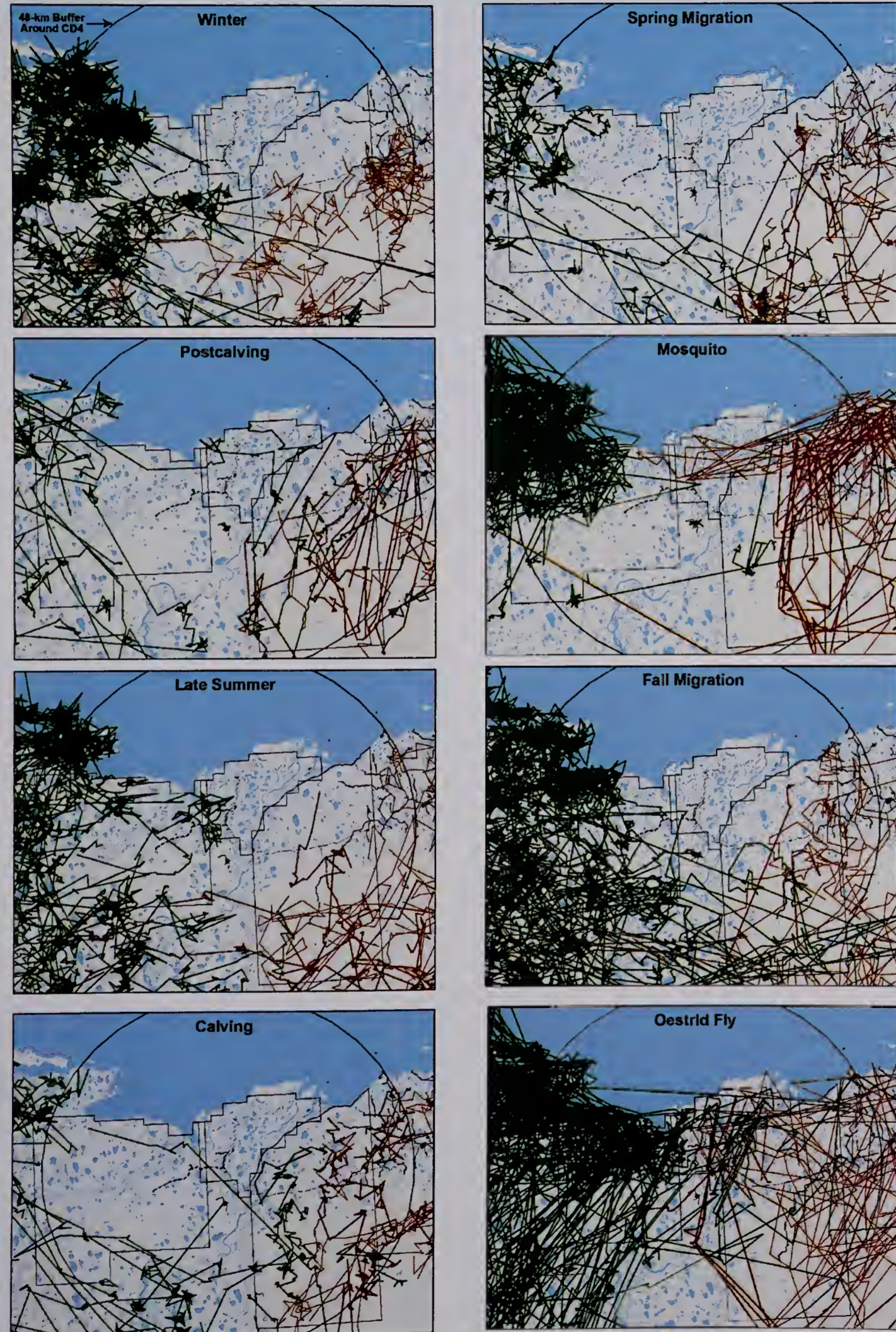
NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet



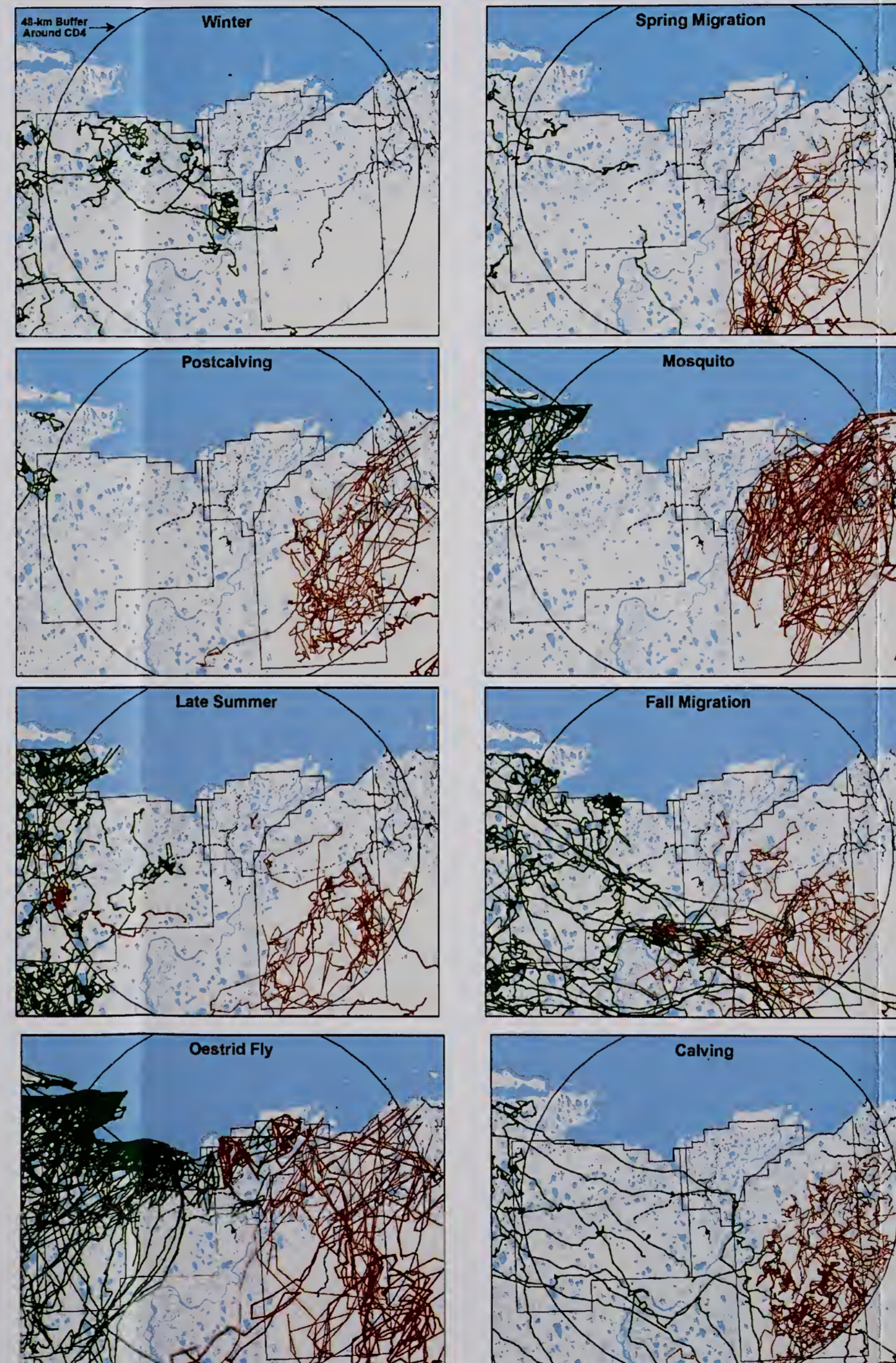
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Movements of satellite-collared caribou from the Teshekpuk Herd (1990-2012 and Central Arctic Herd (1986-1990 and 2001-2009) in the ASDP study area during 8 different seasons.



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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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



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
 0 5 10 20 30 Miles

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NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet



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151°40'0"W

151°20'0"W

151°0'0"W

150°40'0"W

BEAUFORT
SEA

Nigliq

Channel

Colville
River

Creek

Fish

Nuiqsut

Ublutuoch River

Colville
River

Ikilik
River

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

0 0.5 1 2 3
Miles

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NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet



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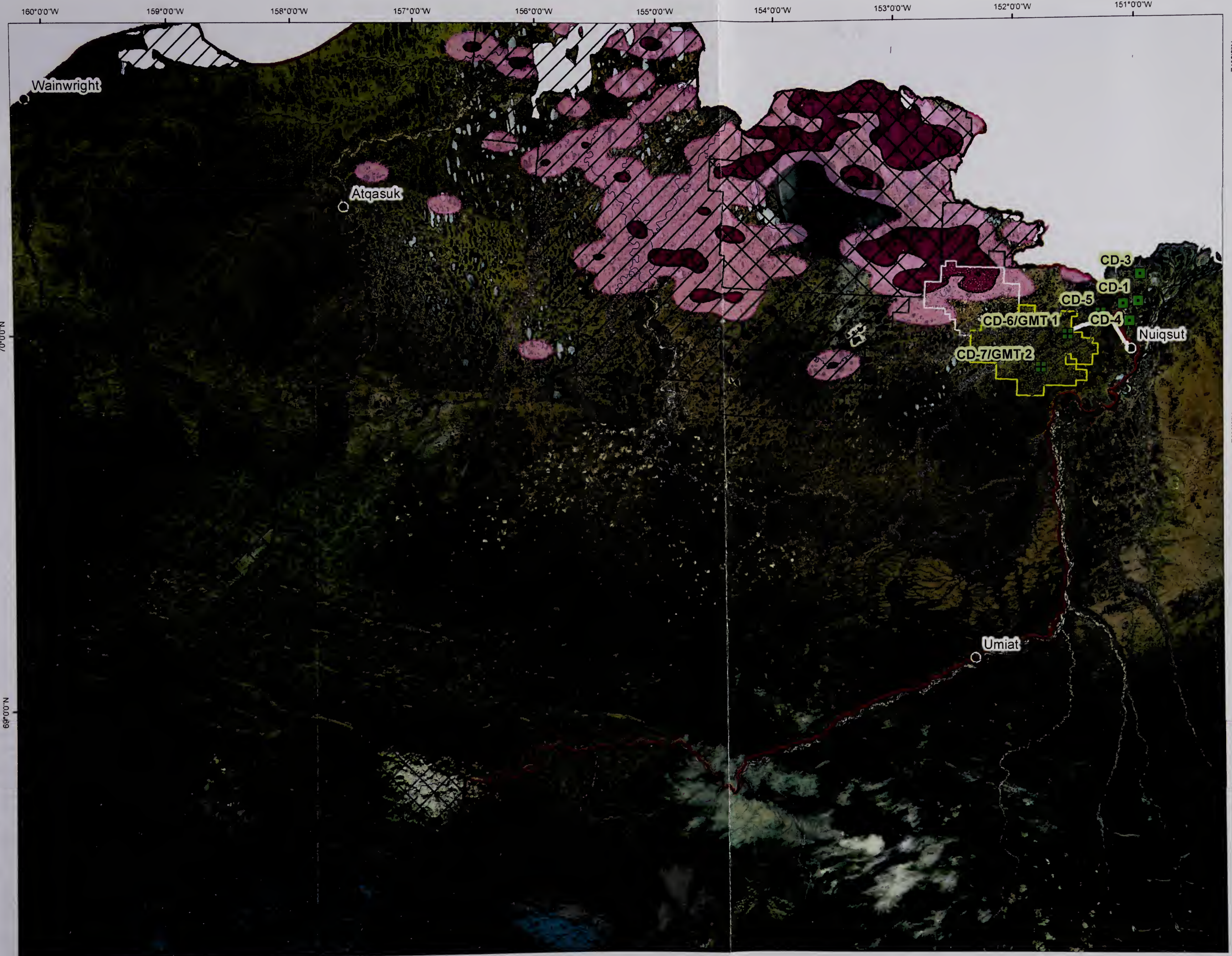


70°20'0"N

70°10'0"N

70°20'0"N

70°10'0"N

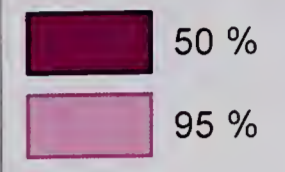


Map 3.3-12

Caribou Summer Areas

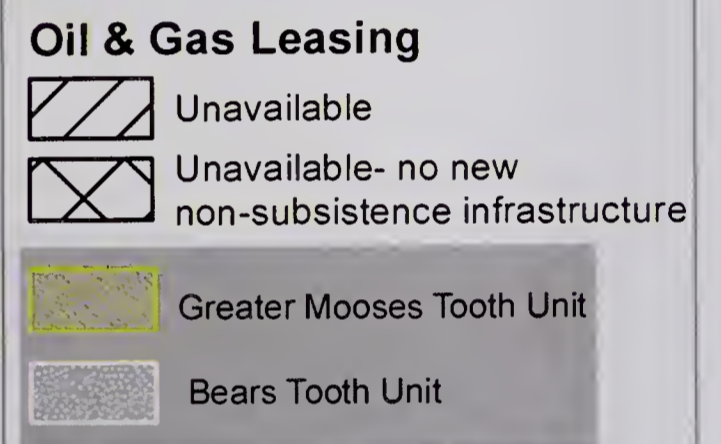
**Teshekpuk Lake Caribou Herd
Mosquito Relief Areas**

(1990-2010 Satellite Telemetry Data)
1-15 July
Kernel Density Analysis - Density Contour



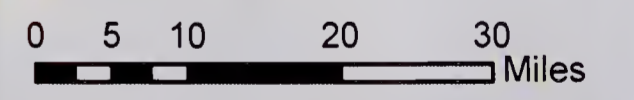
**Western Arctic Caribou Herd
Summer Line Density**

(1988 - 2010)
1-2 movement lines crossing
each 200 sq mi grid
>2 movement lines crossing
each 200 sq mi grid



CONOCO PHILLIPS
Existing Facility
Proposed Facility
Proposed Roads

NPR-A Boundary



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NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet



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160°00'W 159°00'W 158°00'W 157°00'W 156°00'W 155°00'W 154°00'W 153°00'W 152°00'W 151°00'W

71°00'N

70°00'N

69°00'N

70°00'N

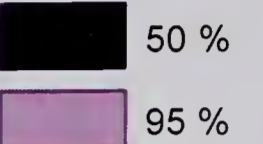
69°00'N



Map 3.3 -13 Caribou Calving Areas

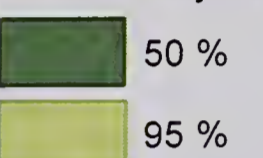
Teshekpuk Lake Caribou Herd Calving Areas

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

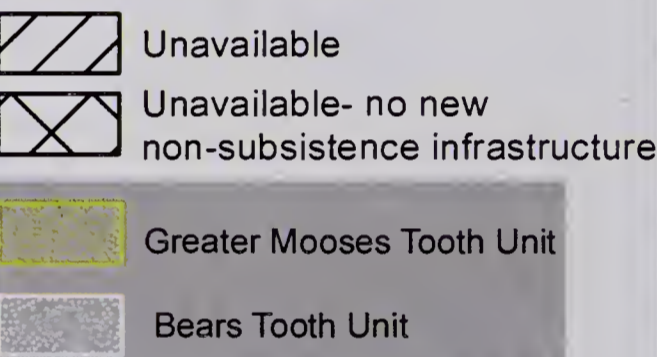


Western Arctic Caribou Herd Calving Areas

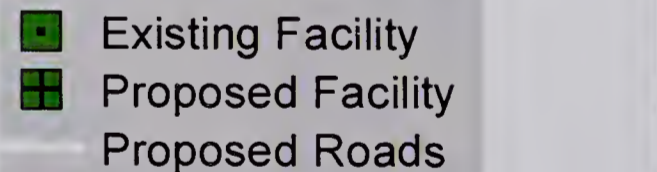
(1987 - 2010, excluding 1990-1991)
Kernel Density Analysis - Density Contour



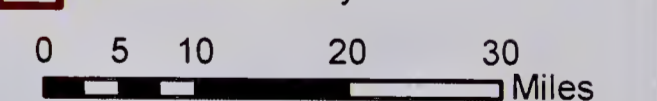
Oil & Gas Leasing



CONOCO PHILLIPS



NPR-A Boundary



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NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet

151°40'0"W

151°20'0"W

151°0'0"W

70°20'0"N

70°20'0"N

70°10'0"N

- Polar Bear Habitat**
- Den Location (1910-2011)¹
 - Polar Bear Sighting (1993-2011)²
 - Polar Bear Denning Habitat Within a 1 Mile buffer of Project Infrastructure³

Data Sources:
 1. 2011 CPAI
 2. Durner et al. 2013

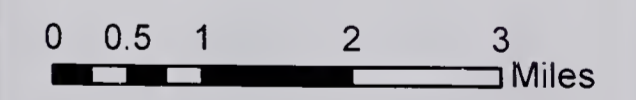


Map 3.3-14

Polar Bear Habitat

- | | |
|---|---|
| Alternative A Infrastructure | Alternative B Infrastructure |
| Road | Road |
| Pipeline | Pipeline |
| Facility | Facility |
| 14 inch Water ² Injection Line | 14 inch Water ² 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 ² Injection Line | 14 inch Water ^{1,2} Injection Line |
| Bridge | Bridge |
| Existing | Proposed or Permitted (not part of GMT1) |
| Pipeline | Road |
| Road | Road |
| Facility | Facility |
| Boundary | Facility |
| 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

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).

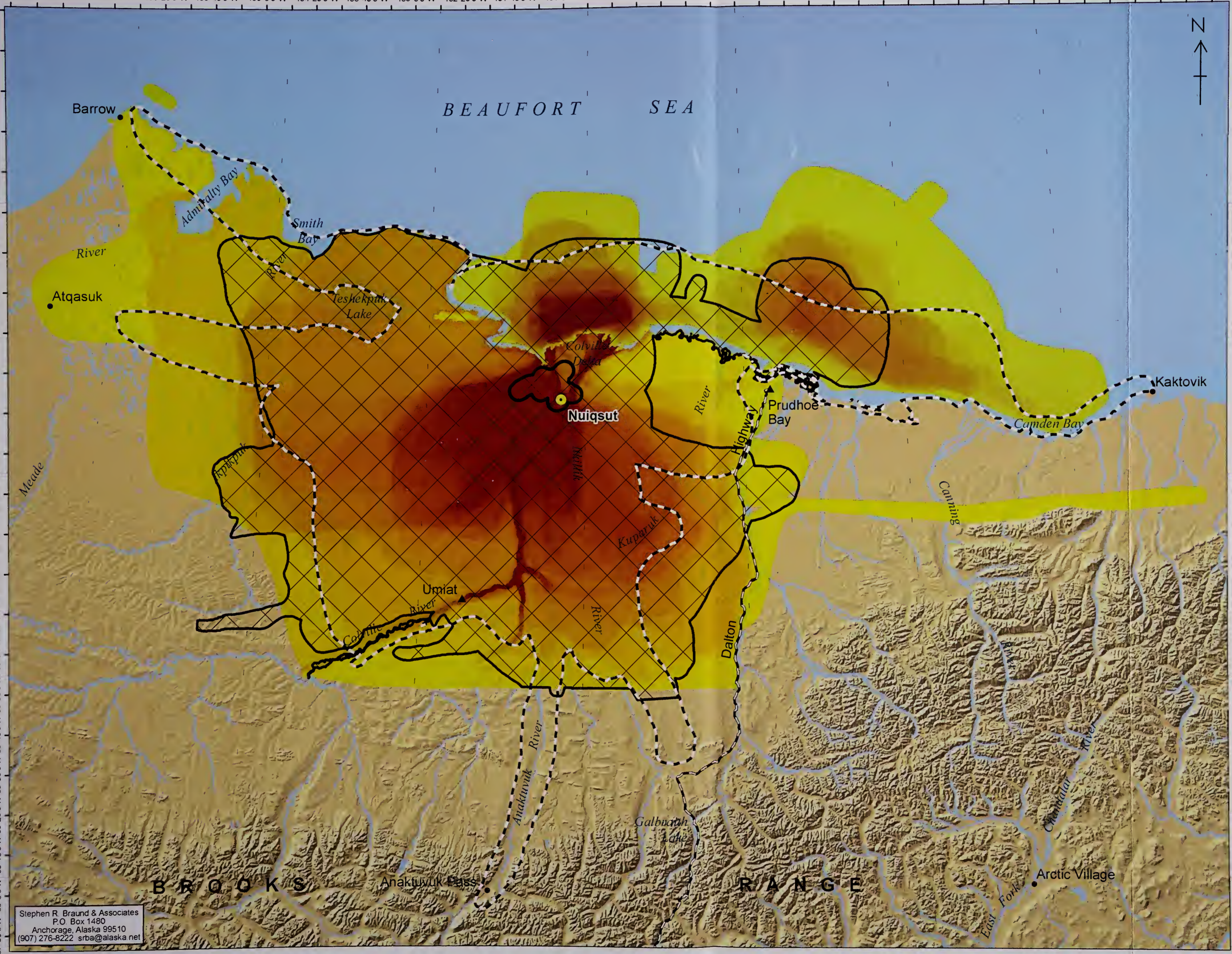


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158°20'0"W 157°40'0"W 157°0'0"W 156°20'0"W 155°40'0"W 155°0'0"W 154°20'0"W 153°40'0"W 153°0'0"W 152°20'0"W 151°40'0"W 151°0'0"W 150°20'0"W 149°40'0"W 149°0'0"W 148°20'0"W 147°40'0"W 147°0'0"W 146°20'0"W 145°40'0"W 145°0'0"W 144°20'0"W 143°40'0"W 143°0'0"W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

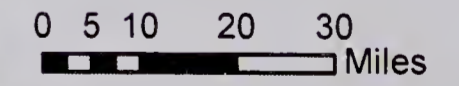
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Map 3.4-1
Nuiqsut Contemporary Subsistence Use Areas, All Resources

- 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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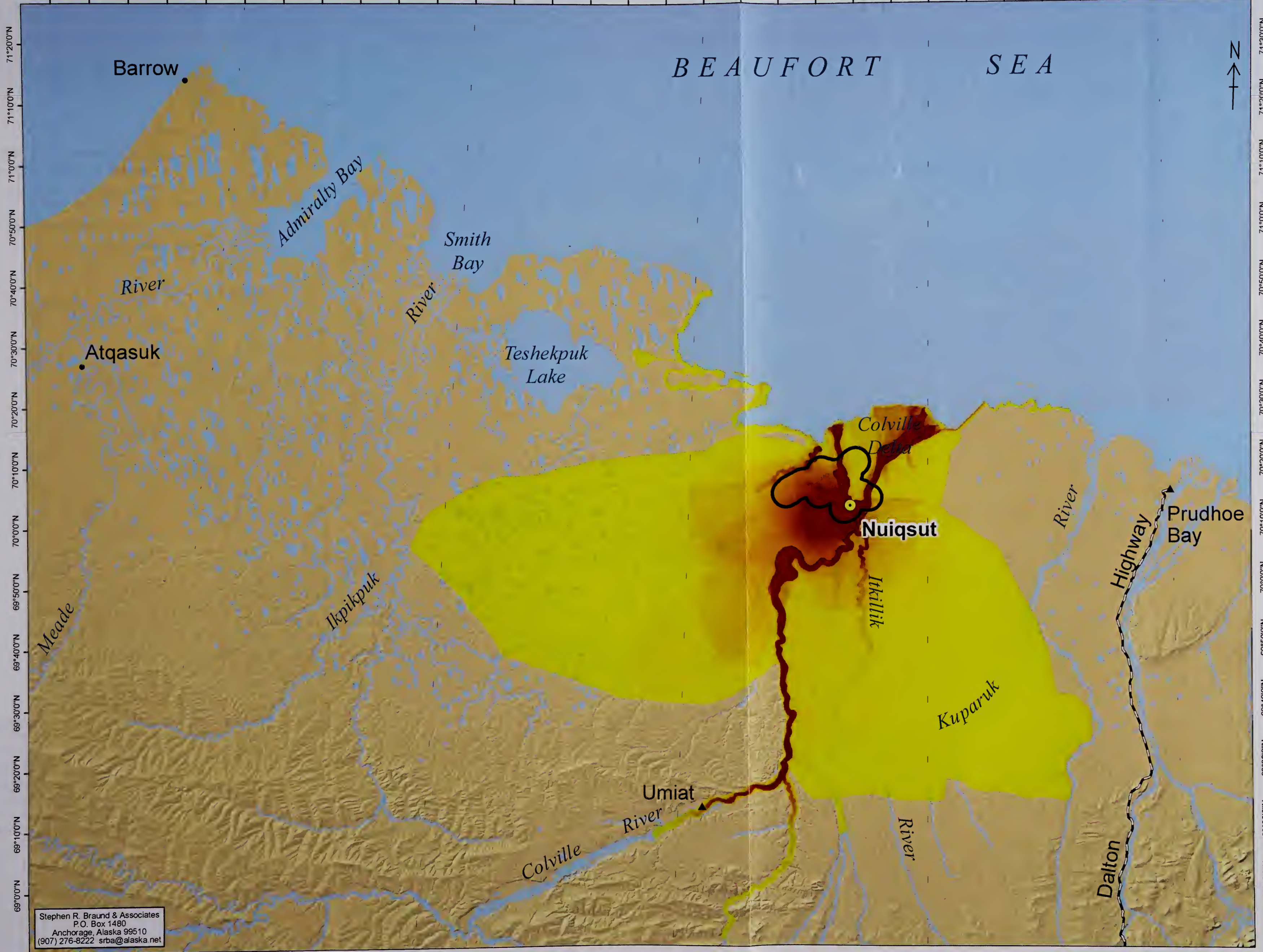
NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet



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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



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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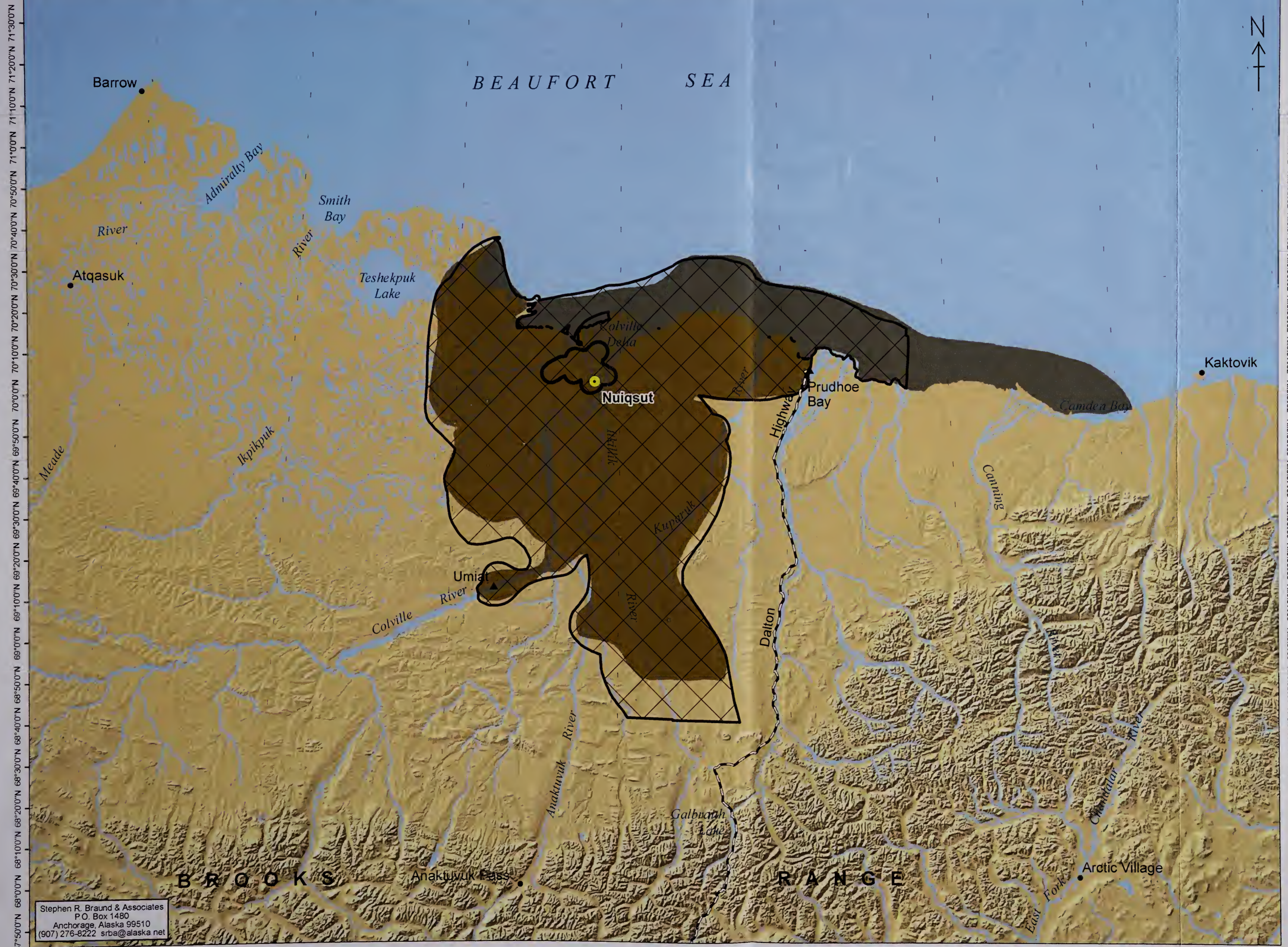
NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet





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



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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

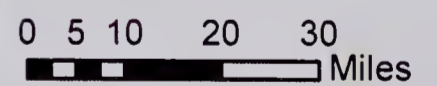


Map 3.4-3
Nuiqsut Historic and Lifetime Subsistence Use Areas, All Resources

- 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

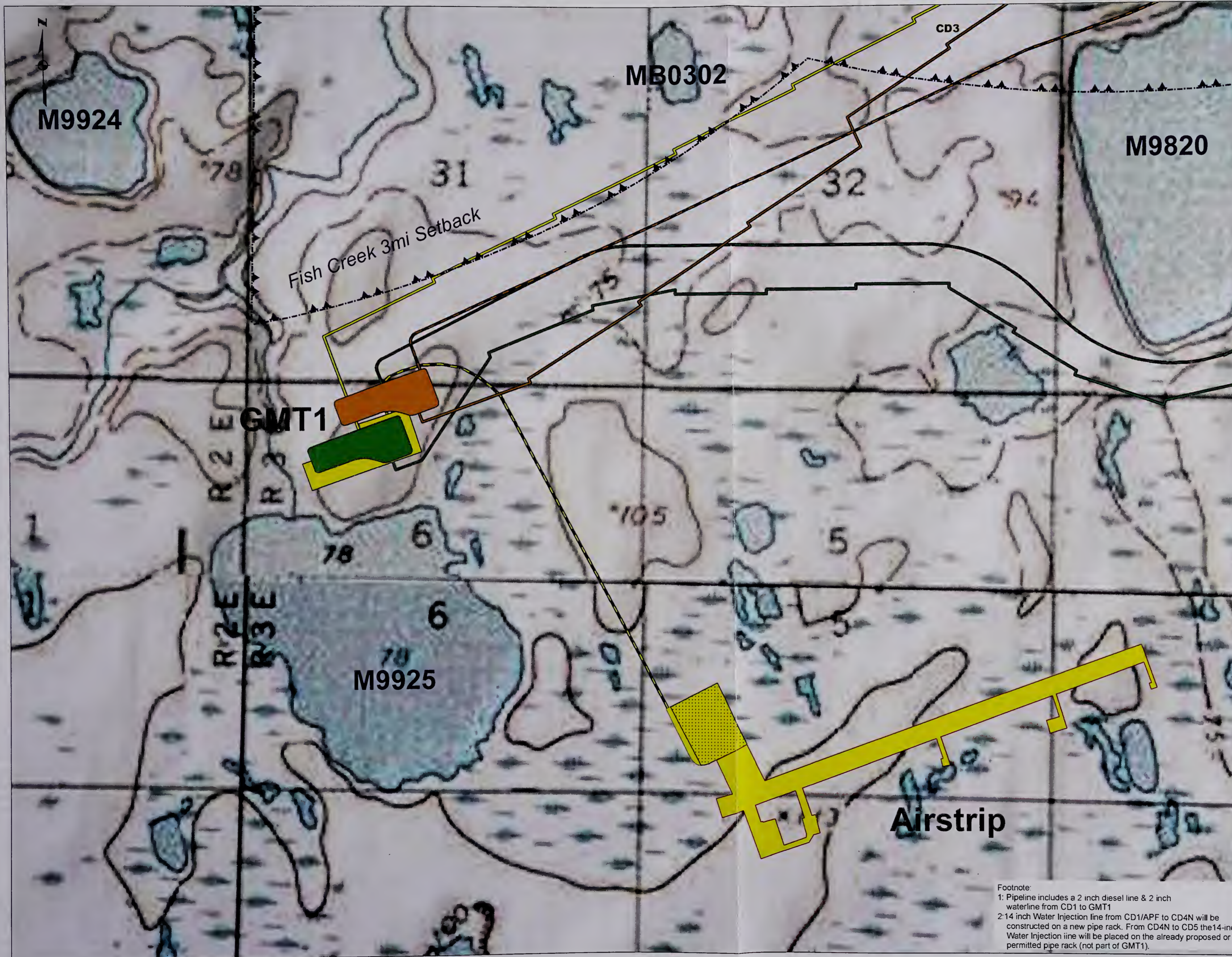


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67°50'0"N 68°0'0"N 68°10'0"N 68°20'0"N 68°30'0"N 68°40'0"N 68°50'0"N 69°0'0"N 69°10'0"N 69°20'0"N 69°30'0"N 69°40'0"N 69°50'0"N 70°0'0"N 70°10'0"N 70°20'0"N 70°30'0"N 70°40'0"N 70°50'0"N 71°0'0"N 71°10'0"N 71°20'0"N 71°30'0"N



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).

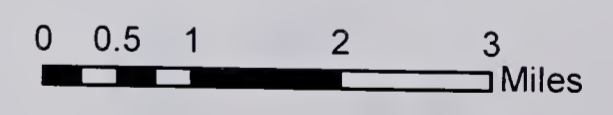


Map 4.2-2
Alternatives A and C
Potential Inundation Analysis

- | | |
|---|---|
| Alternative A Infrastructure | Proposed or Permitted (not part of GMT1) |
| Road | Pipeline |
| Pipeline | Road |
| Facility | Facility |
| 14 inch Water ¹ Injection Line | Existing |
| Bridge | Pipeline |
| | Road |
| | 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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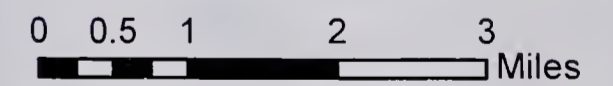
Map 4.2-3
Alternative B
Potential
Inundation Analysis

Alternative B Infrastructure	Proposed or Permitted (not part of GMT1)
Road	Pipeline
Pipeline	Road
Facility	Facility
14 inch Water ¹ Injection Line	Boundary
Bridge	Drainage Basin
Existing Pipeline	Project Study Area
Existing Road	NPR-A
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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Map 4.2-4
Alternatives D1 and D2
Potential Inundation Analysis

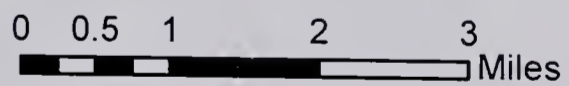
Alternative D1/D2 Infrastructure	Proposed or Permitted (not part of GMT1)
Road	Pipeline
Pipeline	Road
Facility	Facility
Facility	Existing
Facility	Pipeline
Facility	Road
Facility	Facility
14 inch Water ^{1,2} Injection Line	Boundary
Bridge	Drainage Basin
	Project Study Area
	NPR-A

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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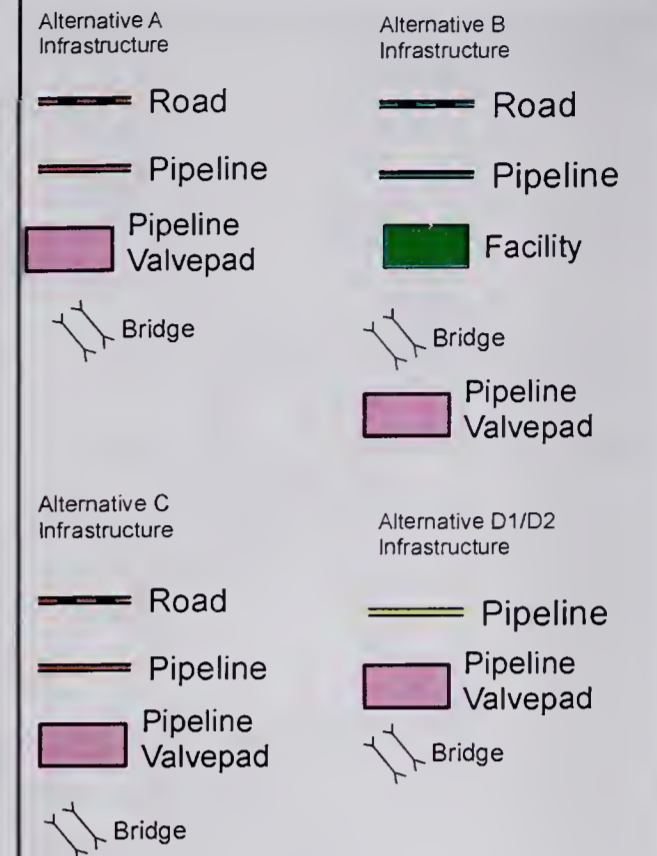
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151°20'W



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



Setback Area
 Fish Creek 3mi
 Ublutuoch River 0.5mi

Date: 10/21/2014



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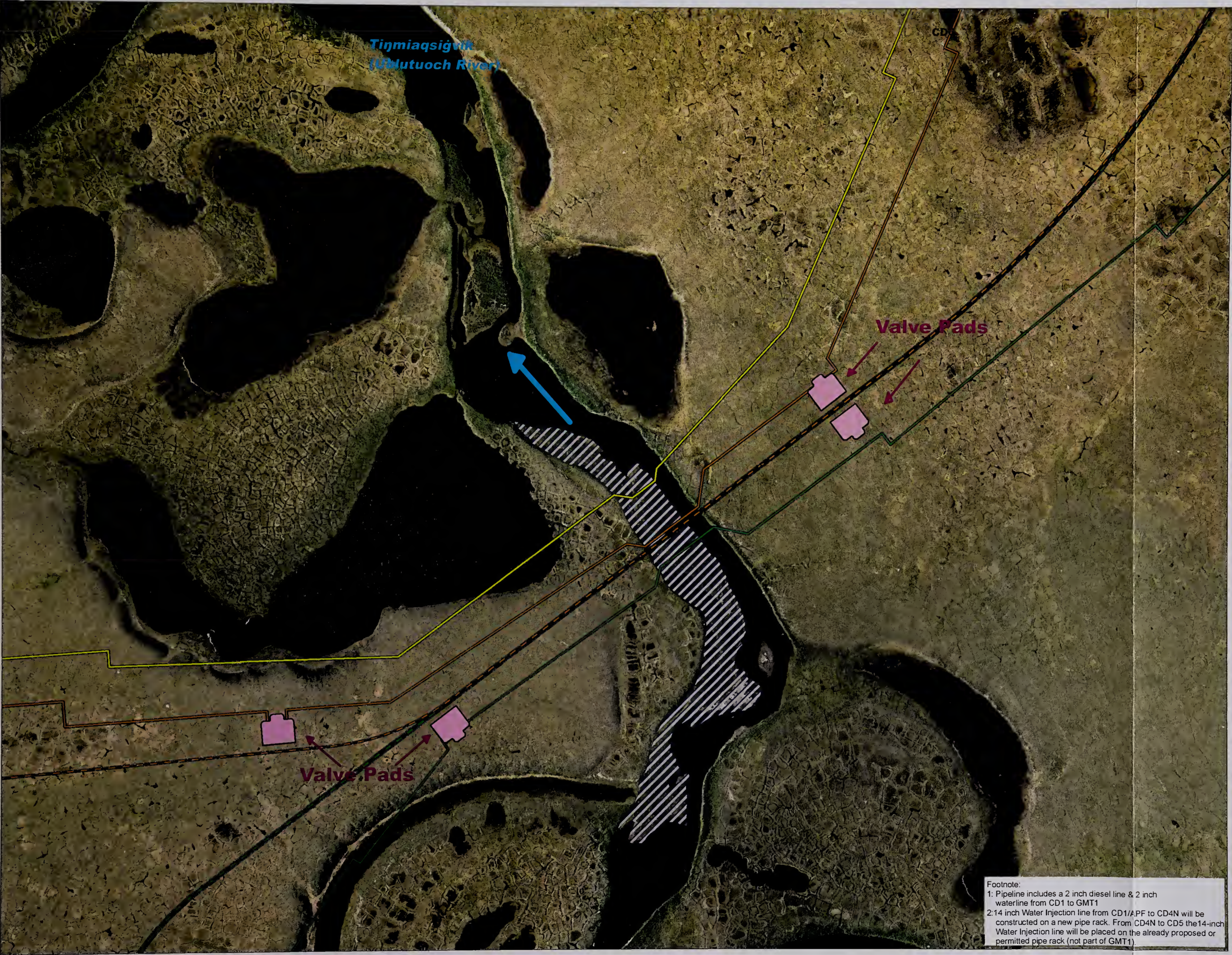
NAD 1983 StatePlane Alaska 4 FIPS 5004 Feet



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

Alternative A Infrastructure	Alternative B Infrastructure
Road	Road
Pipeline	Pipeline
Pipeline Valvepad	Pipeline Valvepad

Alternative C Infrastructure	Alternative D1/D2 Infrastructure
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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Footnote:
 1: Pipeline includes a 2 inch diesel line & 2 inch waterline from CD1 to GMT1
 2: 14 inch Water Injection line from CD1/PF 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

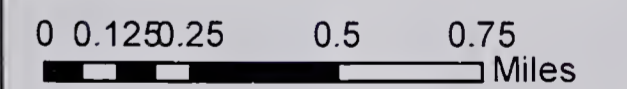
Crea Creek and Barely Creek Drainage Basins

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



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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).

151°40'0"W

151°20'0"W

151°0'0"W

70°20'0"N

70°20'0"N

70°10'0"N

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

Alternative A Infrastructure	Alternative B Infrastructure
Road	Road
Pipeline	Pipeline
Facility	Facility
14 inch Water ² Injection Line	14 inch Water ² 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 D 2
14 inch Water ² Injection Line	AirStrip additional Occupied Pad-for D1
Bridge	14 inch Water ^{1,2} Injection Line
Boundary	Bridge
Project Study Area	NPR-A

**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

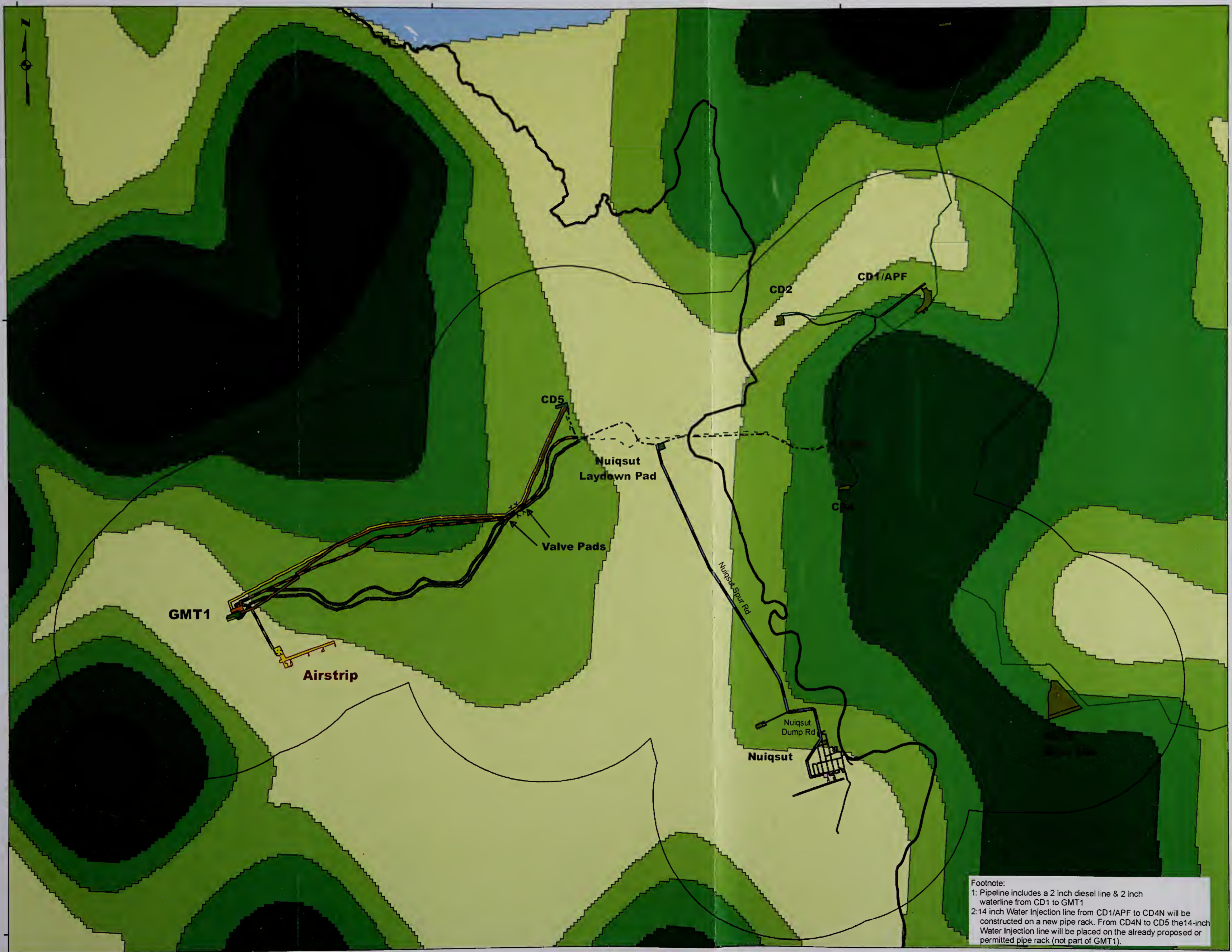
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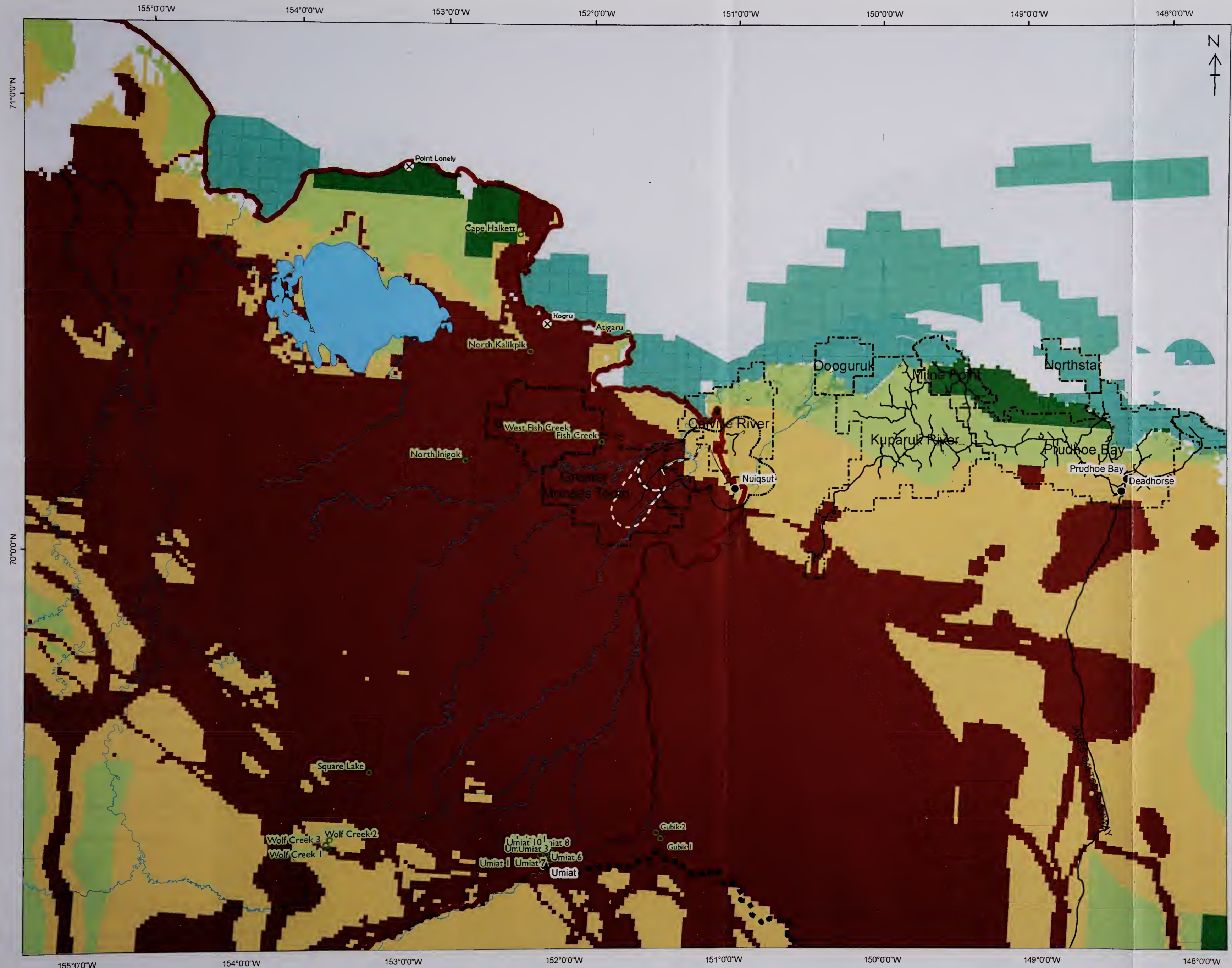


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Footnote:
 1: Pipeline includes a 2 inch diesel line & 2 inch waterline from CD1 to GMT1
 2: 14 inch Water Injection line from CD1/APF to CD4N will be constructed on a new pipe rack. From CD4N to CD5 the 14-inch Water Injection line will be placed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



Map 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

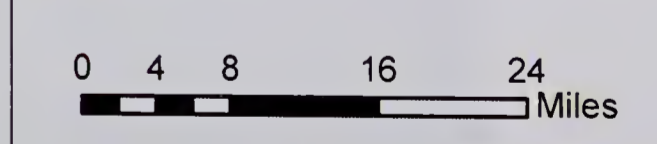
Proposed Infrastructure

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

GMT1 SEIS Project Areas

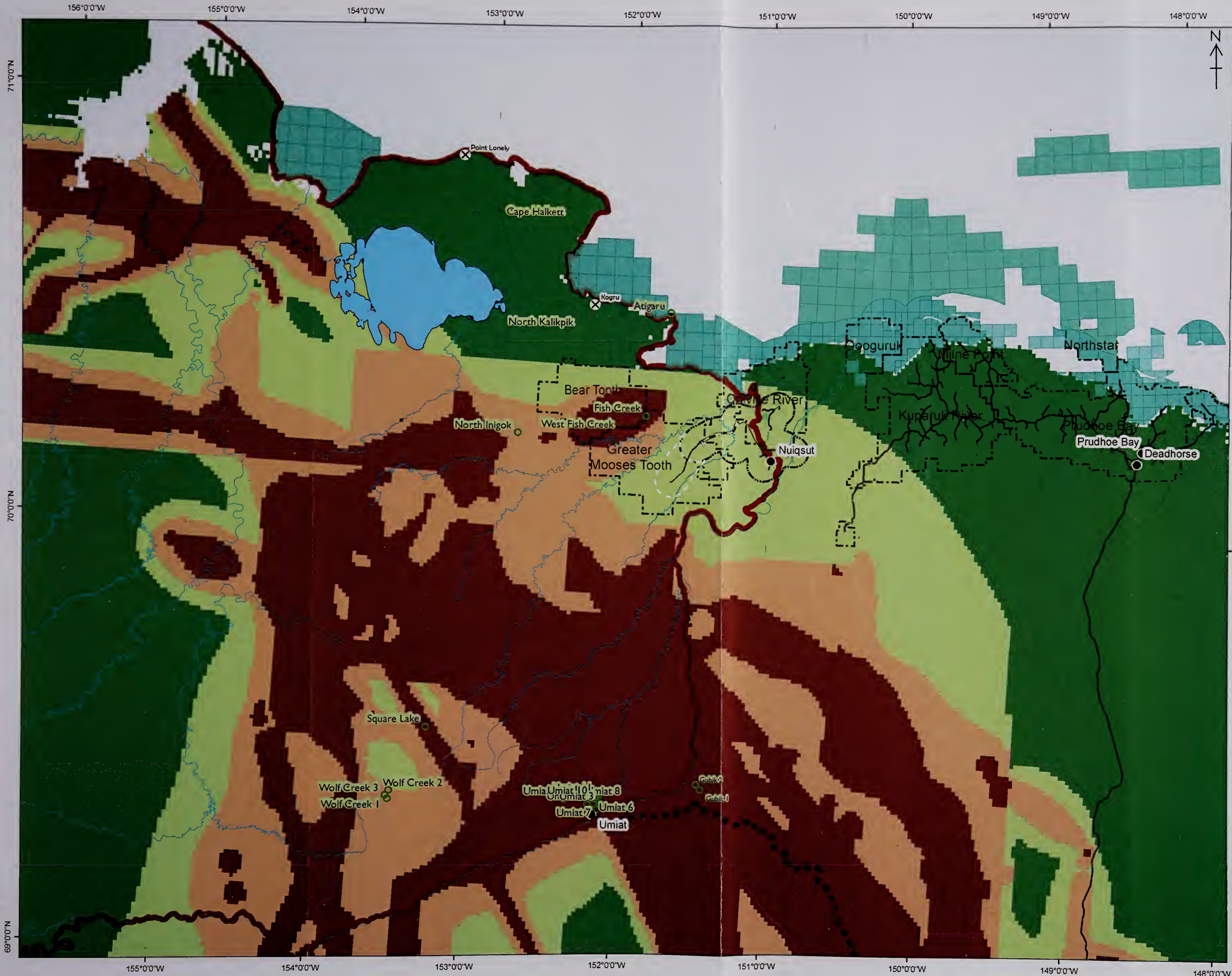
- Project Study Area
- GMT2 2.5-Mile Buffer

- 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



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

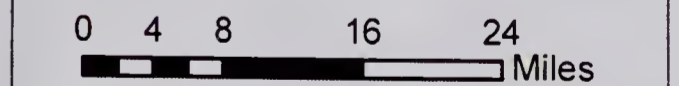
Data analysis by Lincoln Parrett of ADF&G
Data gathered cooperatively by ADF&G, NSB, and BLM

- Existing Oil & Gas Infrastructure**
- Above Ground
 - Existing Facility
 - Oil & Gas Unit

- Proposed Infrastructure**
- | | |
|--|--|
| 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



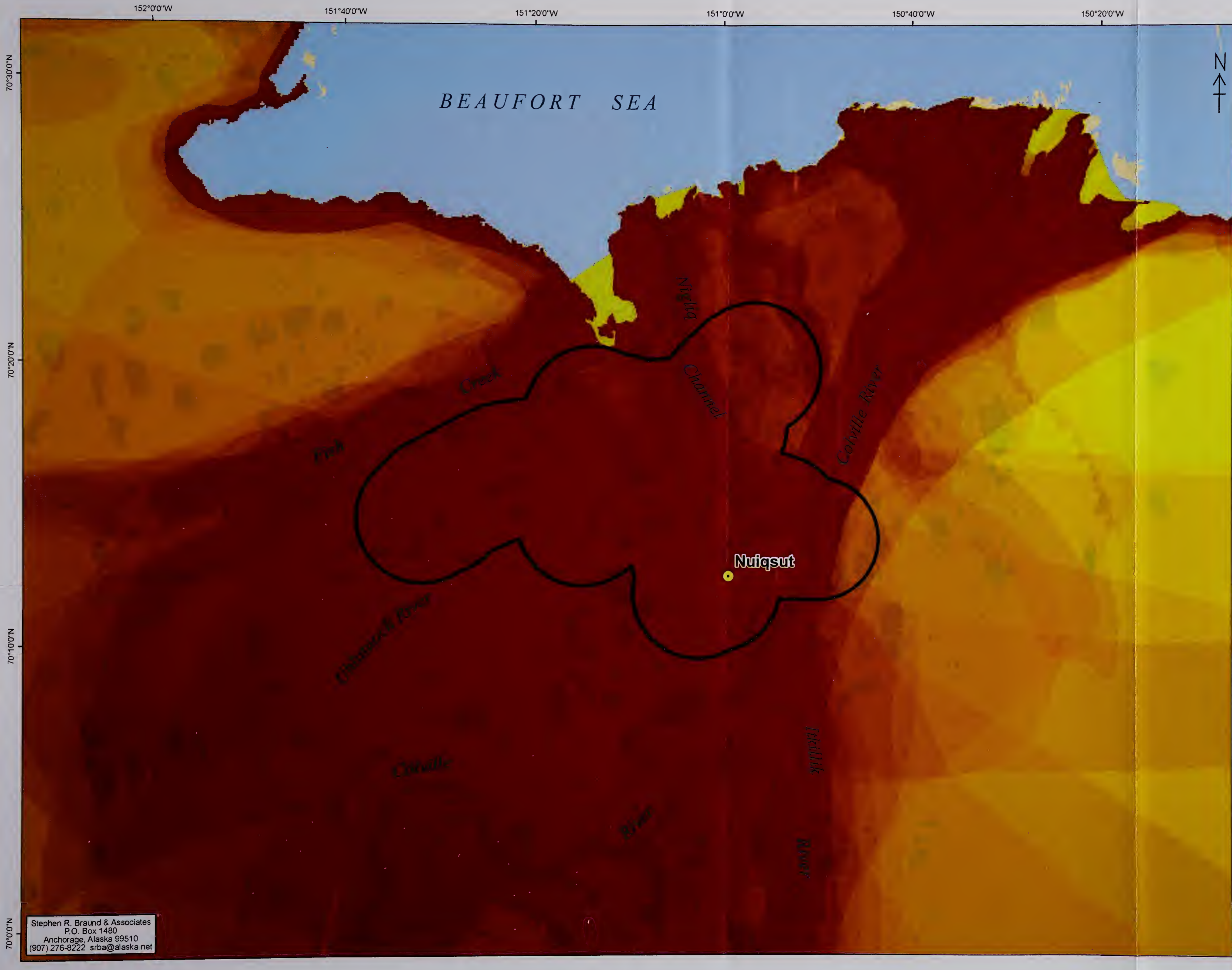
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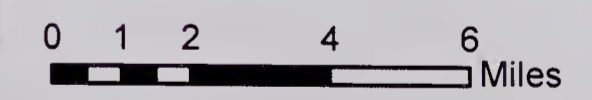


Map 4.4-1
 Caribou Subsistence Use Areas In
 The Project Study Area, 1995-2006

Legend
 High
 Low
 Overlapping Subsistence Use
 Areas, Caribou, 1995-2006
 (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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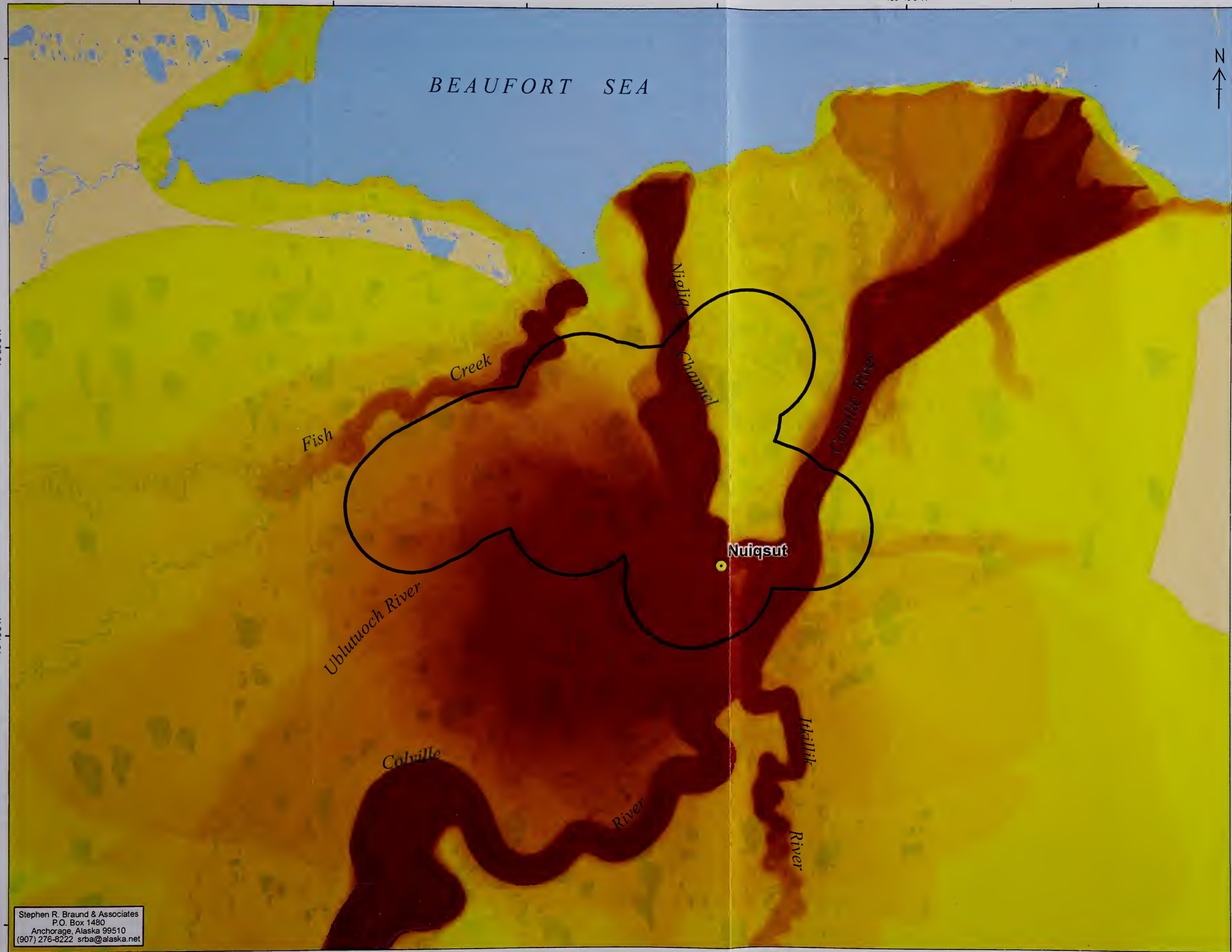
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 (907) 276-8222 sriba@alaska.net



152°00'W 151°40'W 151°20'W 151°00'W 150°40'W 150°20'W

70°30'N
70°20'N
70°10'N
70°00'N





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

Legend

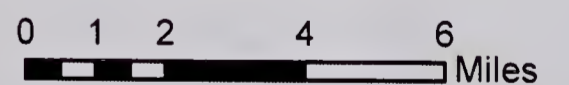
-  **High** Overlapping Subsistence Use Areas, Caribou, 2008-2011
-  **Low**

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



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152°0'0"W 151°40'0"W 151°20'0"W 151°0'0"W 150°40'0"W 150°20'0"W

70°30'0"N
70°20'0"N
70°10'0"N
70°0'0"N

BEAUFORT SEA



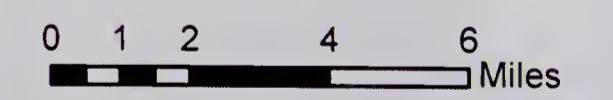
Map 4.4-3
Geese Subsistence Use Areas in the Project Study Area, 1995-2006

Legend
High
Low
Overlapping Subsistence Use Areas, Geese, 1995-2006
(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



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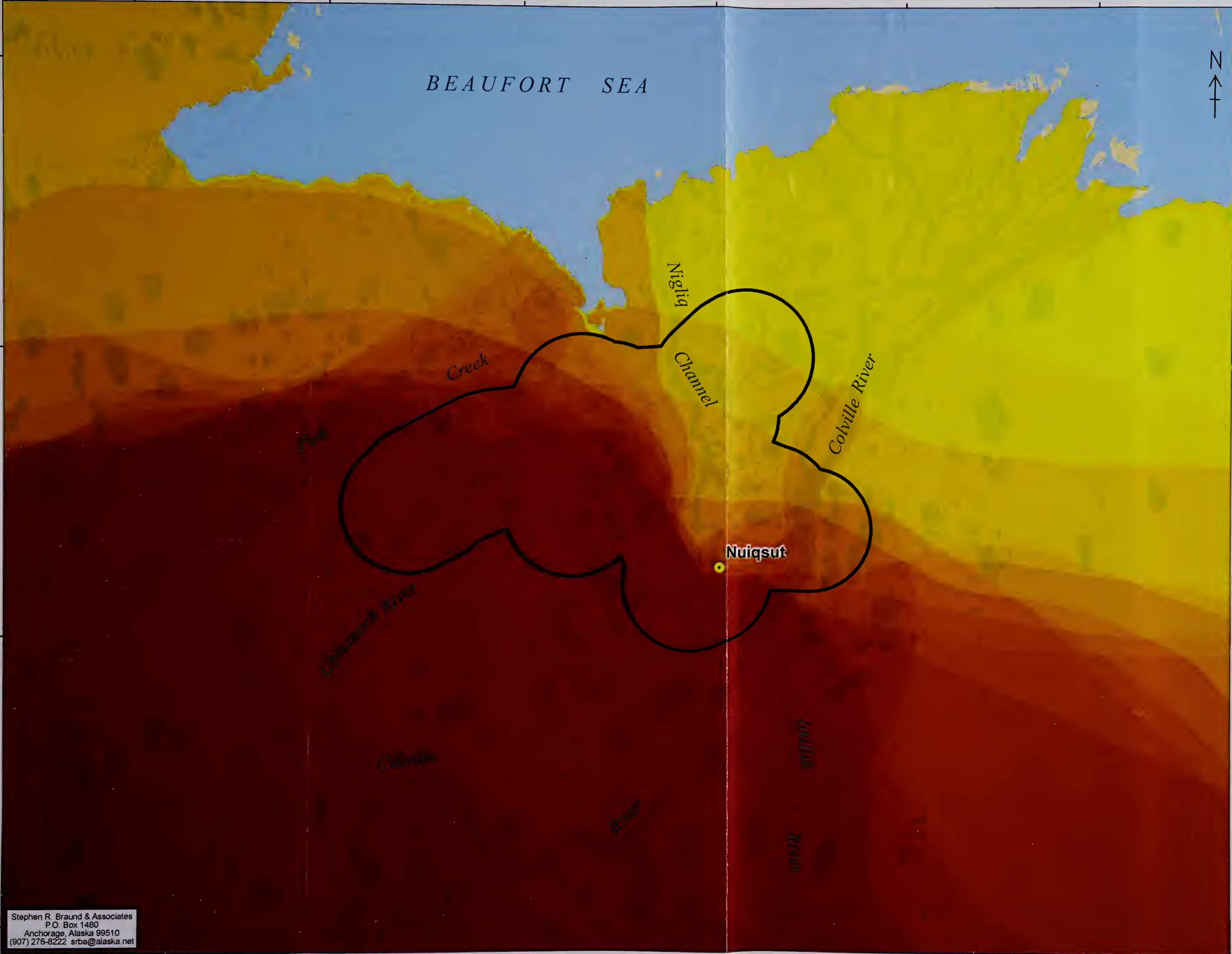
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152°0'0"W 151°40'0"W 151°20'0"W 151°0'0"W 150°40'0"W 150°20'0"W

70°30'0"N
70°20'0"N
70°10'0"N
70°0'0"N



70°30'0"N
70°20'0"N
70°10'0"N
70°0'0"N

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

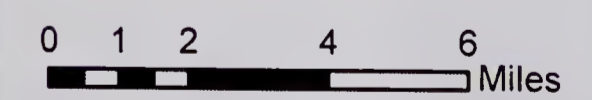
Legend

 Overlapping Subsistence Use Areas, Wolf and Wolverine, 1995-2006
 (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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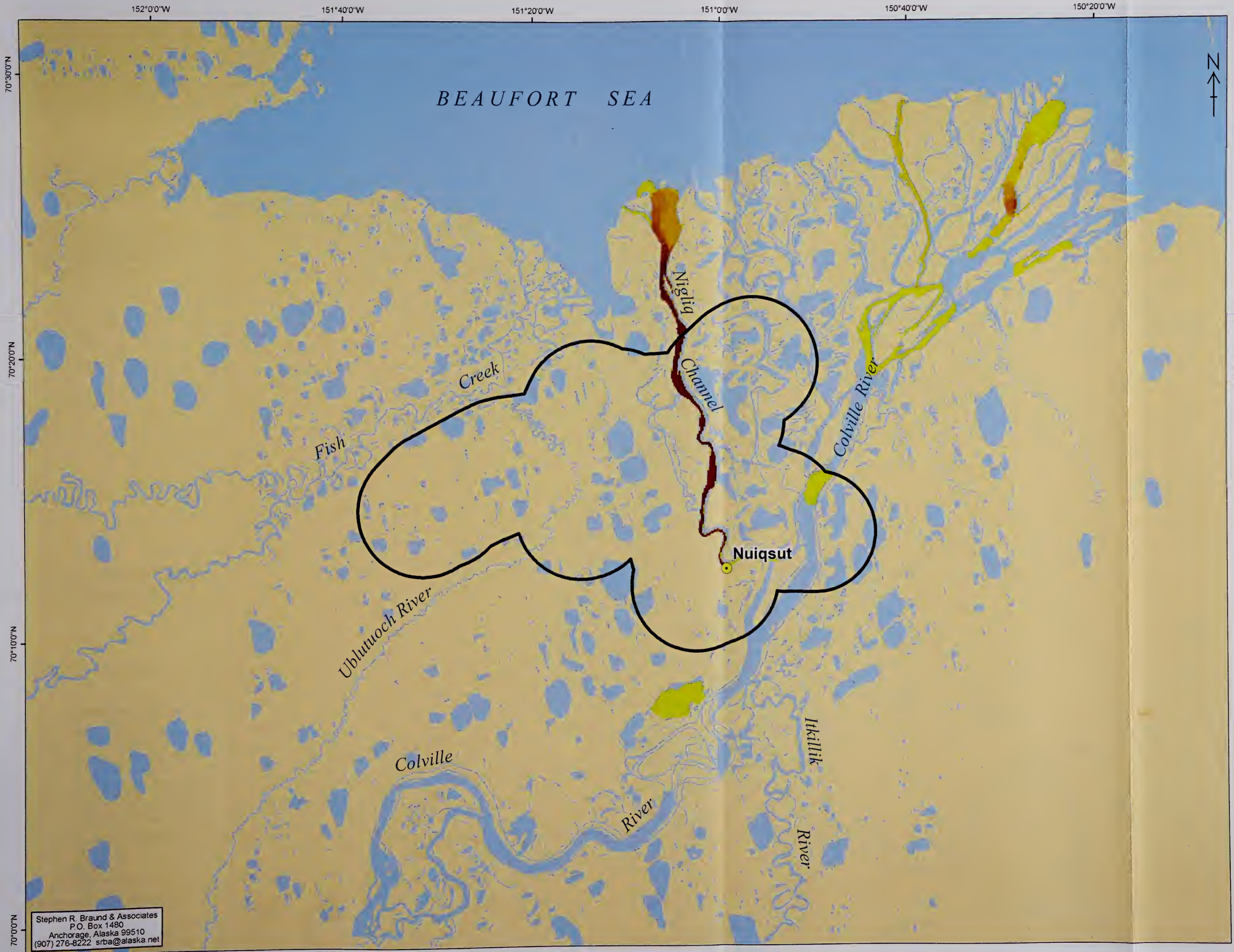
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

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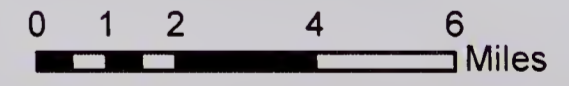
Map 4.4-5
Arctic Cisco Subsistence Use Areas in the Project Study Area, 1995-2006

Legend

 Overlapping Subsistence Use Areas, Arctic Cisco, 1995-2006
 (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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152°00'W 151°40'W 151°20'W 151°00'W 150°40'W 150°20'W

70°30'N
70°20'N
70°10'N
70°00'N



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

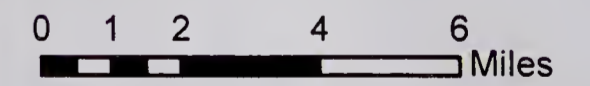
Legend

 Overlapping Subsistence Use
 Areas, Burbot, 1995-2006
 (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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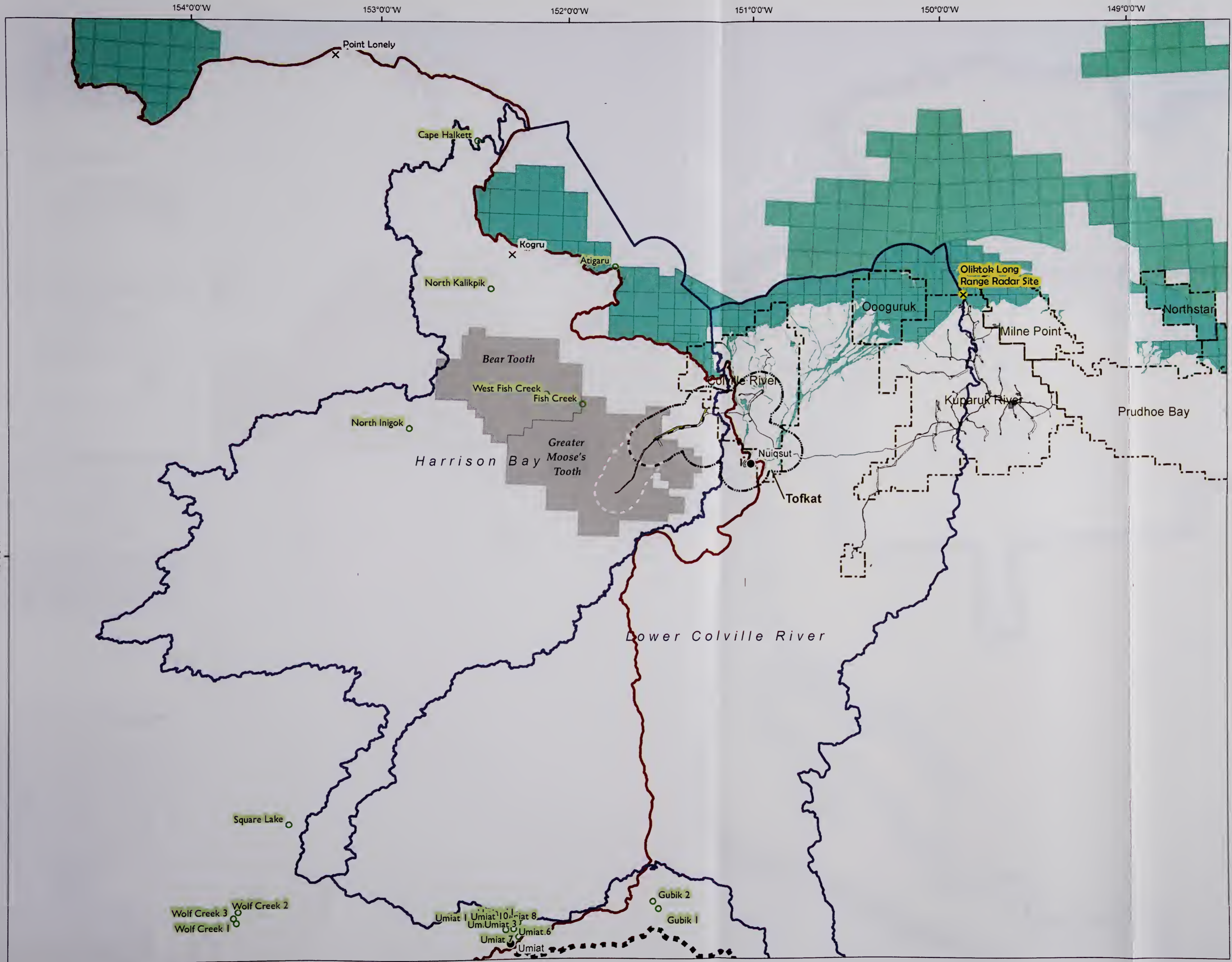
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Map 4.6-1

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

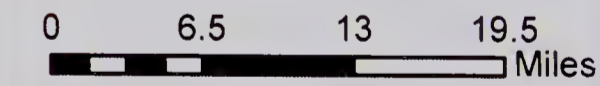
- Project Study Area
- GMT2 2.5-Mile Buffer

■ 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



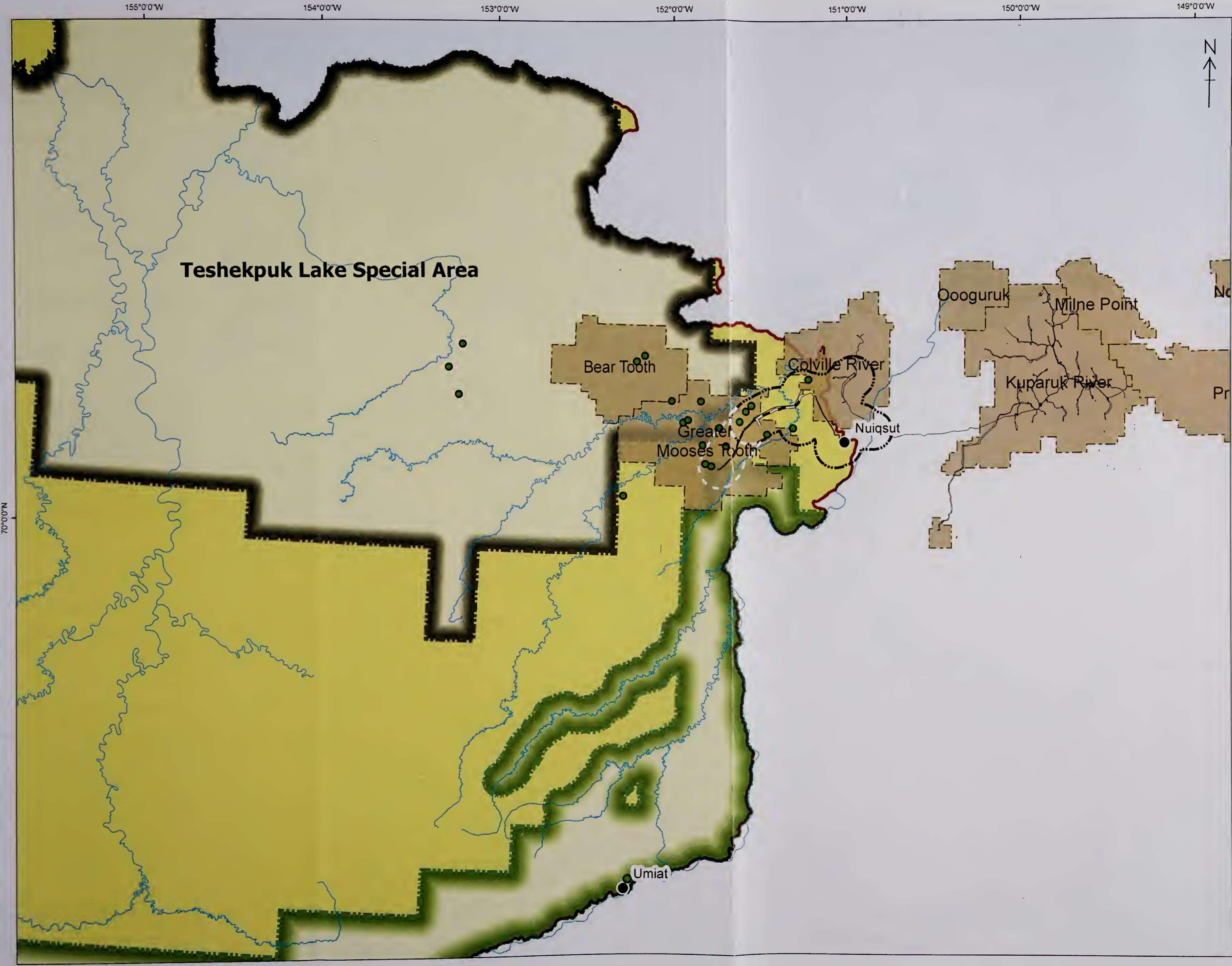
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Map 4.6-2
**Oil and Gas
 Exploratory Wells
 and NPR-A Special Areas**

- 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**
- Producing Unit
-
- Proposed Infrastructure**
- | | |
|-------------------|----------|
| Pipeline | Road |
| Access Road | Pipeline |
| Nuiqsut Spur Road | |
- 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

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