National Petroleum Reserve-Alaska

FINAL

Integrated Activity Plan/ Environmental Impact Statement

Volume 7
Maps

Prepared by:

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

In cooperation with:

North Slope Borough
U.S. Bureau of Ocean Energy Management
U.S. Fish and Wildlife Service

November 2012

How the IAP/EIS is Organized

VOLUME 1

Chapter 1 – Introduction: Summarizes the purpose of and need for this IAP/EIS and decisions to be made.

Chapter 2 – Alternatives: Describes and compares proposed management alternatives.

Chapter 3 – Affected Environment: Presents existing natural and socioeconomic resources in the NPR-A and trends, including those associated with climate change.

VOLUME 2

Chapter 4 – Environmental Consequences (sections 4.1 – 4.4): Provides the assumptions upon which the impact analysis rests and evaluates impacts of Alternatives A and B-1 on resources and uses in the NPR-A relevant to making a decision among the alternatives.

VOLUME 3

Chapter 4 – Environmental Consequences continued (sections 4.5 – 4.7): Evaluates impacts of Alternatives B-2 (preferred alternative), C, and D on resources and uses in the NPR-A relevant to making a decision among the alternatives.

VOLUME 4

Chapter 4 – Environmental Consequences continued (sections 4.8 – 4.13): Evaluates the cumulative impacts on resources and uses in the NPR-A and other effects relevant to making a decision among the alternatives.

VOLUME 5

Chapter 5 – Consultation and Coordination: Describes public and government (including tribal) consultation undertaken for this plan and the development of alternatives and lists the plan's preparers.

Chapter 6 – Comments and Responses: Presents public comments on the Draft IAP/EIS and responses to the comments.

VOLUME 6

Appendix A: ANILCA Section 810 Analysis of Subsistence Impacts

Appendix B: Federal, State, and Local Permits and/or Approvals for Oil and Gas Exploration, Development, and Production Activities

Appendix C: NPR-A Climate Change Analysis: An Assessment of Climate Change Variables in the National Petroleum Reserve in Alaska

Appendix D: Essential Fish Habitat

Appendix E: Common, Scientific and Iñupiaq Names of Species Listed in the IAP/EIS

Appendix F: BLM Sensitive Species List for Alaska

Appendix G: Information, Models, and the Assumptions Used to Analyze the Effects of Oil Spills

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Glossary and Bibliography

VOLUME 7

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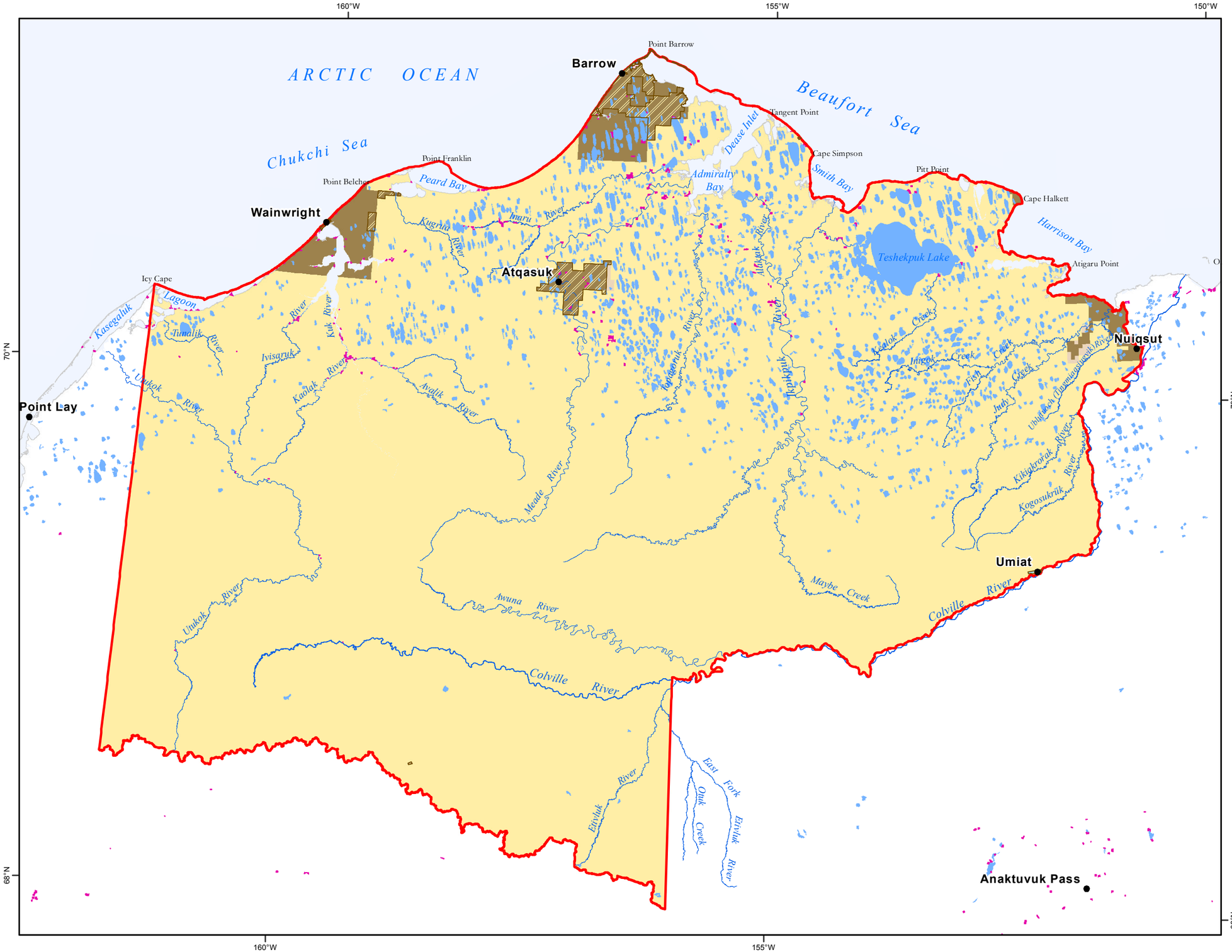

Map 1-1
Land Status

Source: BLM, 2011

Land Status

Surface

- Bureau of Land Management
- Native Patent or IC
- Native Selected
- State Patent or TA (near Umiat)
- Major Military (north of Barrow)
- Private Land - Native Allotments

Federal Subsurface

- Federal Subsurface

Federal subsurface rights were also reserved to the US government under Native Allotments. Features too small for hatching symbol.

- NPR-A Boundary

0 6 12 24 36 48 Miles

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Projection: Albers Conic Equal Area referencing NAD83

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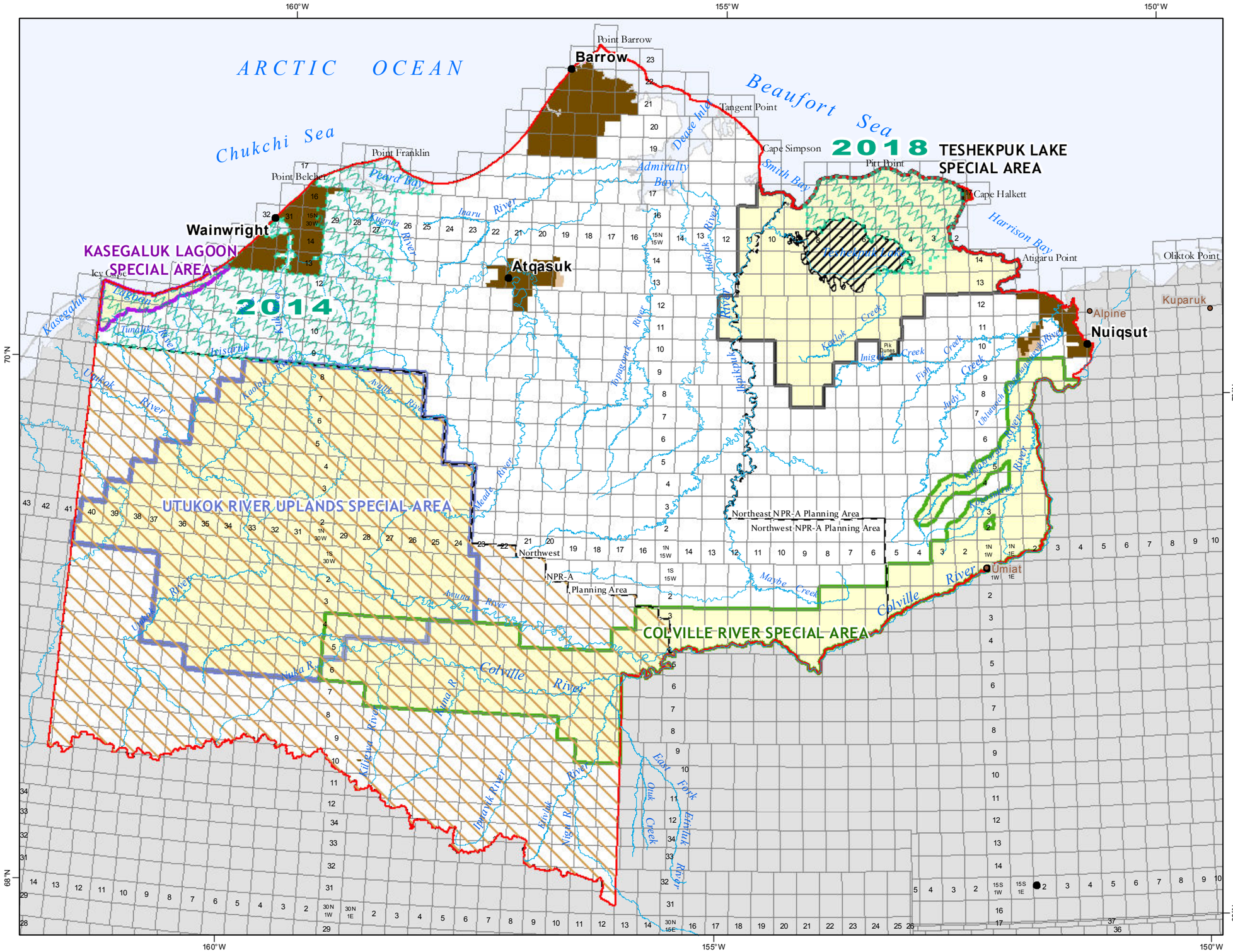

MAP 2-1
Alternative A
Land Allocations

Oil & Gas Leasing and Infrastructure

- Unavailable: 2008 ROD
- Unavailable: unplanned

All other BLM-managed subsurface would be available for leasing.

- Leasing deferred to stated year

Note: All BLM-managed lands would be available for applications for permanent infrastructure in support of offshore oil and gas development.

Special Areas

- Colville River
- Teshekpuk Lake
- Utukok River Uplands
- Kasegaluk Lagoon

Land Status

- Native Patent or IC
- Native Selected
- NPR-A Boundary

0 6 12 24 36 48 Miles

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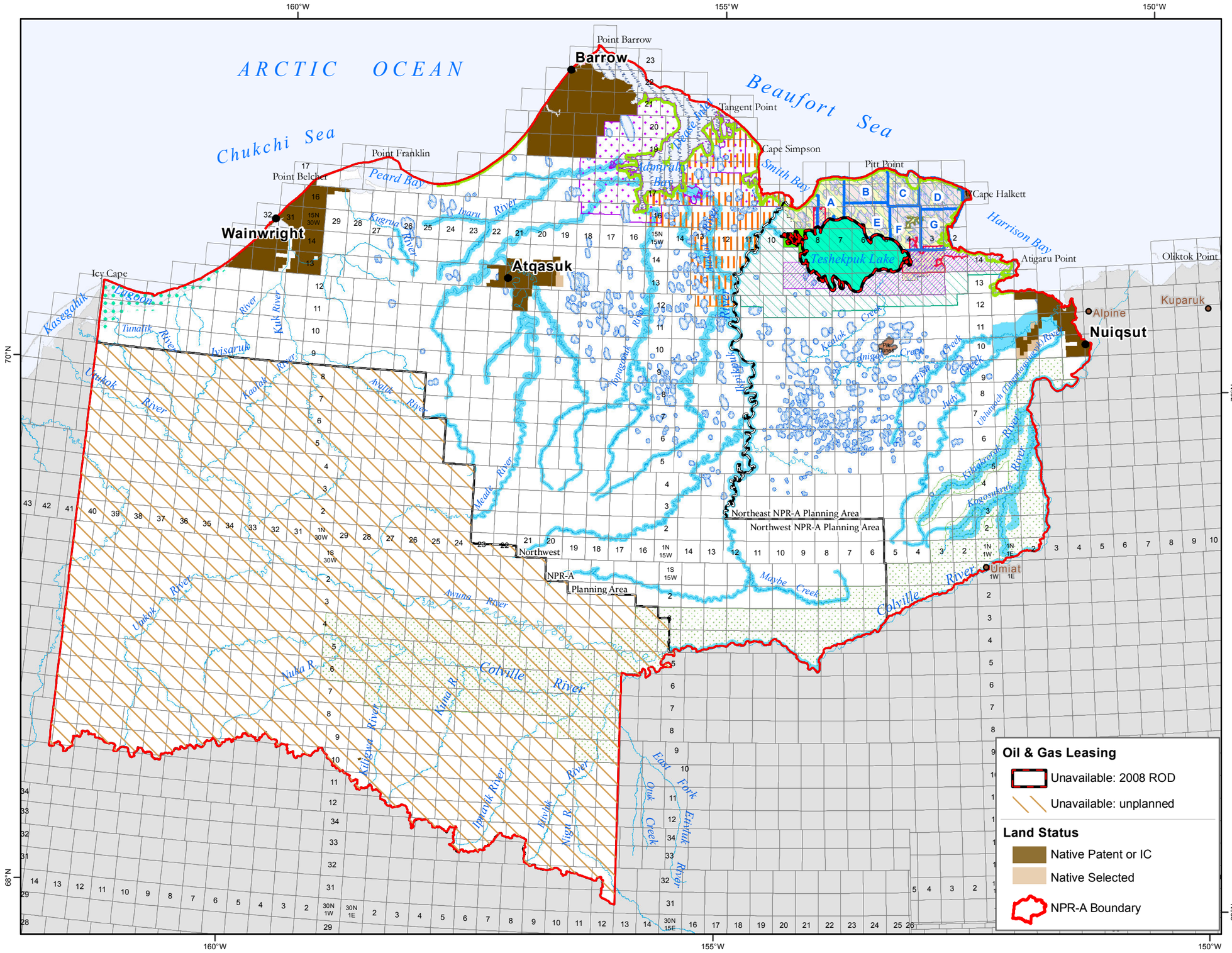

MAP 2-1 K

Alternative A

K Stipulations

- K-1 River: No permanent or temporary facilities in stream bed. No permanent facilities within listed distance from river except essential pipeline and road crossings.
- K-2 Deep Water Lakes: No permanent or temporary facilities on lakes Only essential permanent facilities within 1/4 mile of lakes
- K-3a Teshekpuk Lake not available for oil and gas leasing; permanent oil and gas facilities prohibited onshore within 1/4 mile of Teshekpuk Lake; permanent oil and gas facilities, except pipelines, prohibited in indicated portions of Ts. 14-15 N., R. 9 W. and T. 15 N. 8 W. U.M. greater than 1/4 mile from Teshekpuk Lake (Stipulation K-3)
- K-3b Dease Inlet - Admiralty Bay - Elson Lagoon - Associated Barrier Islands: Special stipulations for exploration and development
- K-4a Goose Molting Lakes: Permanent oil and gas facilities, with the exception of pipelines, prohibited
- K-4a Goose Molting Area
- Goose molting research required (Table 2-2)
- K-4b Brant Survey Area
- K-5a Teshekpuk Lake Caribou Habitat Area
- K-5b Caribou Study Area
- K-6 Coastal Area: Special restrictions on facility development within 3/4 mile of coast
- K-7 Colville River Special Area raptor protection and CRSAMP Protection 2
- K-8a Pik Dunes: Surface structures, except approximately perpendicular pipeline crossings and ice pads, are prohibited
- K-8b Kasegaluk Lagoon: Permanent oil and gas facilities prohibited within the Kasegaluk Lagoon Special Area
- K-9 Caribou Movement Corridors: Permanent oil and gas facilities, with the exception of pipelines, prohibited
- K-10 Southern Caribou Calving Area: Permanent oil and gas facilities, with the exception of pipelines, prohibited
- B C K-11 Lease Tracts with surface occupancy limited to a maximum of 300 acres per tract

0 6 12 24 36 48 Miles

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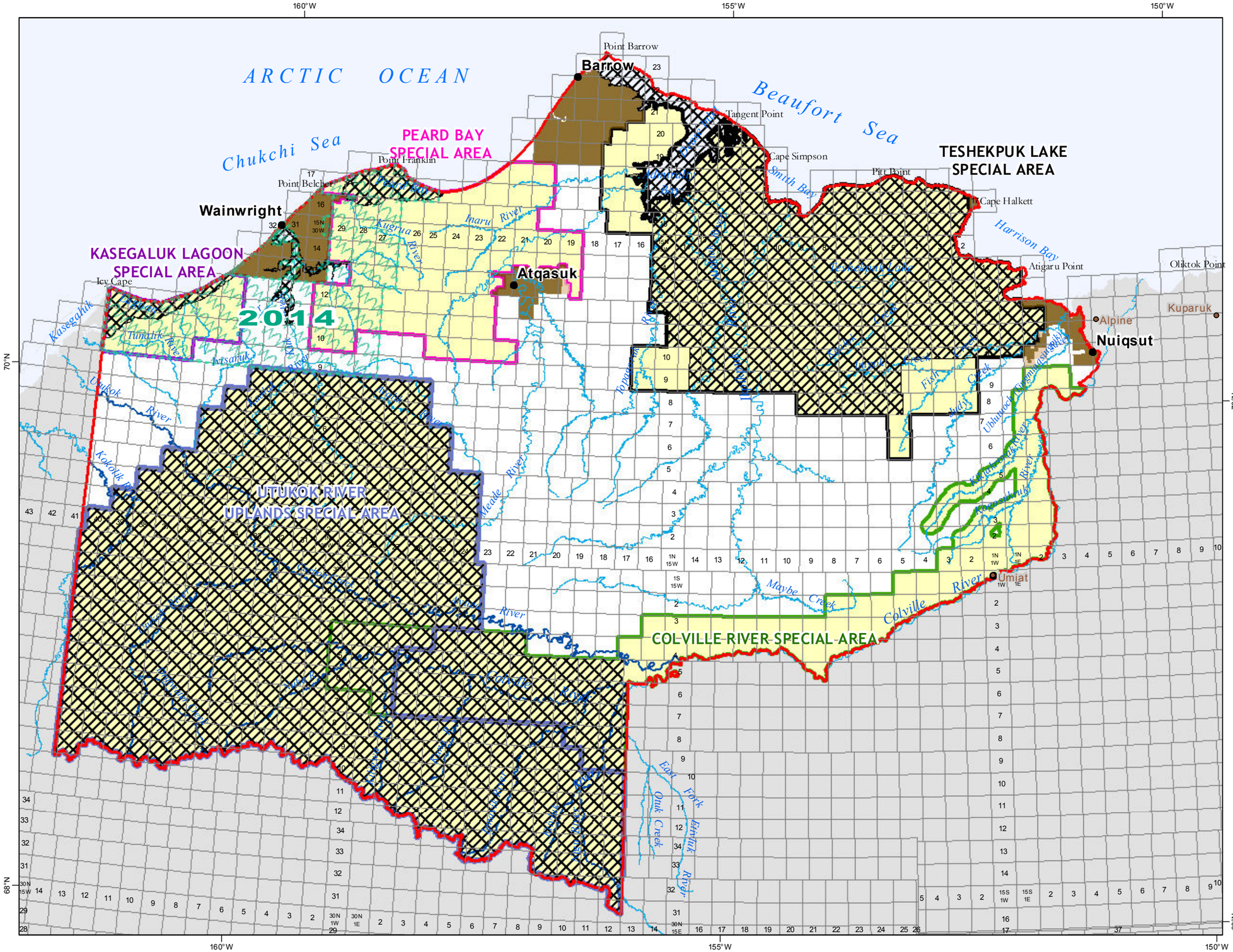

MAP 2-2-1

Alternative B-1 Land Allocations

Oil & Gas Leasing and Infrastructure

Unavailable for Leasing and no exploratory drilling or non-subsistence permanent infrastructure, except for valid existing NPR-A leases and for a subsurface pipeline across Wainwright Inlet/Kuk River.

Note: All other BLM-managed lands would be available for leasing and for applications for permanent infrastructure in support of offshore oil and gas development.

Leasing deferred to 2014

Special Areas

- Colville River
- Teshekpuk Lake
- Utukok River Uplands
- Peard Bay
- Kasegaluk Lagoon

Wild & Scenic Rivers

- Wild & Scenic Rivers

Land Status

- Native Patent or IC
- Native Selected

NPR-A Boundary

0 6 12 24 36 48 Miles

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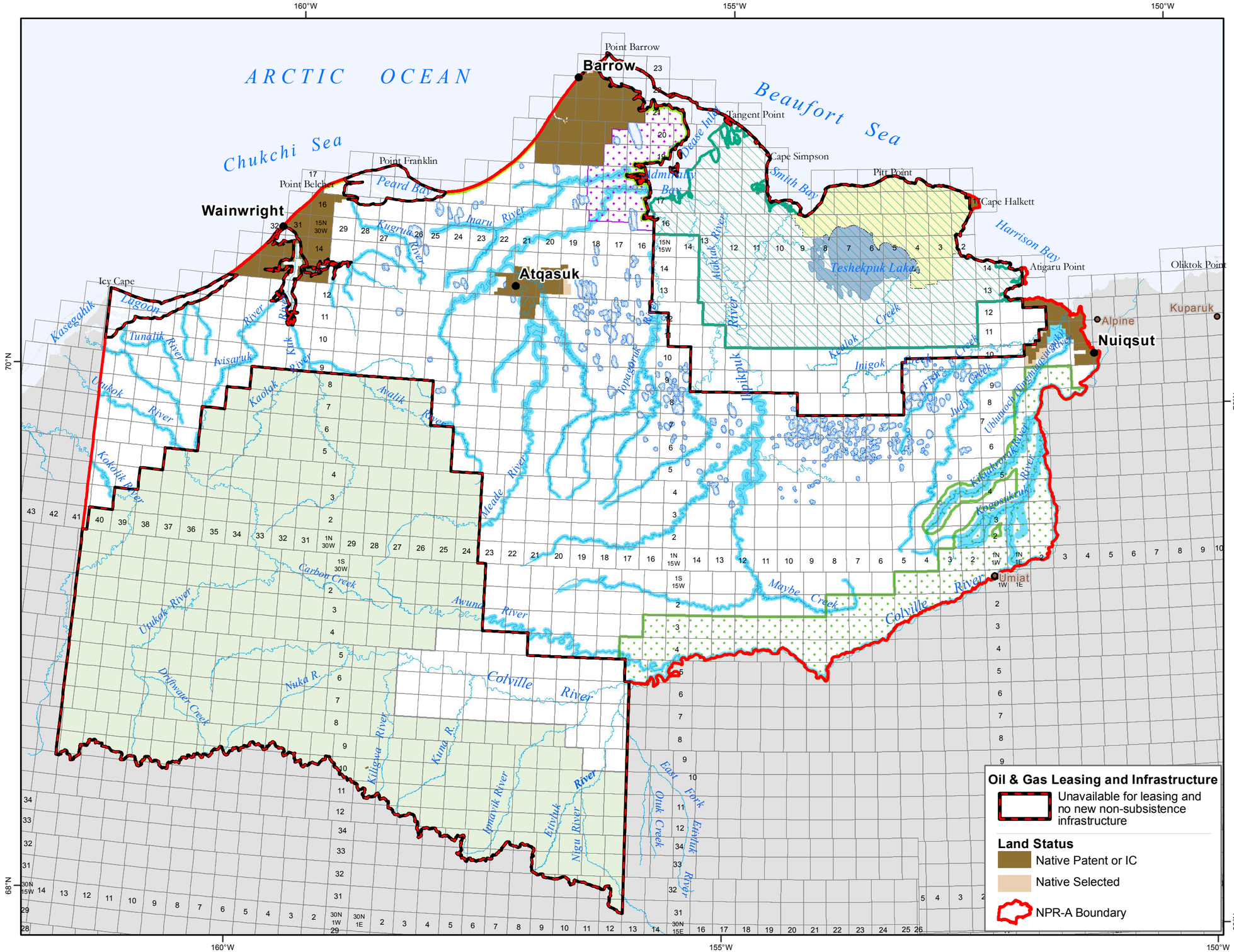

MAP 2-2-1K

Alternative B-1

K Stipulations

- K-1 River: No permanent or temporary facilities in stream bed. No permanent facilities within listed distance from river except essential pipeline and road crossings
- K-2 Deep Water Lakes: No permanent or temporary facilities on lakes Only essential permanent facilities within 1/4 mile of lakes
- K-4a Goose Molting Area (air restrictions only)
- K-4b Brant Survey Area
- K-5 Teshekpuk Lake Caribou Habitat Area (air restrictions only)
- K-6 Coastal Area: Special restrictions on facility development within 3/4 mile of coast
- K-7 Colville River Special Area raptor protection
- K-12 Western Arctic Herd Habitat Area (air restrictions only)

0 6 12 24 36 48 Miles

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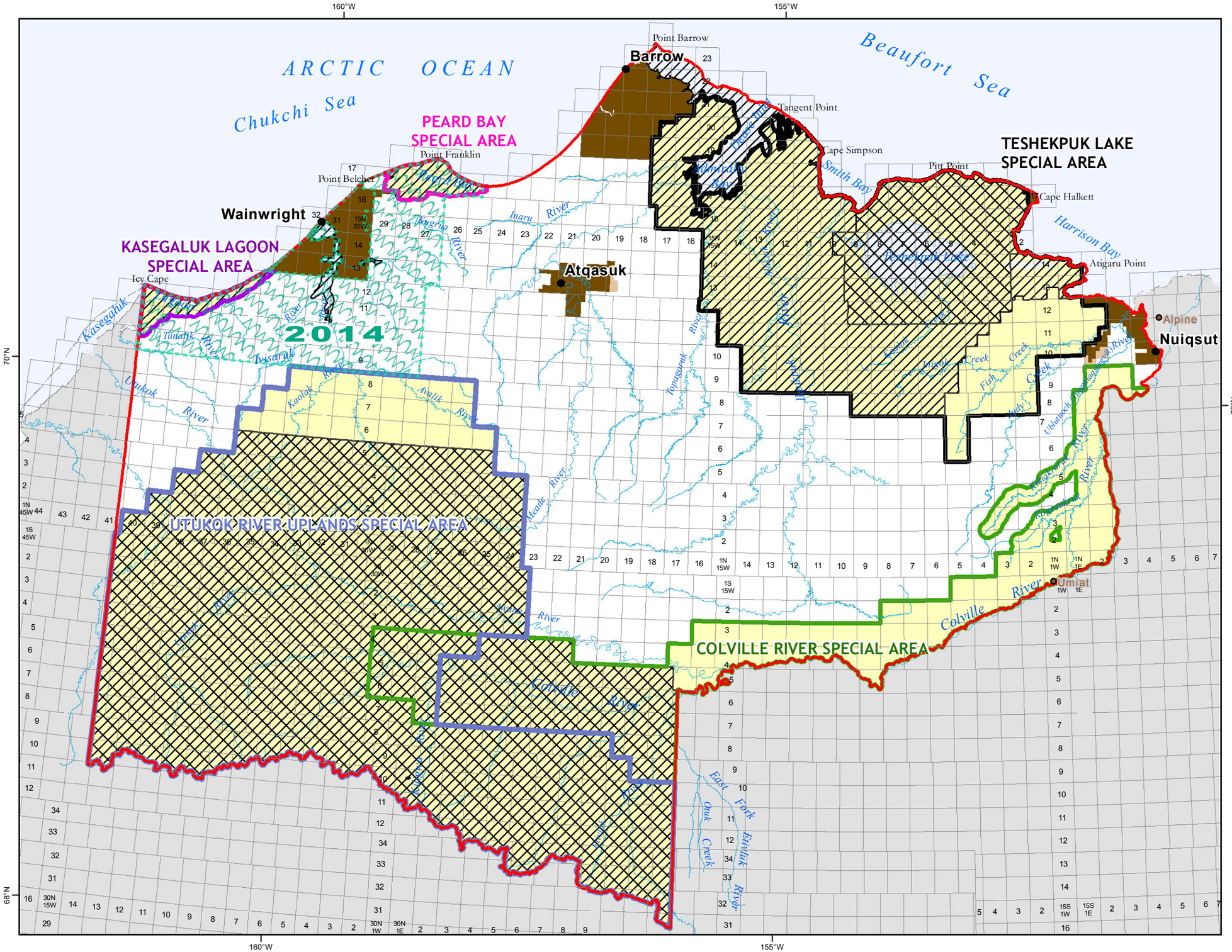

MAP 2-2-2
Preferred Alternative
B-2
Land Allocations

Oil & Gas Leasing and Infrastructure

- Unavailable for leasing or exploratory drilling
- Unavailable for leasing and no new non-subsistence infrastructure or exploratory drilling; all other BLM-managed lands would be available for applications for permanent infrastructure in support of offshore oil and gas development.
- Leasing deferred to 2014

Special Areas

- Colville River
- Teshekpuk Lake
- Utukok River Uplands
- Peard Bay
- Kasegaluk Lagoon

Land Status

- Native Patent or IC
- Native Selected
- NPR-A Boundary

0 6 12 24 36 48 Miles

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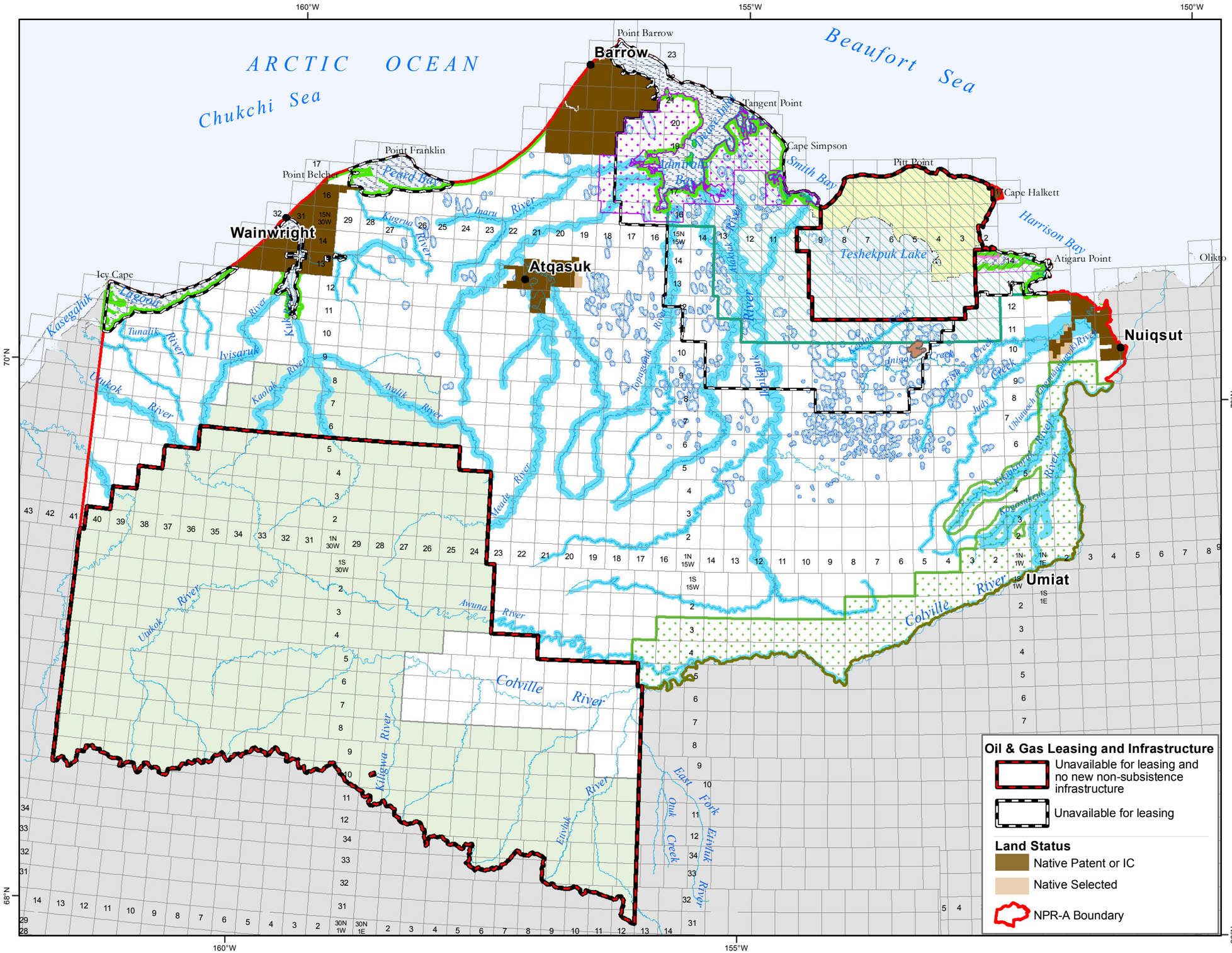

MAP 2-2-2K

Preferred Alternative

B-2

K Stipulations

- K-1 River: No permanent or temporary facilities in stream bed
  No permanent facilities within listed distance from river except essential pipelines and road crossings
- K-2 Deep Water Lakes:
  No permanent or temporary facilities on lakes
  Only essential permanent facilities within 1/4 mile of lakes
- K-3b Kogru River, Dease Inlet, Admiralty Bay, Elson Lagoon, Peard Bay, Wainwright Inlet/ Kuk River, Kasegaluk Lagoon, and their associated Islands: Special stipulations for exploration and development
- K-4a Goose Molting Area
- K-4b Brant Survey Area
- K-5 Teshekpuk Lake Caribou Habitat Area
- K-6 Coastal Area: Special restrictions on facility development in coastal waters and within 1 mile of coast
- K-7 Colville River Special Area raptor protection and CRSAMP Protection 2
- K-8a Pik Dunes: Surface structures, except approximately perpendicular pipeline crossings and ice pads, are prohibited
- K-9 Caribou Movement Corridors: Permanent oil and gas facilities, with the exception of pipelines, prohibited
- K-10 Southern Caribou Calving Area: Permanent oil and gas facilities, with the exception of pipelines, prohibited
- K-12 Western Arctic Herd Habitat Area

0 6 12 24 36 48 Miles

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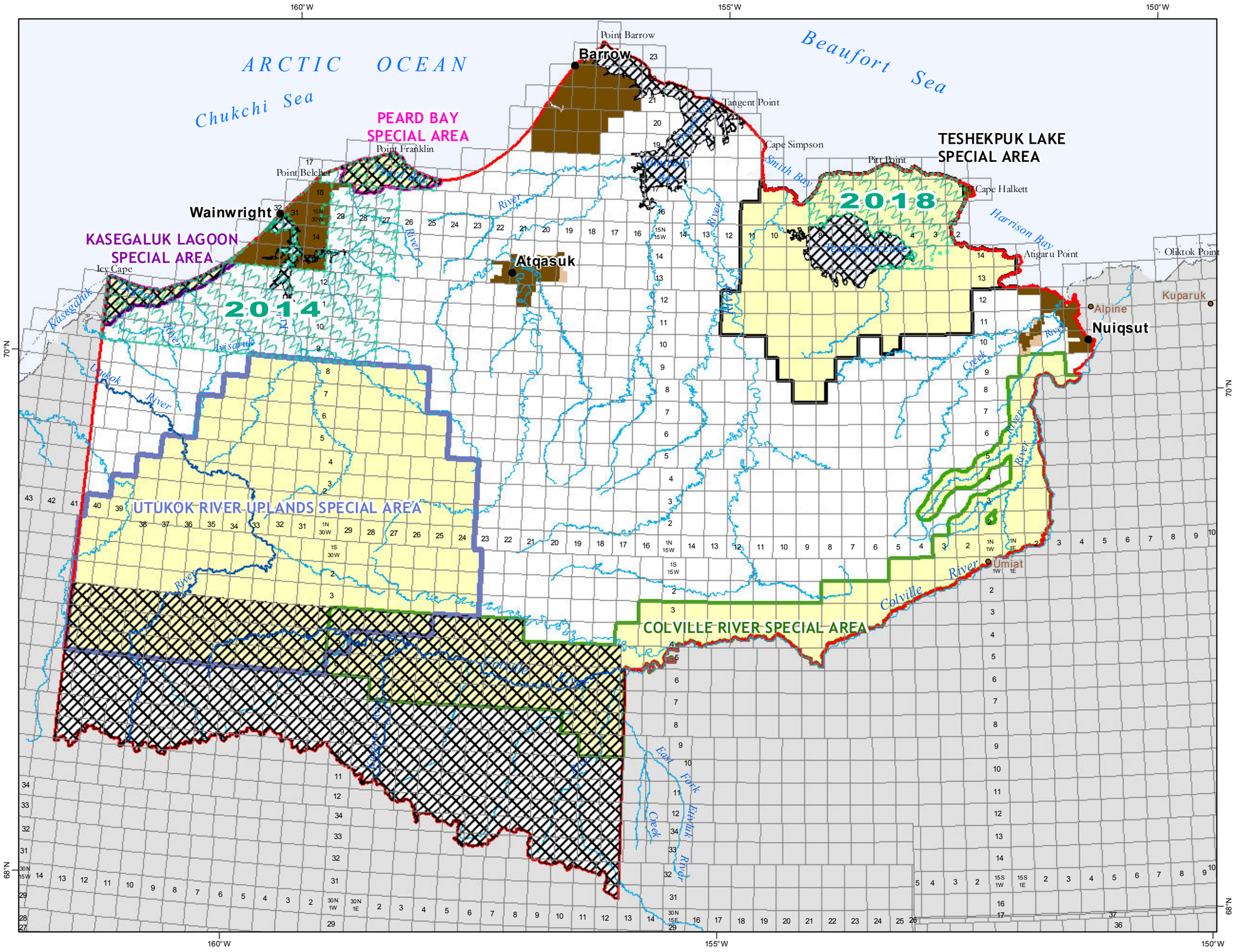

MAP 2-3
Alternative C
Land Allocations

Oil & Gas Leasing and Infrastructure

Unavailable for Leasing and no exploratory drilling or non-subsistence permanent infrastructure, except for valid existing NPR-A leases and for a subsurface pipeline across Wainwright Inlet/Kuk River.

Note: All other BLM-managed lands would be available for leasing and for applications for permanent infrastructure in support of offshore oil and gas development.

Leasing deferred to stated year

Special Areas

- Colville River
- Teshekpuk Lake
- Utukok River Uplands
- Peard Bay
- Kasegaluk Lagoon

Wild & Scenic Rivers

- Wild & Scenic Rivers

Land Status

- Native Patent or IC
- Native Selected
- NPR-A Boundary

0 6 12 24 36 48 Miles

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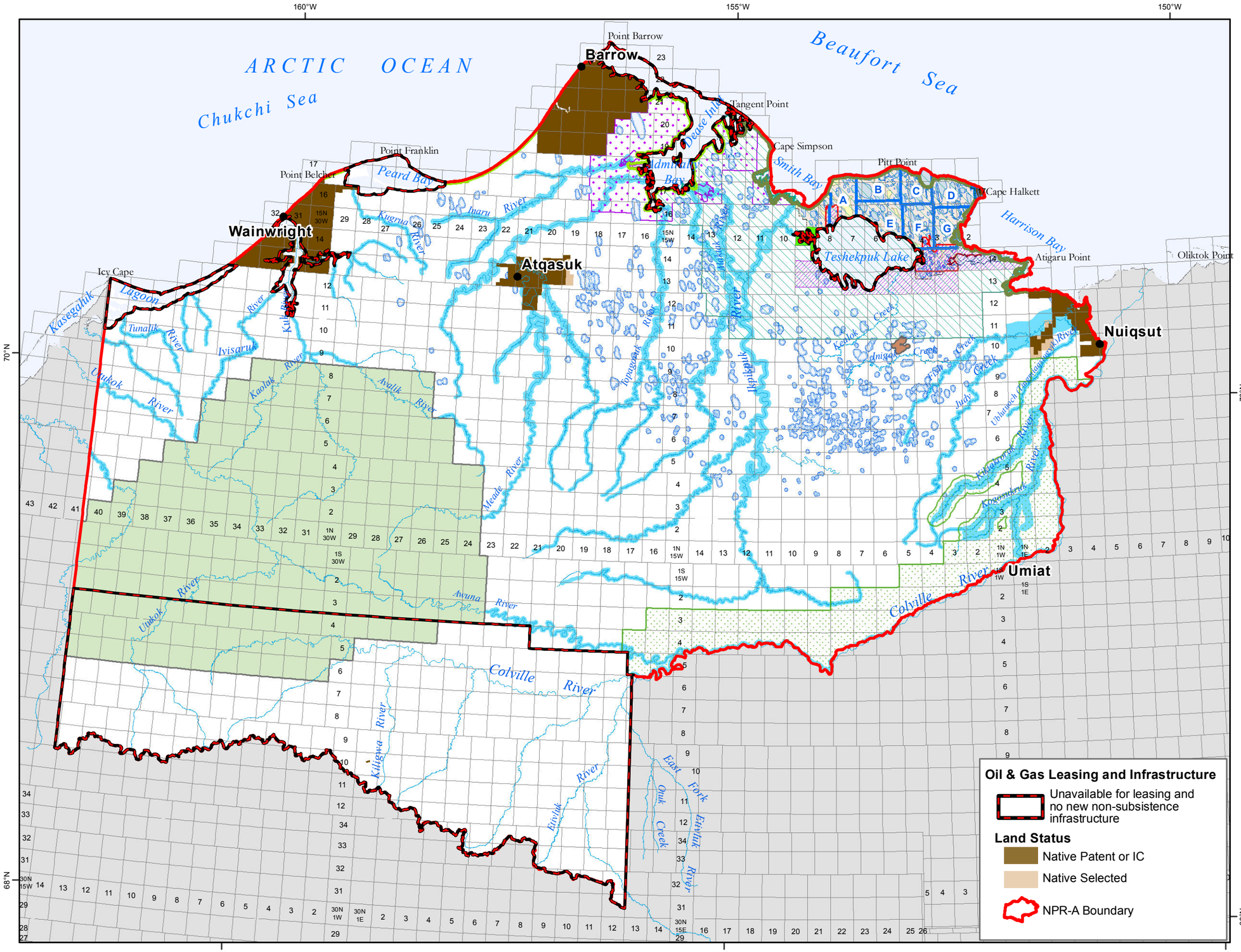

MAP 2-3 K
Alternative C
K Stipulations

- K-1 River: No permanent or temporary facilities in stream bed. No permanent facilities within listed distance from river except essential pipelines and road crossings.
- K-2 Deep Water Lakes: No permanent or temporary facilities on lakes Only essential permanent facilities within 1/4 mile of lakes
- K-3a Teshekpuk Lake not available for oil and gas leasing; permanent oil and gas facilities prohibited onshore within 1/4 mile of Teshekpuk Lake; permanent oil and gas facilities, except pipelines, prohibited in indicated portions of Ts. 14-15 N., R. 9 W. and T. 15 N. 8 W. U.M. greater than 1/4 mile from Teshekpuk Lake (Stipulation K-3)
- K-3b Kogru River: Special stipulations for exploration and development
- K-4a Goose Molting Lakes: Permanent oil and gas facilities, with the exception of pipelines, prohibited within lakes and 1 mile onshore
- K-4a Goose Molting Area
- K-4b Brant Survey Area
- K-5 Teshekpuk Lake Caribou Habitat Area
- K-6 Coastal Area: Special restrictions on facility development within 3/4 mile of coast
- K-6 Coastal Area: Special restrictions on facility development within 1 mile of coast
- K-7 Colville River Special Area raptor protection
- K-8a Pik Dunes: Surface structures, except approximately perpendicular pipeline crossings and ice pads, are prohibited
- K-9 Caribou Movement Corridors: Permanent oil and gas facilities, with the exception of pipelines, prohibited
- K-10 Southern Caribou Calving Area: Permanent oil and gas facilities, with the exception of pipelines, prohibited
- K-11 Lease Tracts with surface occupancy limited to a maximum of 300 acres per tract
- K-12 Western Arctic Herd Habitat Area

0 6 12 24 36 48 Miles

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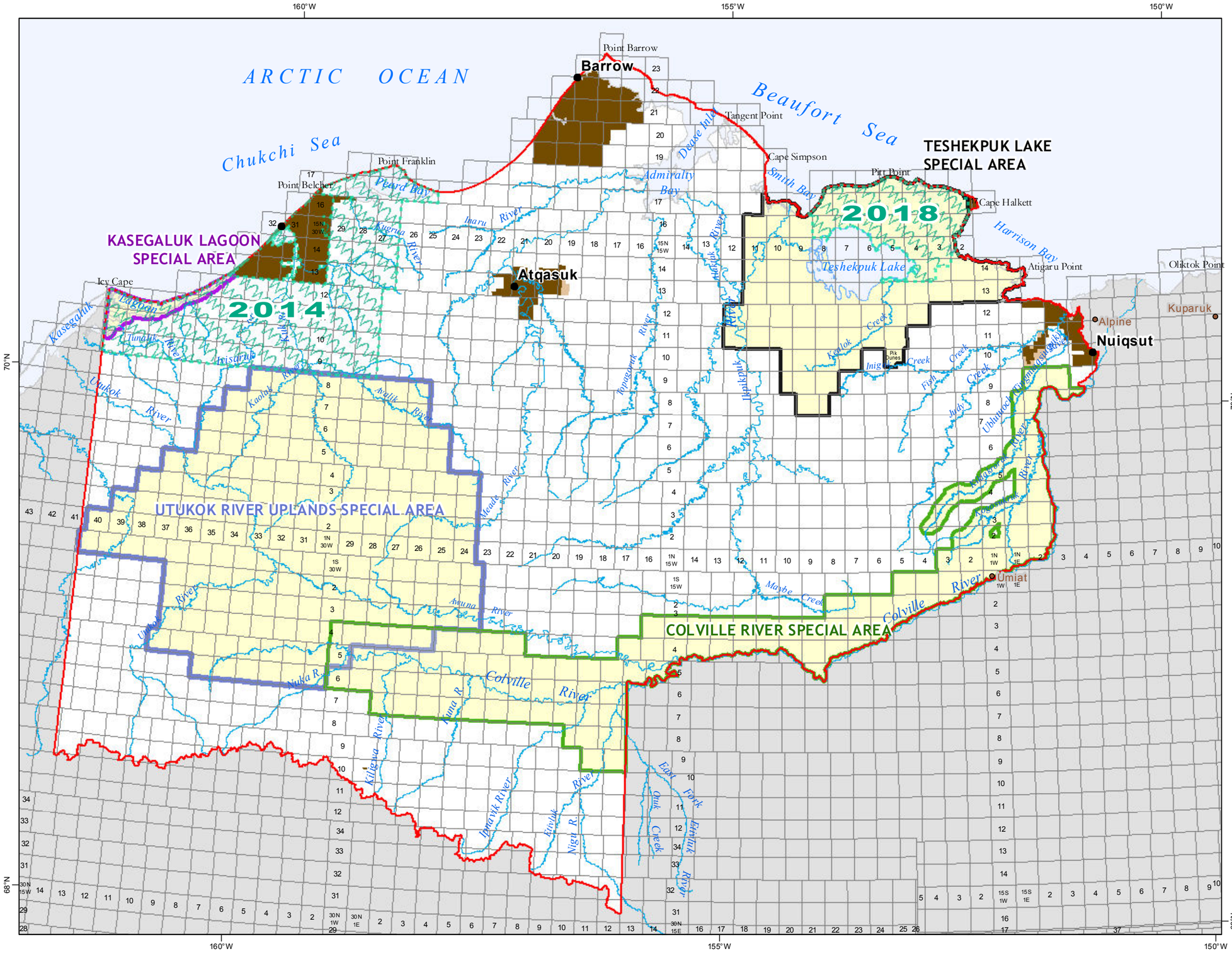

MAP 2-4

Alternative D

Land Allocations

Oil & Gas Leasing and Infrastructure

All BLM-managed subsurface would be available for leasing

Leasing deferred to stated year

Note: All BLM-managed lands would be available for applications for permanent infrastructure in support of offshore oil and gas development.

Special Areas

- Colville River
- Teshekpuk Lake
- Utukok River Uplands
- Kasegaluk Lagoon

Land Status

- Native Patent or IC
- Native Selected
- NPR-A Boundary

0 6 12 24 36 48 Miles

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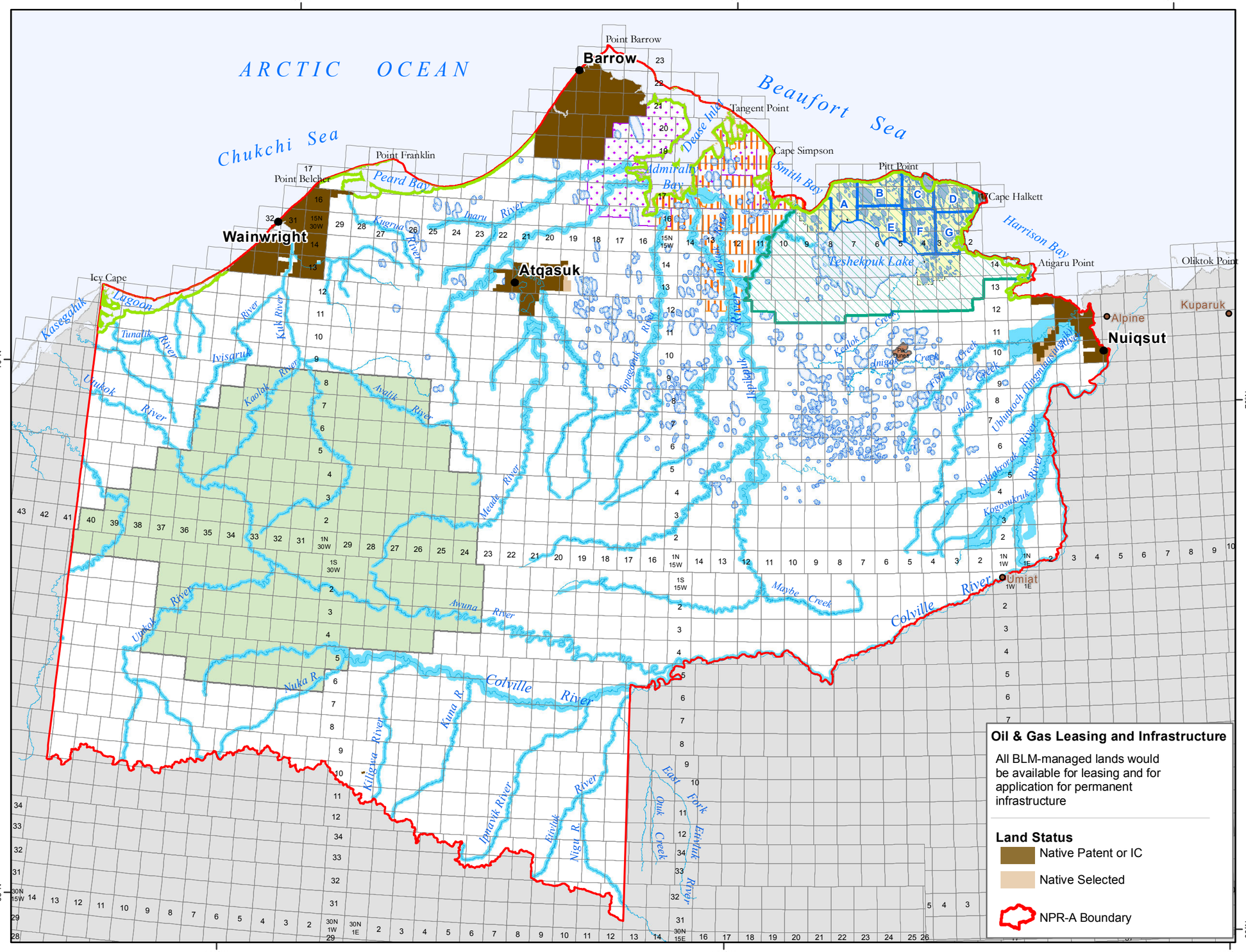
MAP 2-4 K
Alternative
D
K Stipulations



Oil & Gas Leasing and Infrastructure

All BLM-managed lands would be available for leasing and for application for permanent infrastructure

Land Status

- Native Patent or IC
- Native Selected
- NPR-A Boundary

- K-1 River: No permanent or temporary facilities in stream bed. No permanent facilities within listed distance from river except essential pipeline and road crossings
- K-2 Deep Water Lakes: No permanent or temporary facilities on lakes Only essential permanent facilities within 1/4 mile of lakes
- K-4a Goose Molting Area
- K-4b Brant Survey Area
- K-5a Teshekpuk Lake Caribou Habitat Area
- K-5b Caribou Study Area
- K-6 Coastal Area: Special restrictions on facility development within 3/4 mile of coast
- K-8a Pik Dunes: Surface structures, except approximately perpendicular pipeline crossings and ice pads, are prohibited
- K-11 Lease Tracts with surface occupancy limited to a maximum of 300 acres per tract (B, C)
- K-12 Western Arctic Herd Habitat Area

0 12 24 36 48 Miles

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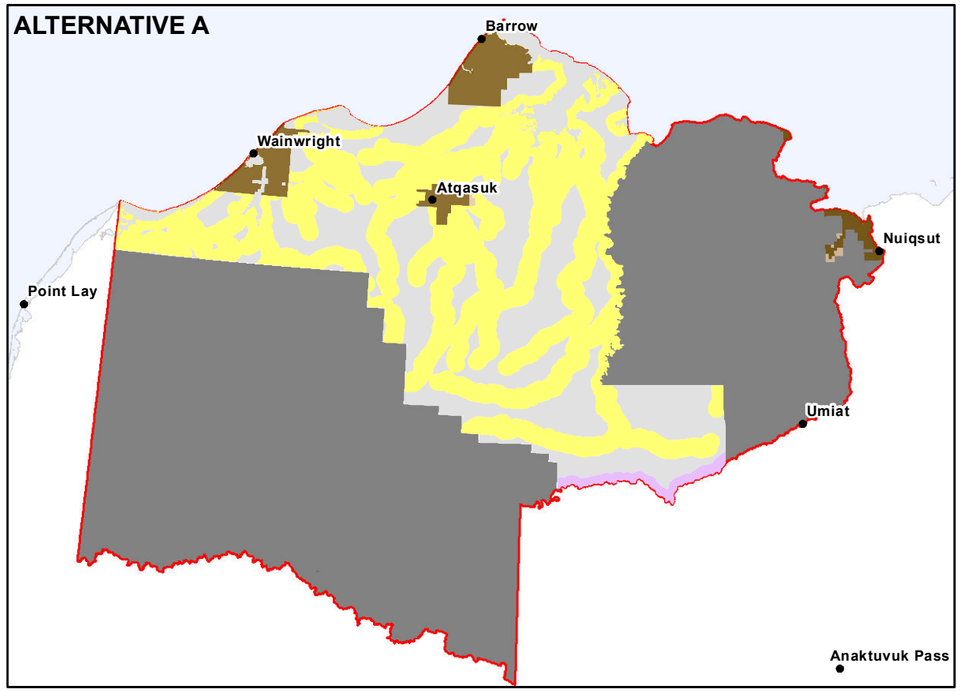

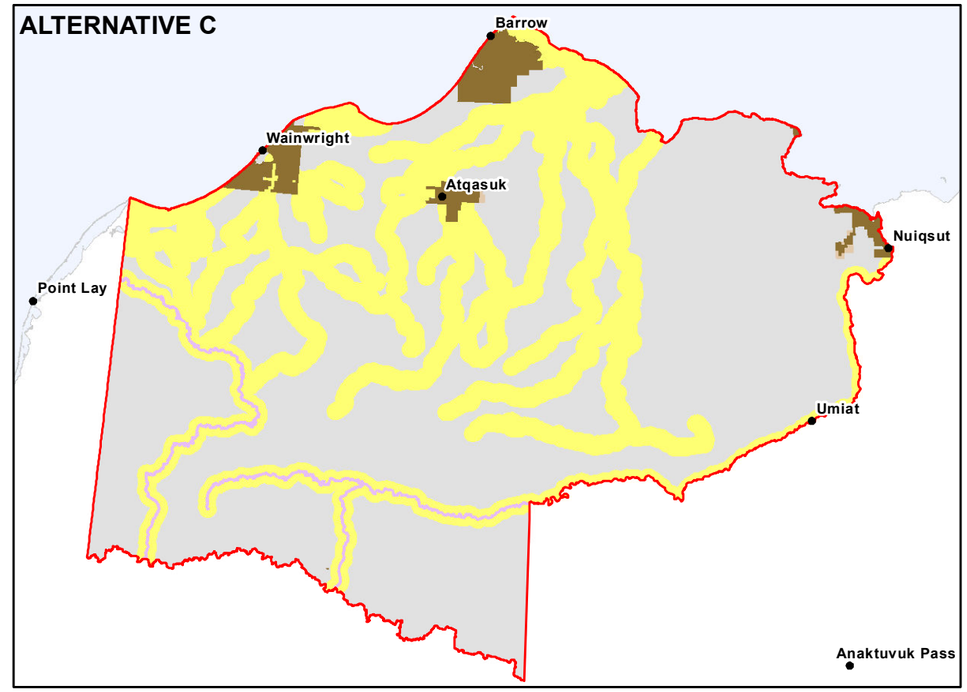

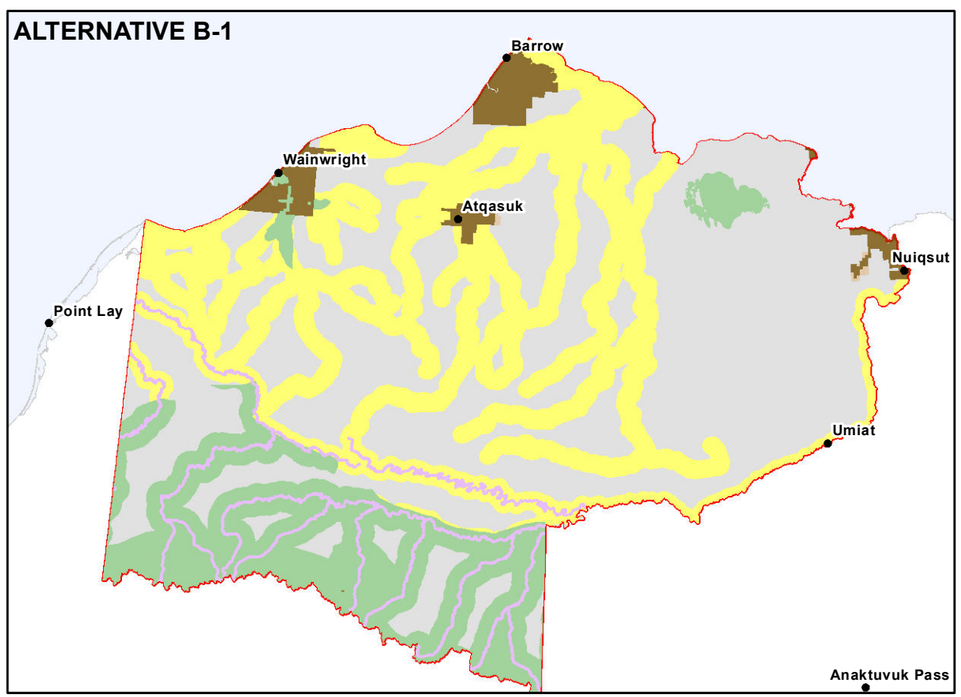

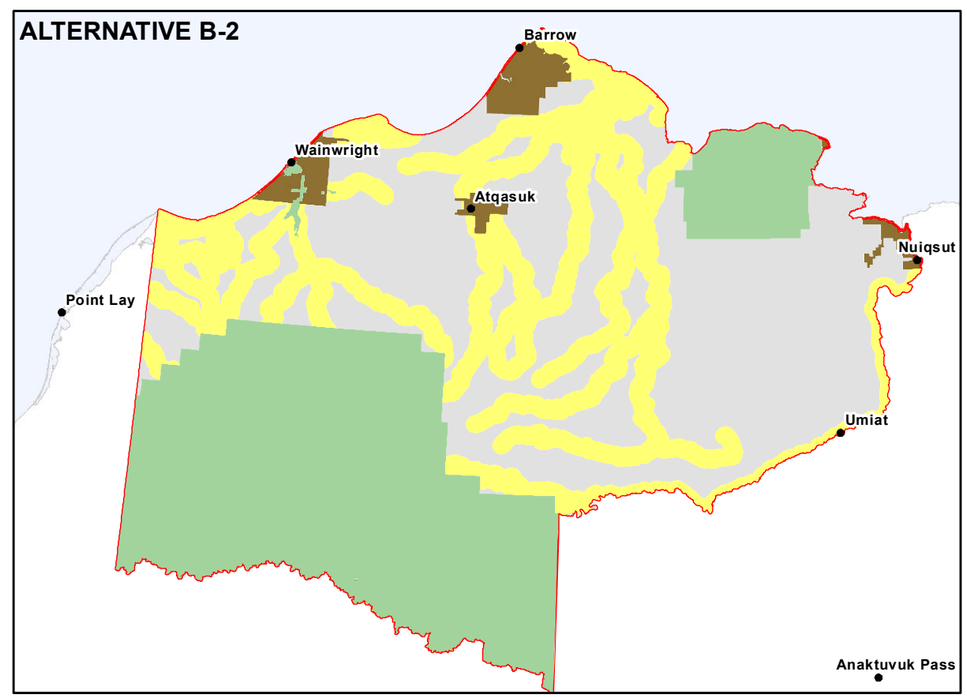

Map 2 - 5

Visual Resource Management (VRM) - Management Classes

Source: BLM, 2011

VRM Management Class

- Class I
- Class II
- Class III
- Class IV
- No Management Classes Delineated

In Alternative D, all BLM-managed lands would be Class IV

Land Status

- Native Patent or IC
- Native Selected

NPR-A Boundary

0 20 40 60 Miles

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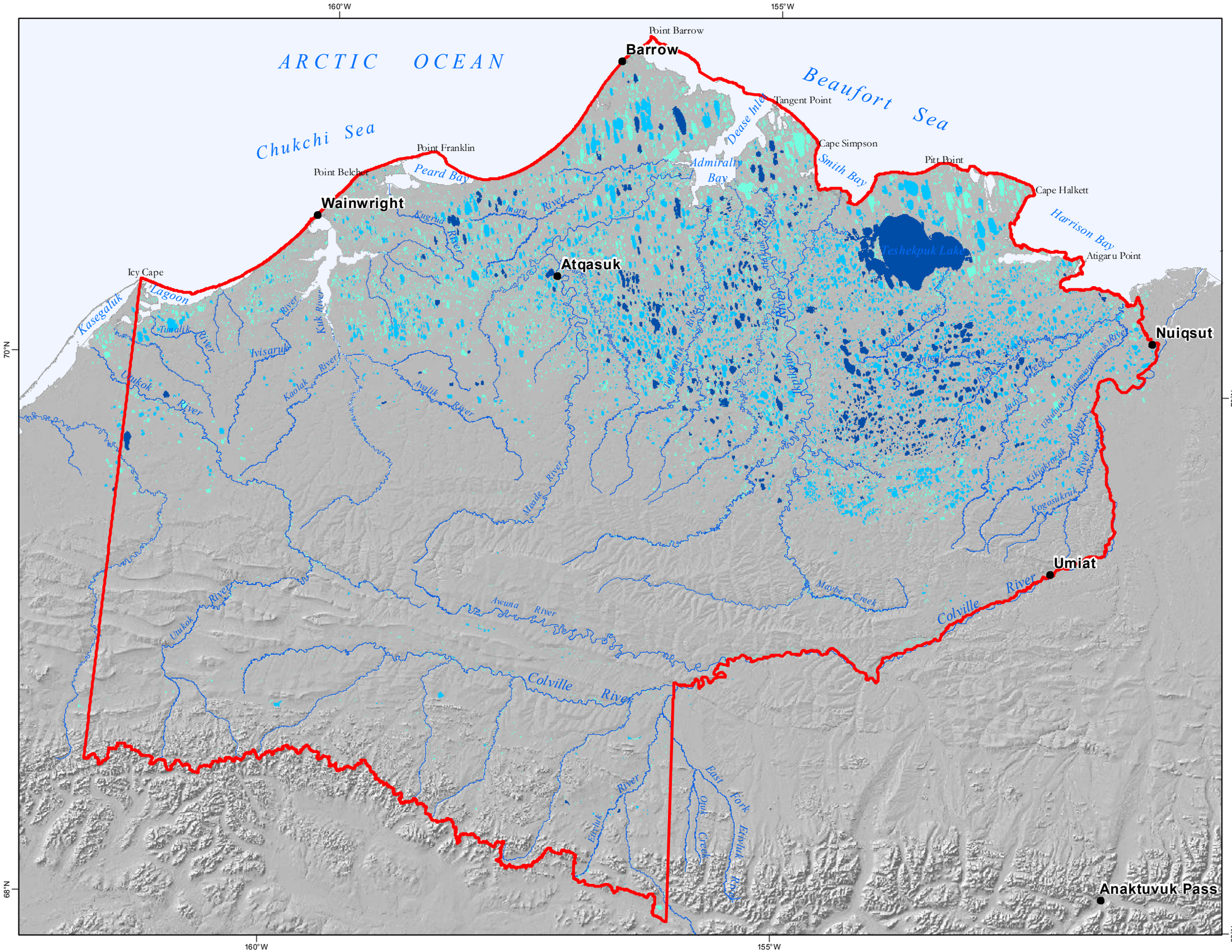
Projection: Albers Conic Equal Area referencing NAD83

Bureau of Land Management - Alaska

National Petroleum Reserve - Alaska

Final IAP/EIS



Map 3.2.10-1

Lake Depth

Source: Mellor, 1985

Lake Depth (m)

- < 1.6 m
- 1.6 m - 4 m
- > 4 m

NPR-A Boundary

0 6 12 24 36 48 Miles

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Projection: Albers Conic Equal Area referencing NAD83

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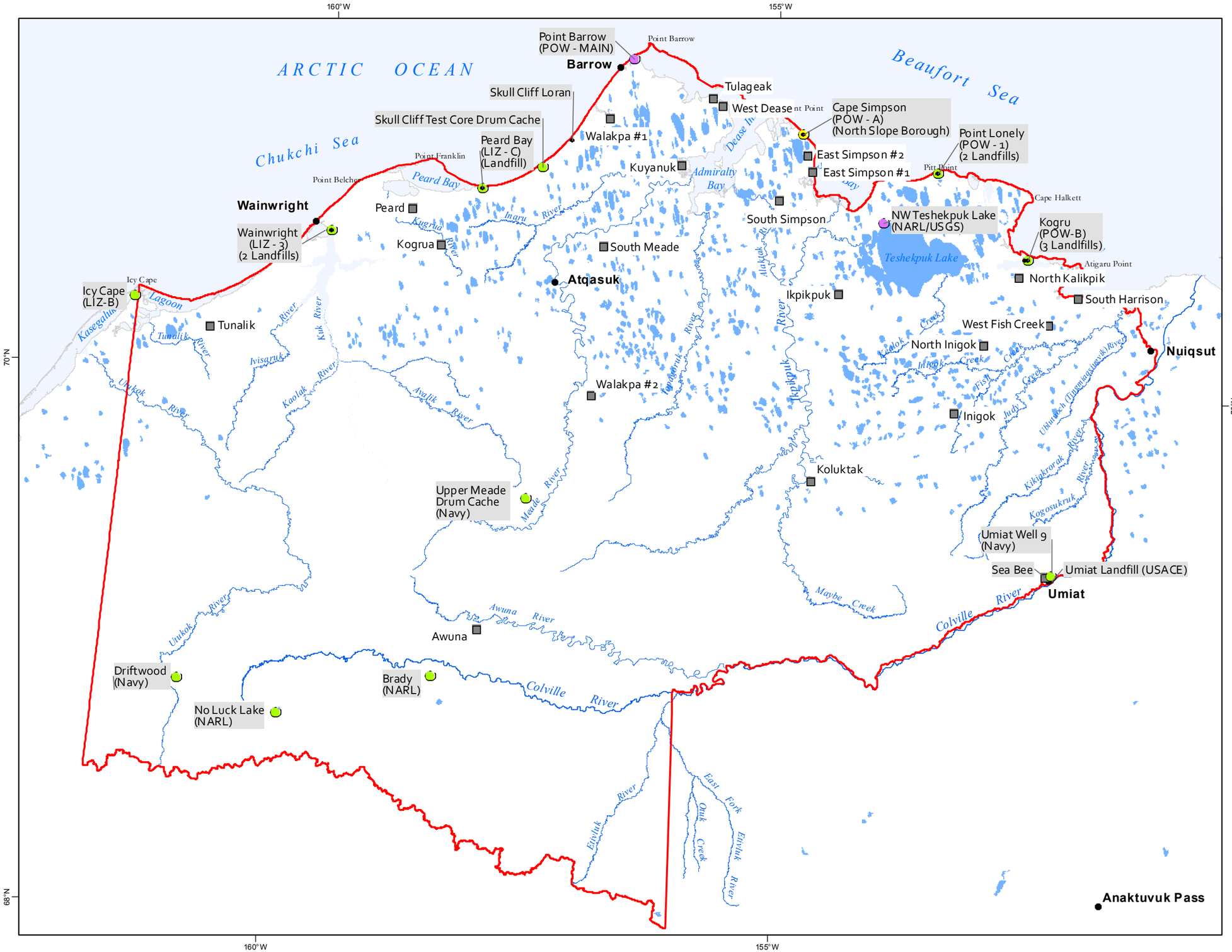
National Petroleum Reserve - Alaska
Final IAP/EIS



Map 3.2.11-1

Existing Hazards

Source: BLM, 2011

Existing Hazard Locations

- Landfill
- Currently Used
- Formerly Used Defense Site
- Privately Owned
- Reserve Pit

NPR-A Boundary

0 6 12 24 36 48 Miles

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Projection: Albers Conic Equal Area referencing NAD83

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National Petroleum Reserve - Alaska

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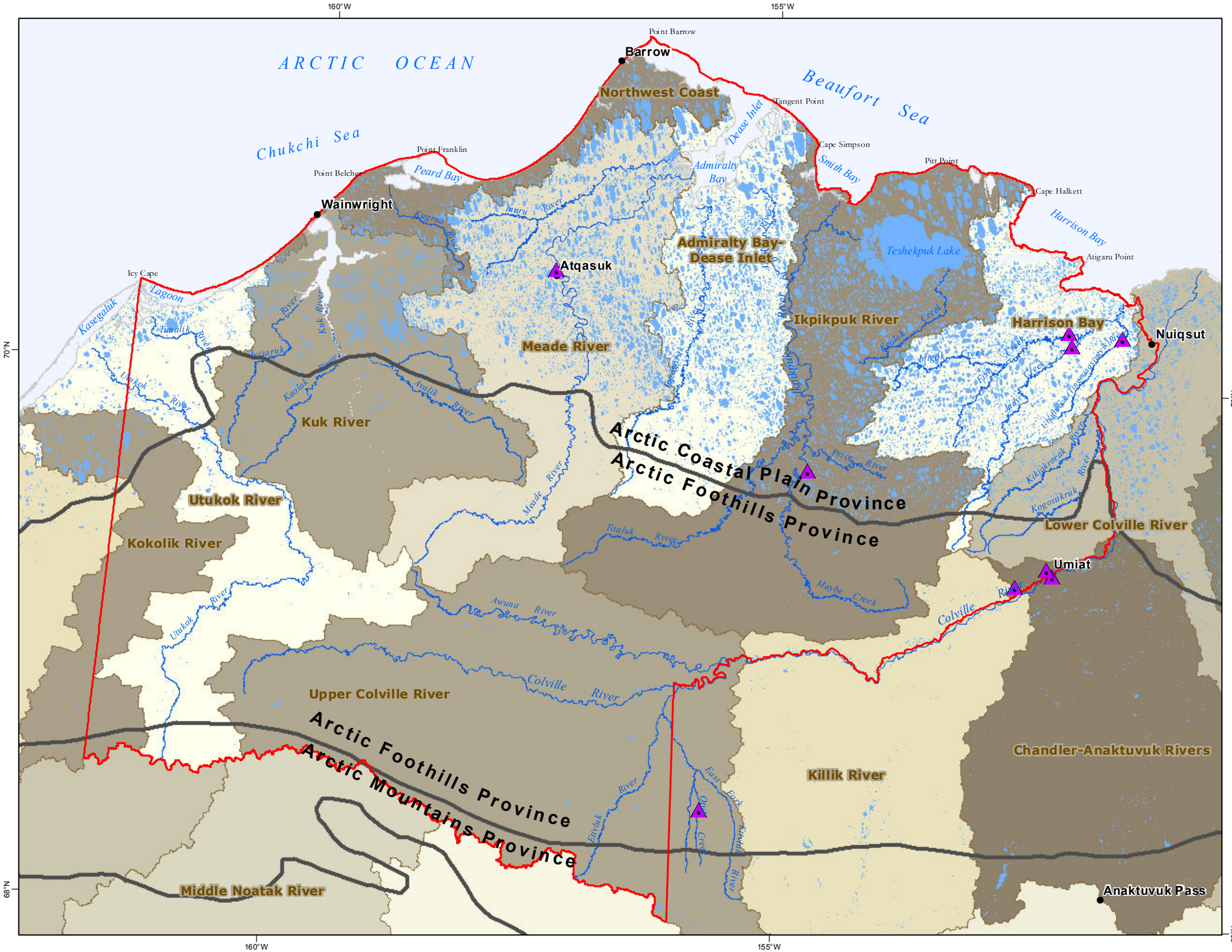

Map 3.2.4-1
Major Rivers, Hydrologic Units and Physiographic Provinces

Sources: Wahrhaftig, 1965
USGS- NHD, 2010
USDOI-BLM & USGS, 2010

- Stream Gauges
- Physiographic Provinces
- Watershed Boundary 4th level HUC (8-digit)
- NPR-A Boundary

0 6 12 24 36 48 Miles

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Projection: Albers Conic Equal Area
referencing NAD83

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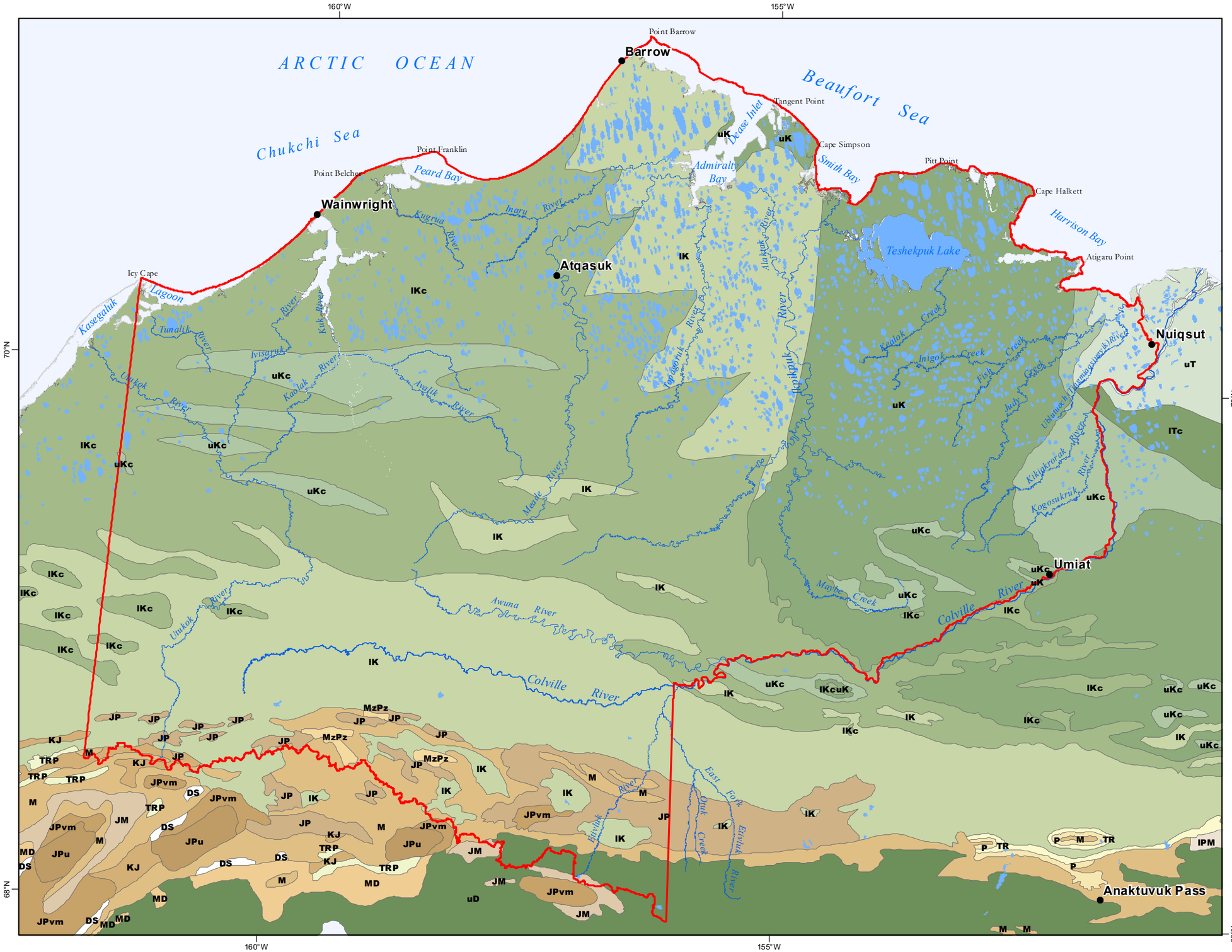
Final IAP/EIS



Map 3.2.5-1

Bedrock Geology

Sources: Beikman, 1980

Bedrock Geology Unit within NPR-A

JP	Jurassic, Triassic, and Permian Rocks
JPvm	Jurassic, Triassic, and Permian Mafic Volcanic Rocks
KJ	Cretaceous and Jurassic Rocks
M	Mississippian Rocks
MzPz	Mesozoic and Paleozoic Rocks
TR	Triassic Rocks
lK	Lower Cretaceous
lKc	Lower Cretaceous Continental Deposit
uK	Upper Cretaceous
uKc	Upper Cretaceous Continental Deposit
uT	Upper Tertiary Rocks

NPR-A Boundary

0 6 12 24 36 48 Miles

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Projection: Albers Conic Equal Area referencing NAD83

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National Petroleum Reserve - Alaska

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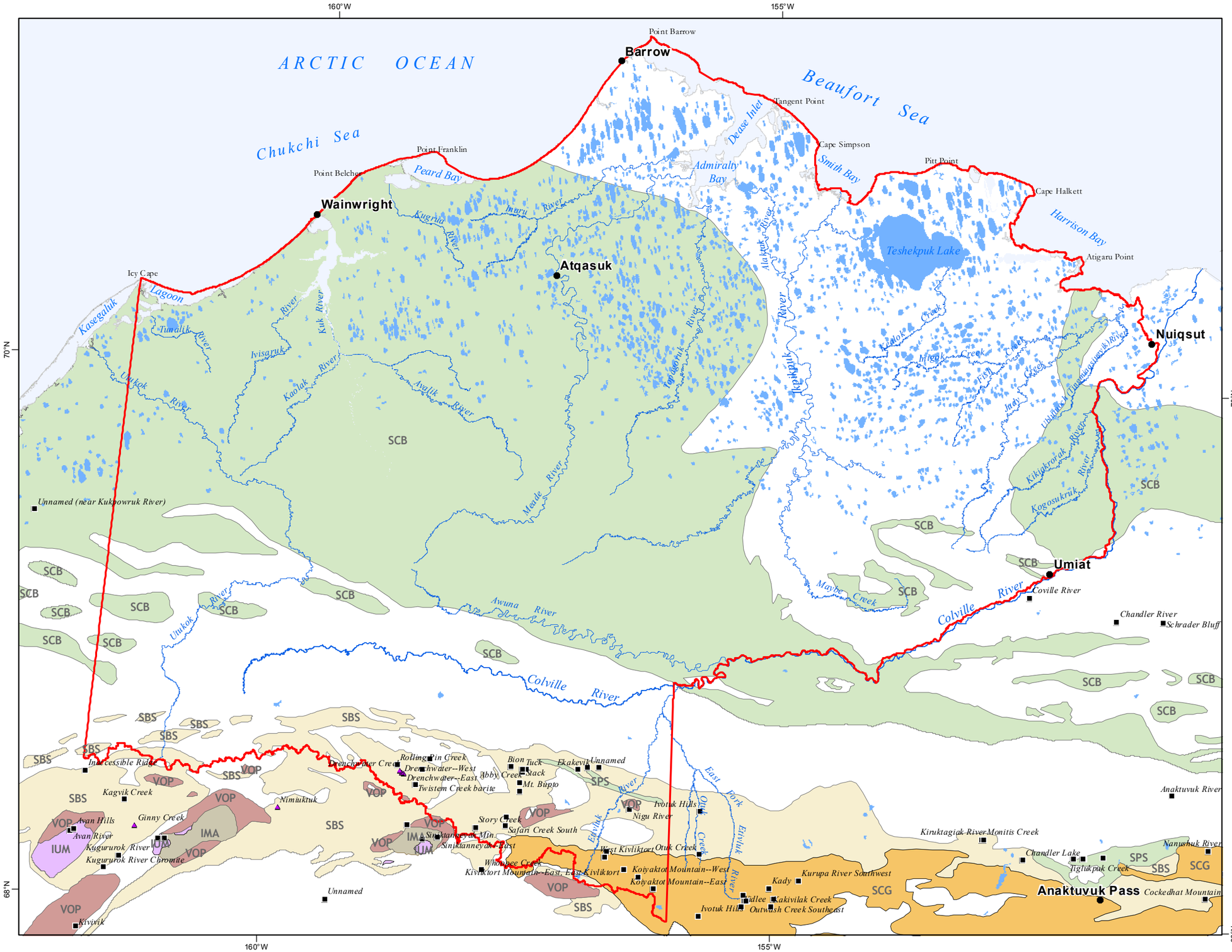

Map 3.2.5-2

Mineral Terranes & Alaska Resource Data File (ARDF) Locations

Sources: ARDF- USGS, 2008.
Terranes- Resource Data Inc., Alaska Earth Science, and US Bureau of Mines.

Alaska Resources Data File

- Occurrence
- Prospect
- Mineral Terrane
- NPR-A Boundary

0 6 12 24 36 48 Miles

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Projection: Albers Conic Equal Area referencing NAD83

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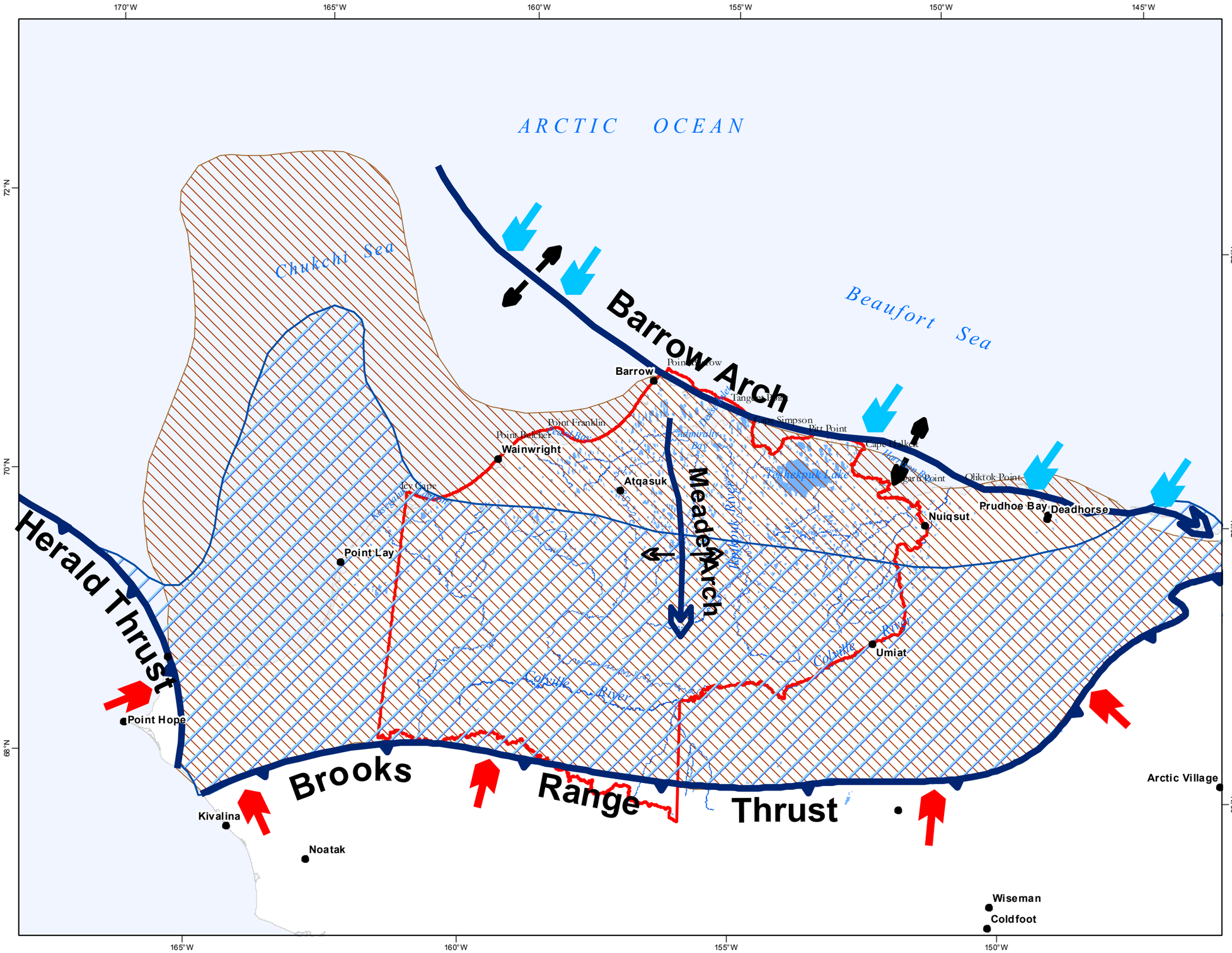

Map 3.2.6-1

Major Sedimentary Basins and Tectonic Features

Sources:

- Arctic Alaska Basin (Ellesmerian Strata, Devonian-Jurassic)
- Colville Basin [>3 km] (Brookian Strata, Cretaceous)
- Geologic Arch
- Thrust Fault System
- Arctic Alaska Basin Sediment Supply
- Colville Basin Sediment Supply
- NPR-A Boundary

0 20 40 60 Miles

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Projection: Albers Conic Equal Area referencing NAD83

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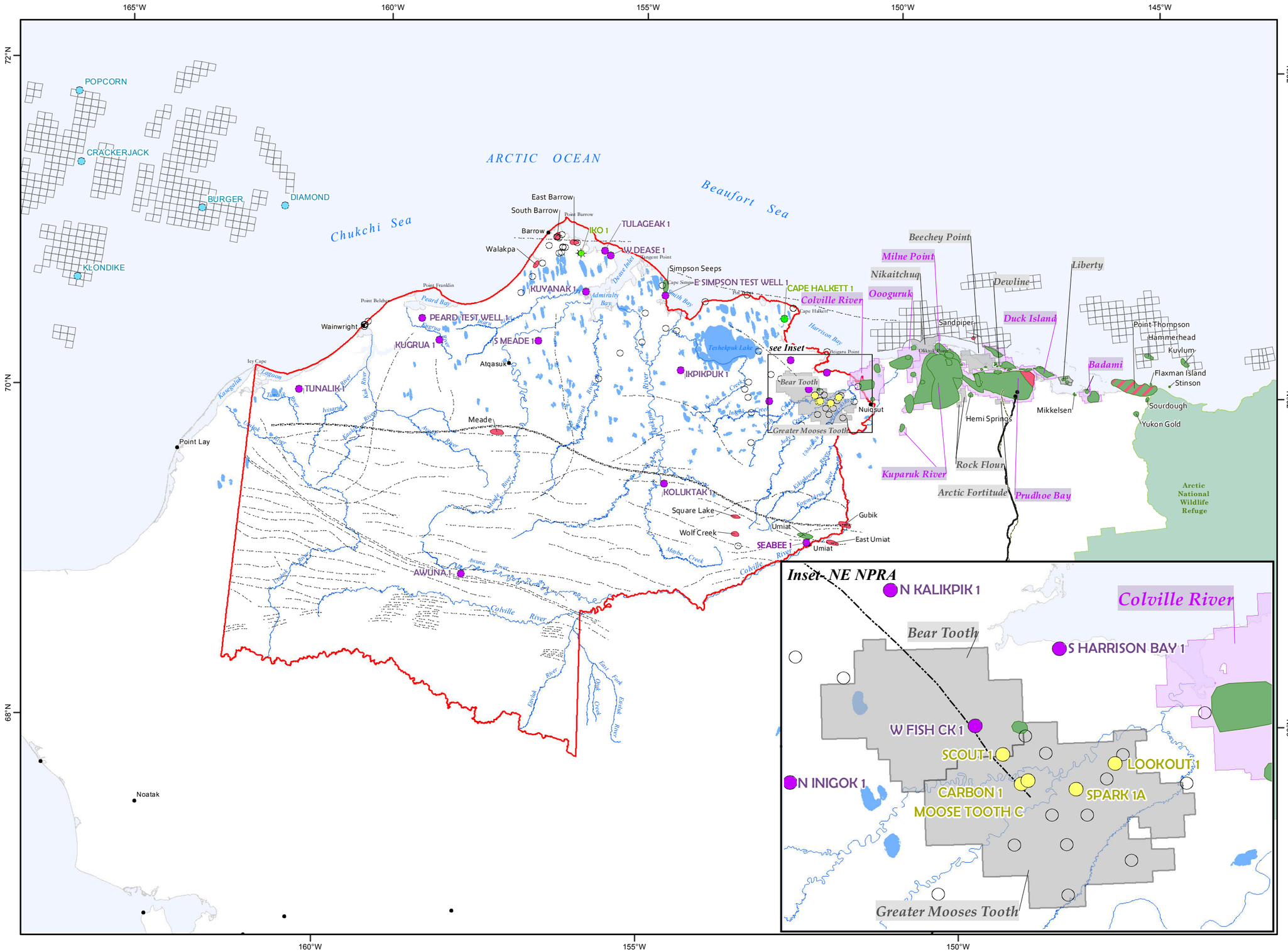

Map 3.2.6-2

Oil & Gas Fields and Wells of the North Slope

Sources: AOGCC, 2011
BOEMRE & AK-DNR

Selected NPR-A Well Locations

- Gas well, U S NAVY
- Oil Well, Husky
- Oil Well, Private industry
- Oil Well, US Navy
- Chukchi Wells
- Plugged & Abandoned

- --- -- Anticlines

Oil & Gas Fields

- Gas
- Oil
- Oil and Gas

Active Oil and Gas Units

- Not Producing
- Producing

- BOEMRE OCS Lease Tracts 2002 -2007

- Trans-Alaska Pipeline
- Dalton Highway
- Well Locations
- NPR-A Boundary

0 6 12 24 36 48 Miles

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Projection: Albers Conic Equal Area referencing NAD83

Bureau of Land Management - Alaska
National Petroleum Reserve - Alaska
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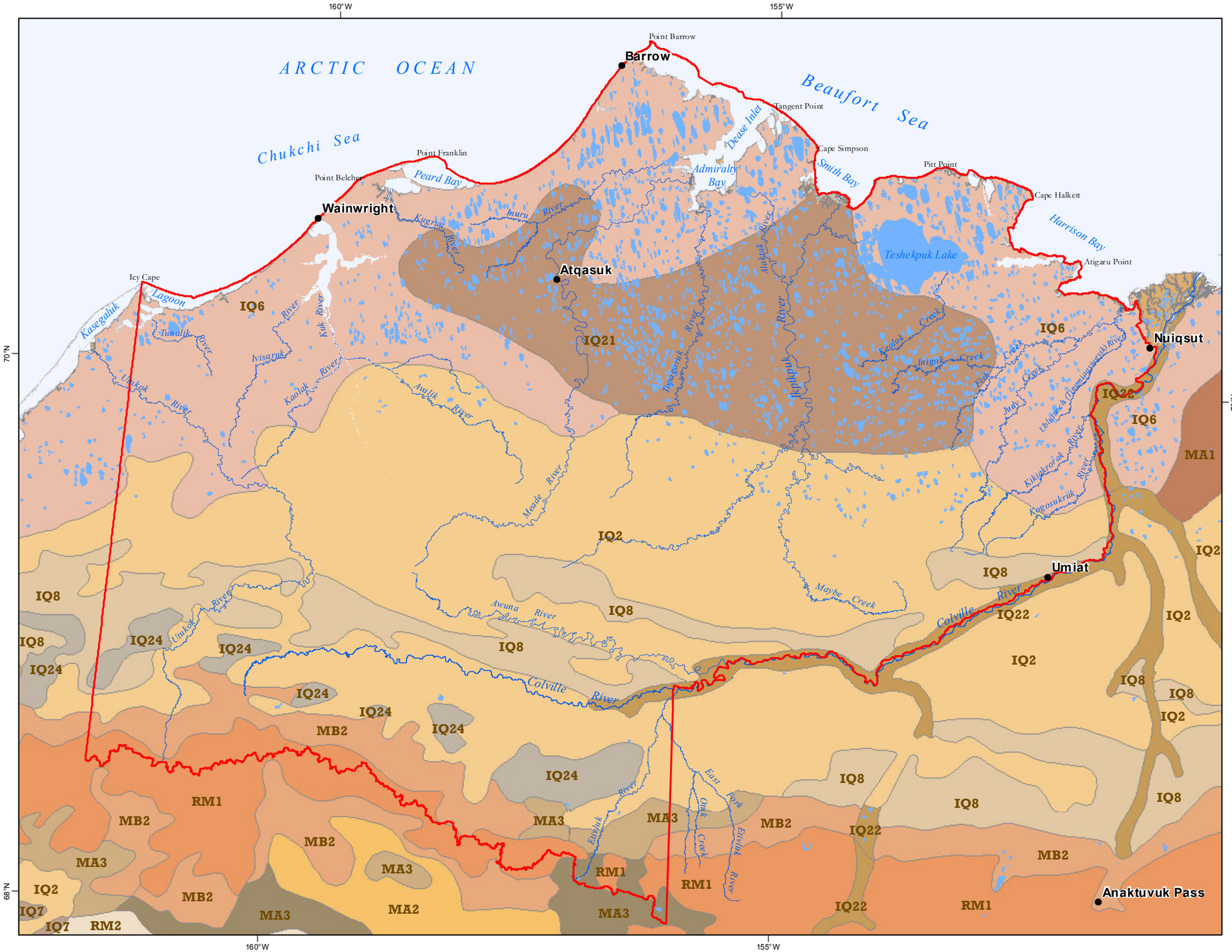

Map 3.2.8-1

Soils

Source: Natural Resource Conservation Service 1979, 1994.

Soil Unit within NPR-A

IQ2	Typic Histoturbels
IQ6	Typic Histoturbels - Typic Fibristels
IQ21	Typic Aquiturbels - Typic Psammoturbels
IQ8	Typic Histoturbels- Typic Aquiturbels
MB2	Typic Molliturbels - Typic Aquiturbels
IQ24	Typic Aquiturbels - Typic Gelorthents
RM1	Rough mountainous land
MA3	Typic Aquiturbels - Typic Molliturbels
MA3	Typic Aquiturbels - Typic Haplogelolls
IQ22	Fluvaquentic Aquorthels

NPR-A Boundary

0 6 12 24 36 48 Miles

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Projection: Albers Conic Equal Area referencing NAD83

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National Petroleum Reserve - Alaska
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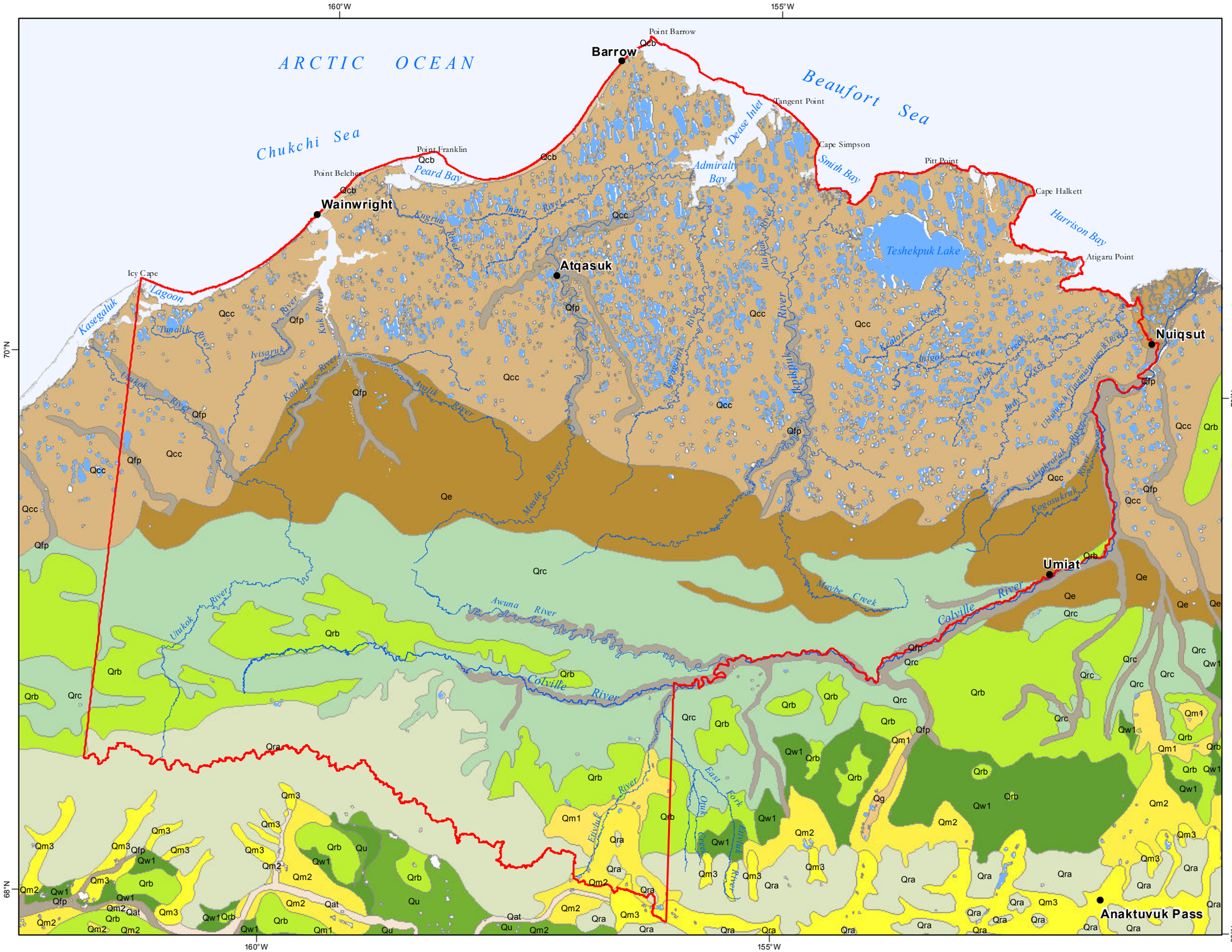

Map 3.2.9-1

Surficial Geology

Sources: Karlstrom 1964

Surficial Geology Unit within NPR-A

Qcb	Modern coastal beach deposits (sand to silt)
Qcc	Older coastal deposits of alluvial and marine sediments (sand to silt)
Qe	Silt more then 5-feet thick (silt)
Qfp	Modern floodplains (sand to silt)
Qm1	Remnants of highly modified glacial moraines and associated drift
Qm3	Prominent, slightly modified, glacial moraines and associated drift
Qra	Dominantly course rubbly deposits associated with steep-sloped mountains with higher percentage of bedrock exposures (talus slopes with course grained sand to boulders)
Qrb	Course and fine-grained deposits associated with moderate to steep-sloped mountains and hills with bedrock exposures largely restricted to upper slopes and rubble on crestlines (course grained sand to boulders)
Qrc	Fine-grained deposits associated with gently sloping hills with rare bedrock exposures (sand to silt)

NPR-A Boundary

0 6 12 24 36 48 Miles

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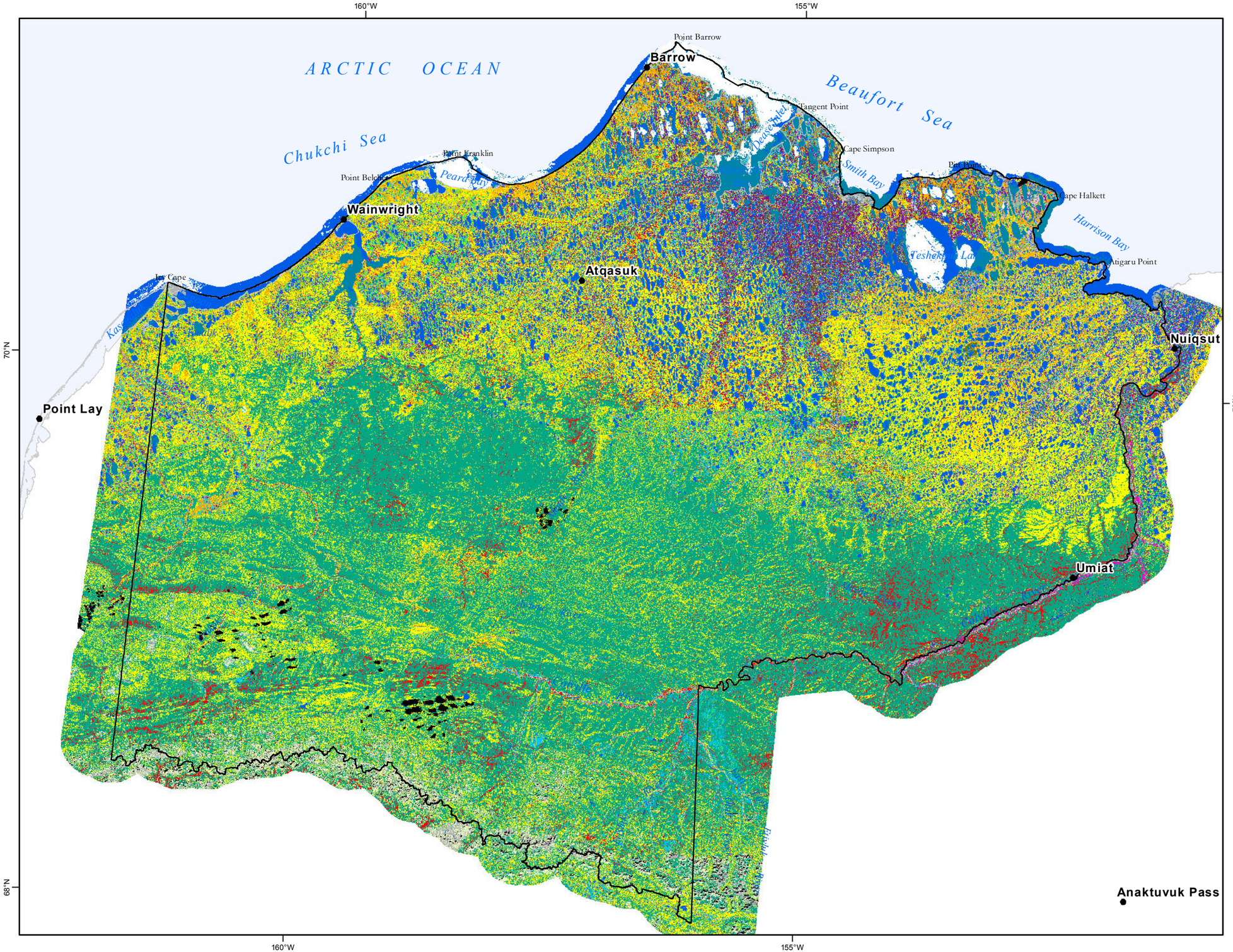

Map 3.3.1-1

Vegetation

Source: USDOI BLM - 2002

VEGETATION OVERVIEW
From National Petroleum Reserve - Alaska Earth Cover Classification

- Clear Water
- Turbid Water
- Ice
- Arctophila fulva
- Carex aquatilis
- Flooded Tundra - LCP
- Flooded Tundra - Nonpattern
- Wet Tundra
- Sedge/Grass Meadow
- Tussock Tundra
- Moss/Lichen
- Dwarf Shrub
- Low Shrub
- Tall Shrub
- Sparsely Vegetated
- Dunes/Dry Sand
- Barren Ground Other
- Clouds, Shadows, Bad Pixels

NPR-A Boundary

0 6 12 24 36 48 Miles

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Projection: Albers Conic Equal Area referencing NAD83

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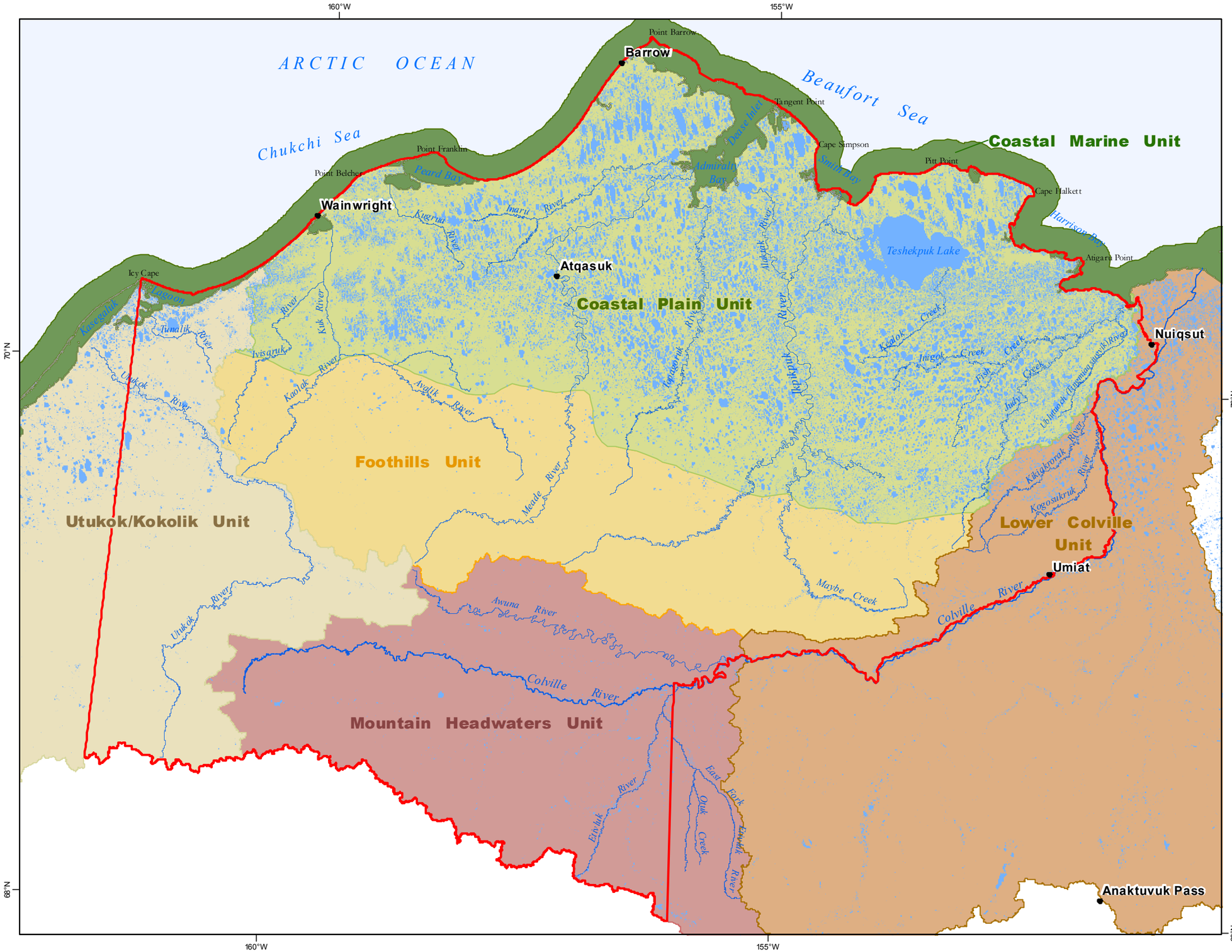

Map 3.3.4-1

Fish Habitat Units

Source: BLM, 2011

Fish Habitat Unit

NPR-A Boundary

0 6 12 24 36 48 Miles

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Projection: Albers Conic Equal Area
referencing NAD83

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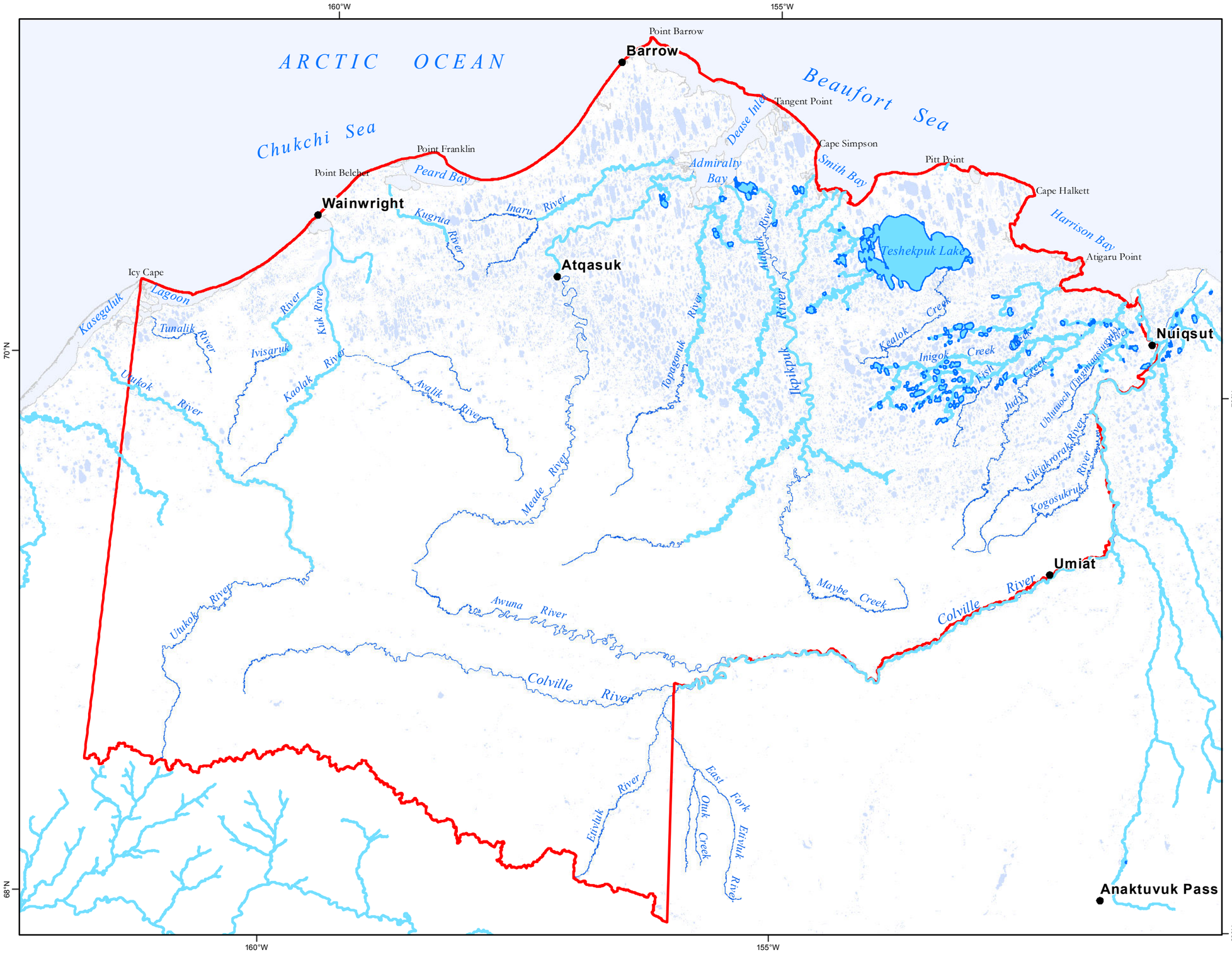

Map 3.3.4-2

Anadromous Waters

Sources: ADF&G, 2011.

- Anadromous Waters
- Rivers
- Lakes with anadromous fish present
- Lakes
- NPR-A Boundary

0 6 12 24 36 48 Miles

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Projection: Albers Conic Equal Area referencing NAD83

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National Petroleum Reserve - Alaska

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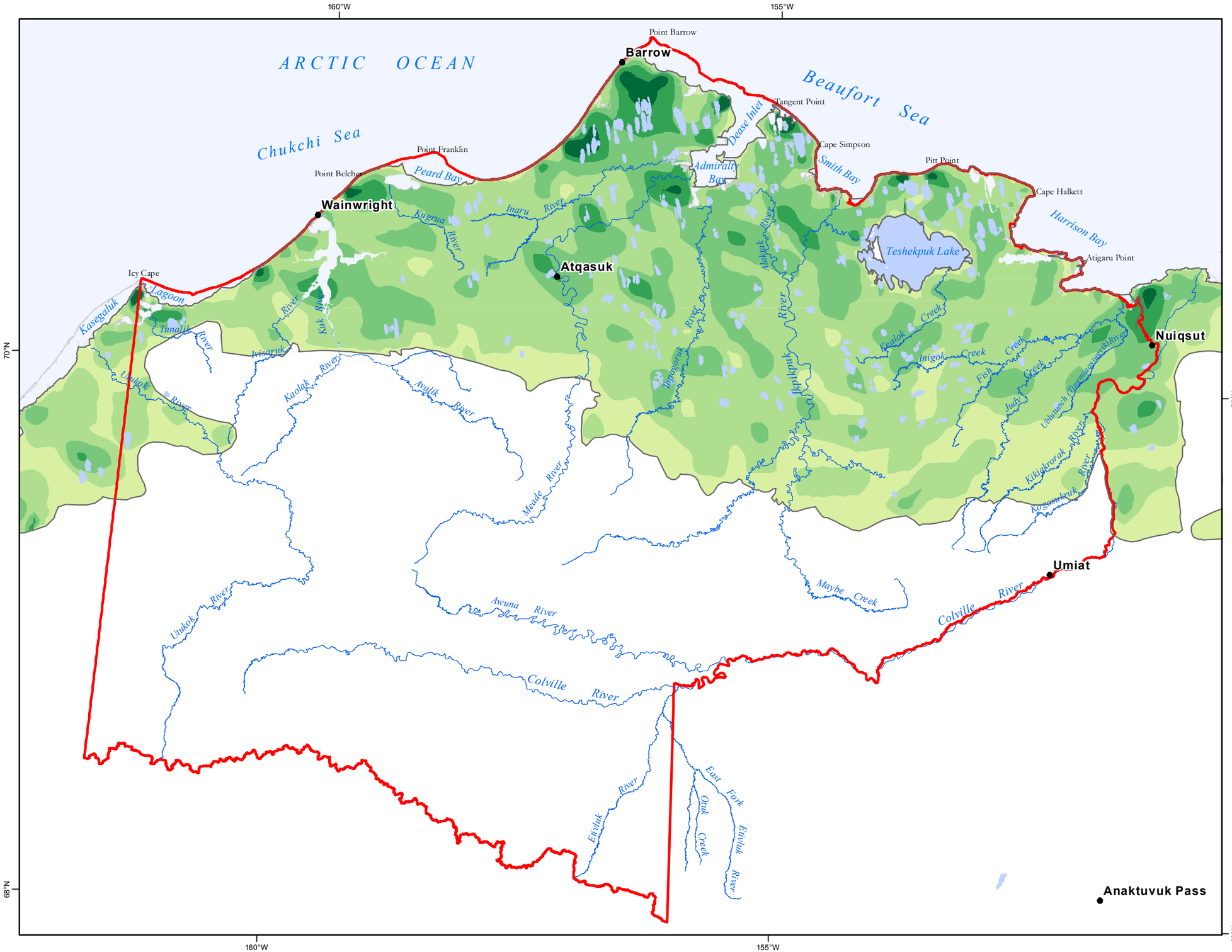

Map 3.3.5-1

Glaucous gull Onshore Density

Sources: USFWS - Migratory Bird Management, 2010.

Estimated Relative Onshore Density (2007-2010)

Birds per Square Kilometer

- 1.992 - 4.033
- 0.980 - 1.991
- 0.420 - 0.980
- 0.052 - 0.419
- 0.000 - 0.051

Survey Area Boundary

NPR-A Boundary

0 12 24 36 Miles

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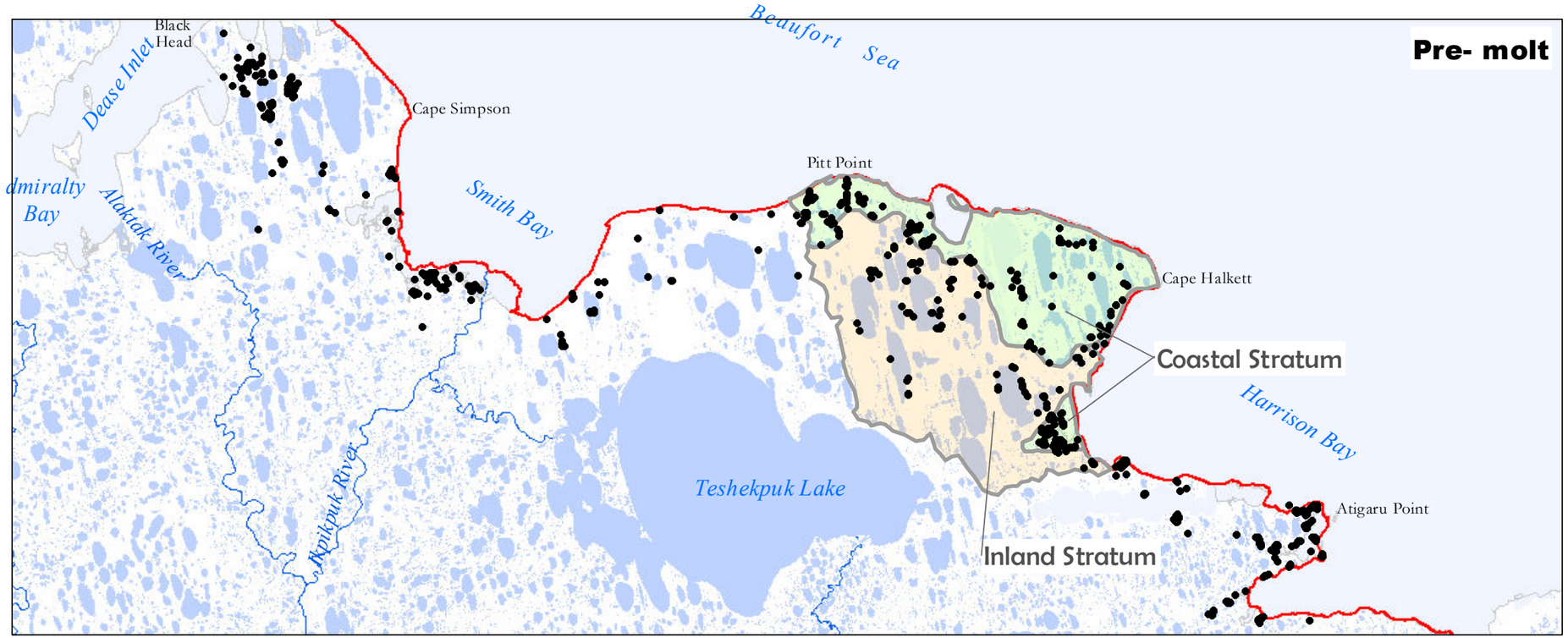
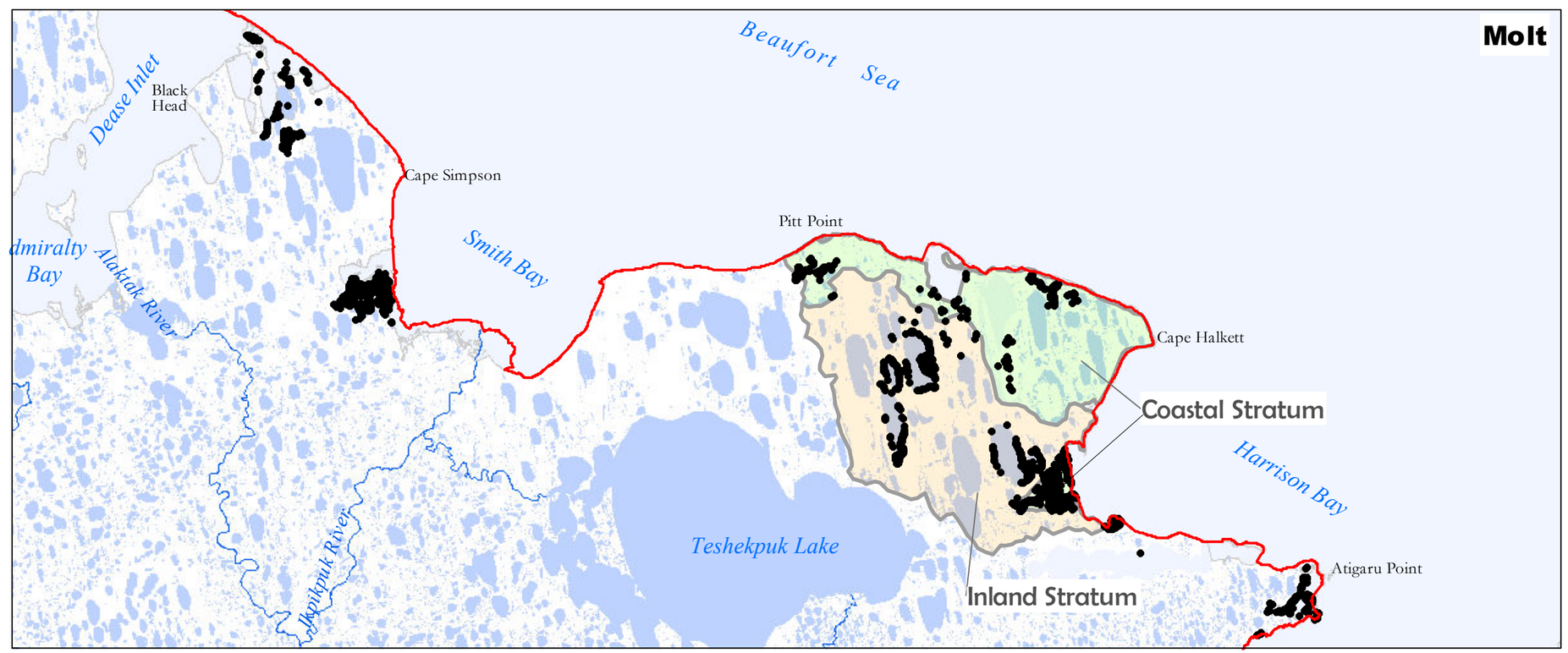




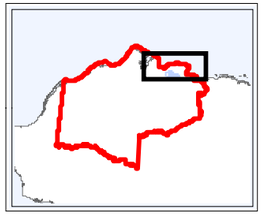
Map 3.3.5-10

Black Brant Locations Pre-Molt and Molt

Source: USGS, 2010

BLACK BRANT

- Locations from GPS Transmitter-marked brant Summers 2007 & 2008
- Stratum Boundary
- NPRA- Boundary



0 5 10 Miles

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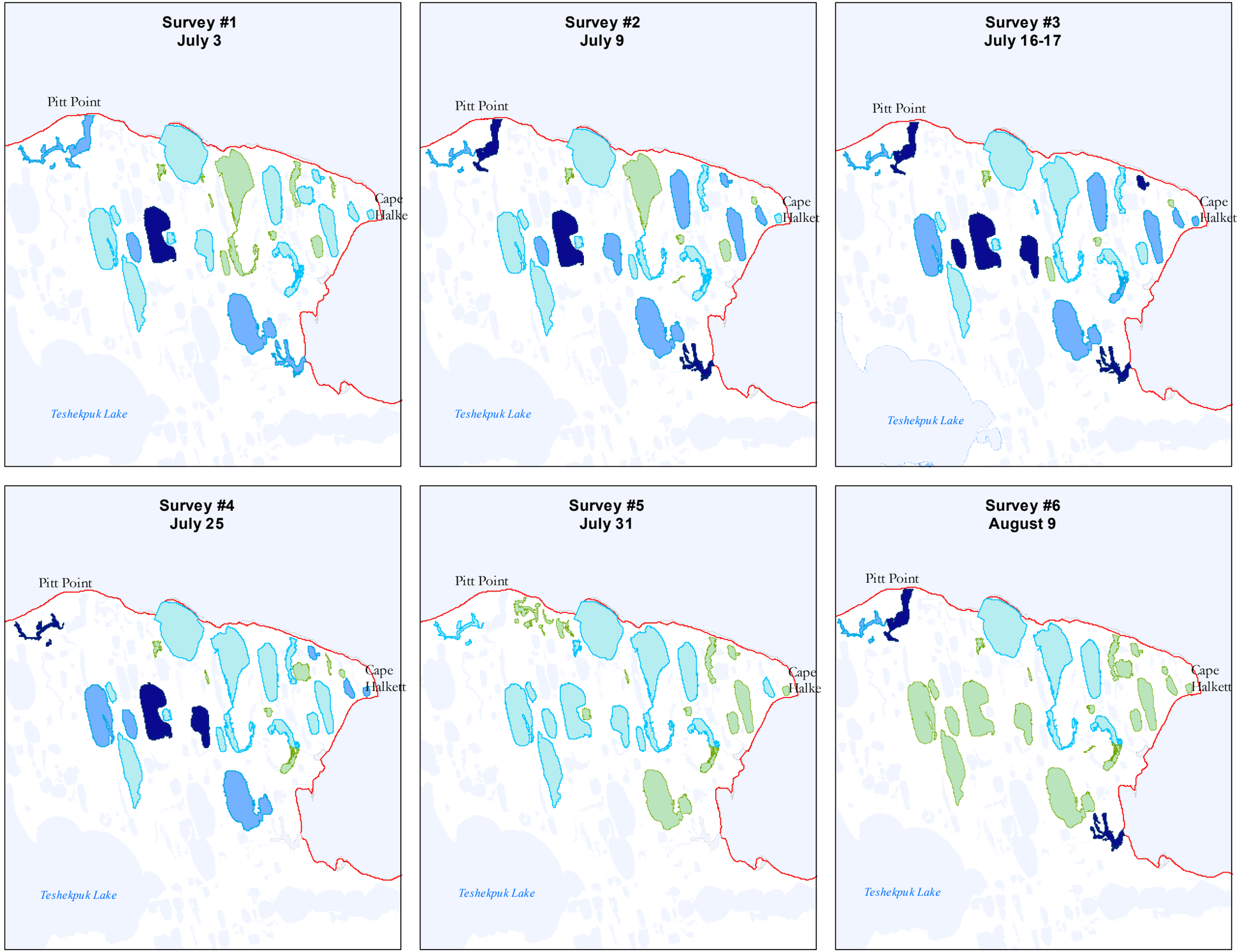


Map 3.3.5-11

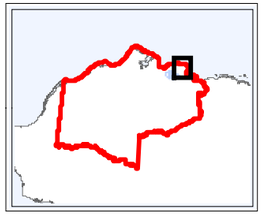
Brant Distribution in Surveyed Lakes - 2007

Source: USGS, 2010

Number of Brant per Lake

- 1 - 100
- 101 - 500
- 501 - 1,000
- 1,001 - 2,946

NPR-A Boundary



0 5 10 Miles

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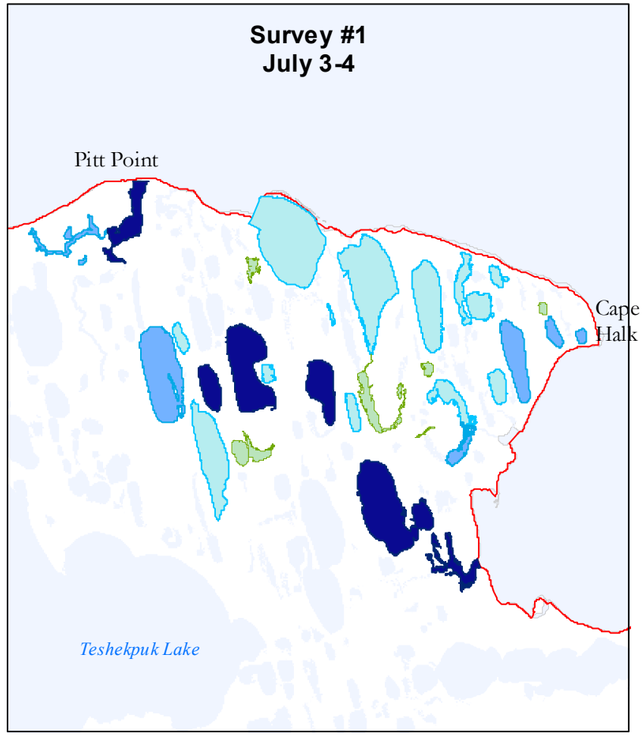
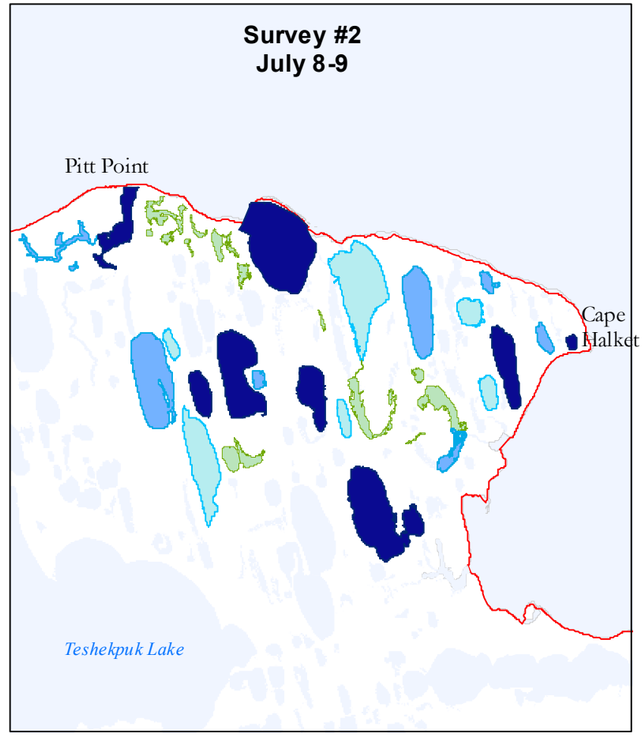
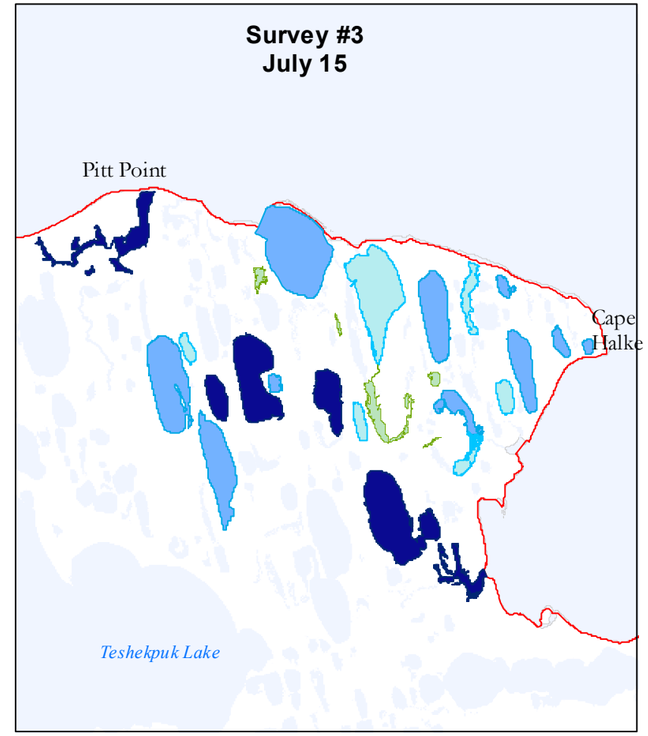
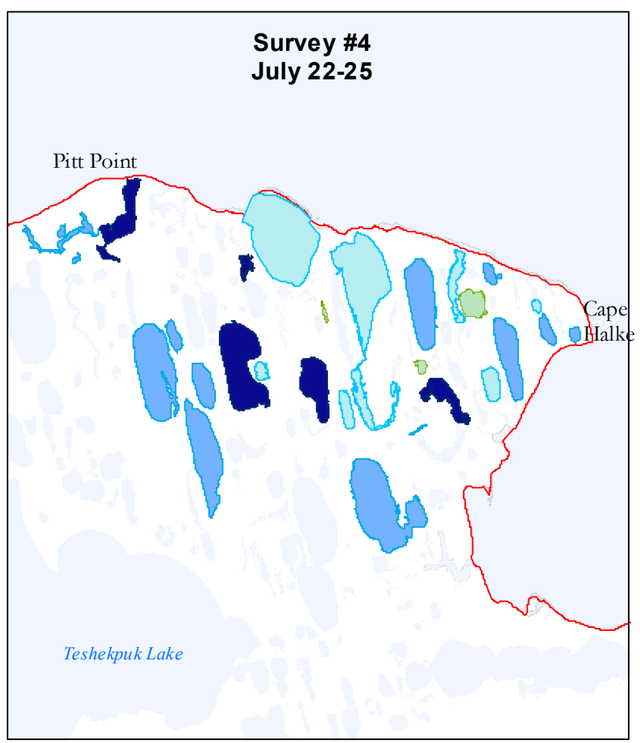
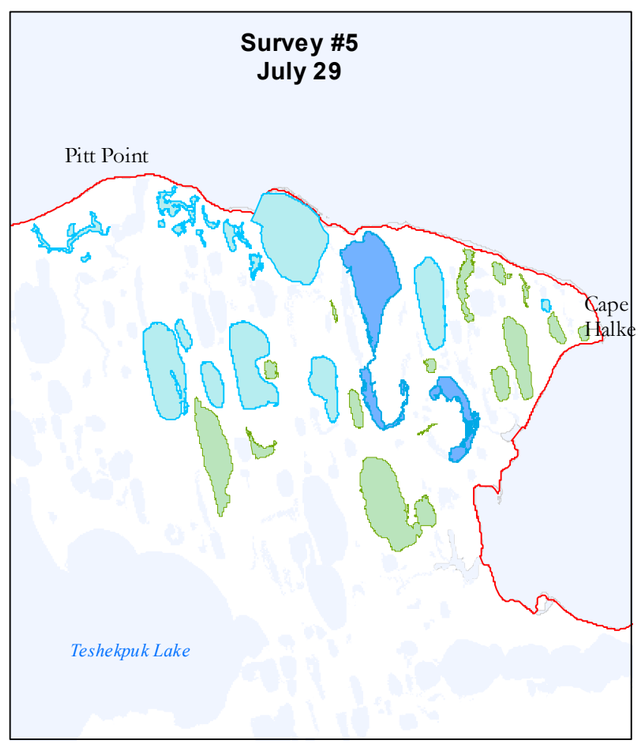
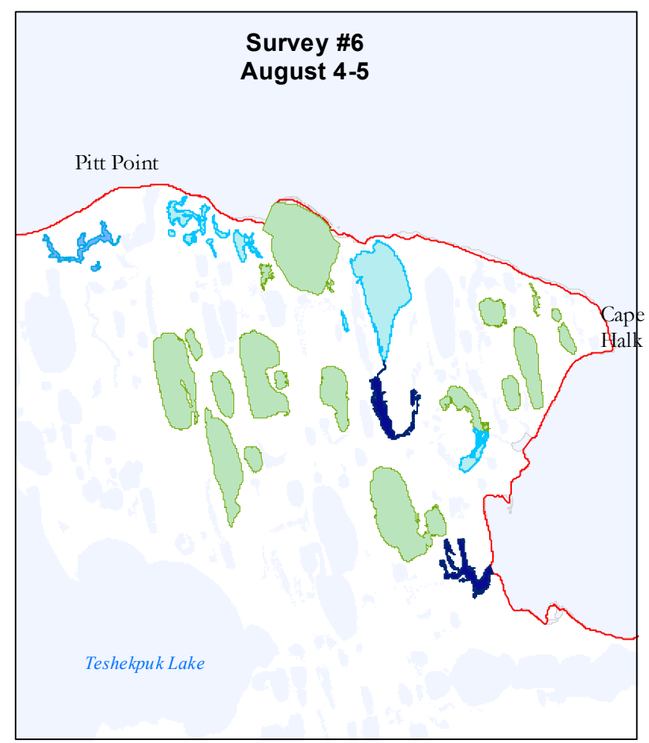












Map 3.3.5-12

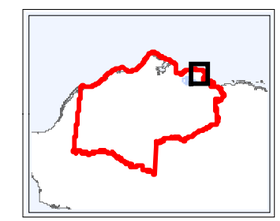
Brant Distribution in Surveyed Lakes - 2008

Source: USGS, 2010

Number of Brant per Lake

- 1 - 100
- 101 - 500
- 501 - 1,000
- 1,001 - 2,946

NPR-A Boundary



0 5 10 Miles

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Projection: Albers Conic Equal Area referencing NAD83

Bureau of Land Management - Alaska

National Petroleum Reserve - Alaska

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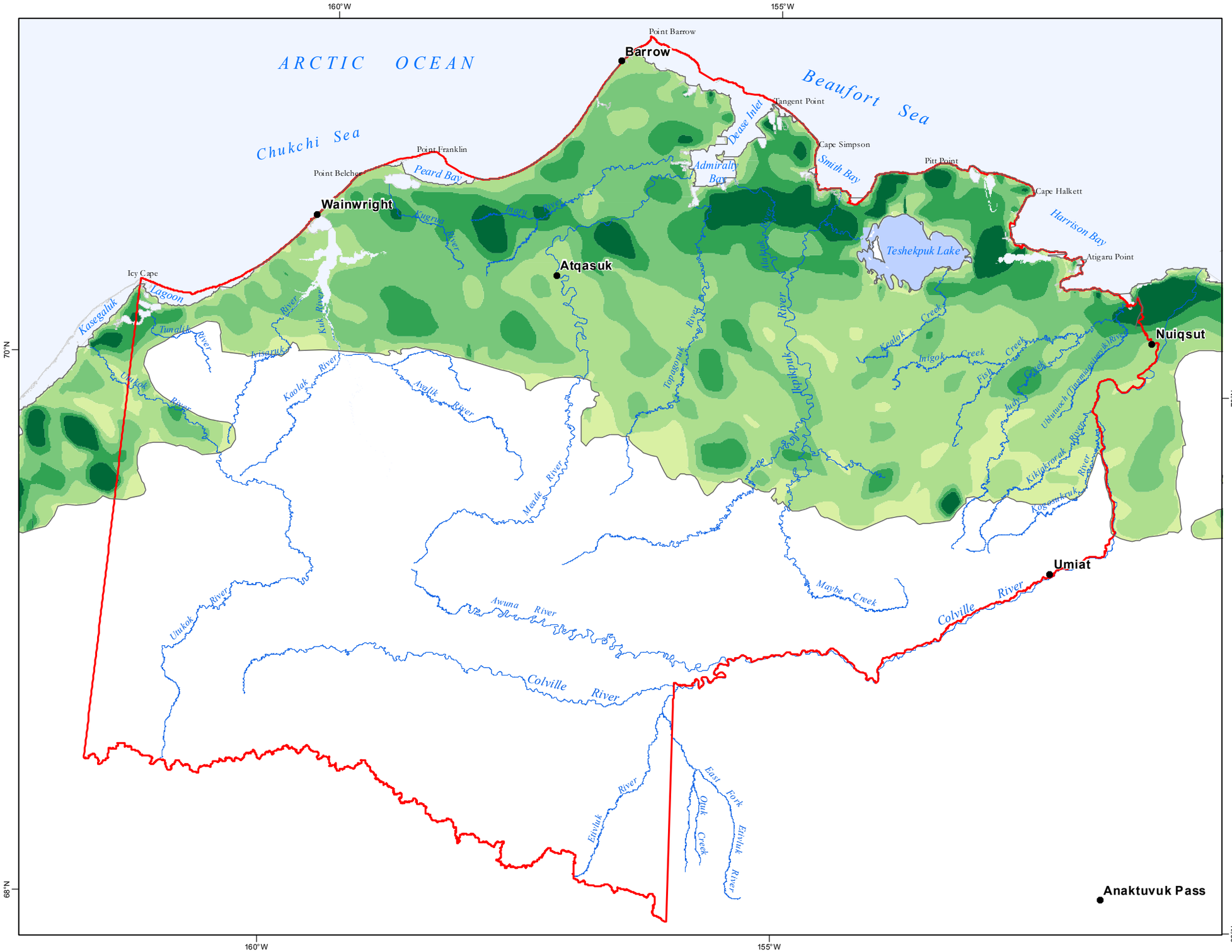

Map 3.3.5-13

Greater White-fronted Goose Onshore Density

Source: USFWS - Migratory Bird Management, 2010.

GREATER WHITE-FRONTED GOOSE

Estimated Relative Onshore Density (2007-2010)

Birds per Square Kilometer

- 8.782 - 15.846
- 5.002 - 8.781
- 2.304 - 5.001
- 0.119 - 2.303
- 0.000 - 0.118

Survey Area Boundary

NPR-A Boundary

0 12 24 36 Miles

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Projection: Albers Conic Equal Area referencing NAD83

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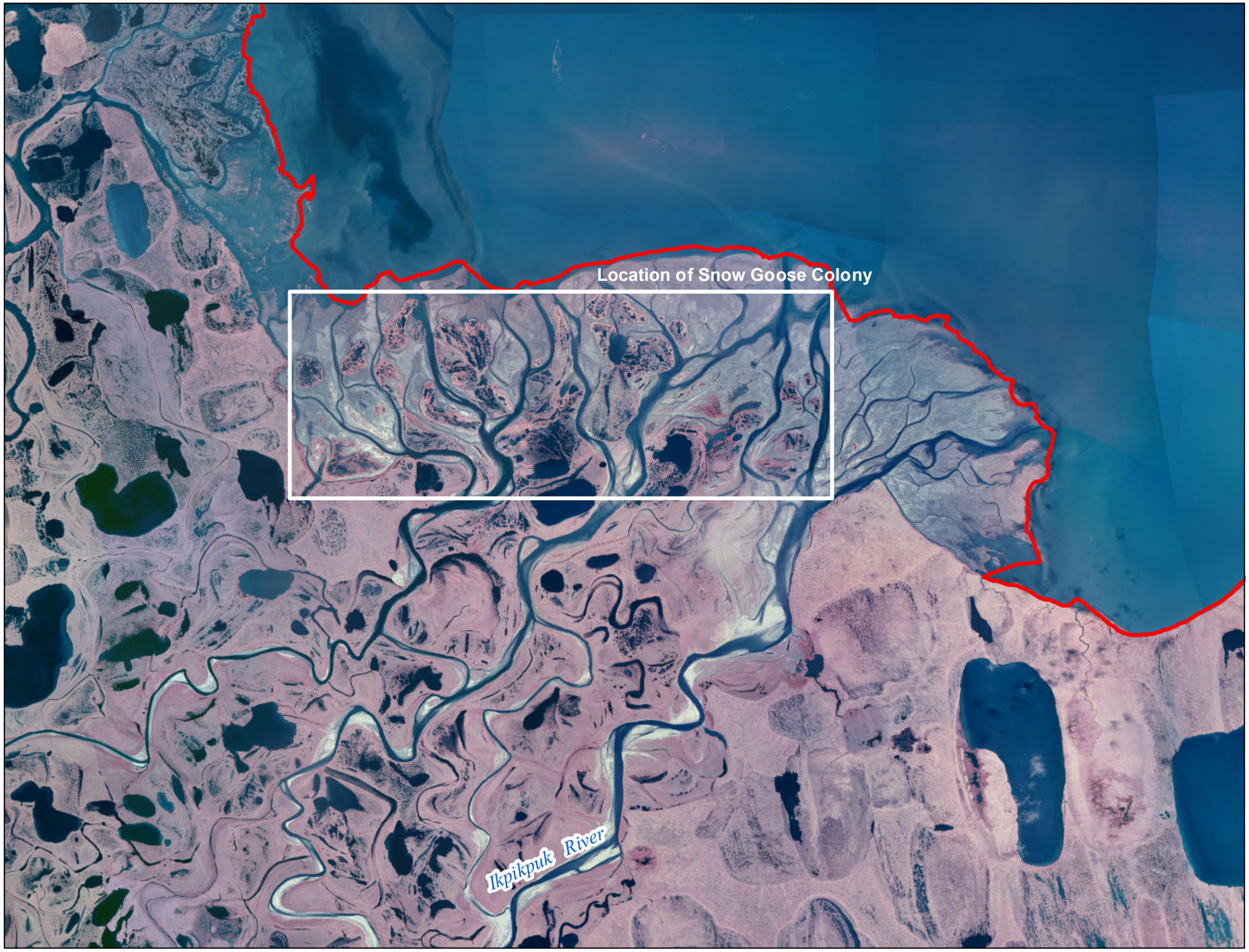

Map 3.3.5-14

Ikpikpuk River Delta Lesser Snow Goose Colony

Sources: ABR, 2007.
Imagery Source: USGS, 2002-2007.

NPR-A Boundary

0 1 2 Miles

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Projection: Albers Conic Equal Area
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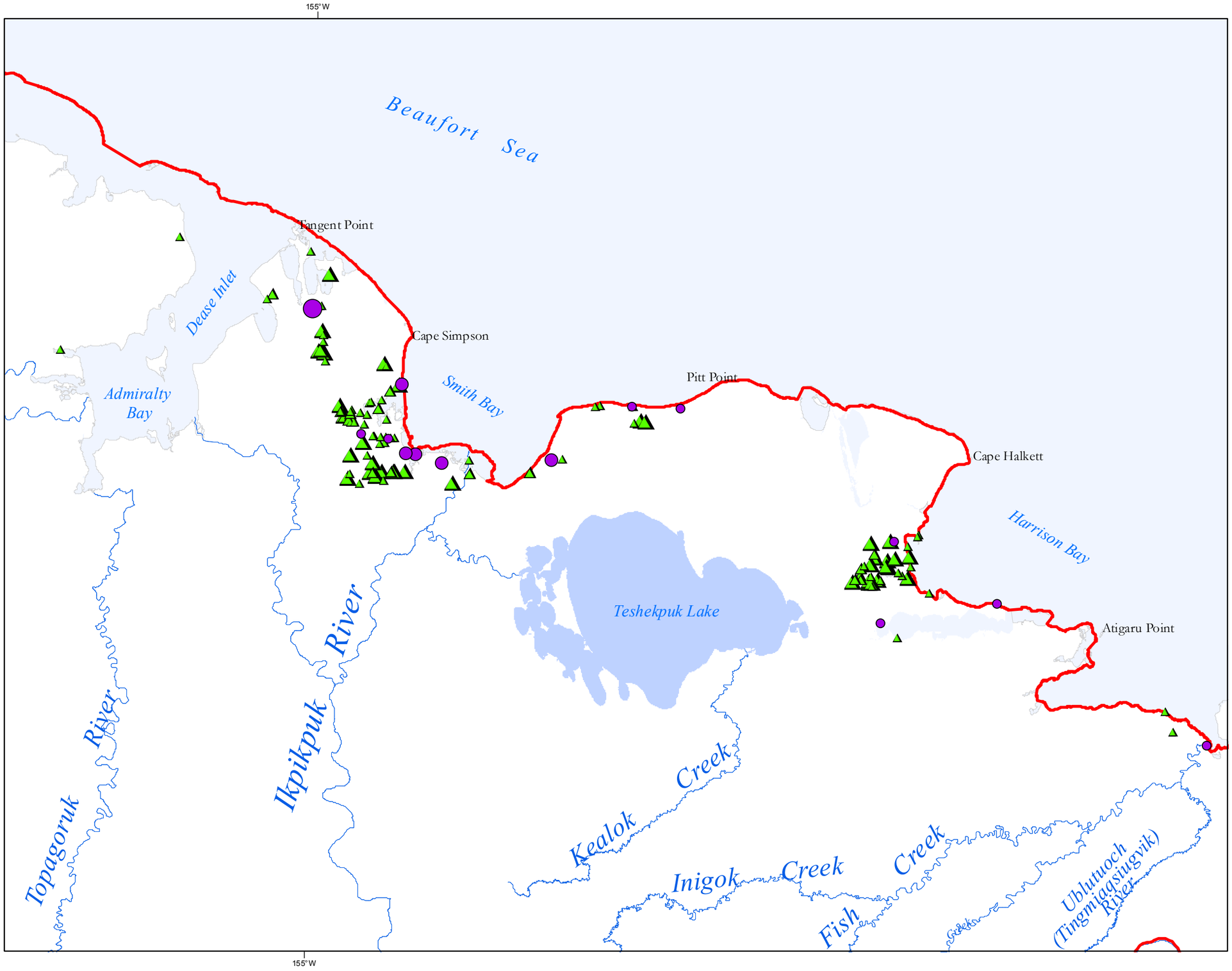

Map 3.3.5-15

Lesser Snow Goose Brood-rearing Survey

Source: Ritchie et al., 2010

LESSER SNOW GOOSE
Brood-rearing Survey Locations 2010

Groups With Young
- 1 - 50
- 51 - 100
- >100

Goups Without Young
- 1 - 50
- 50 - 100
- >100

NPR-A Boundary

0 6 12 18 Miles

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Projection: Albers Conic Equal Area referencing NAD83

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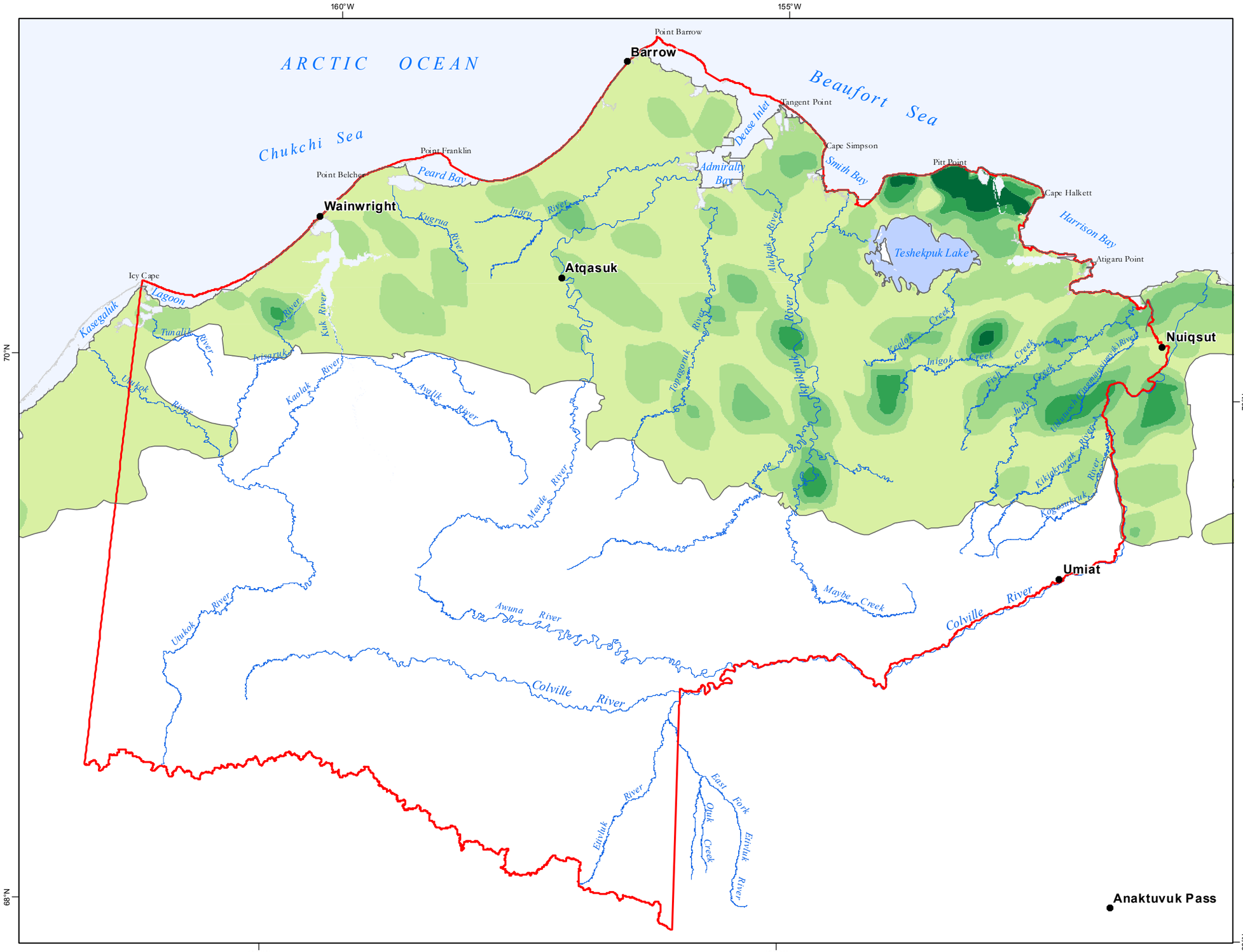
National Petroleum Reserve - Alaska
Final IAP/EIS



Map 3.3.5-16

Canada Goose Onshore Density

Source: USFWS - Migratory Bird Management, 2010.

CANADA GOOSE

Estimated Relative Onshore Density (2007-2010)

Birds per Square Kilometer

- 2.973 - 8.104
- 1.294 - 2.972
- 0.460 - 1.293
- 0.030 - 0.460
- 0.000 - 0.029

Survey Area Boundary

NPR-A Boundary

0 12 24 36 Miles

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Projection: Albers Conic Equal Area referencing NAD83

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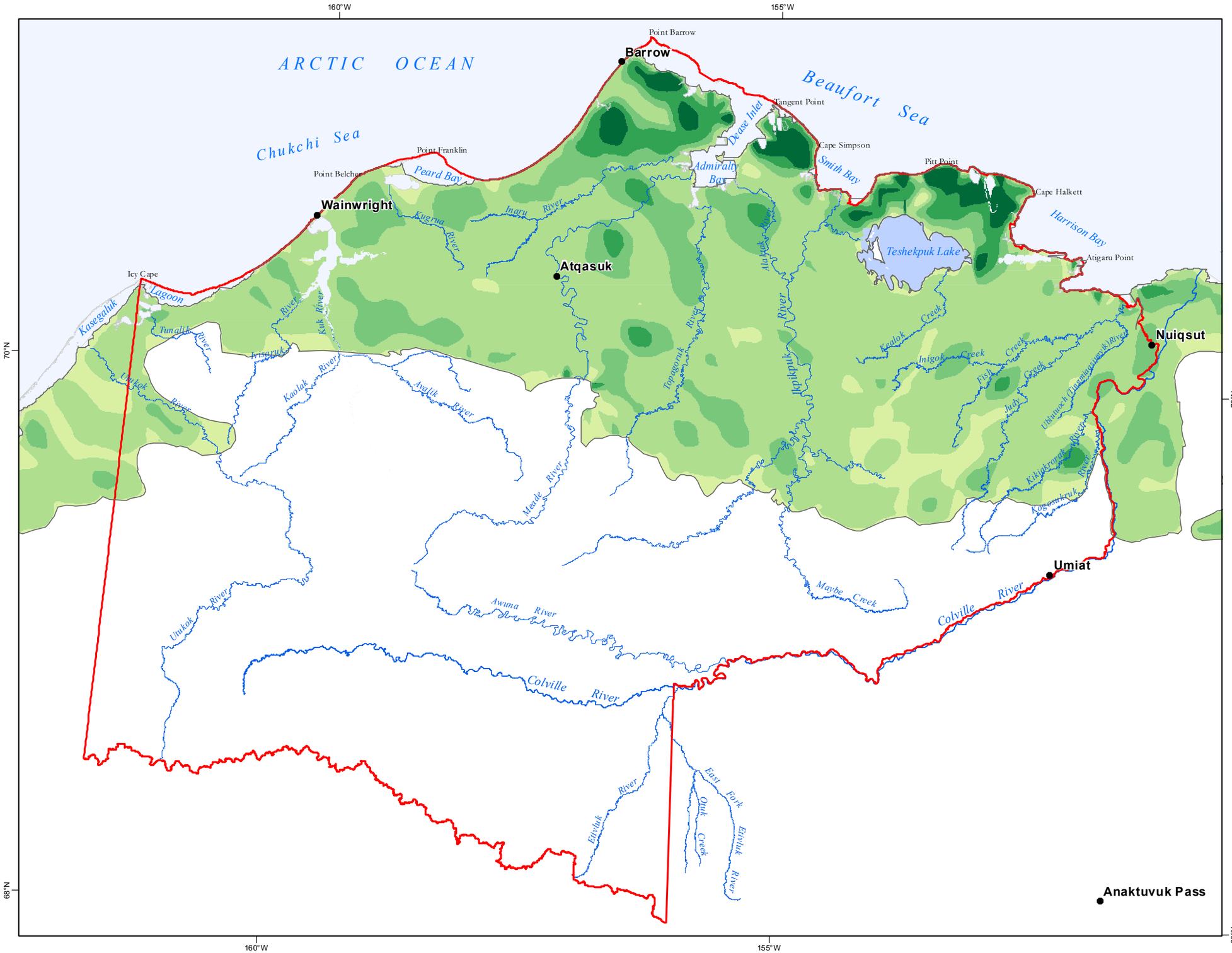

Map 3.3.5-17
Northern Pintail Onshore Density

Source: USFWS - Migratory Bird Management, 2010.

NORTHERN PINTAIL

Estimated Relative Onshore Density (2007-2010)

Birds per Square Kilometer

- 3.918 - 7.284
- 2.029 - 3.918
- 0.844 - 2.028
- 0.029 - 0.844
- 0.000 - 0.028

Survey Area Boundary

NPR-A Boundary

0 12 24 36 Miles

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Projection: Albers Conic Equal Area referencing NAD83

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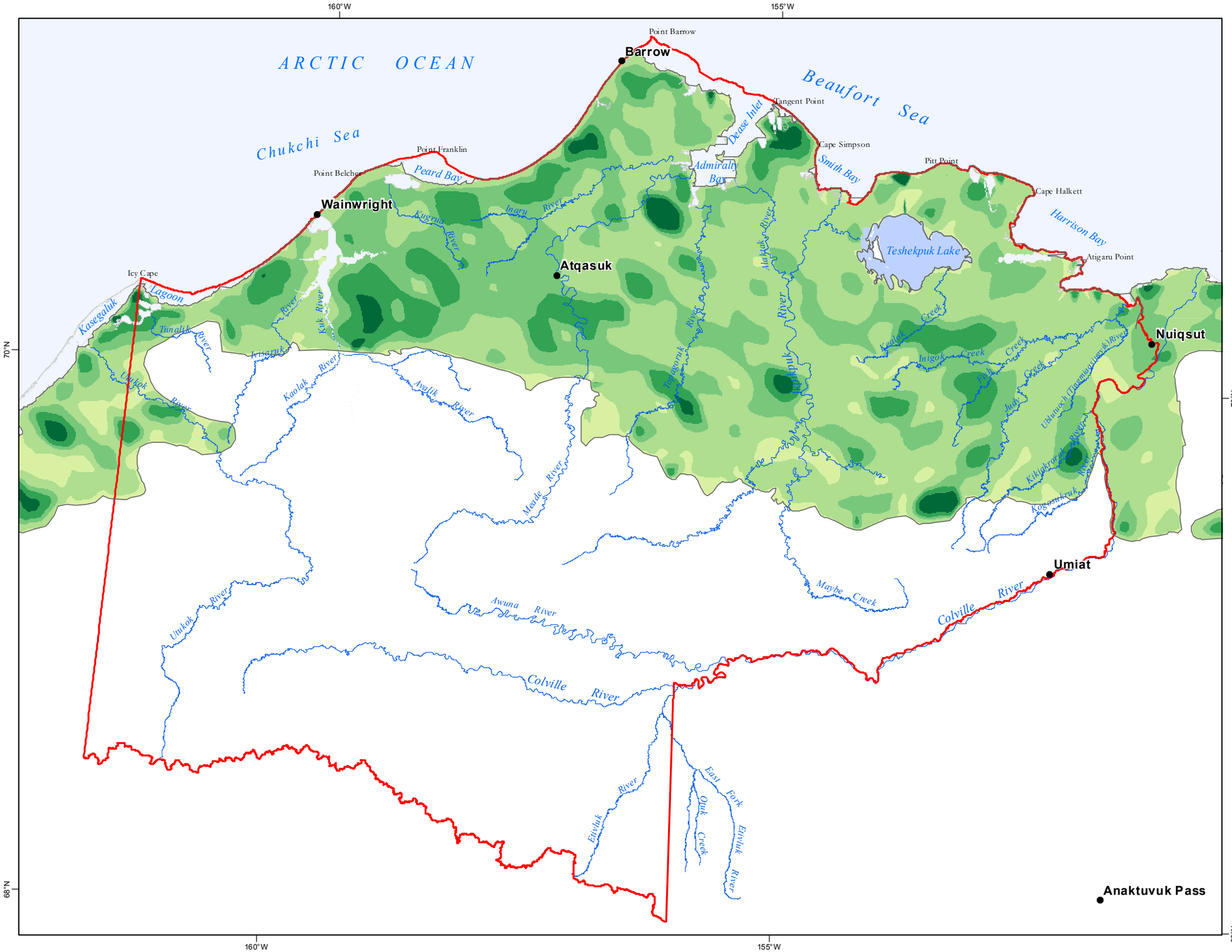

Map 3.3.5-18

Long-tailed Duck Onshore Density

Source: USFWS - Migratory Bird Management, 2010.

LONG-TAILED DUCK

Estimated Relative Onshore Density (2007-2010)

Birds per Square Kilometer

- 2.070 - 4.346
- 1.156 - 2.070
- 0.608 - 1.155
- 0.029 - 0.607
- 0.000 - 0.028

Survey Area Boundary

NPR-A Boundary

0 12 24 36 Miles

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Projection: Albers Conic Equal Area referencing NAD83

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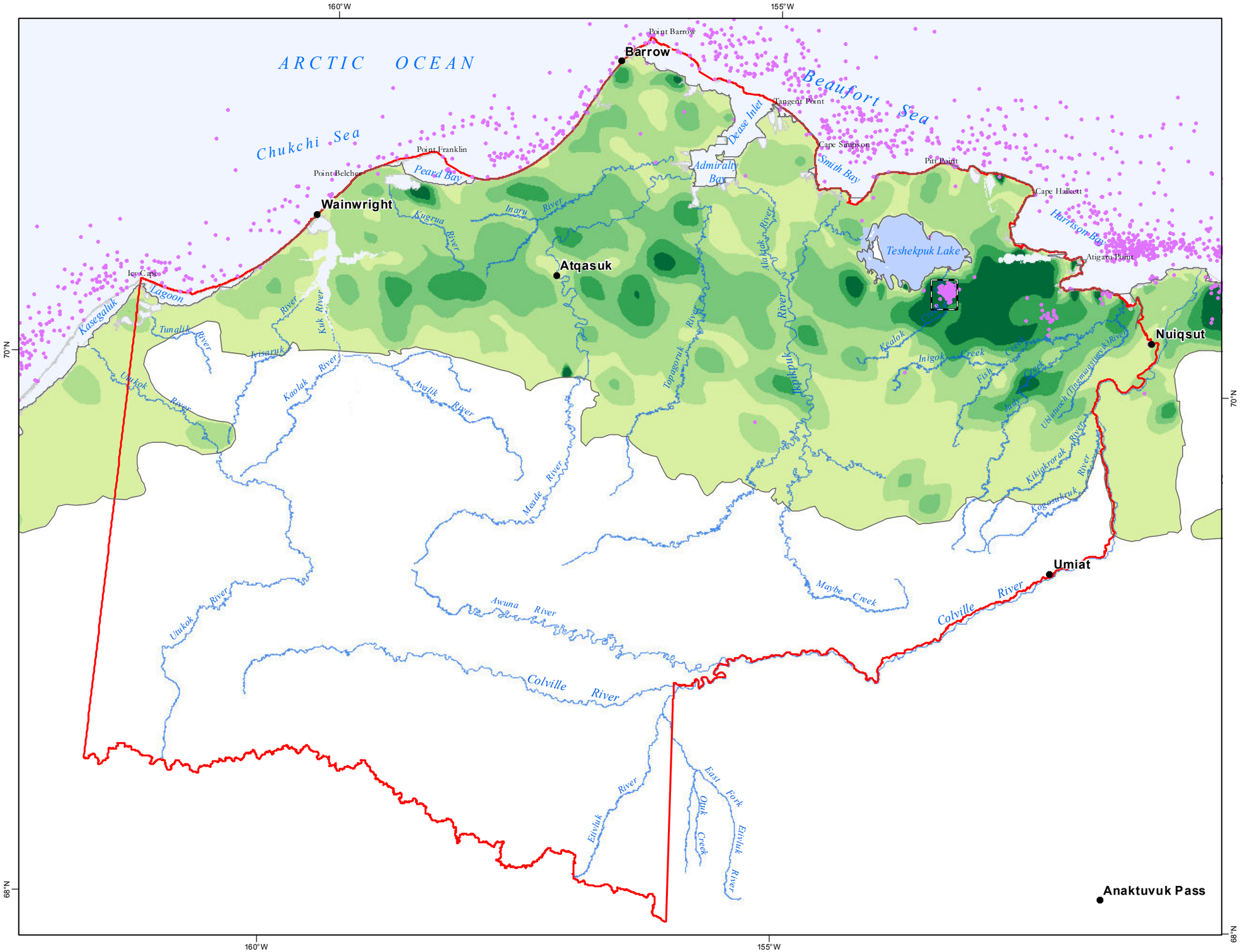

Map 3.3.5-19

King Eider Onshore Density and Selected Locations of Satellite Transmitter Equipped Individuals

Source: USFWS - Migratory Bird Management, 2010 & Minerals Management Service

KING EIDERS
Estimated Relative Onshore Density (2007-2010)
Birds per Square Kilometer

- 1.311 - 2.367
- 0.728 - 1.310
- 0.338 - 0.728
- 0.033 - 0.337
- 0.000 - 0.032

Survey Area Boundary

Sample of Satellite Transmitter Locations (2002 - 2007)

Location of King Eider Individual on Specific Date

King Eider Satellite Capture Area

NPR-A Boundary

0 12 24 36 Miles

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Projection: Albers Conic Equal Area referencing NAD83

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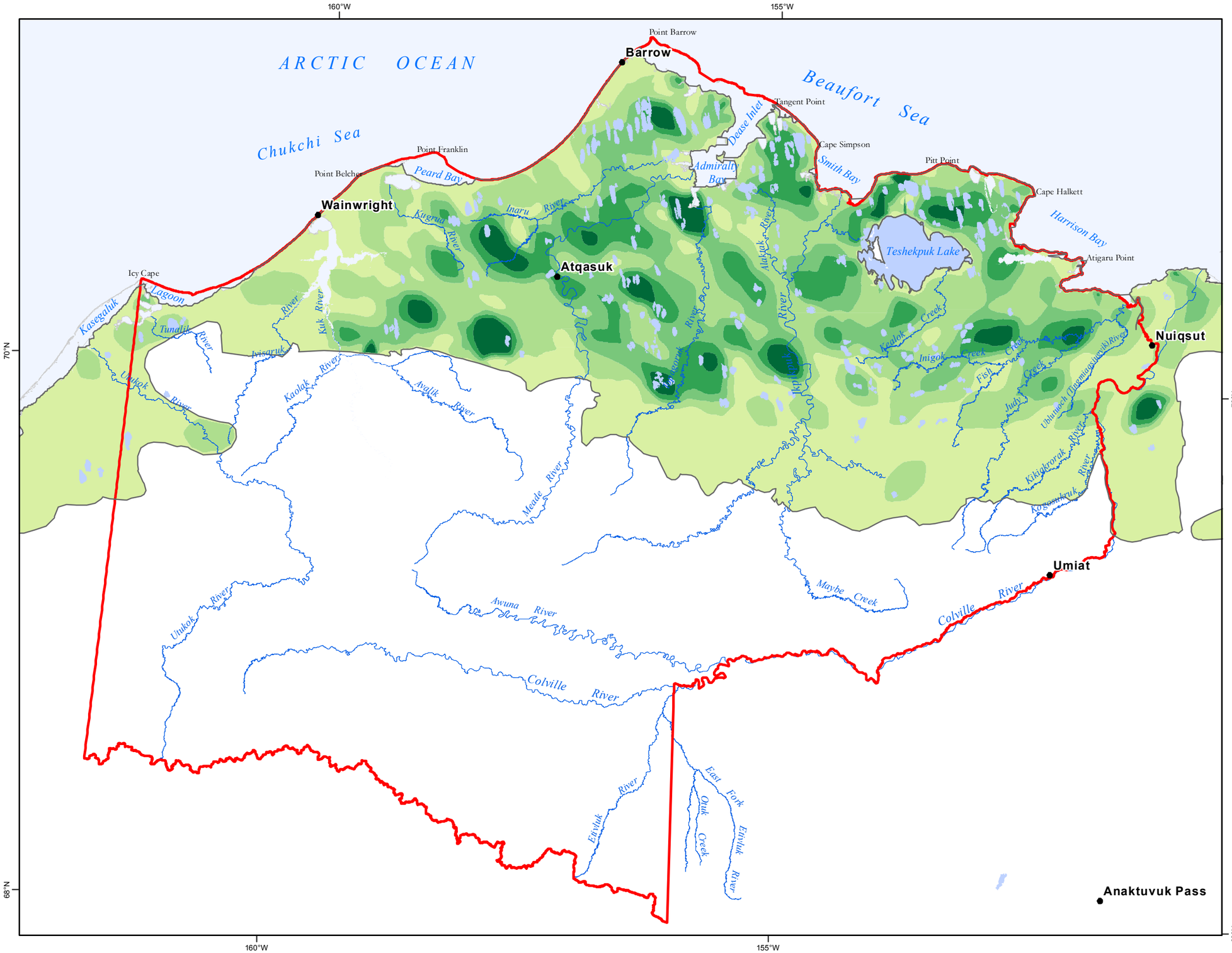

Map 3.3.5-2

Sabine's gull Onshore Density

Sources: USFWS - Migratory Bird Management, 2010.

Estimated Relative Onshore Density (2007-2010)

Birds per Square Kilometer

- 1.311 - 2.926
- 0.665 - 1.310
- 0.310 - 0.664
- 0.031 - 0.309
- 0.000 - 0.030

Survey Area Boundary

NPR-A Boundary

0 12 24 36 Miles

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Projection: Albers Conic Equal Area referencing NAD83

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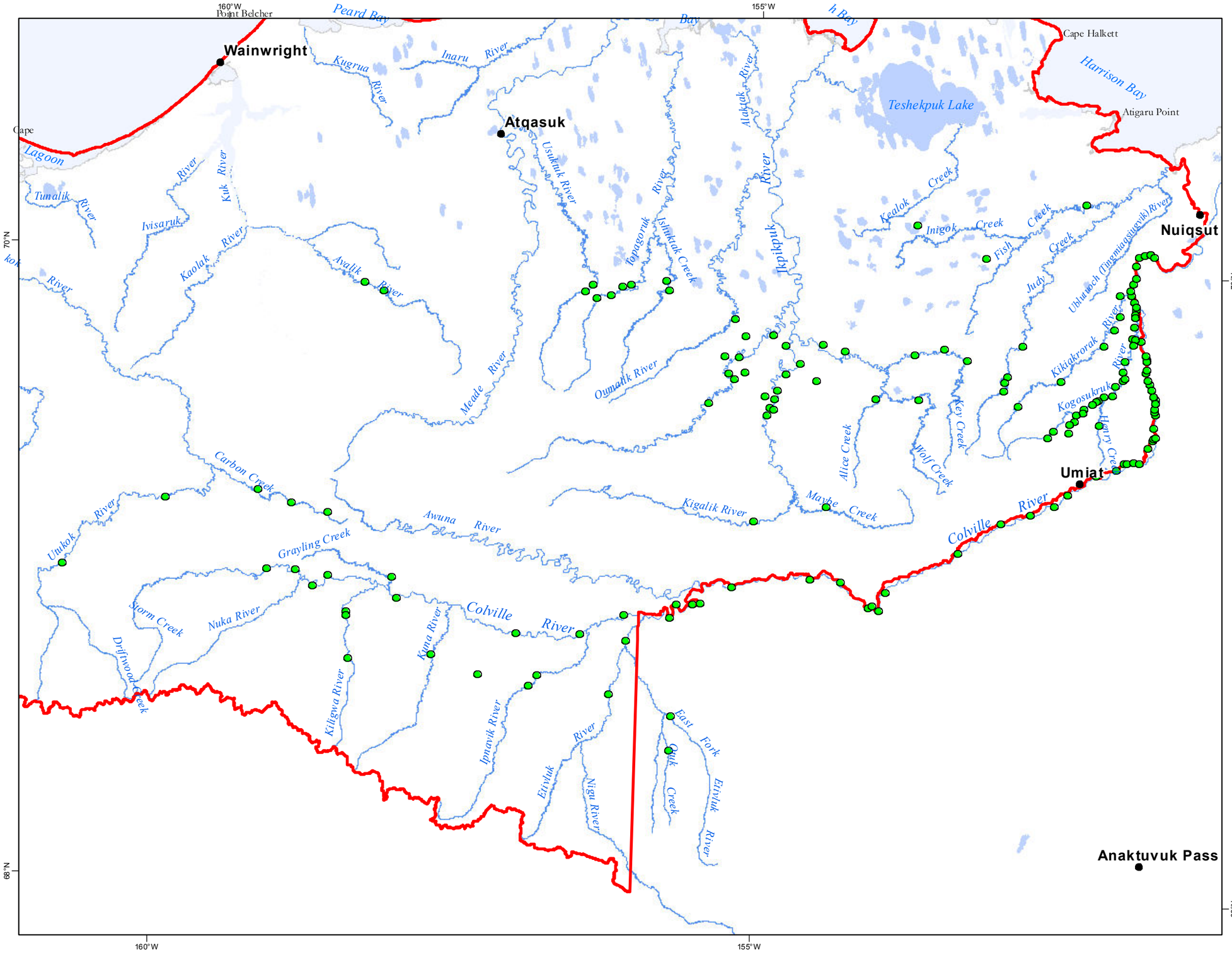

Map 3.3.5-20

Peregrine Falcon Nesting/ Activity Sites

Source: BLM, 2006

- Peregrine Falcon Locations
- NPR-A Boundary

0 12 24 36 Miles

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Projection: Albers Conic Equal Area referencing NAD83

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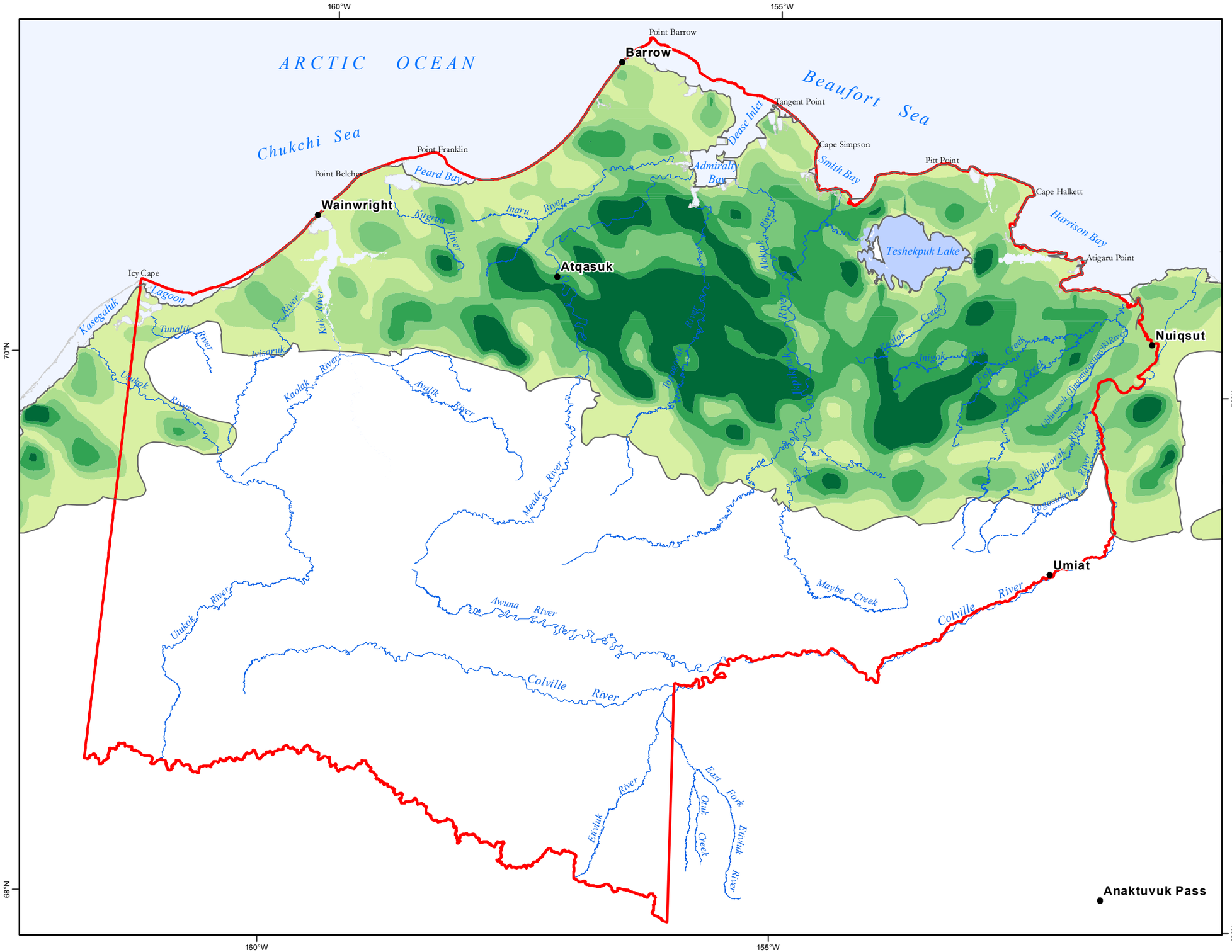

Map 3.3.5-3

Arctic Tern Onshore Density

Source: USFWS - Migratory Bird Management, 2010.

ARCTIC TERN

Estimated Relative Onshore Density (2007-2010)

Birds per Square Kilometer

- 0.980 - 1.639
- 0.594 - 0.980
- 0.277 - 0.594
- 0.047 - 0.276
- 0.000 - 0.046

Survey Area Boundary

NPR-A Boundary

0 12 24 36 Miles

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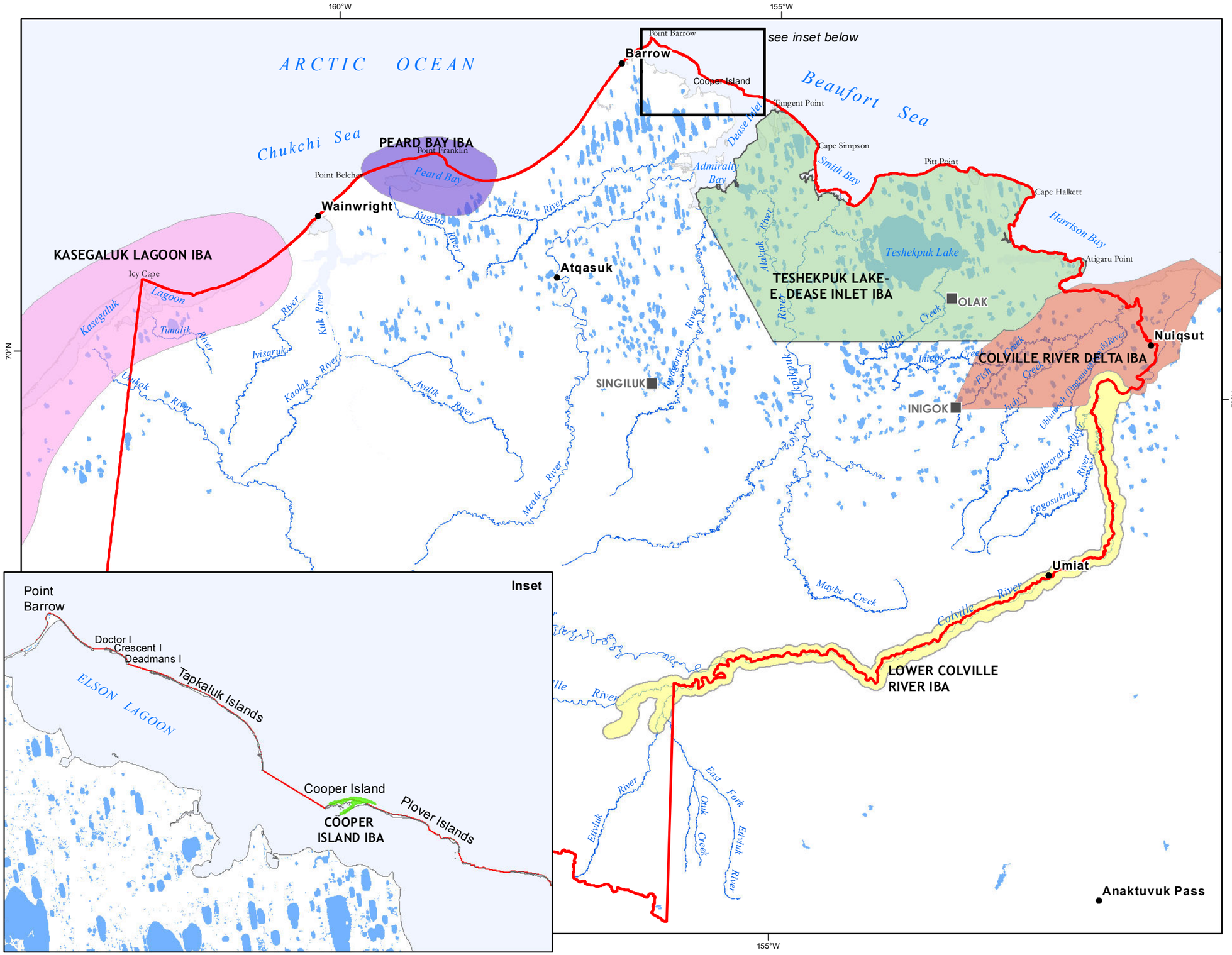

Map 3.3.5-4

Important Bird Areas

Source: National Audubon Society, 2011.

Important Bird Areas (IBA)

Camp Locations

NPR-A Boundary

0 6 12 24 36 48 Miles

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Projection: Albers Conic Equal Area referencing NAD83

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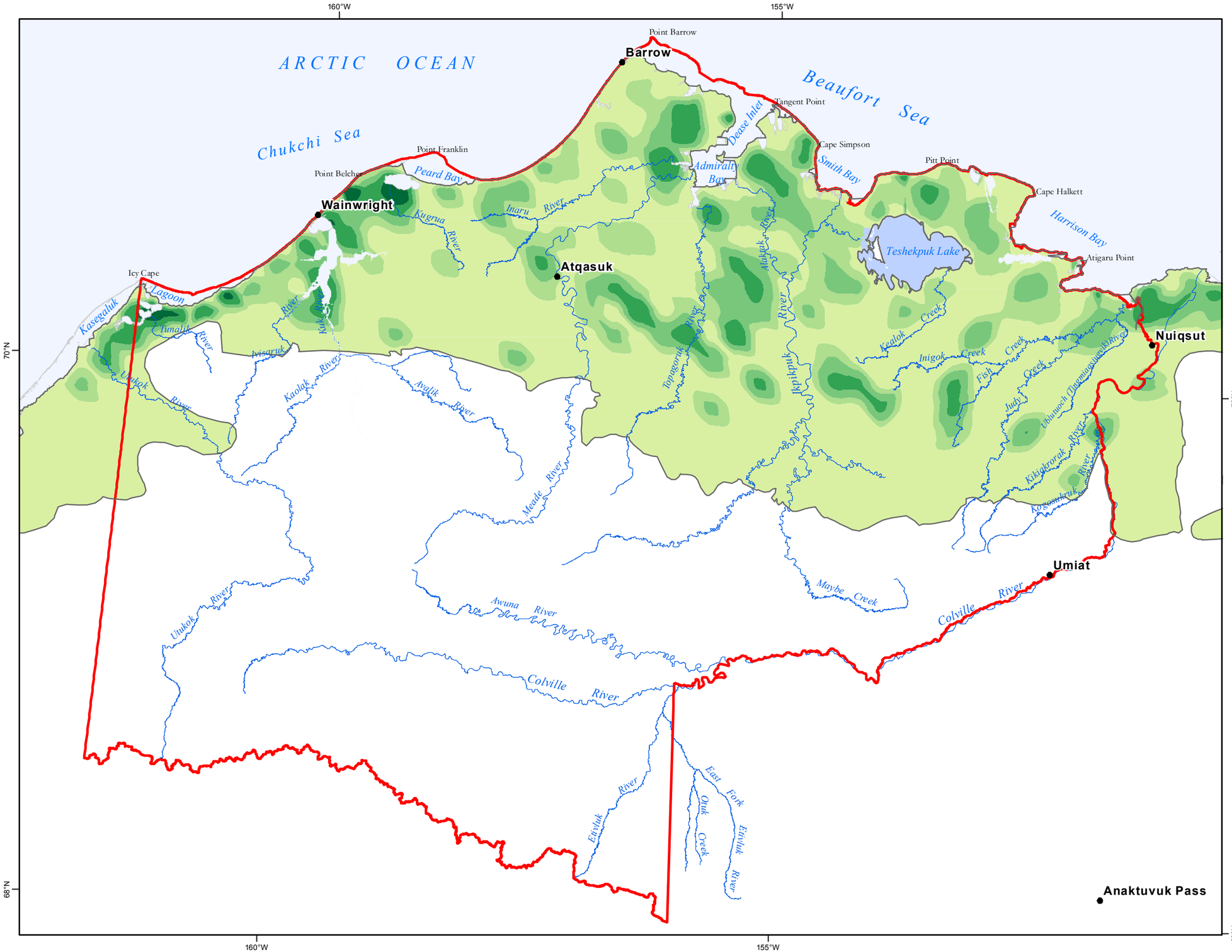

Map 3.3.5-5

Red-throated Loon Onshore Density

Source: USFWS - Migratory Bird Management, 2010.

RED-THROATED LOON

Estimated Relative Onshore Density (2007-2010)

Birds per Square Kilometer

- 0.451 - 1.037
- 0.234 - 0.450
- 0.111 - 0.233
- 0.029 - 0.110
- 0.000 - 0.029

Survey Area Boundary

NPR-A Boundary

0 12 24 36 Miles

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Projection: Albers Conic Equal Area referencing NAD83

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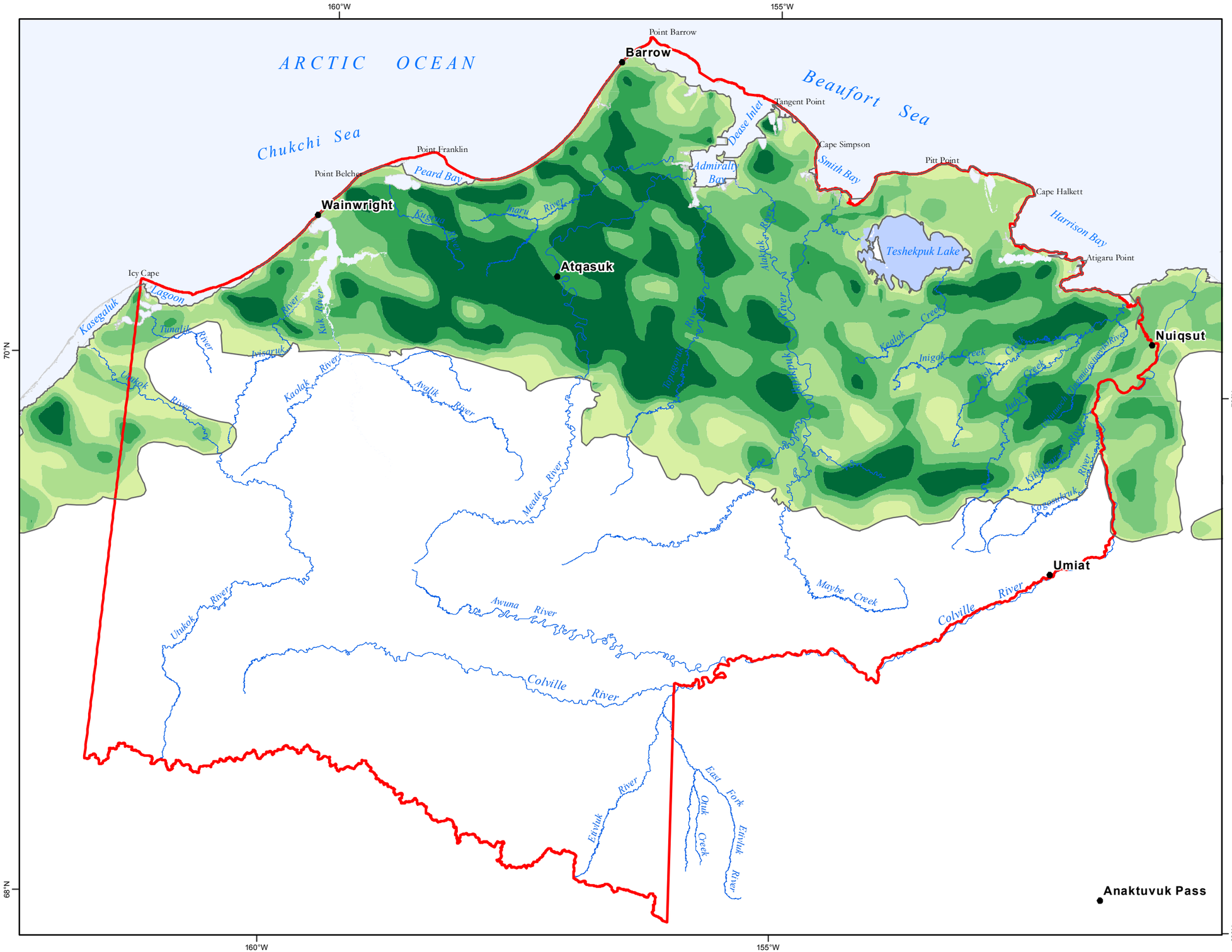

Map 3.3.5-6

Pacific Loon Onshore Density

Source: USFWS - Migratory Bird Management, 2010.

PACIFIC LOON

Estimated Relative Onshore Density (2007-2010)

Birds per Square Kilometer

- 1.098 - 1.671
- 0.712 - 1.097
- 0.390 - 0.711
- 0.061 - 0.389
- 0.000 - 0.060

Survey Area Boundary

NPR-A Boundary

0 12 24 36 Miles

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Projection: Albers Conic Equal Area referencing NAD83

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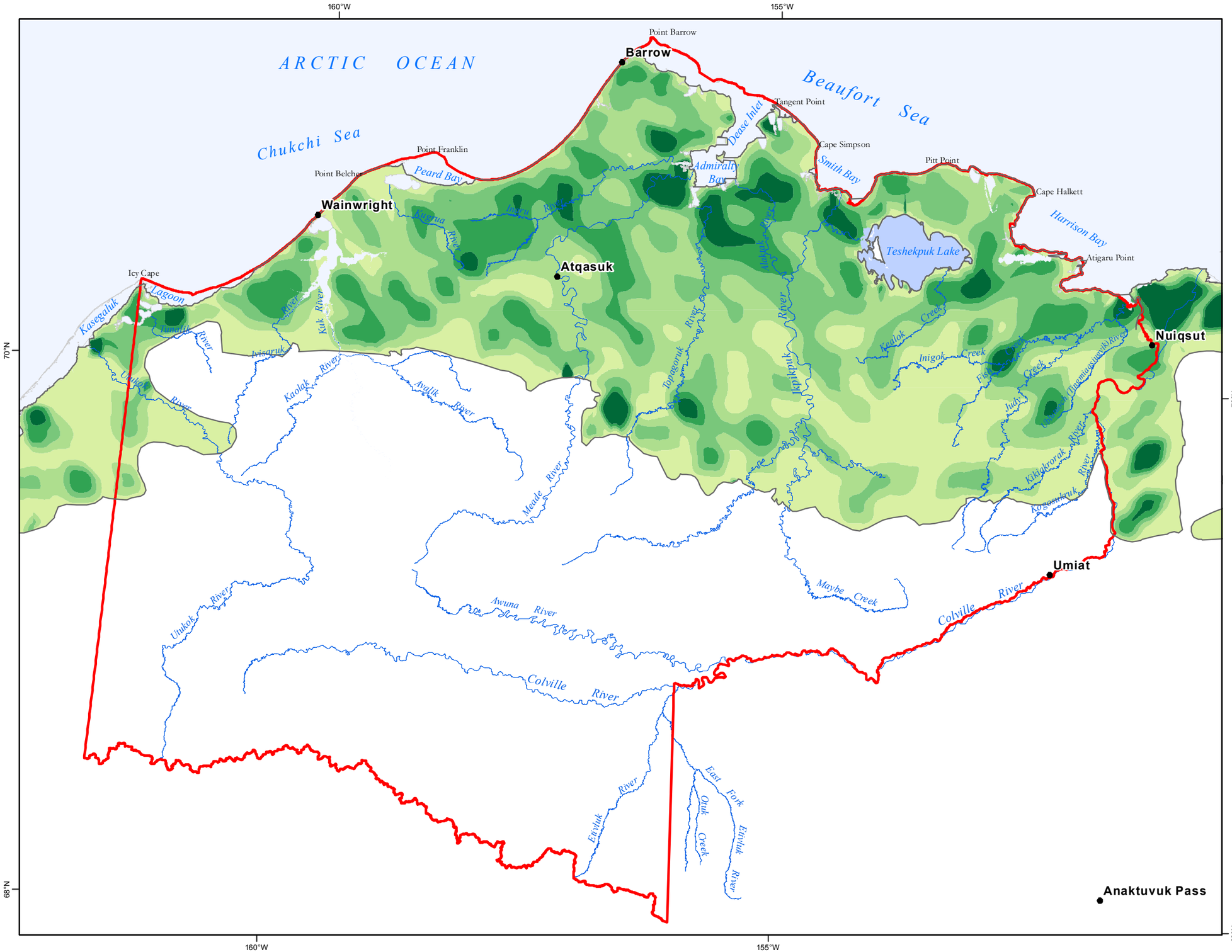

Map 3.3.5-7

Tundra Swan Onshore Density

Source: USFWS - Migratory Bird Management, 2010.

TUNDRA SWAN

Estimated Relative Onshore Density (2007-2010)

Birds per Square Kilometer

- 0.705 - 1.777
- 0.418 - 0.705
- 0.217 - 0.417
- 0.051 - 0.216
- 0.000 - 0.050

Survey Area Boundary

NPR-A Boundary

0 12 24 36 Miles

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Projection: Albers Conic Equal Area referencing NAD83

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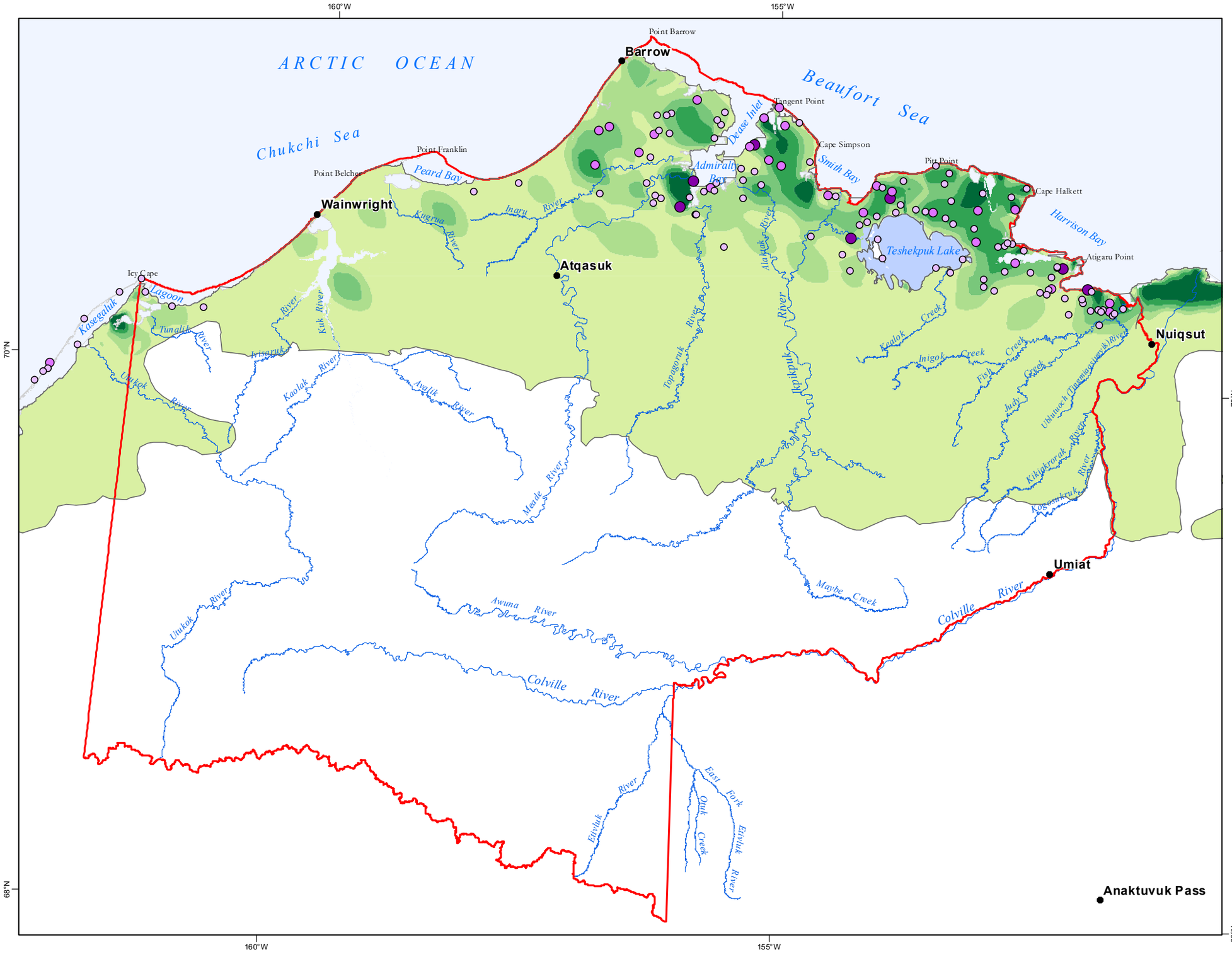

Map 3.3.5-8

Brant Onshore Density and Colonies

Sources: USFWS - Migratory Bird Management, 2010 & ABR, 2007.

Estimated Relative Onshore Density (2007-2010)

Birds per Square Kilometer

- 2.292 - 5.448
- 0.989 - 2.291
- 0.367 - 0.988
- 0.030 - 0.366
- 0.000 - 0.029

Survey Area Boundary

Brant Colonies (1995 - 2006)

Year with Greatest Number of Nests Displayed

- < 12
- 12 - 45
- 46 - 85

NPR-A Boundary

0 12 24 36 Miles

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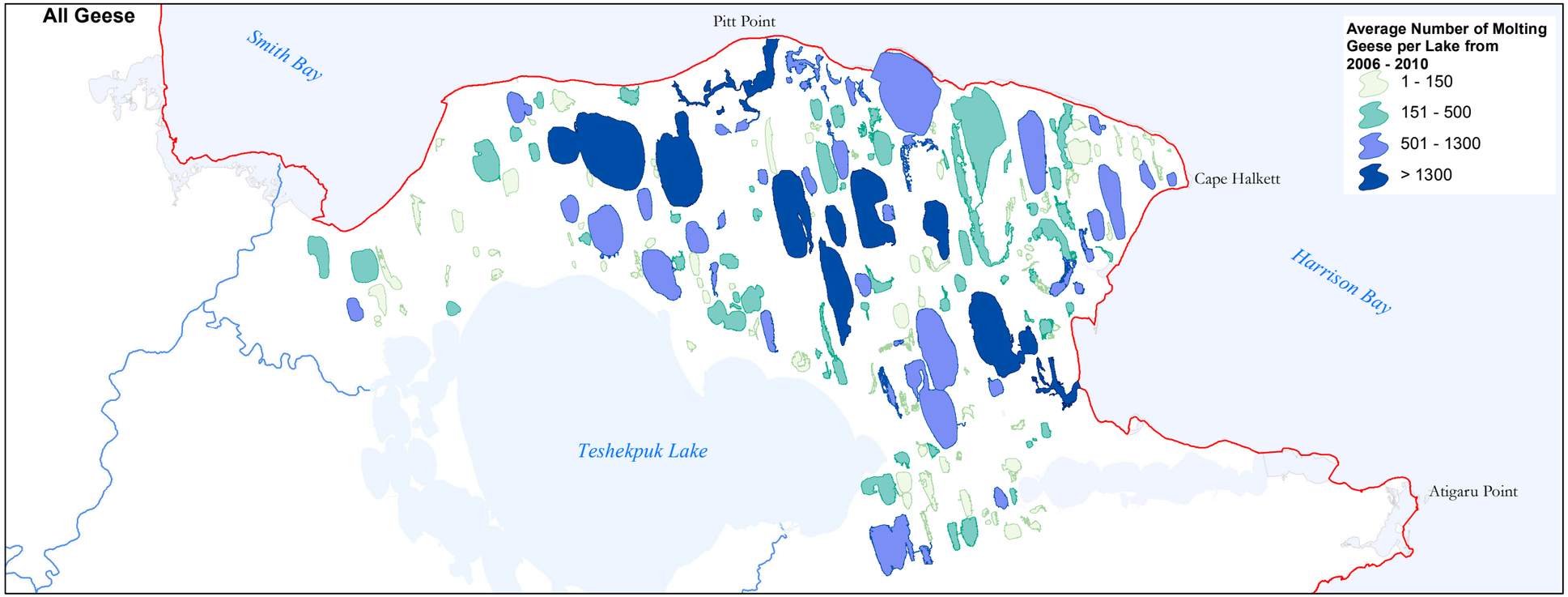
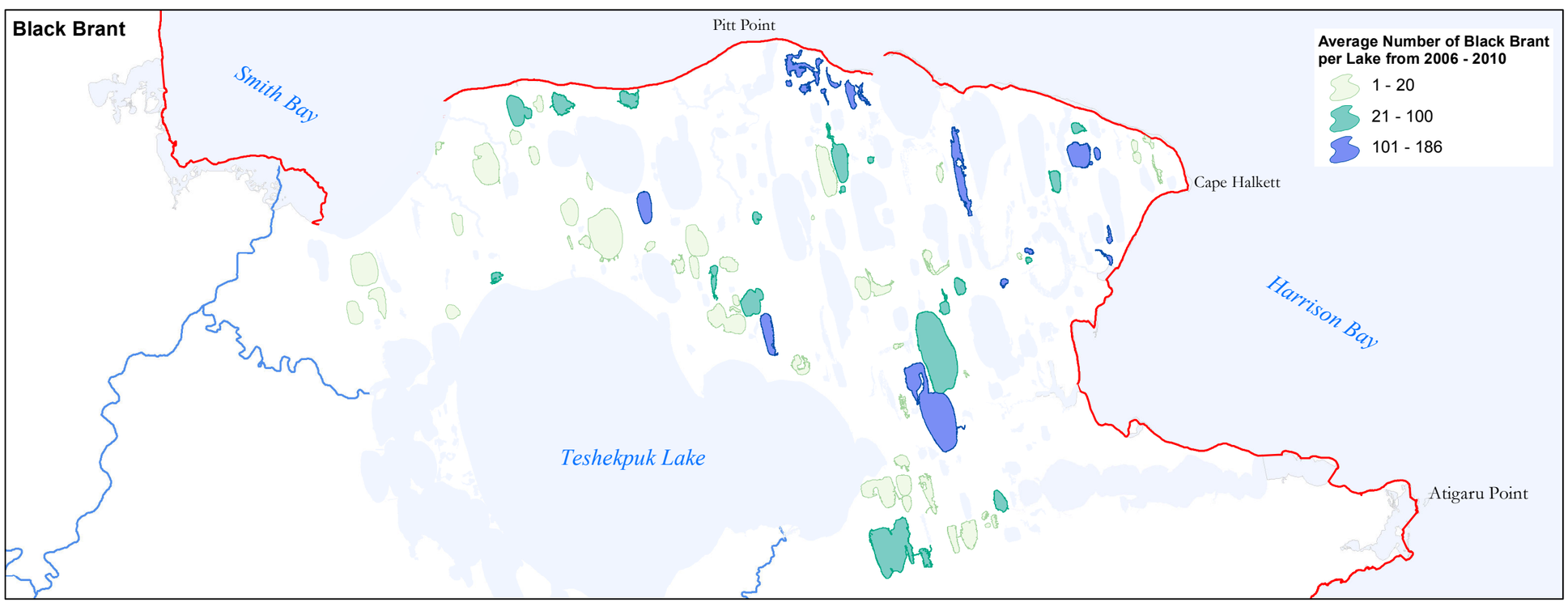




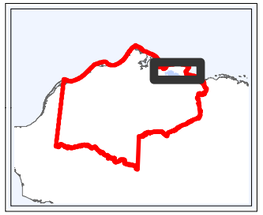
Map 3.3.5-9

Molting Goose* and Black Brant Distribution in Surveyed Lakes 2006 - 2010

Source: USFWS - Migratory Bird Management, 2010

*Black brant, canada goose and white-fronted goose numbers combined

NPR-A Boundary



0 5 10 Miles

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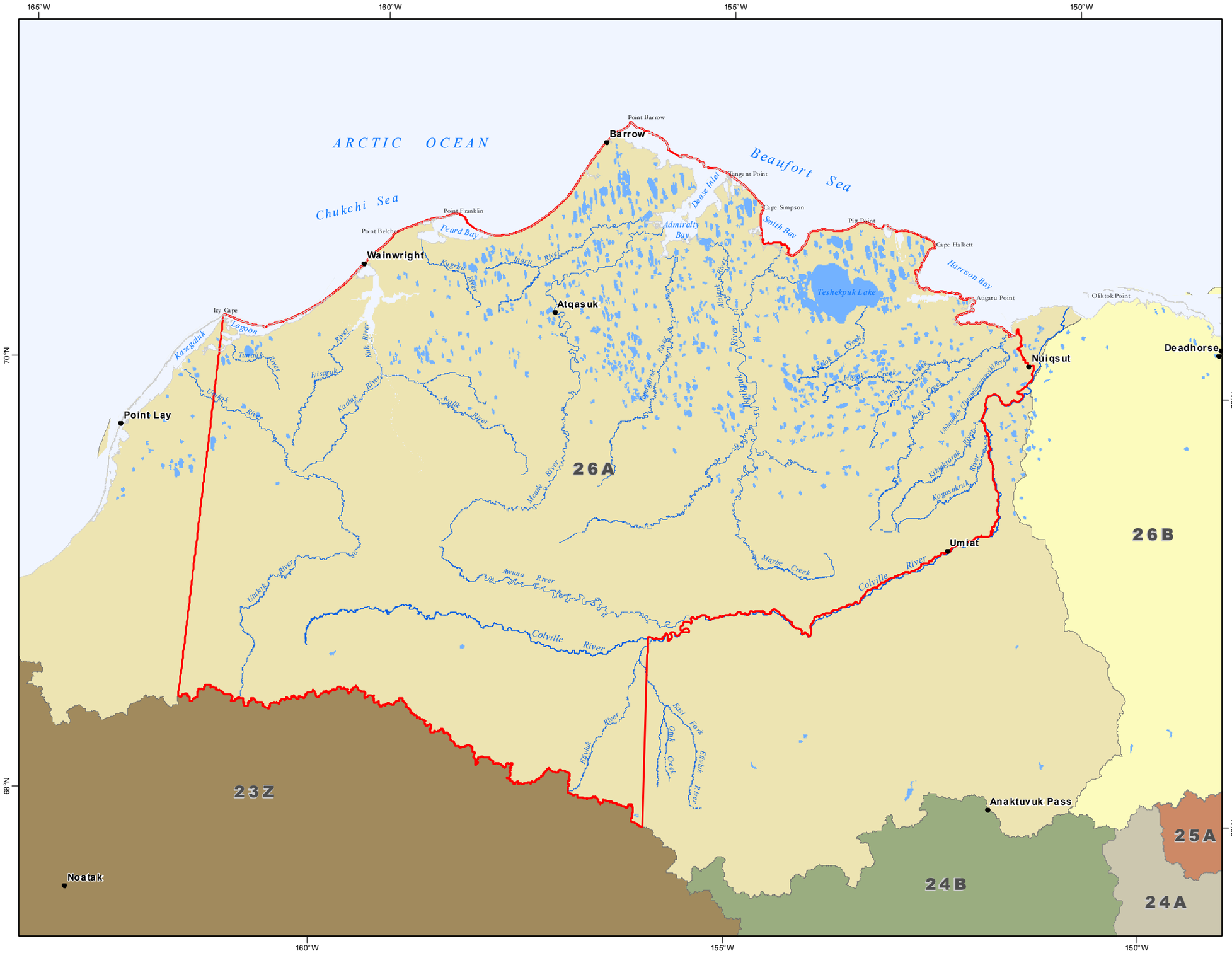

Map 3.3.6-1

Game Management Units

Source: ADF&G - 2010

Game Management Unit

NPR-A Boundary

0 6 12 24 36 48 Miles

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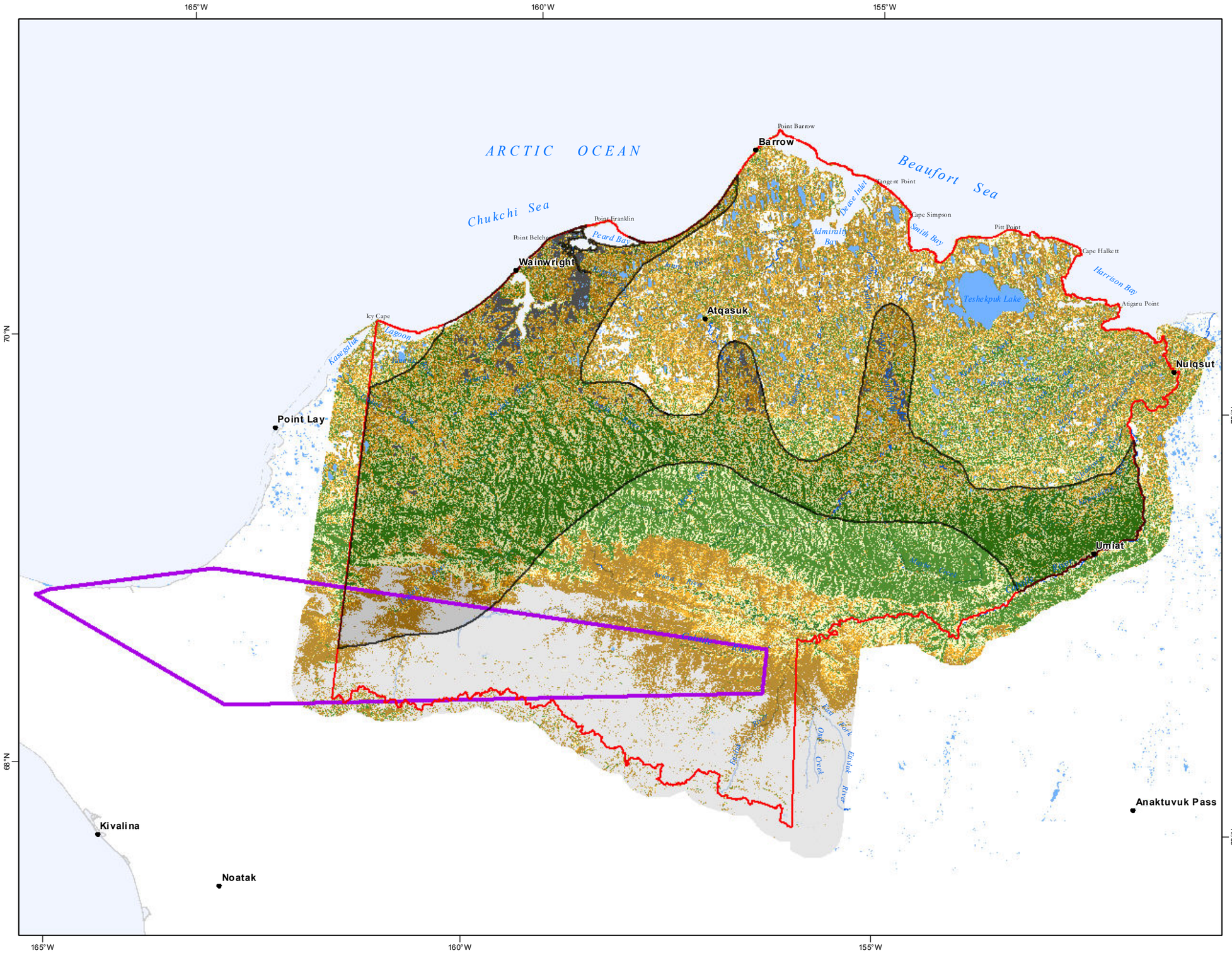

Map 3.3.6-10

Muskox Predicted Winter Habitat

Sources: USDOI BLM -1978
Danks, Fiona - 2000
ADF&G - 2010

Best Potential Year-Round Muskox Habitat (USDOI BLM 1978)

Muskox Potential Winter Habitat (Danks, 2000)

- Low
- Medium
- High

Muskox Sightings, 2008-2010

NPR-A Boundary

0 6 12 24 36 48 Miles

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Projection: Albers Conic Equal Area referencing NAD83

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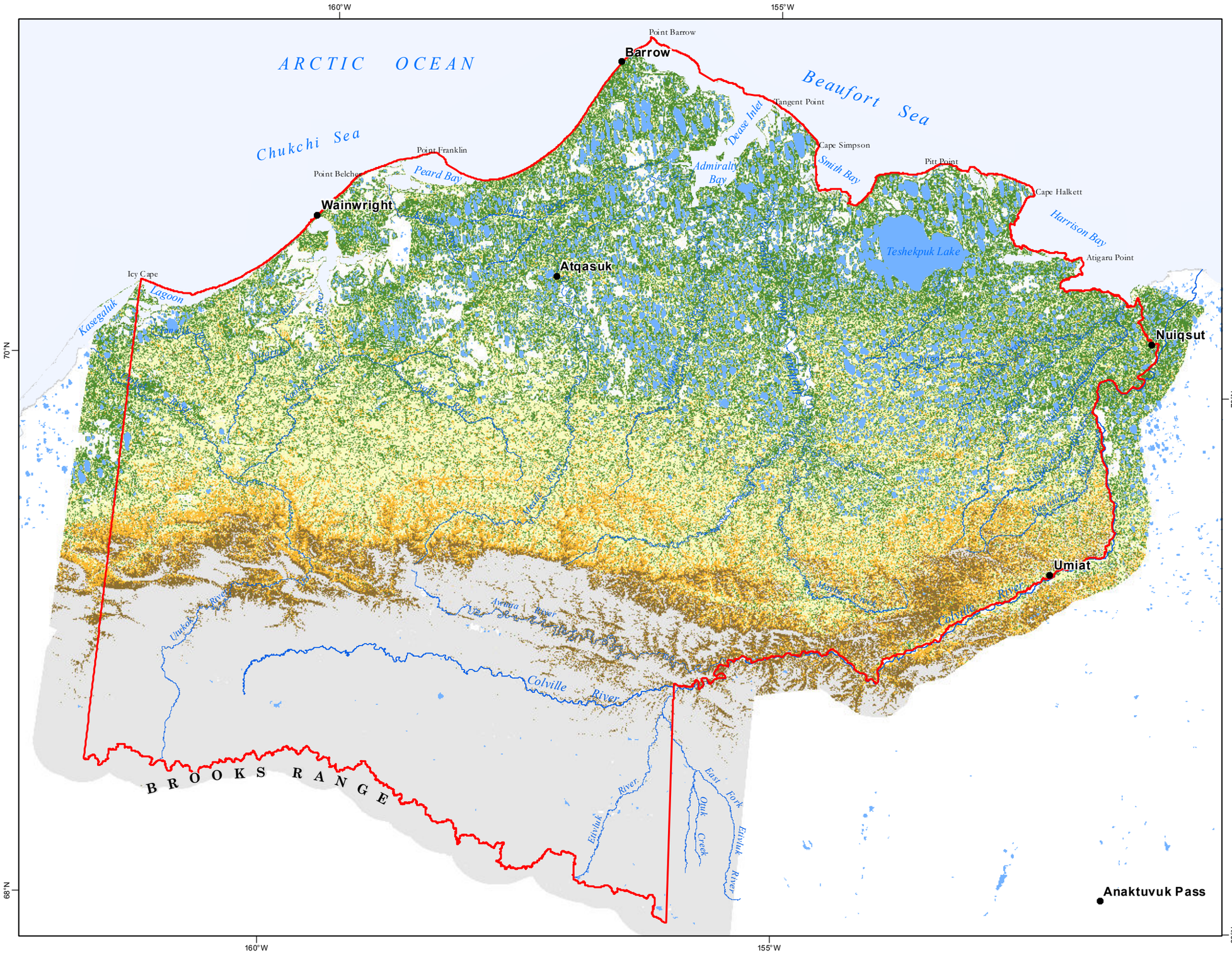

Map 3.3.6-11

Muskox Predicted Summer Habitat

Sources: Danks, Fiona 2000

Muskox Potential Summer Habitat (Danks, 2000)

- Low
- Medium
- High

NPR-A Boundary

0 6 12 24 36 48 Miles

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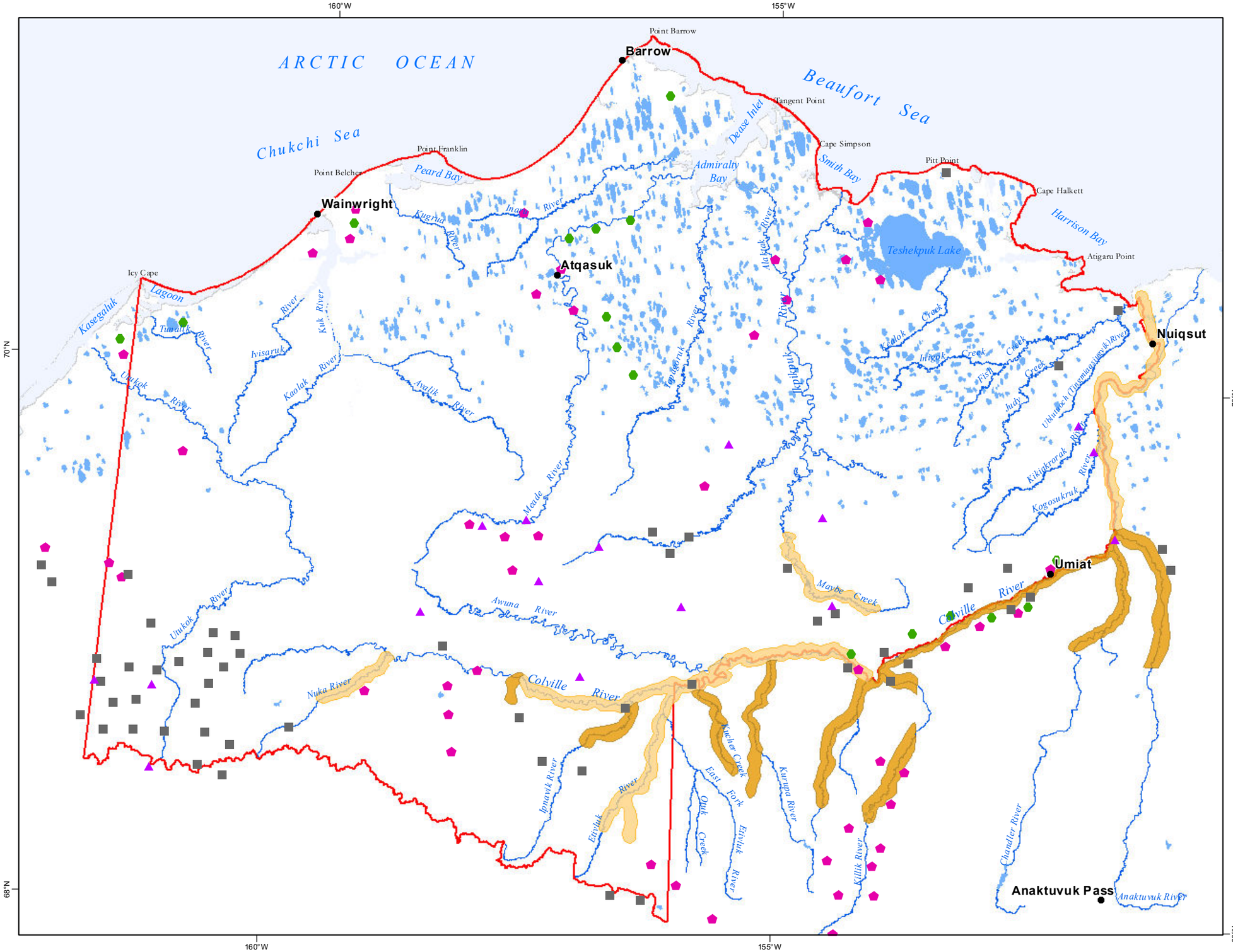

Map 3.3.6-12

Moose Density and Historical Wolverine Sightings and Harvest Locations

Sources: Bee and Hall, 1956
USDOI BLM, 1978

Historical Wolverine Sightings & Harvest Location

- Approximate Harvest Locations of Wolverines Bountied in the 1960s.
- Approximate Locations of Known Wolverine Harvests 1972-1978
- Sightings of Wolverines in Bee and Hall - 1956
- Sightings of Wolverines, 1977 and 1978

Moose Density

- Medium
- High

NPR-A Boundary

0 6 12 24 36 48 Miles

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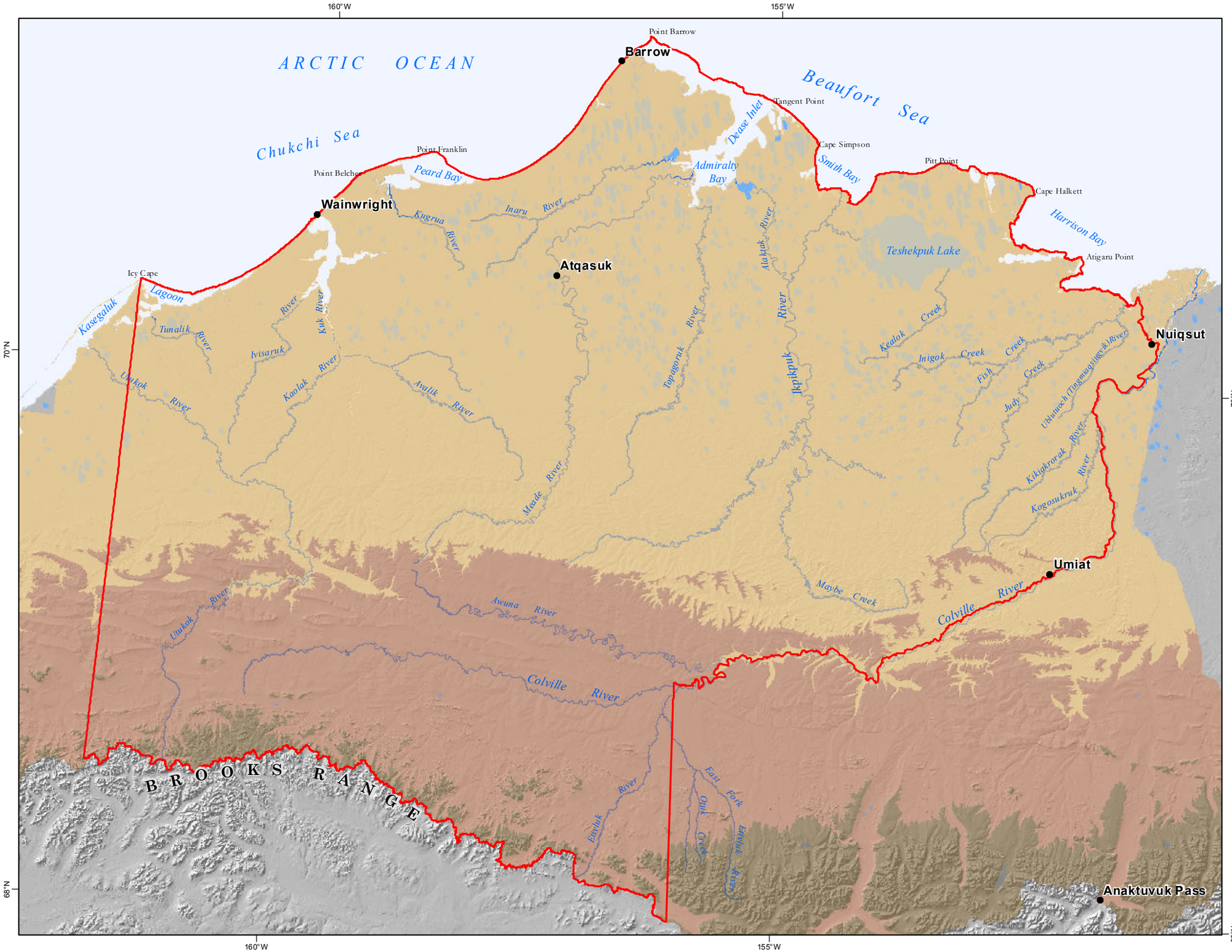

Map 3.3.6-13

Estimated Grizzly Bear Density (based on elevation range)

Source: Carroll, G.M. 1998a.

Estimated Grizzly Bear Density

Bears per 1,000 square kilometers

- 10-20 (>2,500 ft. elevation)
- 10-30 (800 - 2,500 ft. elevation)
- 0.5-2 (<800 ft. elevation)

NPR-A Boundary

0 6 12 24 36 48 Miles

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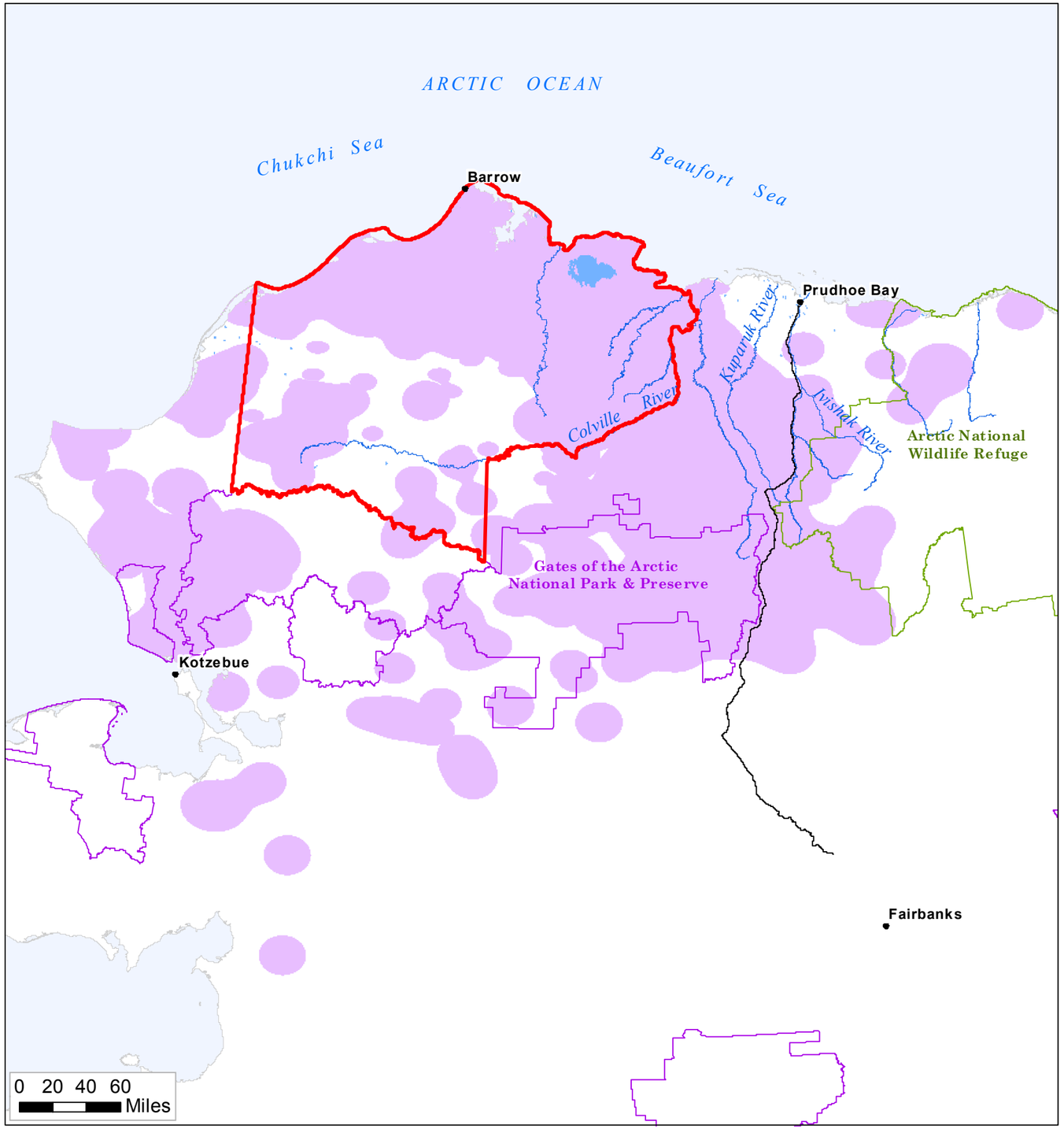
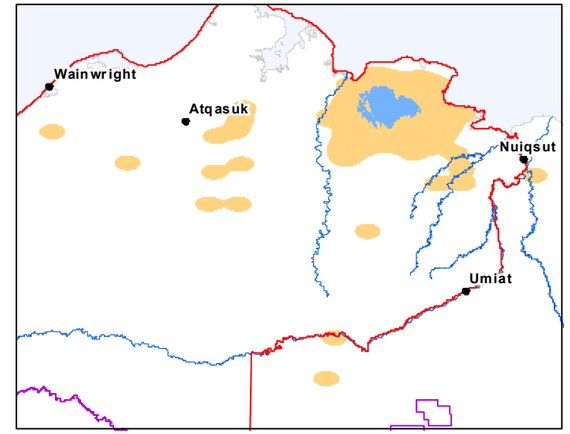
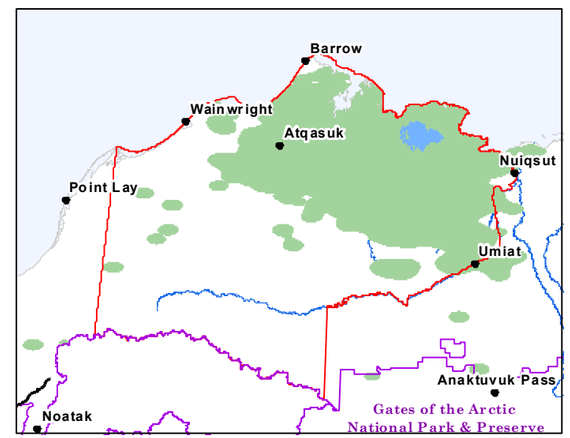


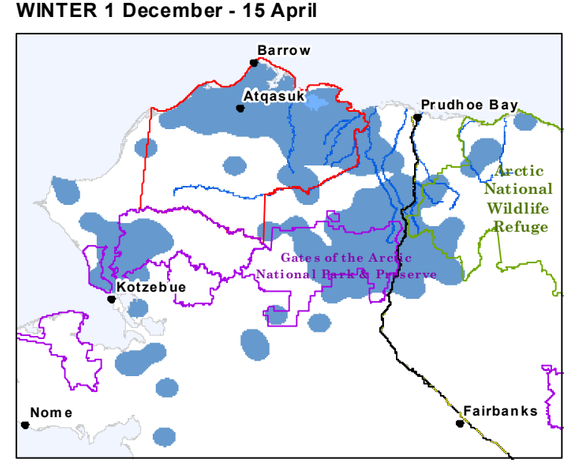
CALVING 1-15 June



SUMMER 1 June - 15 September



WINTER 1 December - 15 April



Map 3.3.6-2

Teshekpuk Lake Caribou Herd - Seasonal Range

Source: ADF&G, NSB, BLM, CPAI, and ABR

Teshekpuk Lake Caribou Seasonal Areas Fixed Kernel Probability 95% Utilization Distribution (1990 - 2010 Satellite Telemetry Data)

Season

- Annual
- Calving
- Summer
- Winter

Dalton Highway

NPR-A Boundary

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Projection: Albers Conic Equal Area referencing NAD83

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National Petroleum Reserve - Alaska

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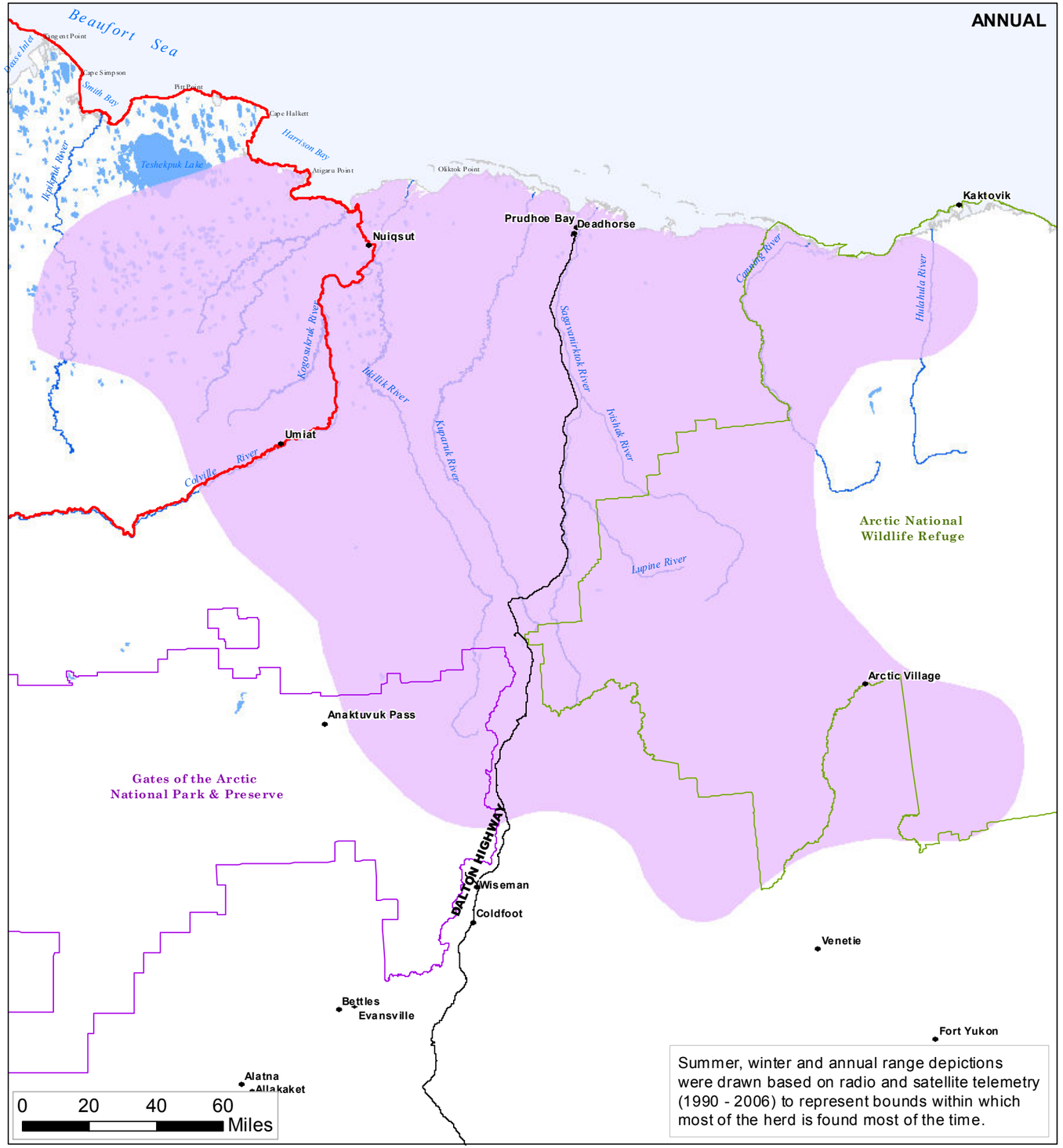
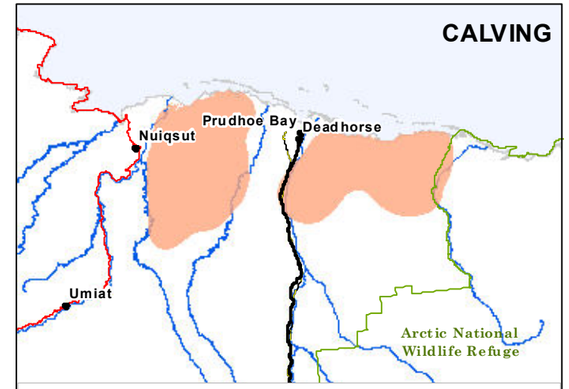
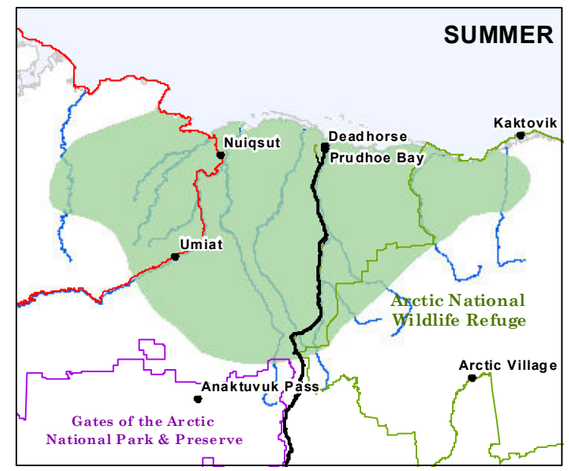
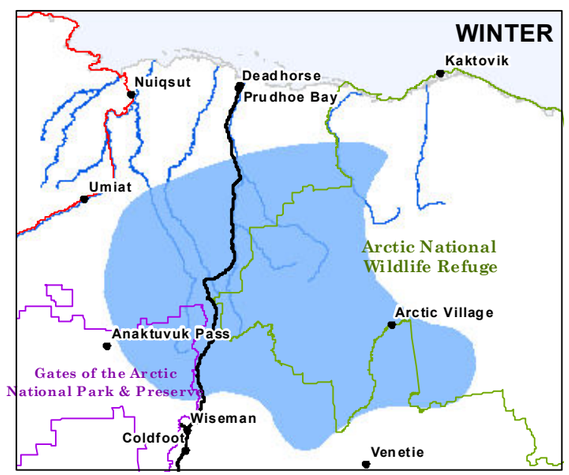


Summer, winter and annual range depictions were drawn based on radio and satellite telemetry (1990 - 2006) to represent bounds within which most of the herd is found most of the time.



Calving range: 95% utilization distribution determined by fixed kernel model of all locations of radiocollared cows observed with calves during early June, 1990-2005.





Map 3.3.6-3

Central Arctic Caribou Seasonal Ranges

Source: ADF&G - 2010

CENTRAL ARCTIC CARIBOU SEASONAL RANGE

- Calving
- Summer
- Winter
- Annual

- Dalton Highway
- NPR-A Boundary

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Projection: Albers Conic Equal Area referencing NAD83

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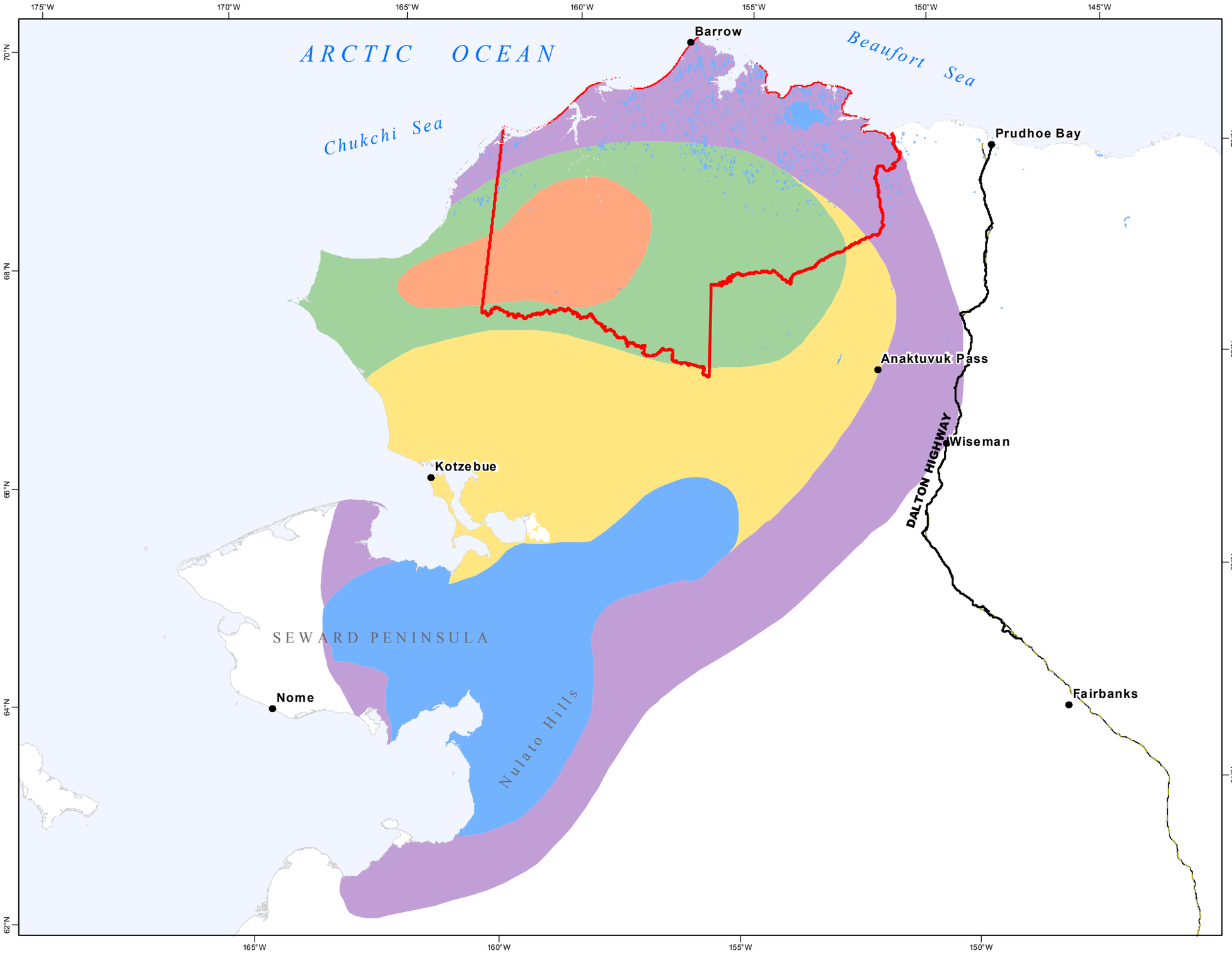

Map 3.3.6-4

Western Arctic Caribou Herd Range

Source: ADF&G - 2010

Western Arctic Caribou Herd Range

- Calving Grounds
- Migratory Area
- Outer Range
- Summer Range
- Winter Range

- Dalton Highway
- Trans-Alaska Pipeline
- NPR-A Boundary

0 50 100 Miles

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Projection: Albers Conic Equal Area referencing NAD83

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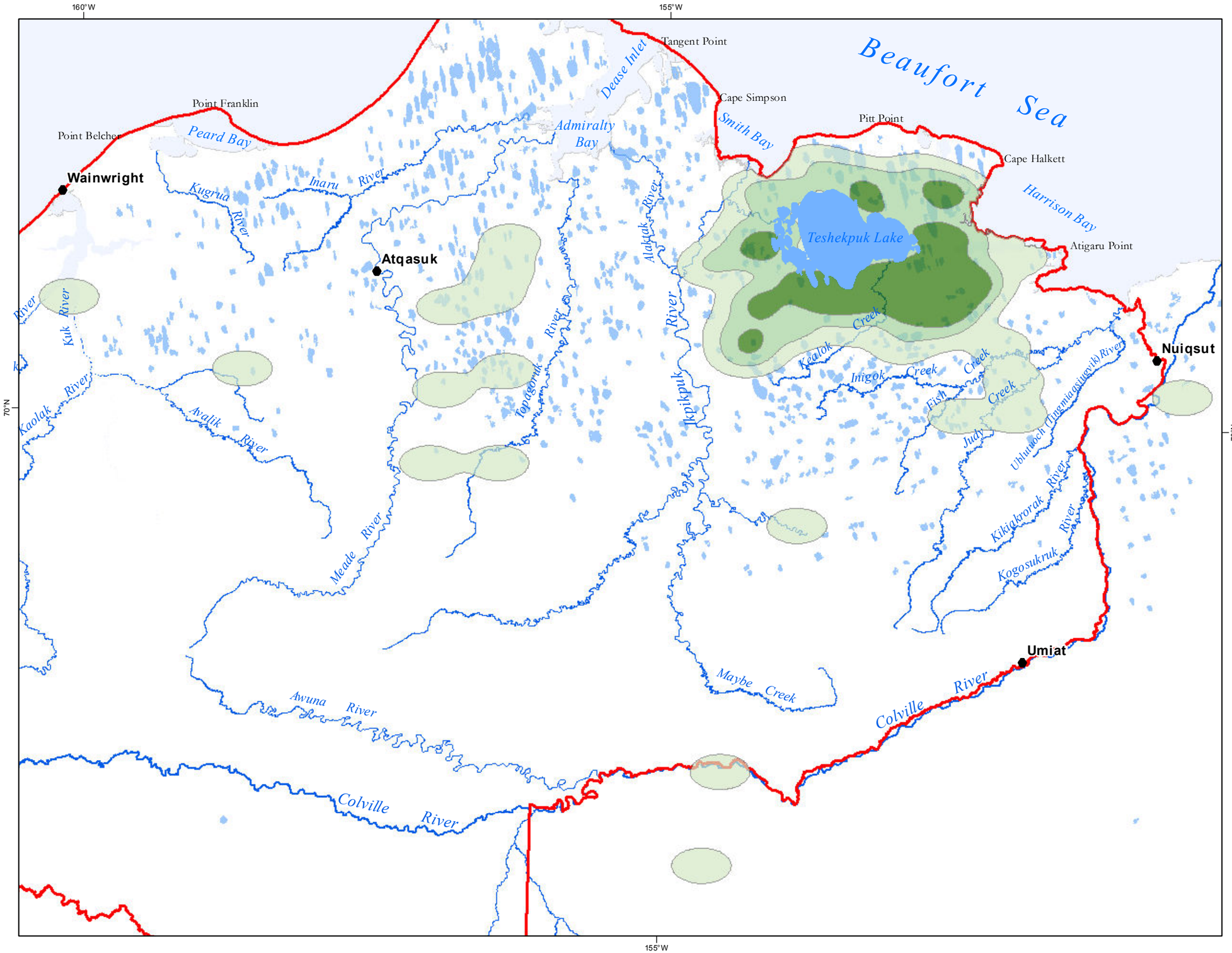
Final IAP/EIS



Map 3.3.6-5

Teshekpuk Lake Caribou Herd - Calving Areas

Source: ADF&G, NSB, BLM, CPAI, and ABR

Teshekpuk Lake Caribou Herd Calving Area - 1 -15 June Successful Females Only Kernel Density Analysis (1990 - 2010 Satellite Telemetry Data)

Density Contour

- 50 %
- 75 %
- 95 %

NPR-A Boundary

0 5 10 15 Miles

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Projection: Albers Conic Equal Area referencing NAD83

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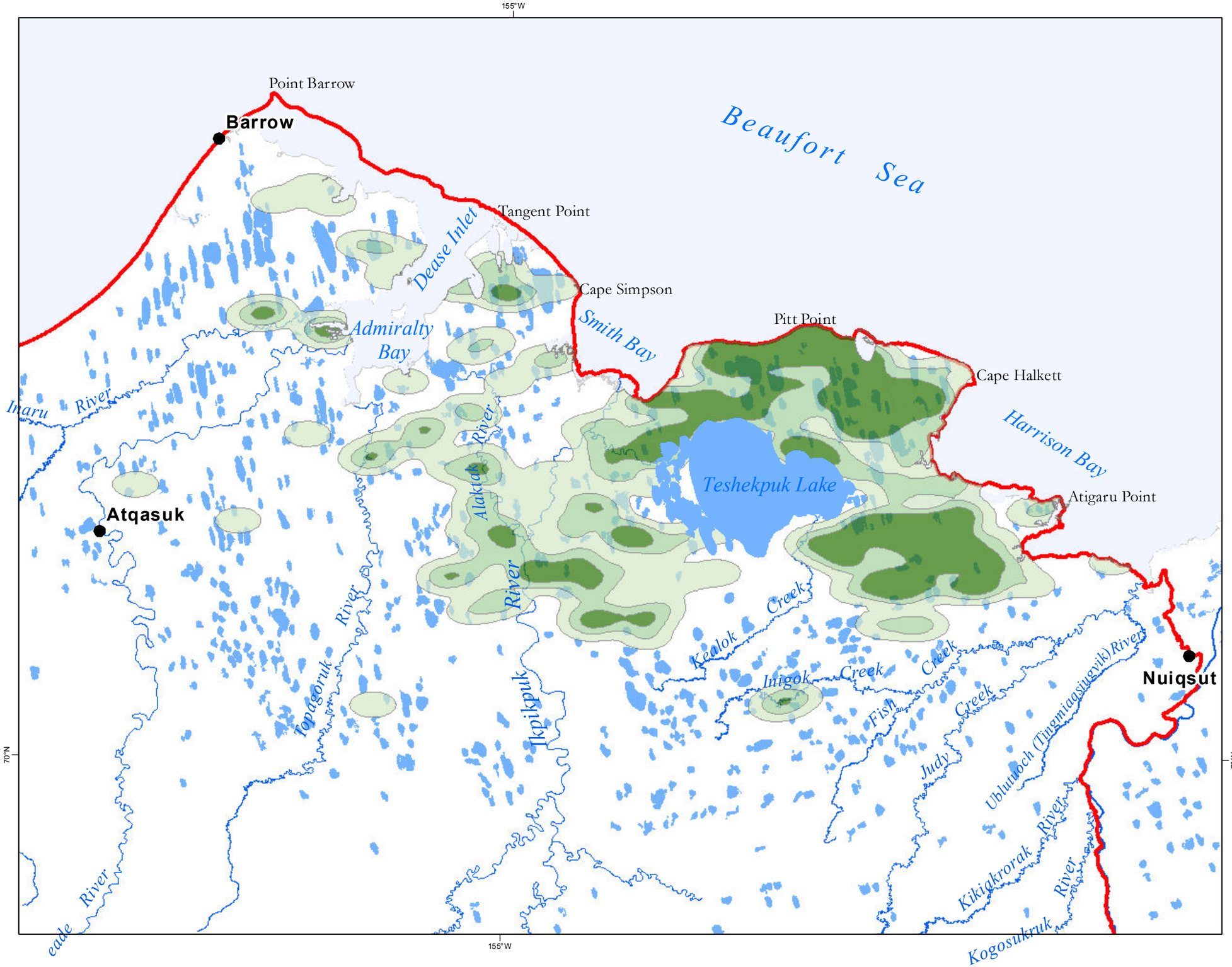
National Petroleum Reserve - Alaska

Final IAP/EIS



Map 3.3.6-6

Teshekpuk Lake Caribou Herd - Mosquito Relief Areas

Source: ADF&G, NSB, BLM, CPAI, and ABR

Teshekpuk Lake Caribou Herd Mosquito Relief Area- 1-15 July Kernel Density Analysis (1990 - 2010 Satellite Telemetry Data)

Density Contour

- 50 %
- 75 %
- 95 %

NPR-A Boundary

0 5 10 15 Miles

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Projection: Albers Conic Equal Area referencing NAD83

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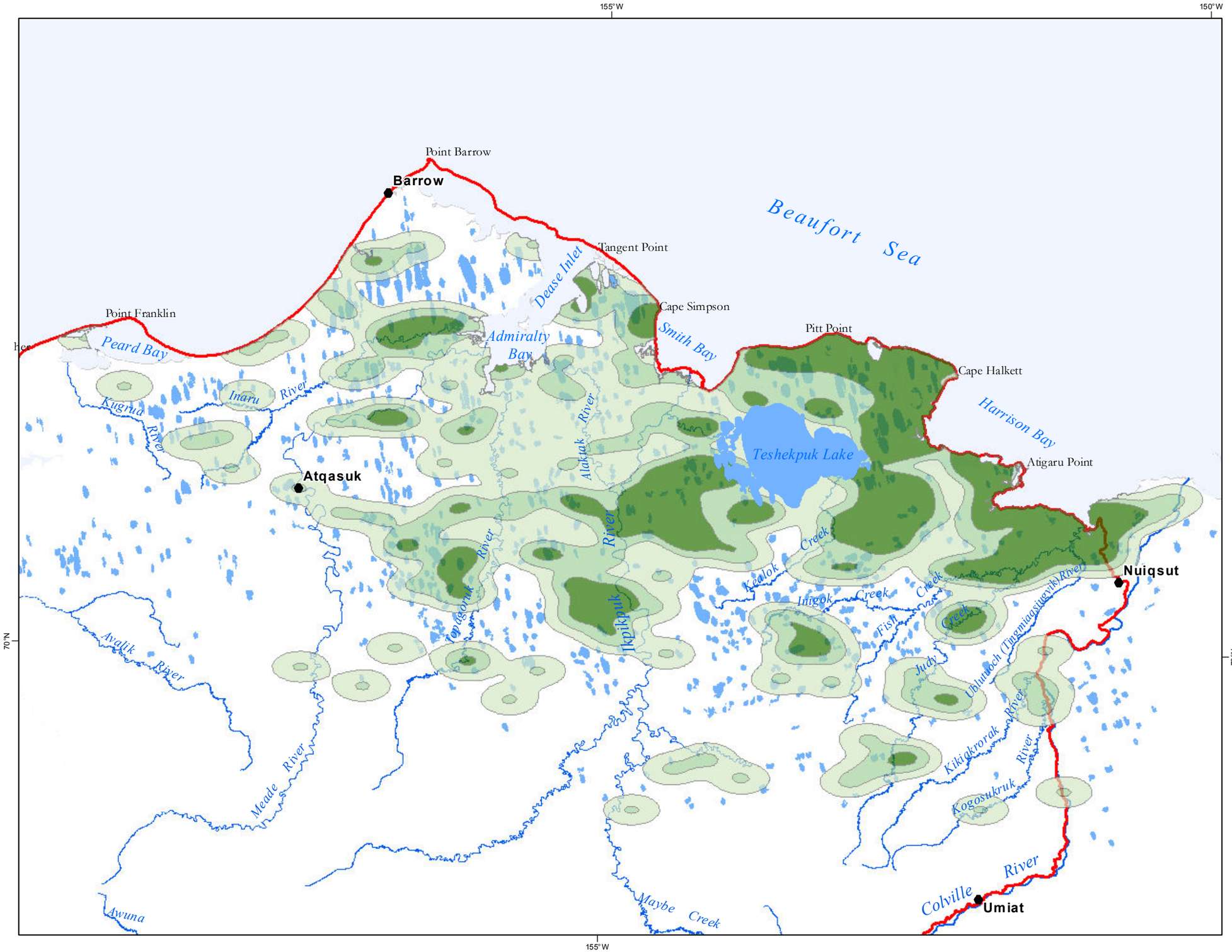

Map 3.3.6-7

Teshekpuk Lake Caribou Herd - Fly Relief Areas

Source: ADF&G, NSB, BLM, CPAI, and ABR

Teshekpuk Lake Caribou Herd Oestrid Fly Relief Area- 16 July - 7 August Kernel Density Analysis (1990 - 2010 Satellite Telemetry Data)

Density Contour

- 50 %
- 75 %
- 95 %

NPR-A Boundary

0 5 10 15 Miles

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Projection: Albers Conic Equal Area referencing NAD83

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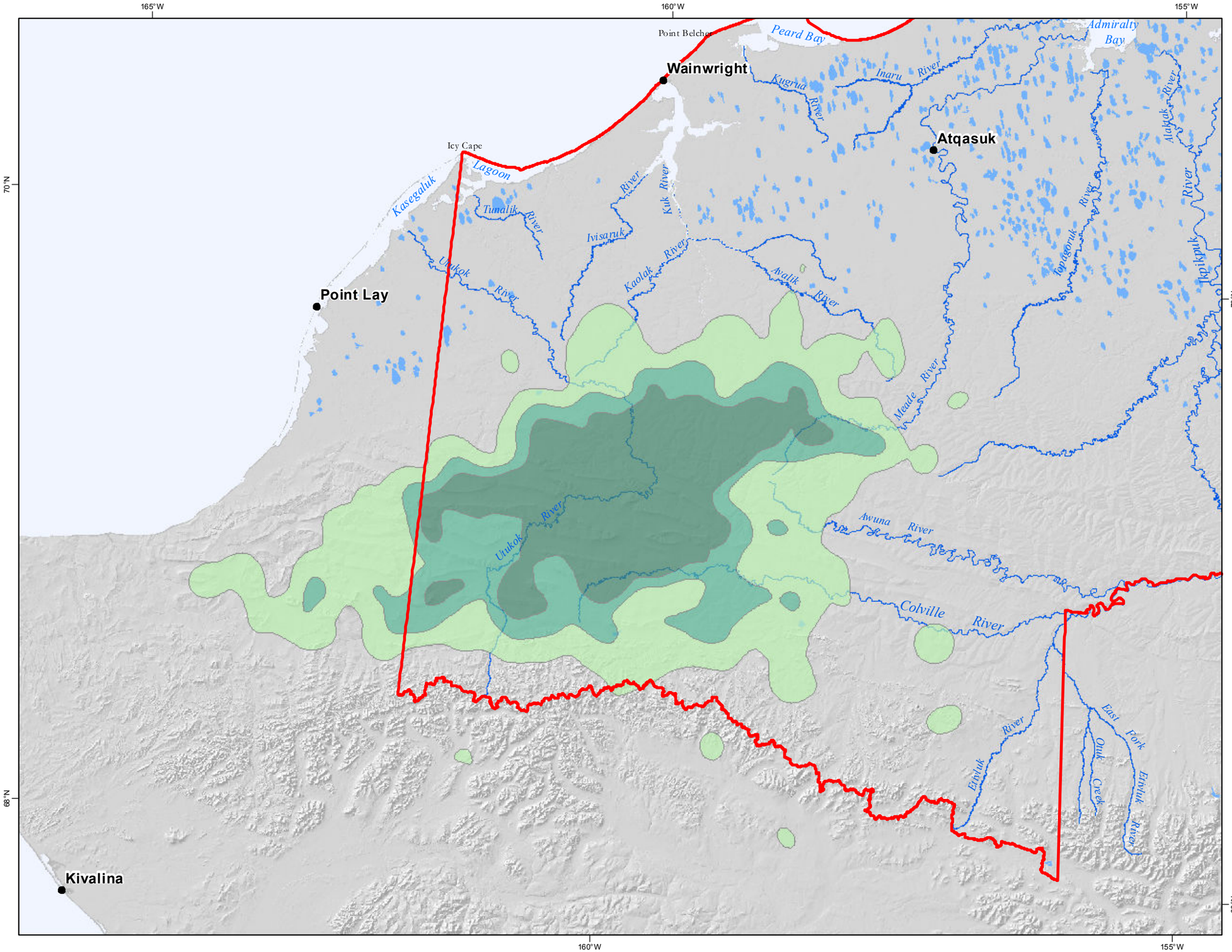

Map 3.3.6-8

Western Arctic Caribou Herd - Calving Ground

Source: ADF&G - 2010

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

Density Contour

- 50%
- 75%
- 95%

NPR-A Boundary

0 10 20 30 Miles

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Projection: Albers Conic Equal Area
referencing NAD83

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National Petroleum Reserve - Alaska
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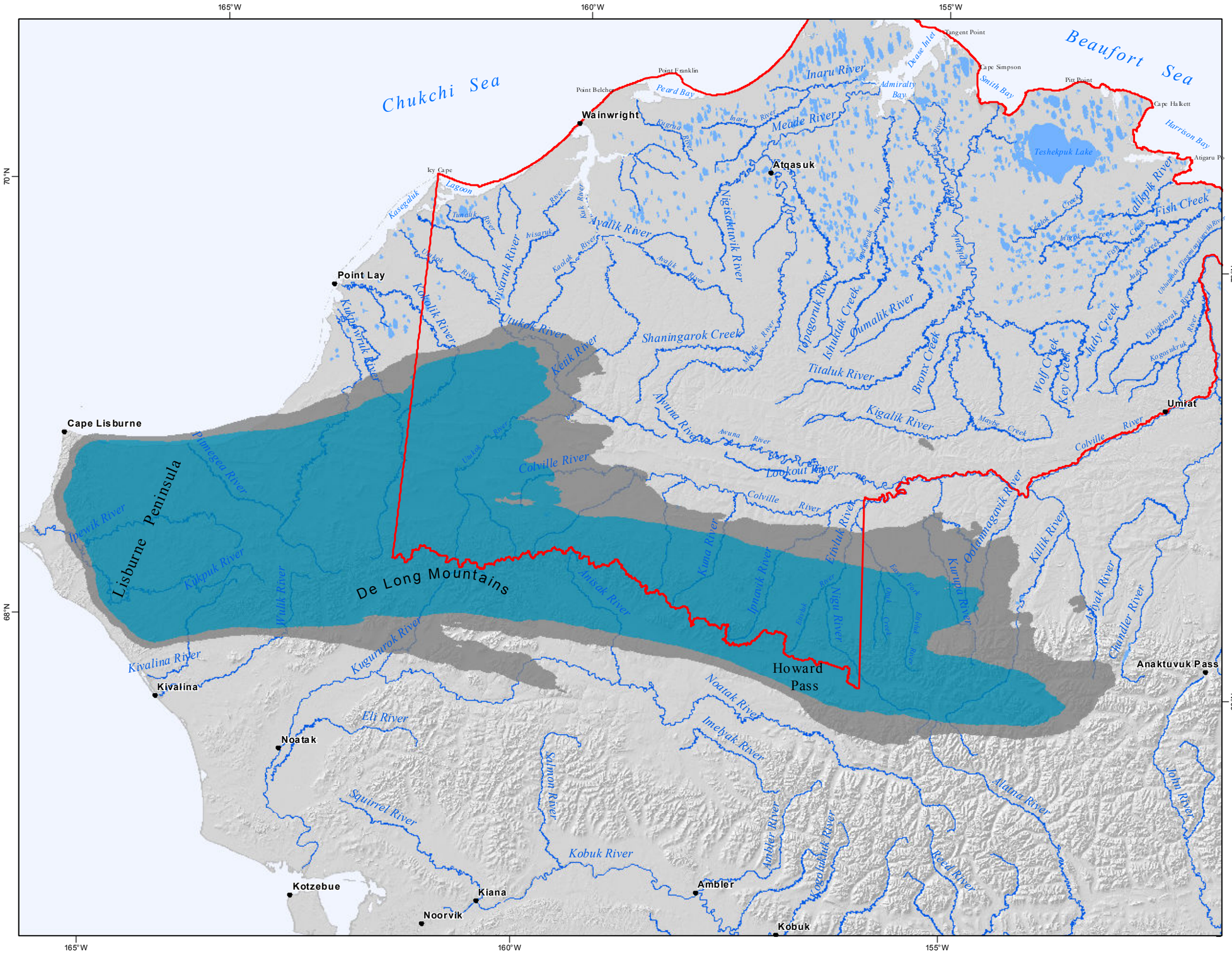
165° W
160° W
155° W
70° N
68° N
Chukchi Sea
Beaufort Sea
Wainwright
Atqasuk
Point Lay
Cape Lisburne
Umiat
Anaktuvuk Pass
Kivalina
Noatak
Kotzebue
Kiana
Noorvik
Ambler
Kobuk
Point Franklin
Point Belcher
Peard Bay
Icy Cape
Lagoon
Tangent Point
Dease Inlet
Admiralty Bay
Cape Simpson
Smith Bay
Pitt Point
Cape Halkett
Harrison Bay
Teshekpuk Lake
Lisburne Peninsula
De Long Mountains
Howard Pass
Inaru River
Meade River
Ikpikpuk River
Ivisaruk River
Ayalik River
Nigisaktuvik River
Utukok River
Kokolik River
Kukpowruk River
Kasegaluk Lagoon
Ketik River
Shaningarok Creek
Titaluk River
Kigalik River
Bronx Creek
Ishuktak Creek
Topagoruk River
Fish Creek
Judy Creek
Wolf Creek
Key Creek
Colville River
Lookout River
Awuna River
Ipewik River
Kukpuk River
Wulik River
Kivalina River
Kugururok River
Eli River
Squirrel River
Kobuk River
Salmon River
Noatak River
Imelyak River
Ambler River
Ogotoruk Creek
Reed River
Alatna River
John River
Chandler River
Anaktuvuk River
Killik River
Ootenmagavik River
Kurupa River
Etivluk River
Nigu River
Ipnavik River
Kuna River
Ansak River
Colville River
Pingegea River
Kukpowruk River
Utukok River
Kokolik River
Ivisaruk River
Kaolak River
Ayalik River
Nigisaktuvik River
Topagoruk River
Ishuktak Creek
Titaluk River
Kigalik River
Bronx Creek
Judy Creek
Fish Creek
Kogosukruk River
Kikiakrorak River
Colville River
Maybe Creek
Awuna River
Lookout River
Colville River
Etivluk River
Nigu River
Ipnavik River
Kuna River
Ansak River
Kurupa River
Ootenmagavik River
Killik River
Anaktuvuk River
Chandler River
Alatna River
John River
Reed River
Ogotoruk Creek
Ambler River
Salmon River
Kobuk River
Squirrel River
Eli River
Kugururok River
Kivalina River
Ipewik River
Kukpuk River
Wulik River
Pingegea River
Kasegaluk Lagoon
Tuvalik River
Ivisaruk River
Kaolak River
Ayalik River
Nigisaktuvik River
Topagoruk River
Ishuktak Creek
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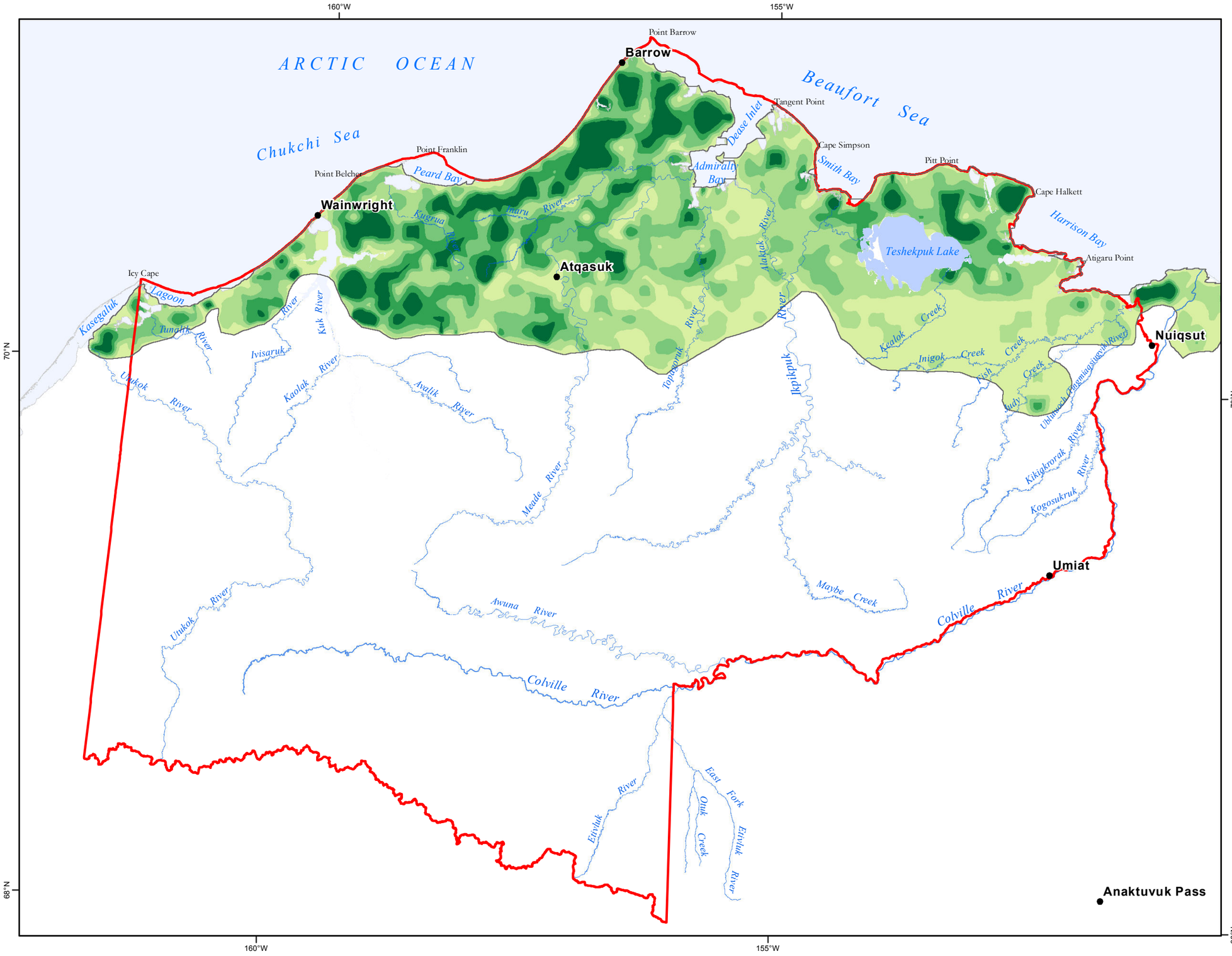
Judy Creek
Fish Creek
Kikiakrorak River
Kogosukruk River
Colville



Map 3.3.8-1

Spectacled Eider Onshore Density

Source: USFWS - Migratory Bird Management, 2010.

SPECTACLED EIDER

Estimated Relative Onshore Density (1993-2010)

Birds per Square Kilometer

- 0.410 - 1.409
- 0.226 - 0.409
- 0.147 - 0.225
- 0.035 - 0.146
- 0.000 - 0.034

Survey Area Boundary

NPR-A Boundary

0 12 24 36 Miles

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Projection: Albers Conic Equal Area referencing NAD83

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National Petroleum Reserve - Alaska

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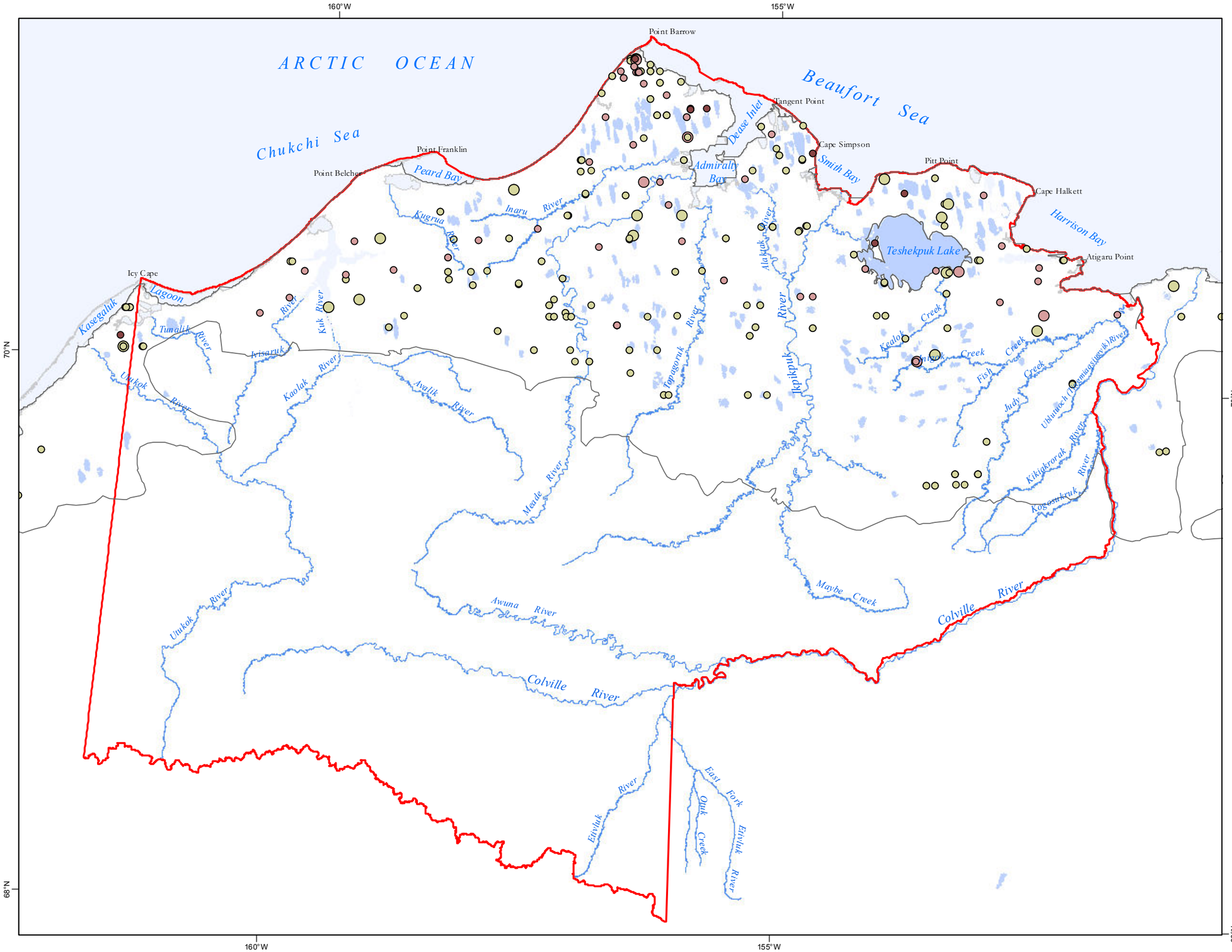

Map 3.3.8-2

Steller's Eider Onshore Locations

Source: USFWS - Migratory Bird Management, 2010

STELLER'S EIDER
Locations of Steller's Eider Groups (1989-2009)

1989-1996
- 1-2 Groups
- 4-5 Groups (seen only in 1993 & 1994)

1997-2006
- 1-2 Groups
- 3-7 Groups

2007-2010
- 1-2 Groups (No birds seen in 2010)

Survey Area Boundary

NPR-A Boundary

0 12 24 36 Miles

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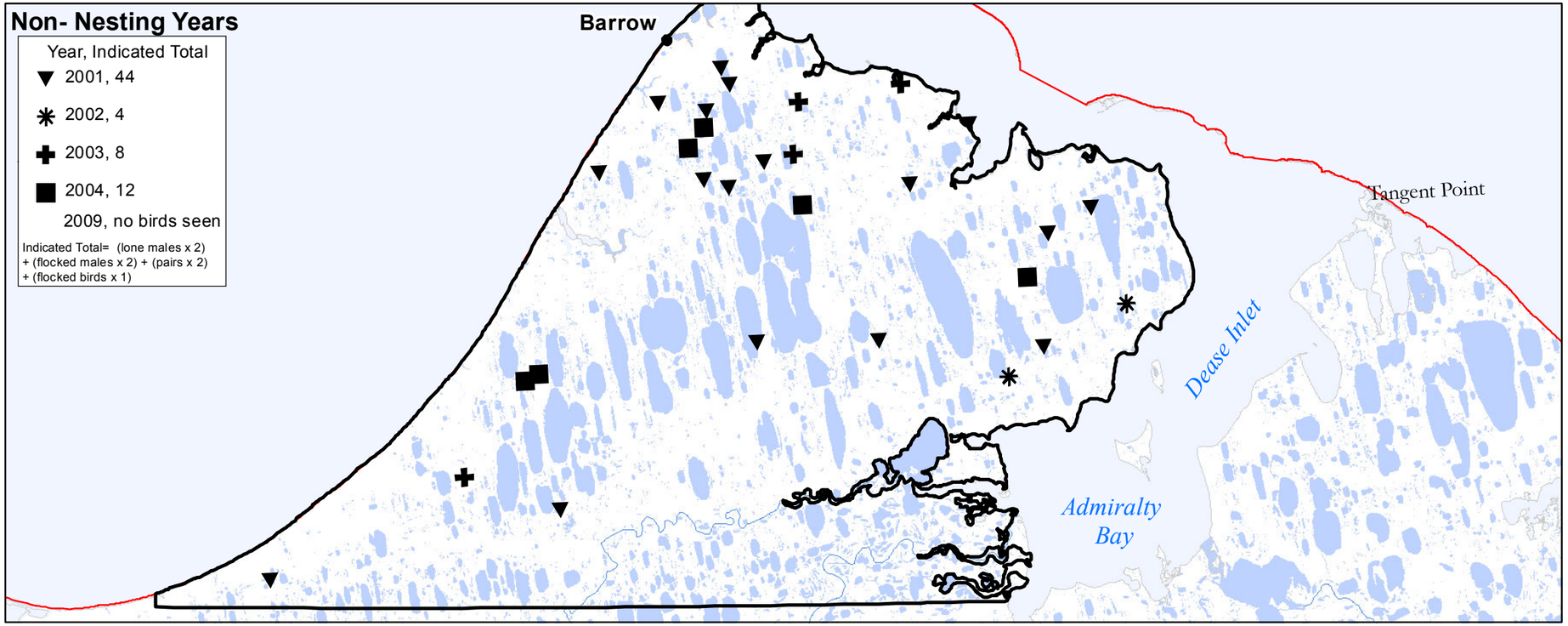
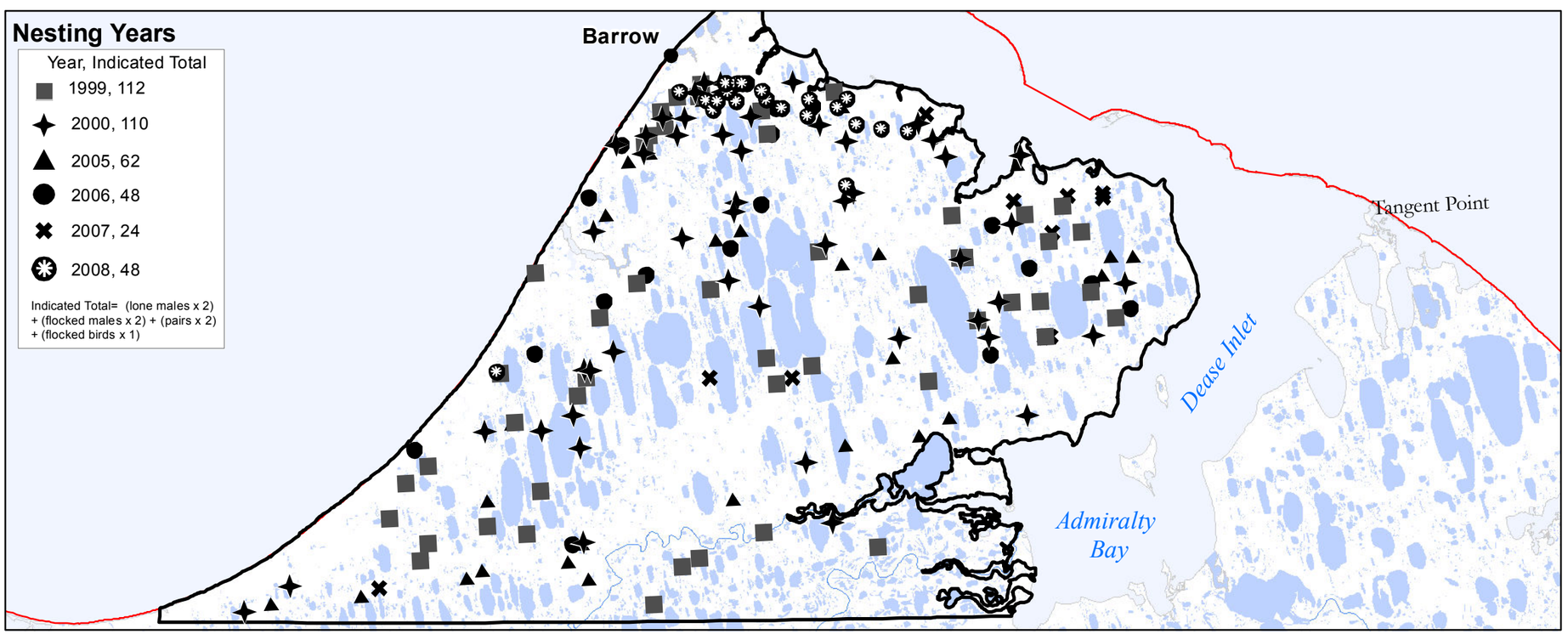




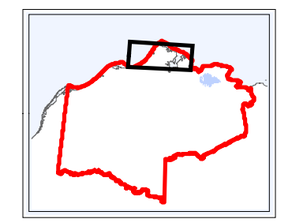
Map 3.3.8-3

Steller's Eider Location Within the Barrow Triangle Survey Area

Source: ABR Inc., 2010

Barrow Triangle

NPR-A Boundary



0 5 10 Miles

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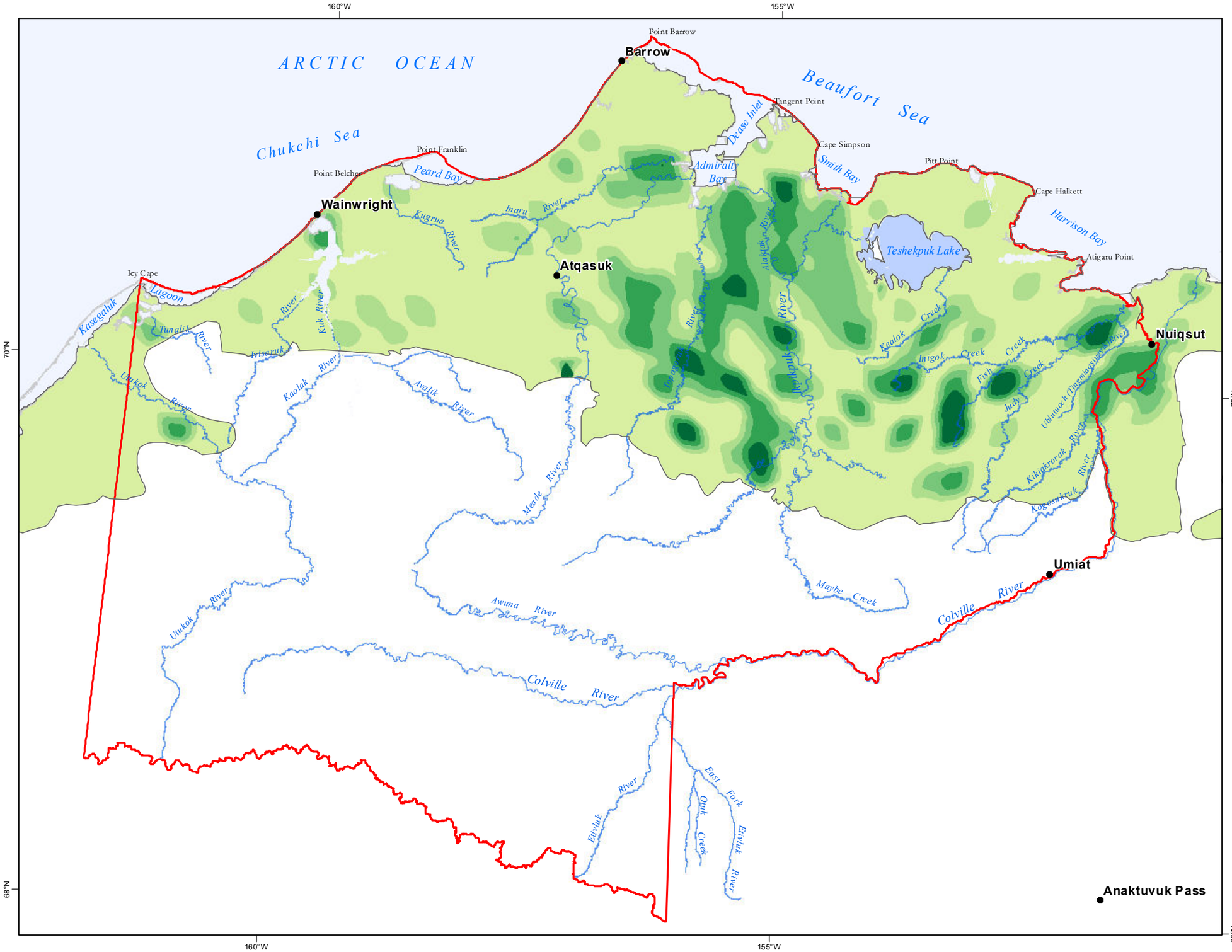

Map 3.3.8-4

Yellow-billed Loon Onshore Density

Source: USFWS - Migratory Bird Management, 2010.

YELLOW-BILLED LOON

Estimated Relative Onshore Density (2007-2010)

Birds per Square Kilometer

- 0.322- 0.516
- 0.204 - 0.321
- 0.103 - 0.203
- 0.031 - 0.102
- 0.000 - 0.030

Survey Area Boundary

NPR-A Boundary

0 12 24 36 Miles

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Projection: Albers Conic Equal Area referencing NAD83

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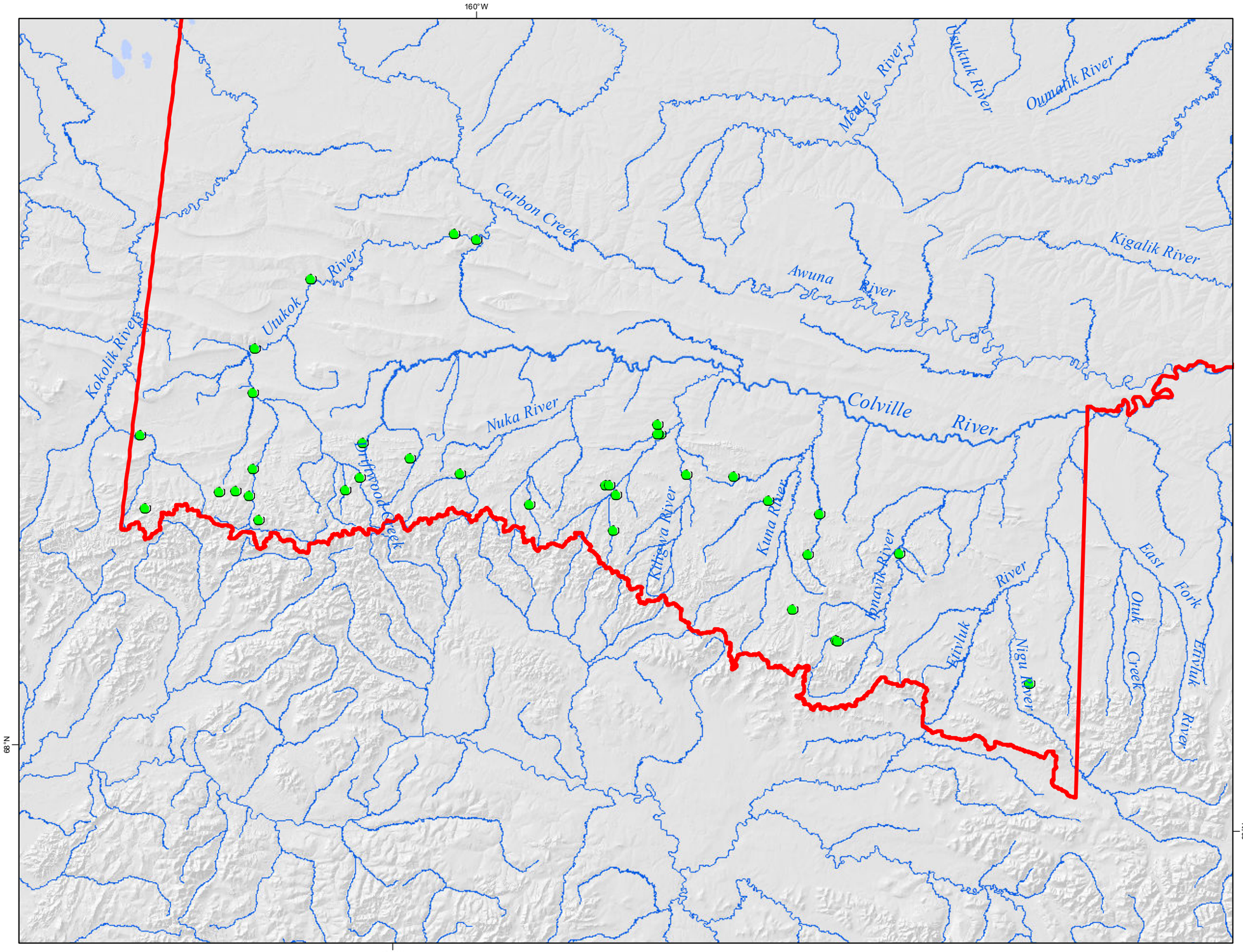


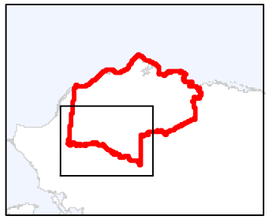
Map 3.3.8-5

Golden Eagle Nesting/ Activity Sites

Source: BLM, 2006

Golden Eagle Locations

NPR-A Boundary



0 6 12 18 Miles

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Projection: Albers Conic Equal Area referencing NAD83

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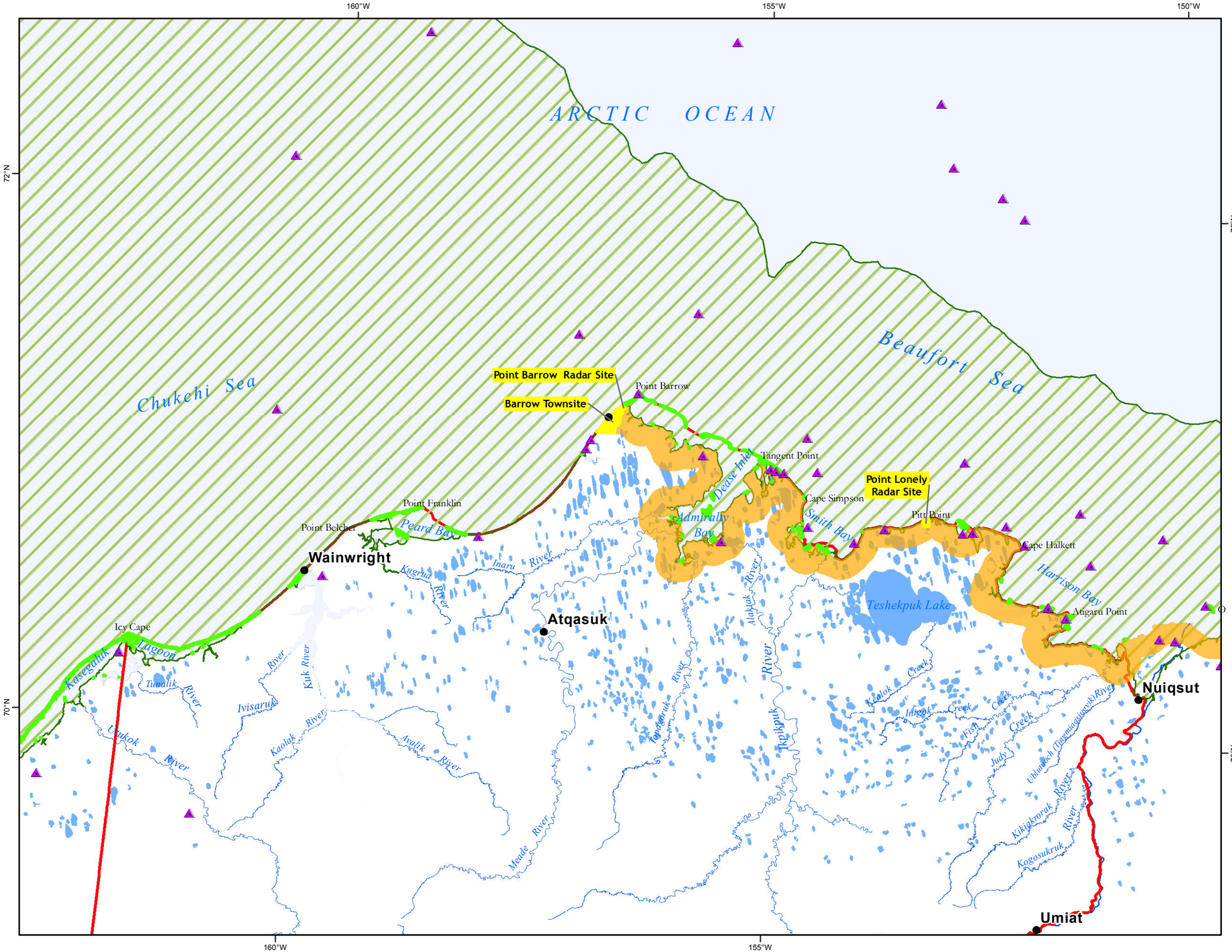

Map 3.3.8-6

Polar Bear - Critical Habitat & Confirmed Dens

Source: USFWS, 2011
USGS, 2007

Confirmed Polar Bear Den Locations (1972 - 2007)

Polar Bear Critical Habitat

- Critical Habitat Exclusion Areas
- Barrier Islands Critical Habitat (outline enlarged in order to be visible at this scale)
- Denning Critical Habitat
- Feeding Critical Habitat

NPR-A Boundary

0 6 12 24 36 48 Miles

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Projection: Albers Conic Equal Area referencing NAD83

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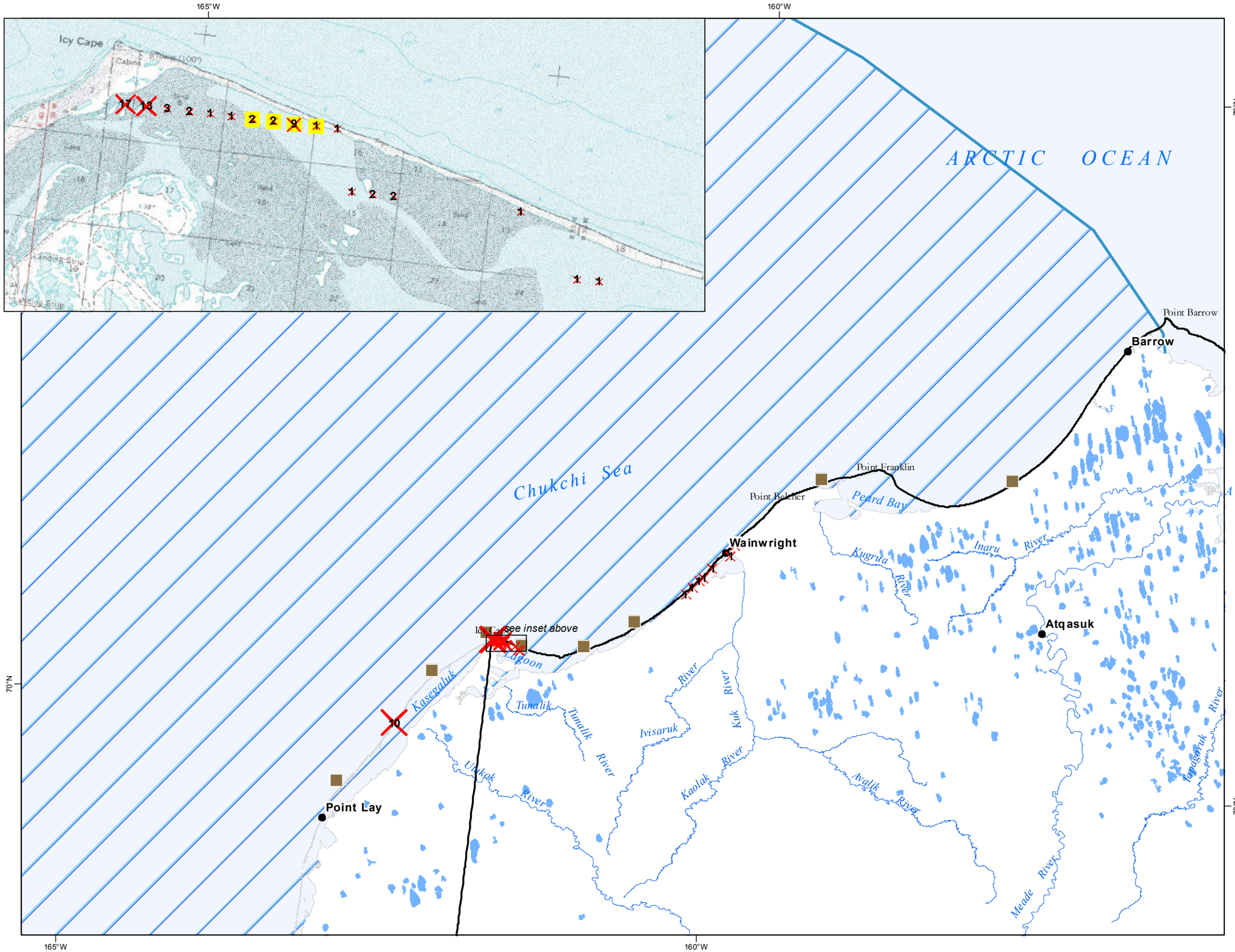

Map 3.3.8-7

Pacific Walrus Summer Range, Haulout & Carcass Locations

Source: USGS, 2009
USFWS, 2011

Walrus Carcass Locations (14-19 September, 2009)

- 1-4
- 5-9
- 10-17

Labeled with maximum number of carcasses counted at location.

- 2009 Recent Haulouts
- Pacific Walrus Haulouts
- Pacific Walrus Summer Range
- NPR-A Boundary

0 12 Miles

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Projection: Albers Conic Equal Area referencing NAD83

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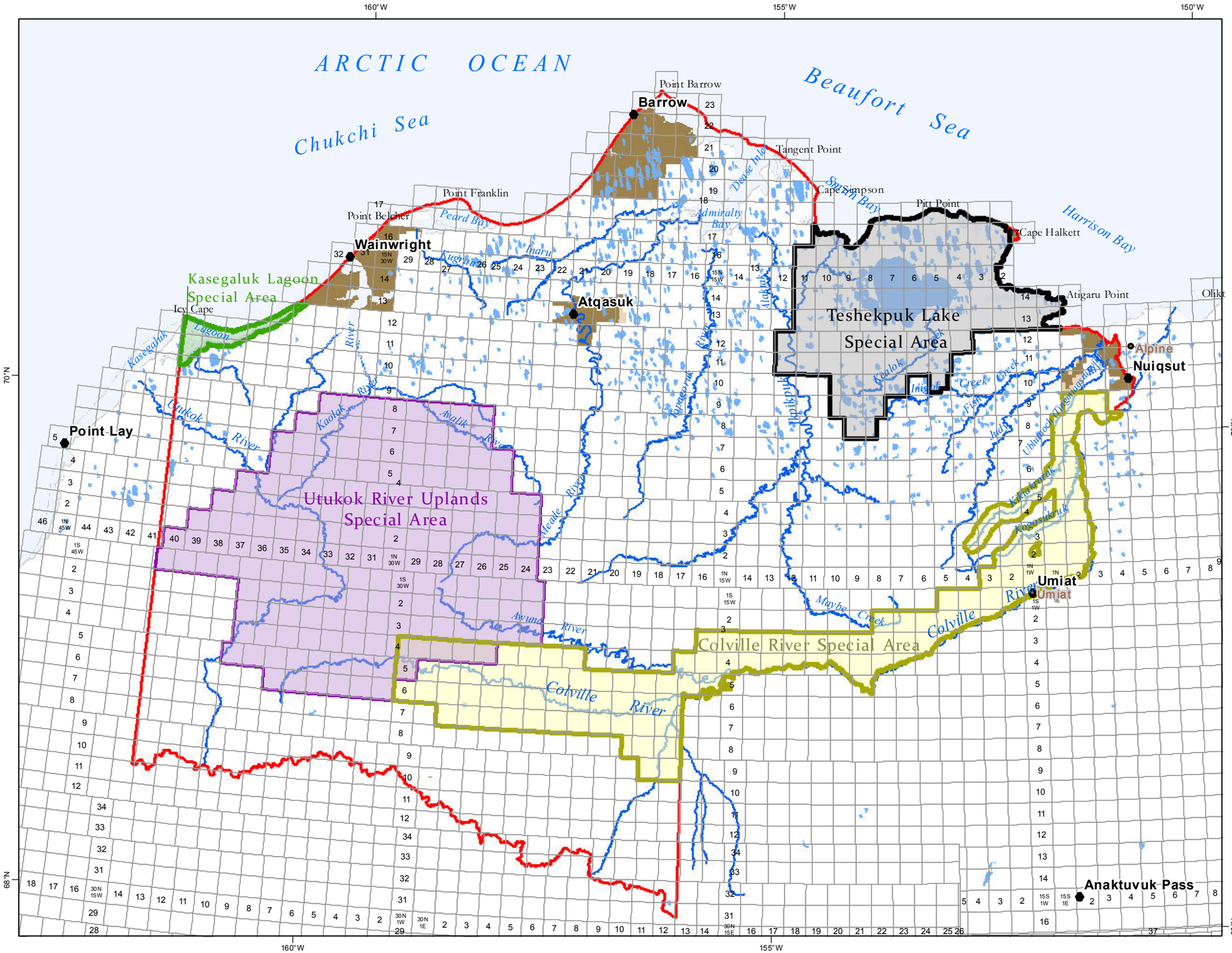

Map 3.3.9-1

Special Areas

Sources: USDOI BLM, 2004 & 2009

Special Area

Land Status

Native Patent or IC

Native Selected

NPR-A Boundary

0 6 12 24 36 48 Miles

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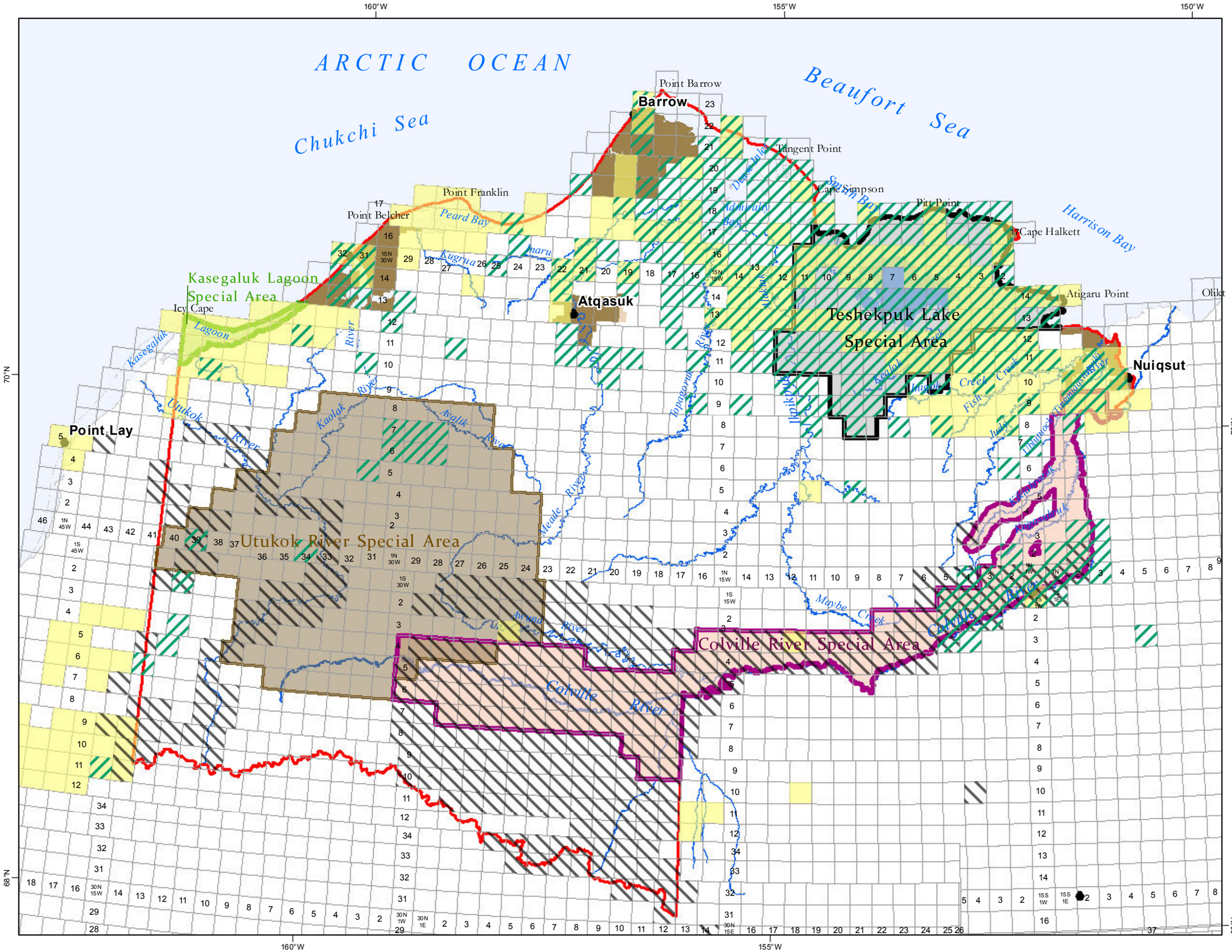

Map 3.4.1-1
Areas Currently Under Permit

Sources: USDOI BLM, 2004 & 2009 & 2011

Permits

- Special Recreation Permits (SRPs)
- Rights-of-Way (ROWs)
- All other permits

Land Status

- Native Patent or IC
- Native Selected
- Special Area
- NPR-A Boundary

0 6 12 24 36 48 Miles

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National Petroleum Reserve - Alaska
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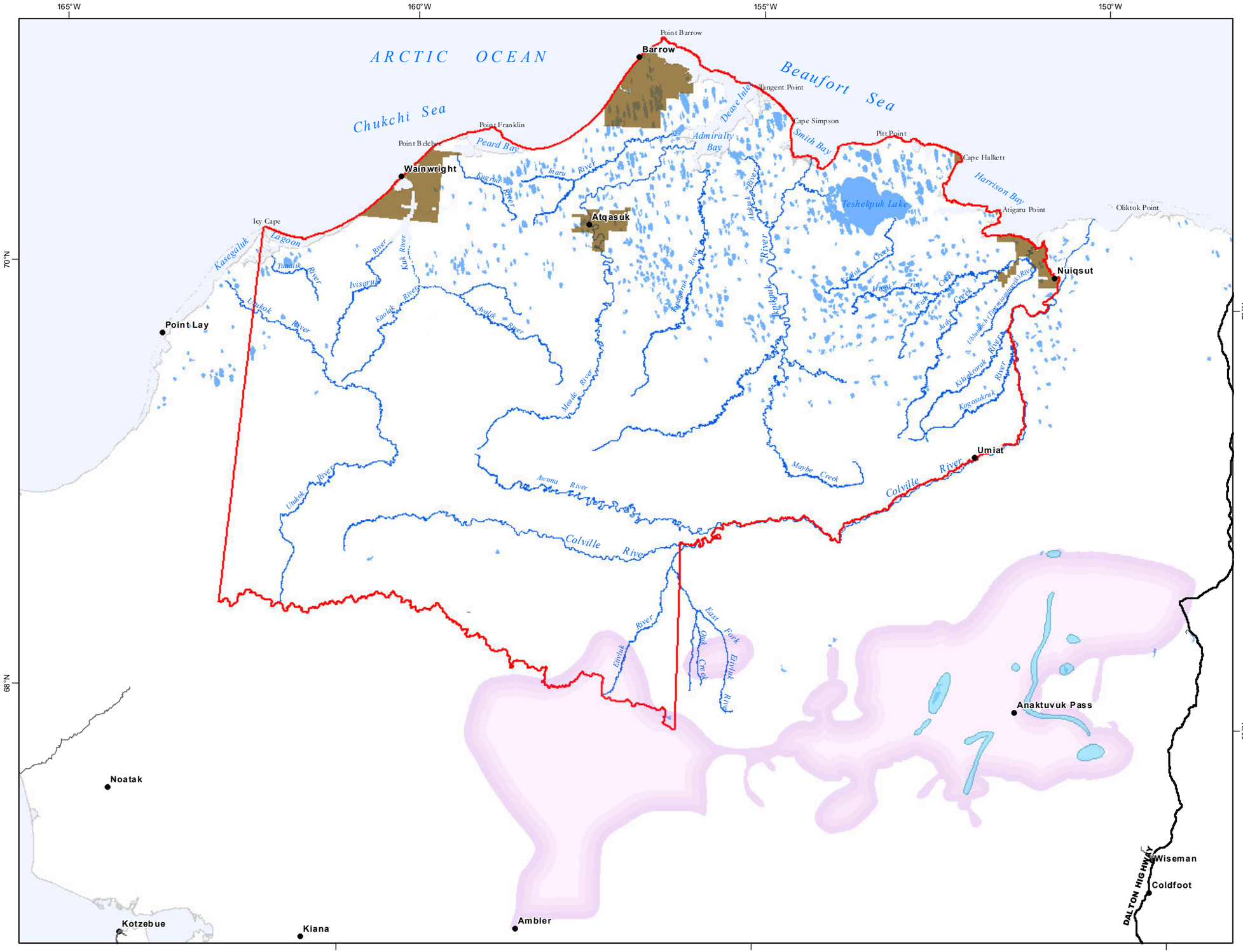

Map 3.4.3-1

Anaktuvuk Pass Subsistence Use Area

Sources: Pedersen 1979

Subsistence Resource

Fish

Anaktuvuk Pass Community Use Area

Resource use areas change through time are not fixed entities. Land outside these areas should not be assumed to be less important to community residents.

Native Patent or IC within NPR-A

NPR-A Boundary

0 6 12 24 36 48 Miles

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Projection: Albers Conic Equal Area referencing NAD83

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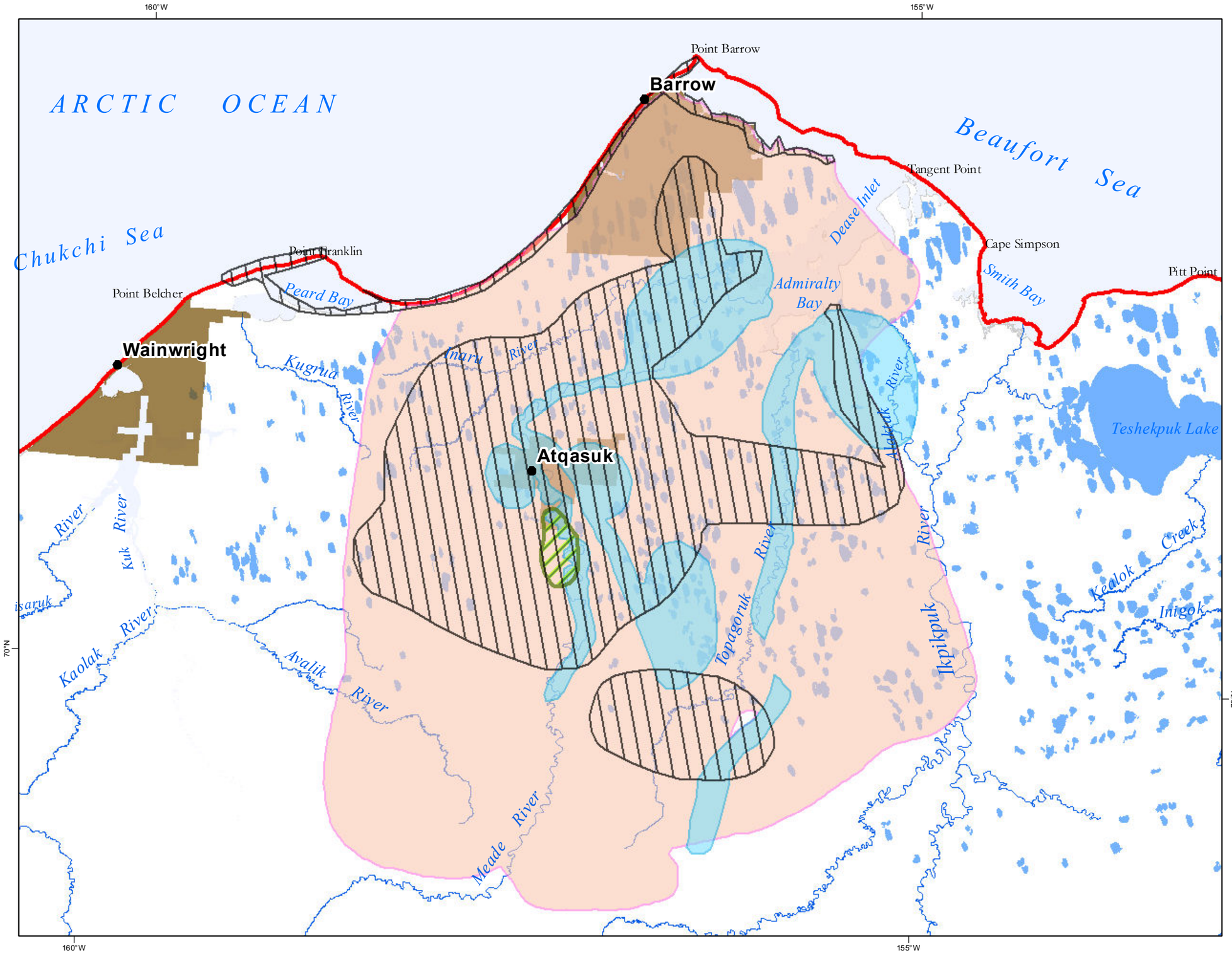

Map 3.4.3-2

Subsistence Use Areas - Atqasuk

Sources: Pedersen 1979.

Subsistence Resource

- Birds
- Moose
- Fishing
- Caribou

Resource use areas change through time are not fixed entities. Land outside these areas should not be assumed to be less important to community residents.

- Native Patent or IC
- NPR-A Boundary

0 6 12 18 Miles

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Projection: Albers Conic Equal Area referencing NAD83

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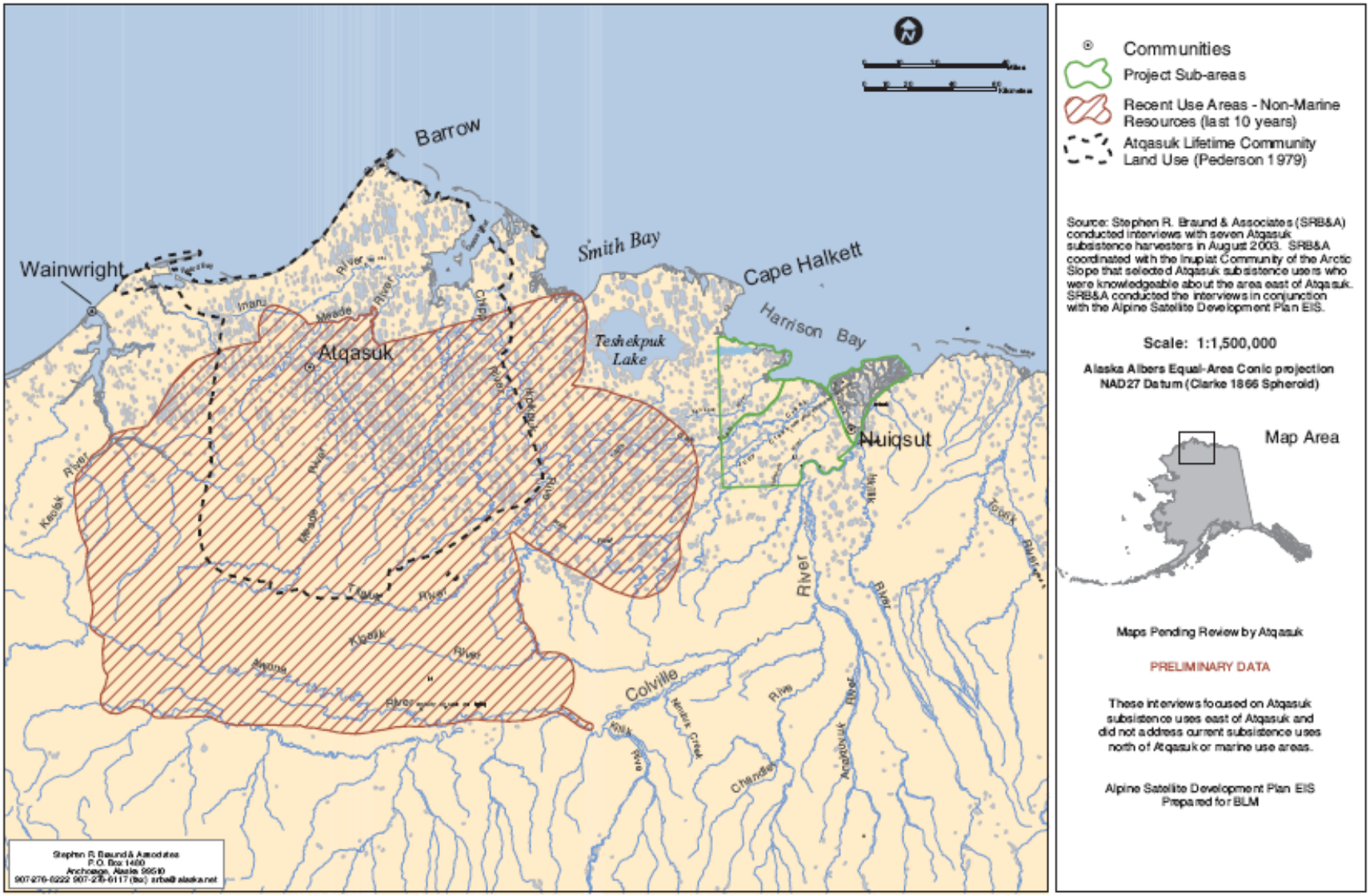
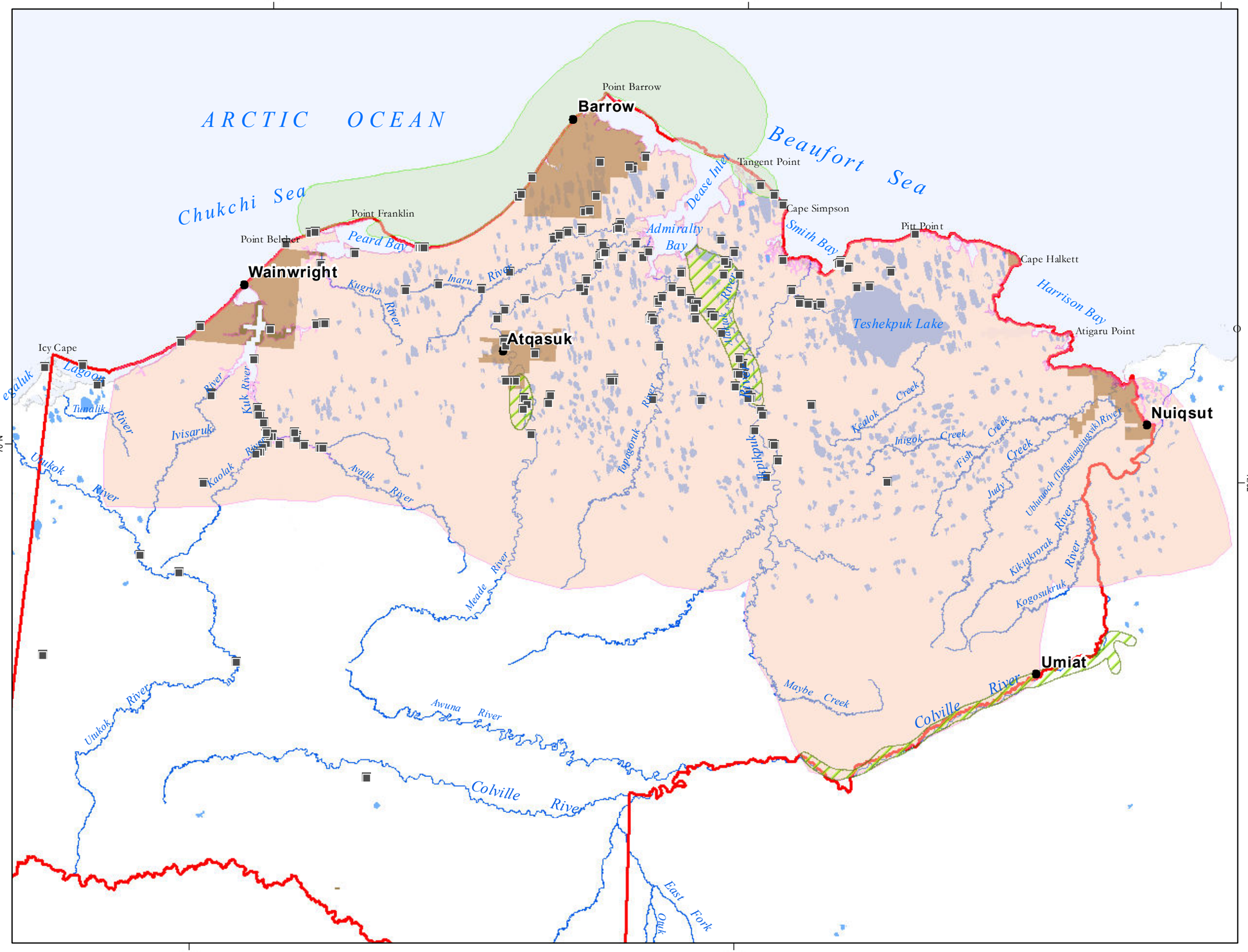


Map3.4.3-3 Atqasuk Partial Subsistence-Use Areas for Non-Marine Resources, 2003.



Map 3.4.3-4

North Slope Borough Subsistence Cabins and Fixed Campsites & Barrow Subsistence Use Areas for Whale, Moose and Caribou

Sources: Pedersen, 1979
North Slope Borough, 2008

Subsistence Cabin and Fixed Campsites

Subsistence Resource

- Whales
- Moose
- Caribou

Resource use areas change through time and are not fixed entities. Land outside these areas should not be assumed to be less important to community residents.

- Native Patent or IC within NPR-A
- NPR-A Boundary

0 12 24 36 Miles

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Projection: Albers Conic Equal Area referencing NAD83

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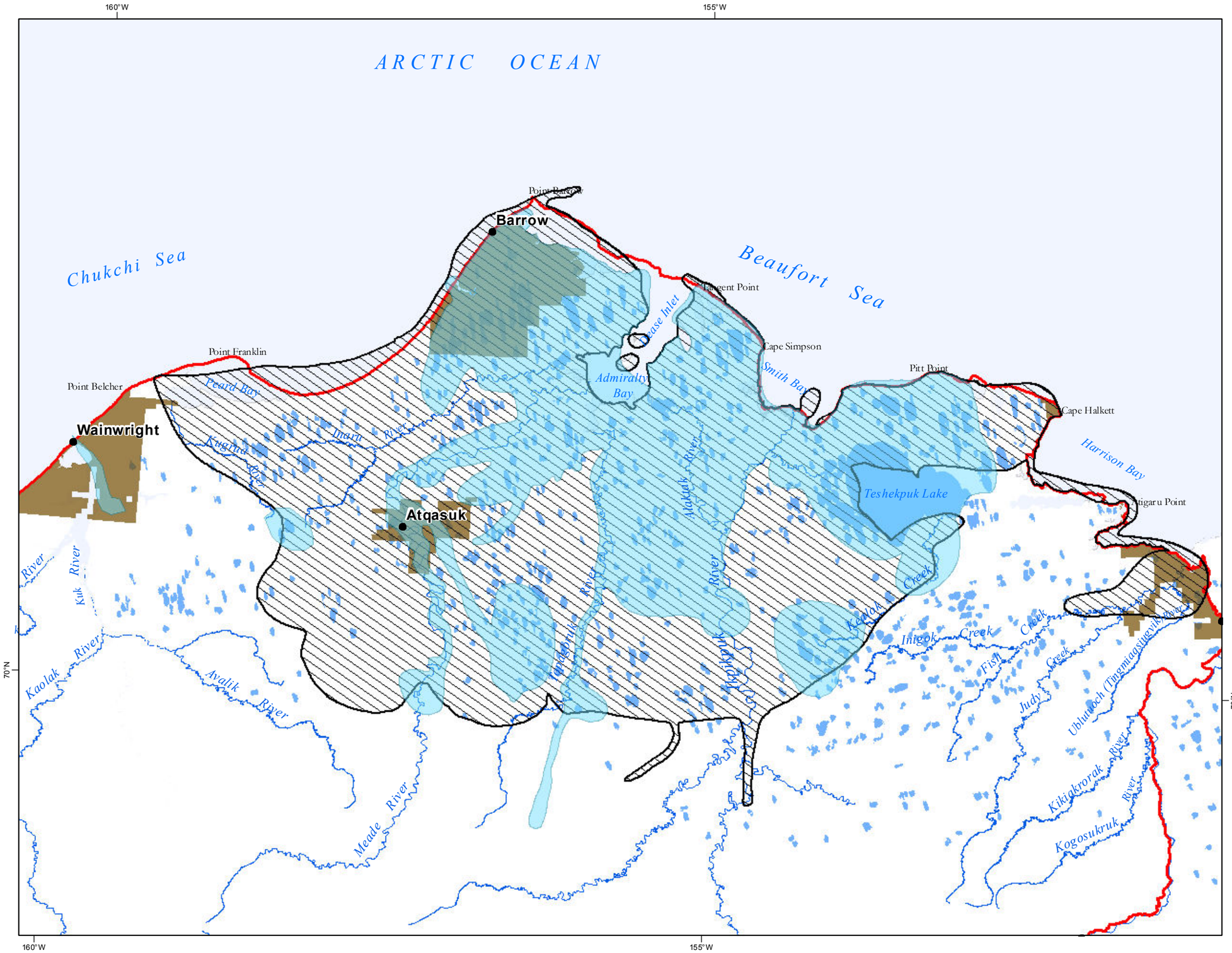

Map 3.4.3-5

Barrow Subsistence Use Areas for Fish and Birds

Source: Pedersen 1979.

Subsistence Resource

- Birds
- Fish

Resource use areas change through time are not fixed entities. Land outside these areas should not be assumed to be less important to community residents.

- Native Patent or IC within NPR-A
- NPR-A Boundary

0 12 24 36 Miles

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Projection: Albers Conic Equal Area referencing NAD83

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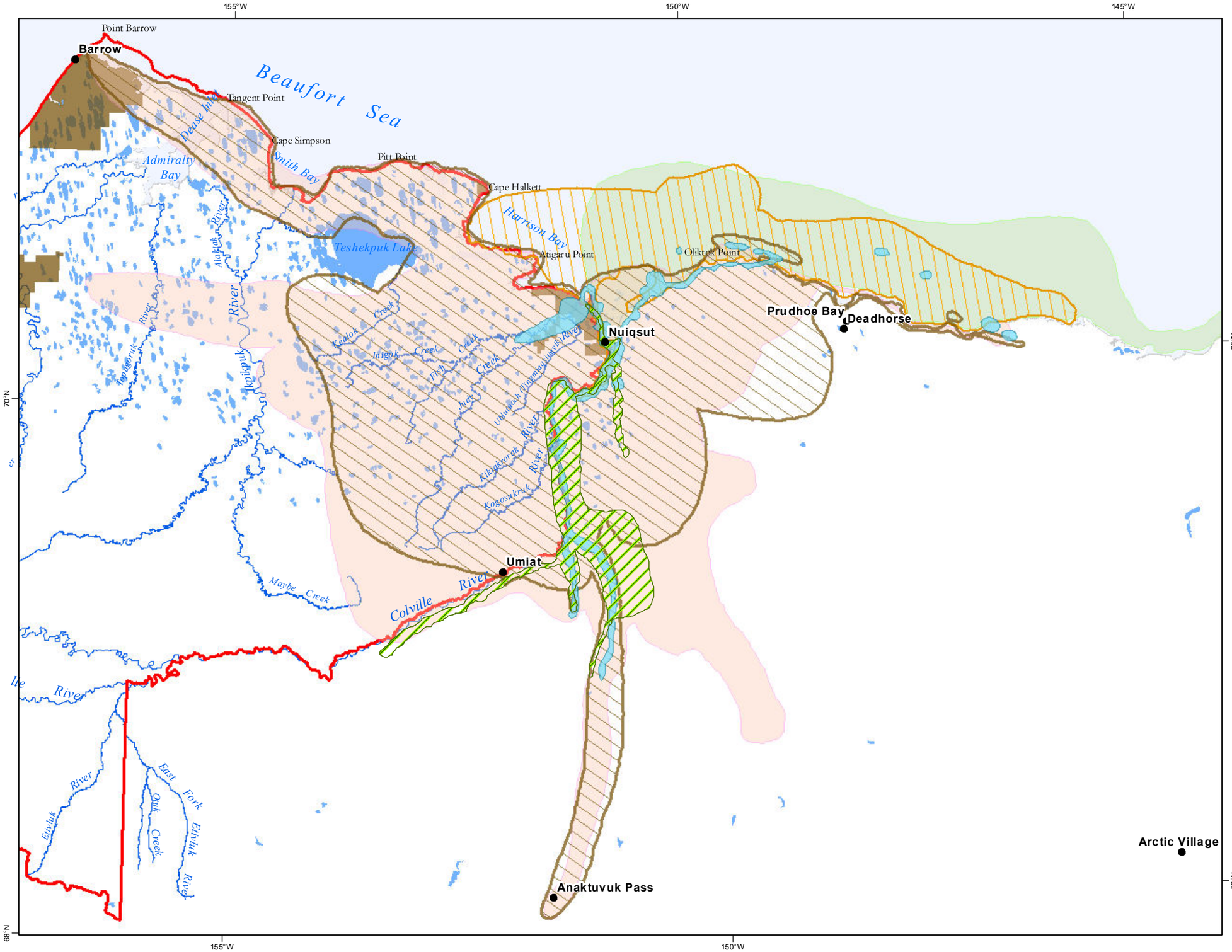

Map 3.4.3-6

Nuiqsut Subsistence Use Area

Sources: Pedersen 1979; Hoffman, Libbey and Spearman 1988

Subsistence Resource

- Moose
- Caribou
- Seal
- Furbearer- Hunting
- Fish
- Whaling

Resource use areas change through time are not fixed entities. Land outside these areas should not be assumed to be less important to community residents.

- Native Patent or IC within NPR-A
- NPR-A Boundary

0 6 12 24 36 48 Miles

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Projection: Albers Conic Equal Area referencing NAD83

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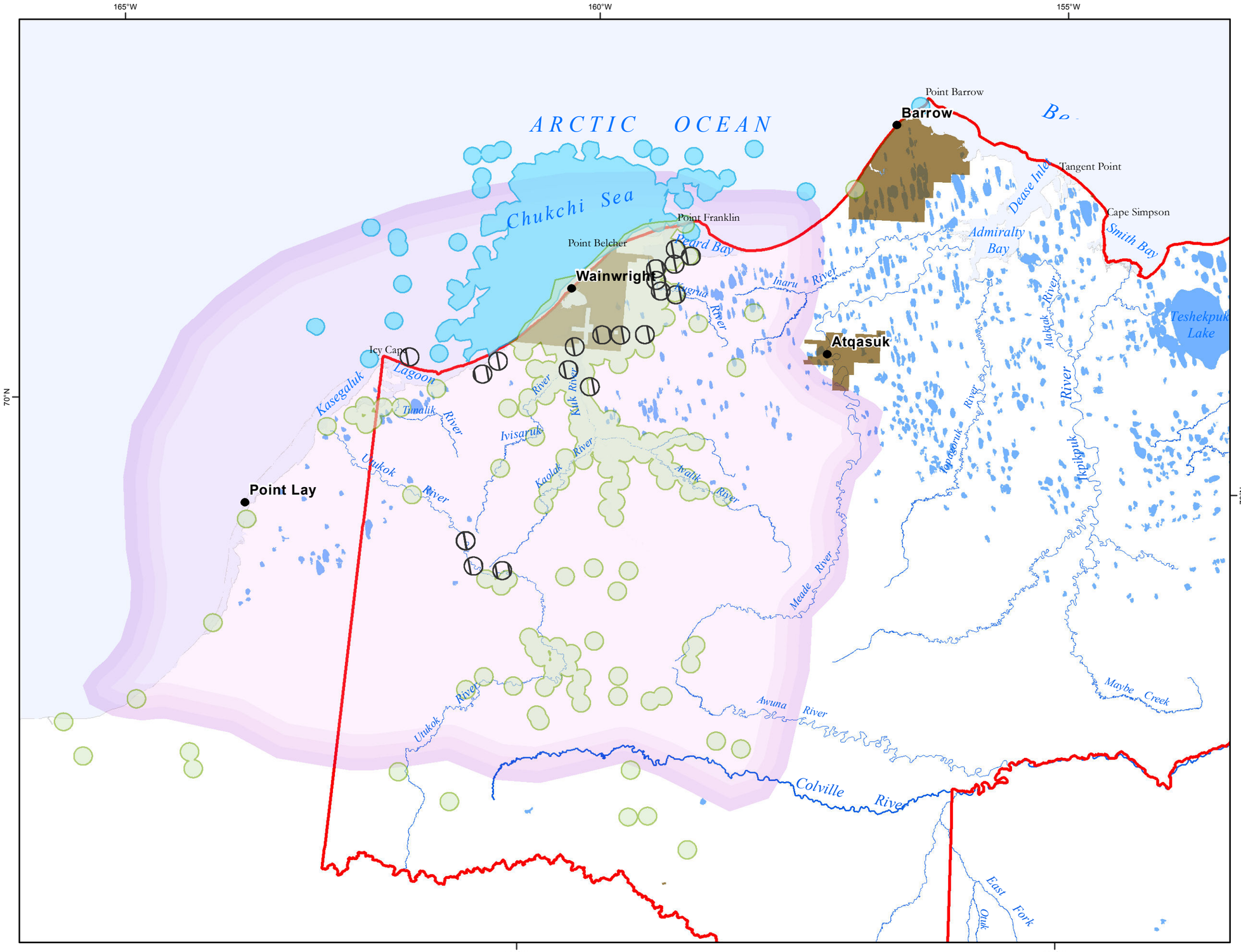

Map 3.4.3-7

Subsistence Use Areas - Wainwright

Sources: MMS/NSB, 1993.

Subsistence Resource

- Fish
- Terrestrial Mammals
- Marine Mammals
- Traditional Use Area

Resource use areas change through time are not fixed entities. Land outside these areas should not be assumed to be less important to community residents.

- Native Patent or IC within NPR-A
- NPR-A Boundary

0 12 24 36 Miles

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Projection: Albers Conic Equal Area referencing NAD83

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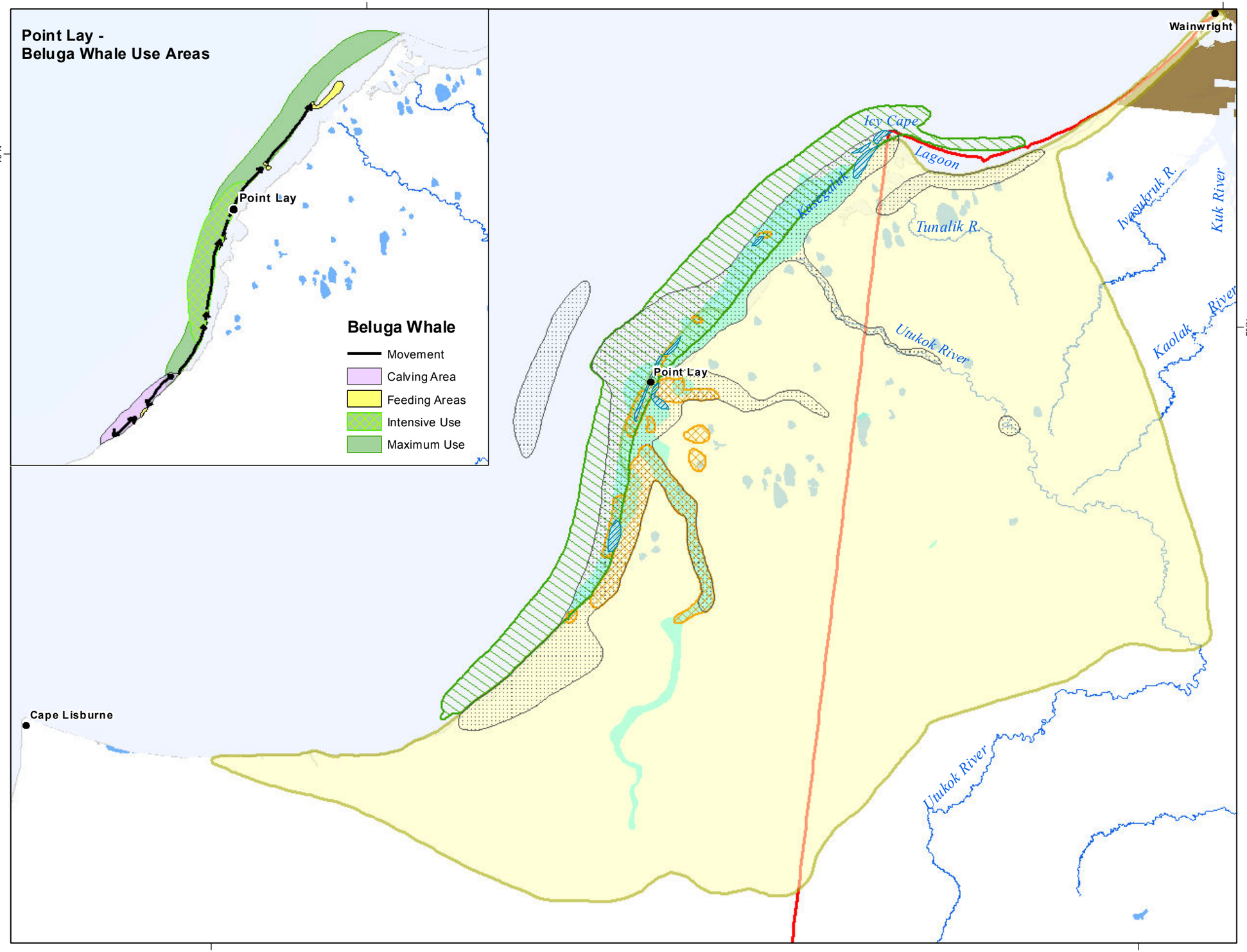

Map 3.4.3-8
Point Lay Subsistence Use Area

Sources: Pedersen 1979

Subsistence Resource

- Fish- Intensive Use
- Waterfowl
- Marine Mammals
- Gathering
- Fish
- Mammals

Resource use areas change through time are not fixed entities. Land outside these areas should not be assumed to be less important to community residents.

- Native Patent or IC within NPR-A
- NPR-A Boundary

0 6 12 24 Miles

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Projection: Albers Conic Equal Area referencing NAD83

Bureau of Land Management - Alaska

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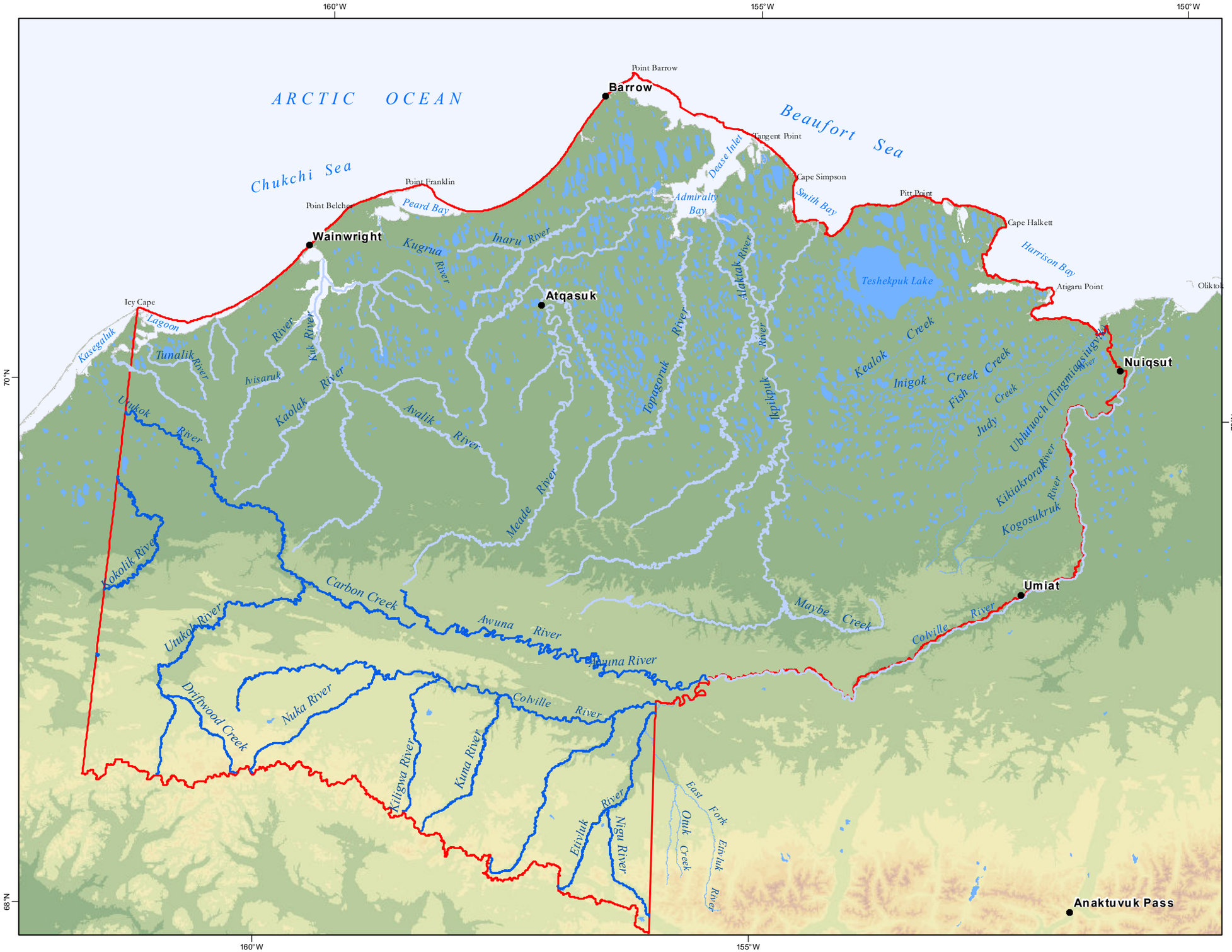

Map 3.4.7-1

Eligible Wild & Scenic Rivers

Sources: USGS NHD 2010
BLM 2008

Eligible Wild & Scenic Rivers Considered for Suitability

Eligible Wild & Scenic Rivers Determined Not Suitable in Past Planning

NPR-A Boundary

0 6 12 24 36 48 Miles

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Projection: Albers Conic Equal Area
referencing NAD83

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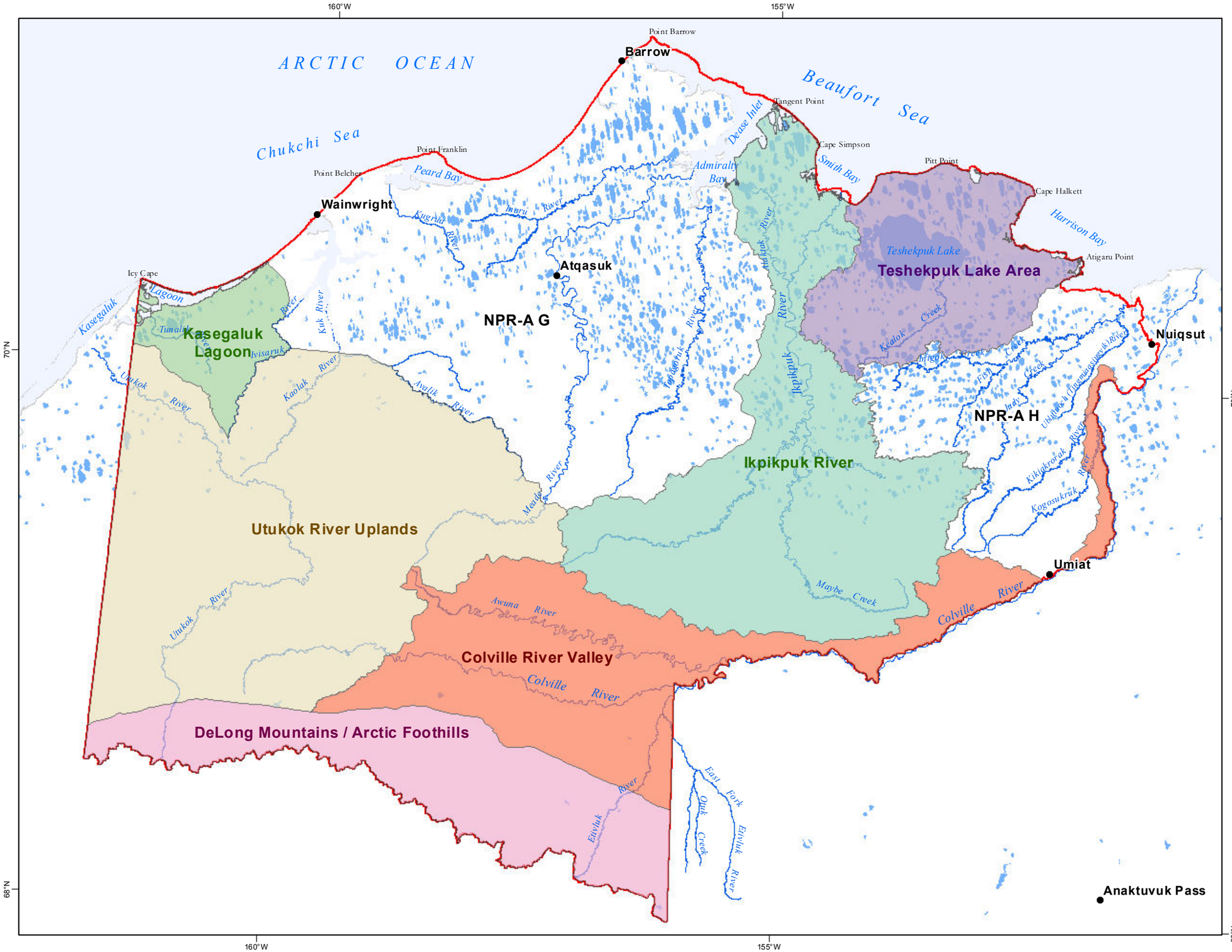

Map 3.4.8-1
Wilderness Characteristics Inventory Areas

Source: BLM 1979

Wilderness Unit

NPR-A Boundary

0 6 12 24 36 48 Miles

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Projection: Albers Conic Equal Area
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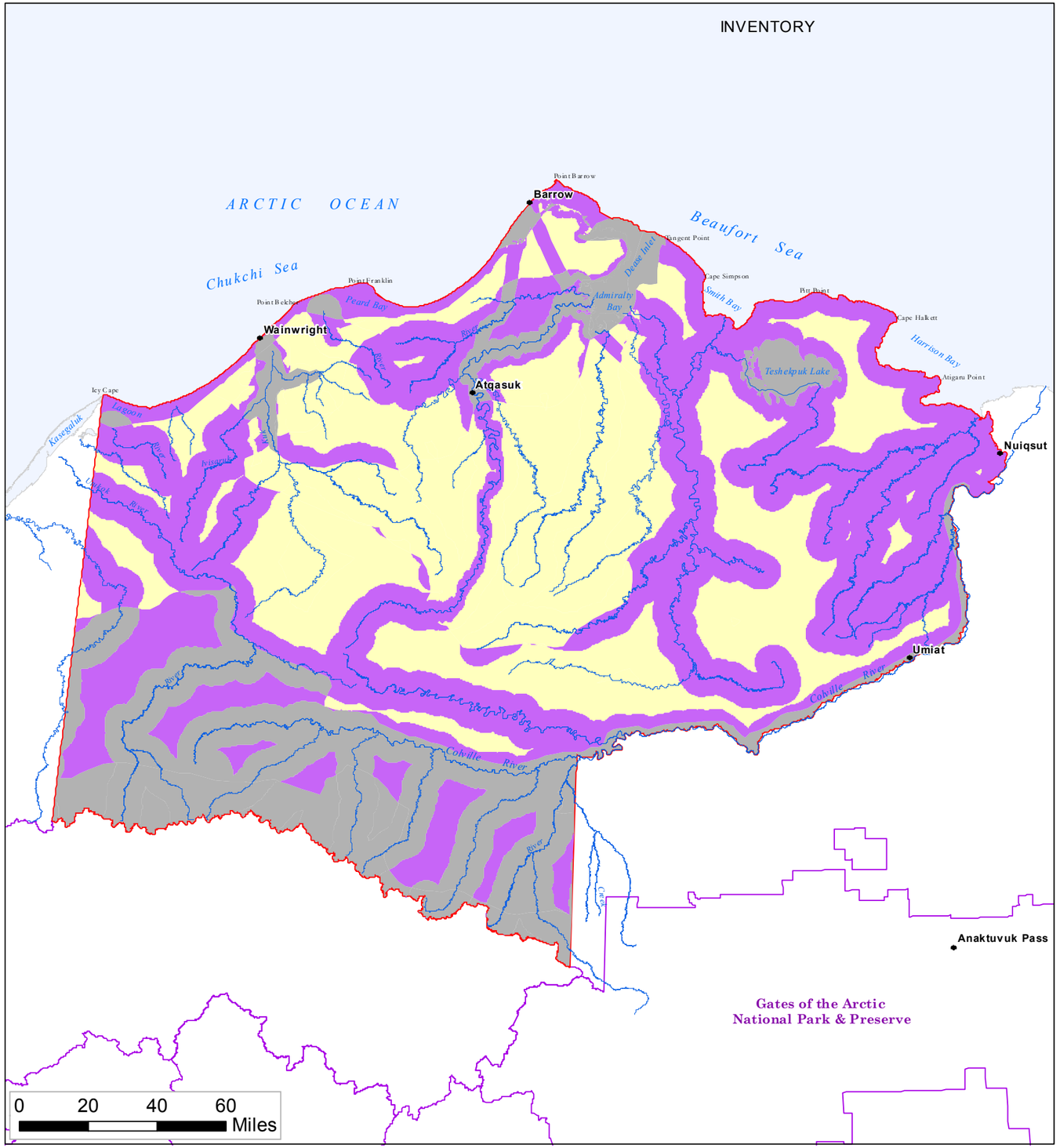

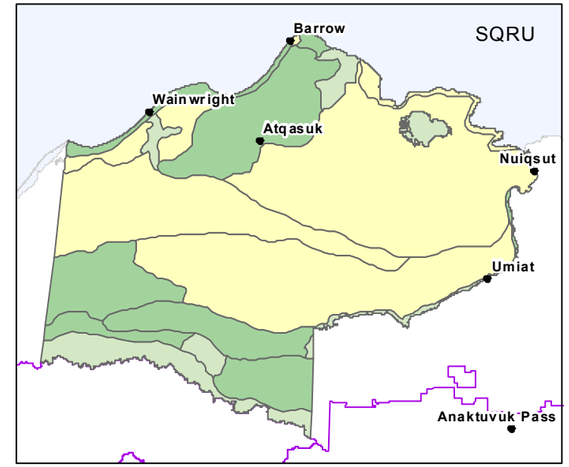

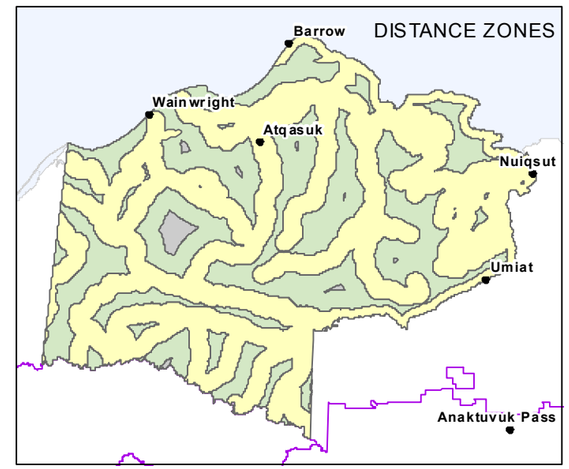

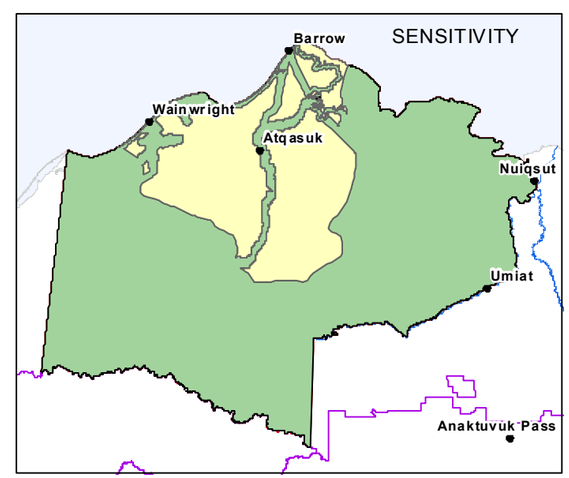

Map 3.4.9-1

Visual Resource Management (VRM)

Source: BLM 2011

VRM Inventory Classes
- Class II
- Class III
- Class IV

Distance Zone
- Background
- Foreground
- Seldom Seen

Sensitivity
- High
- Medium

SQRU
- a
- b
- c

NPR-A Boundary

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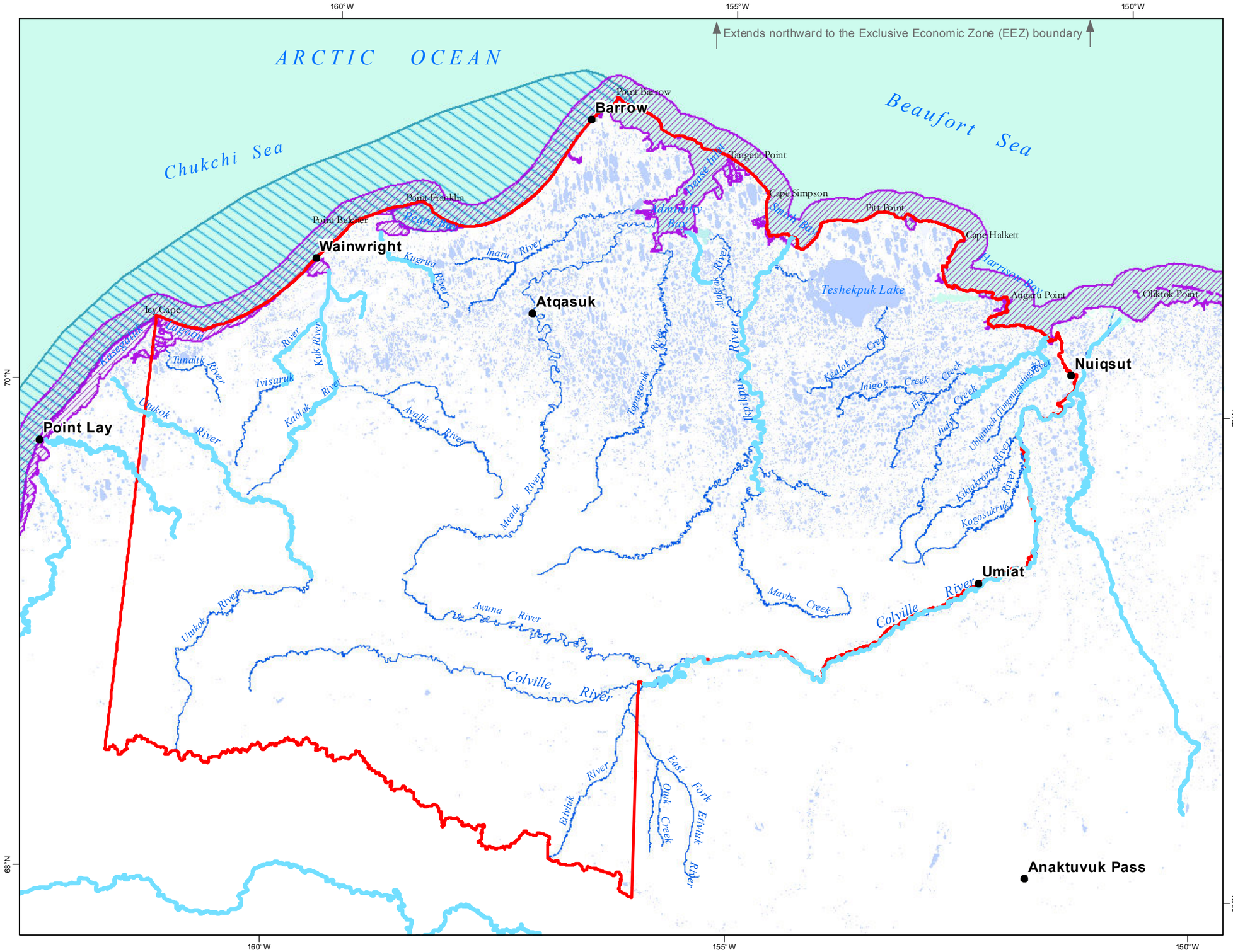

Map D-1

Essential Fish Habitat

Sources: NPFMC 2006, 2009; ADF&G 2011a

- Pacific salmon freshwater
- Pacific salmon estuarine
- Pacific salmon marine & Arctic cod

This area extends north to the Exclusive Economic Zone (EEZ) boundary, 200 nautical miles from State waters.

- Saffron cod
- Rivers
- Lakes
- NPR-A Boundary

0 6 12 24 36 48 Miles

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