



# Coastal Plain Oil and Gas Leasing Program Supplemental Environmental Impact Statement

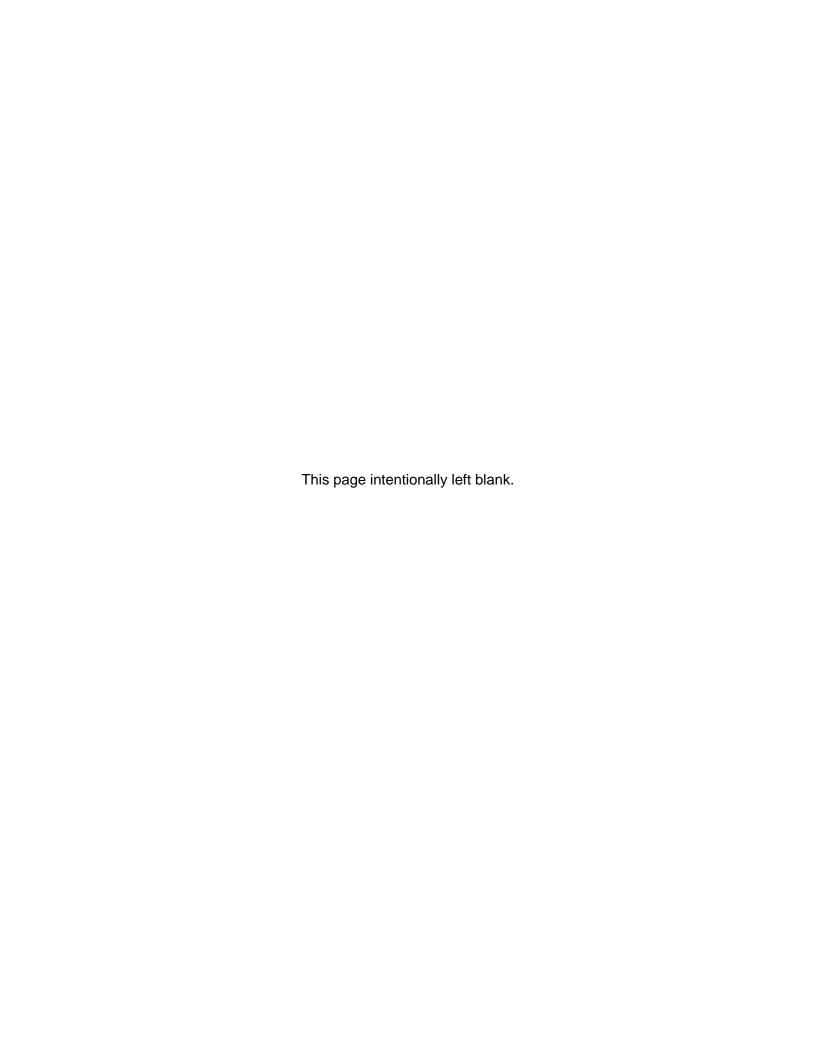


Cover photo by Lisa Hupp (USFWS)

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# APPENDIX A

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# **APPENDIX A**

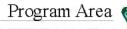
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BLM adjusted the Public Law 115-97 boundary to align with the State of Alaska administrative lease line after reviewing tracts and legal descriptions for the 2021 lease sale (Source: Alaska Land Information System [ALIS]).

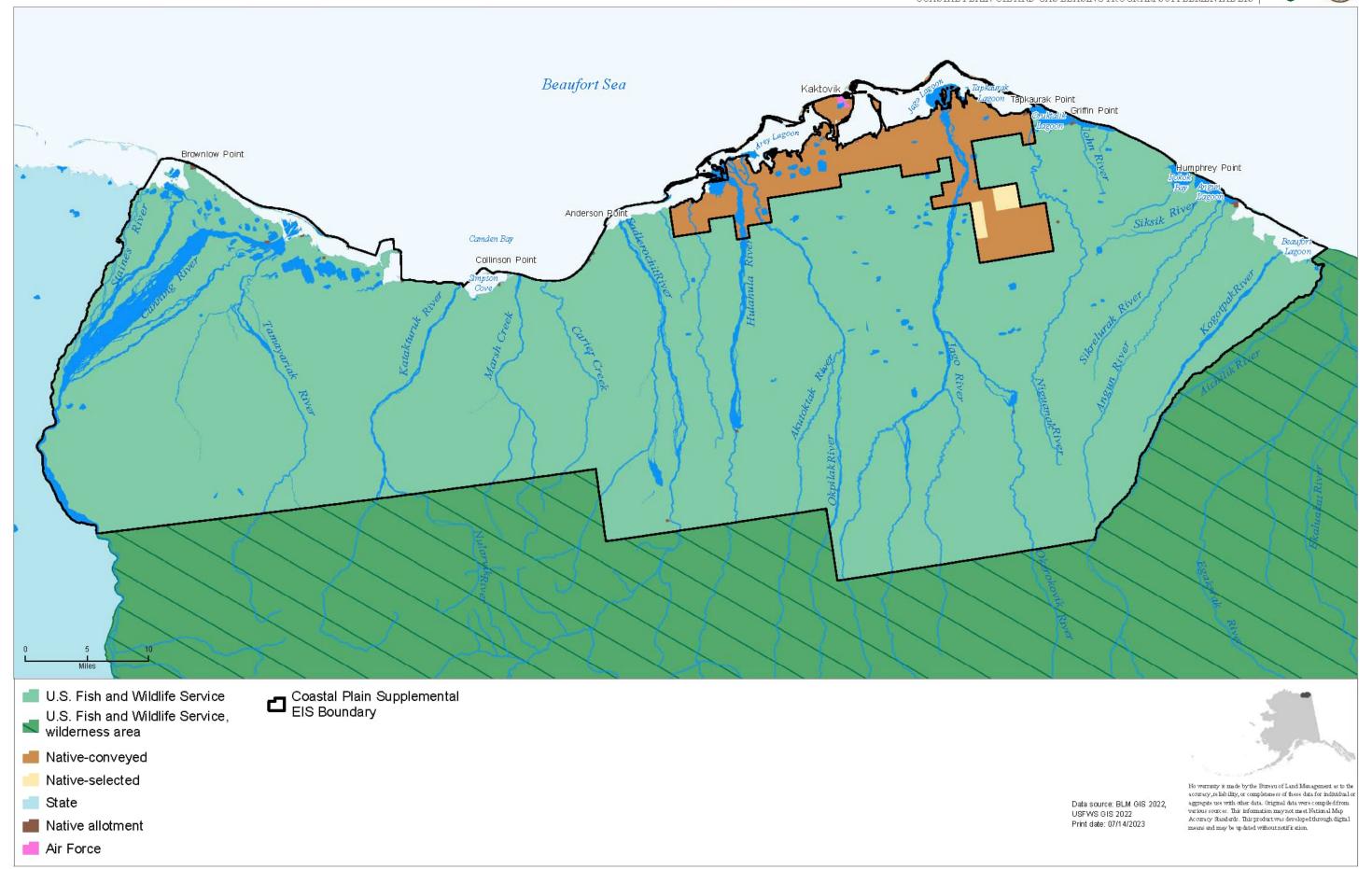
Data from geographic information systems (GIS) have been used in developing acreage calculations and for generating the maps in this appendix. Calculations are dependent upon the quality and availability of data and most calculations in this EIS are rounded to the nearest one hundred acres. Given the scale of the analysis, the compatibility constraints between datasets, and lack of data for some resources, all calculations are approximate and serve for comparison and analytic purposes only. Likewise, the maps in this appendix are provided for illustrative purposes and subject to the limitations discussed above. BLM may receive additional GIS data; therefore, acreages may be recalculated and revised later.

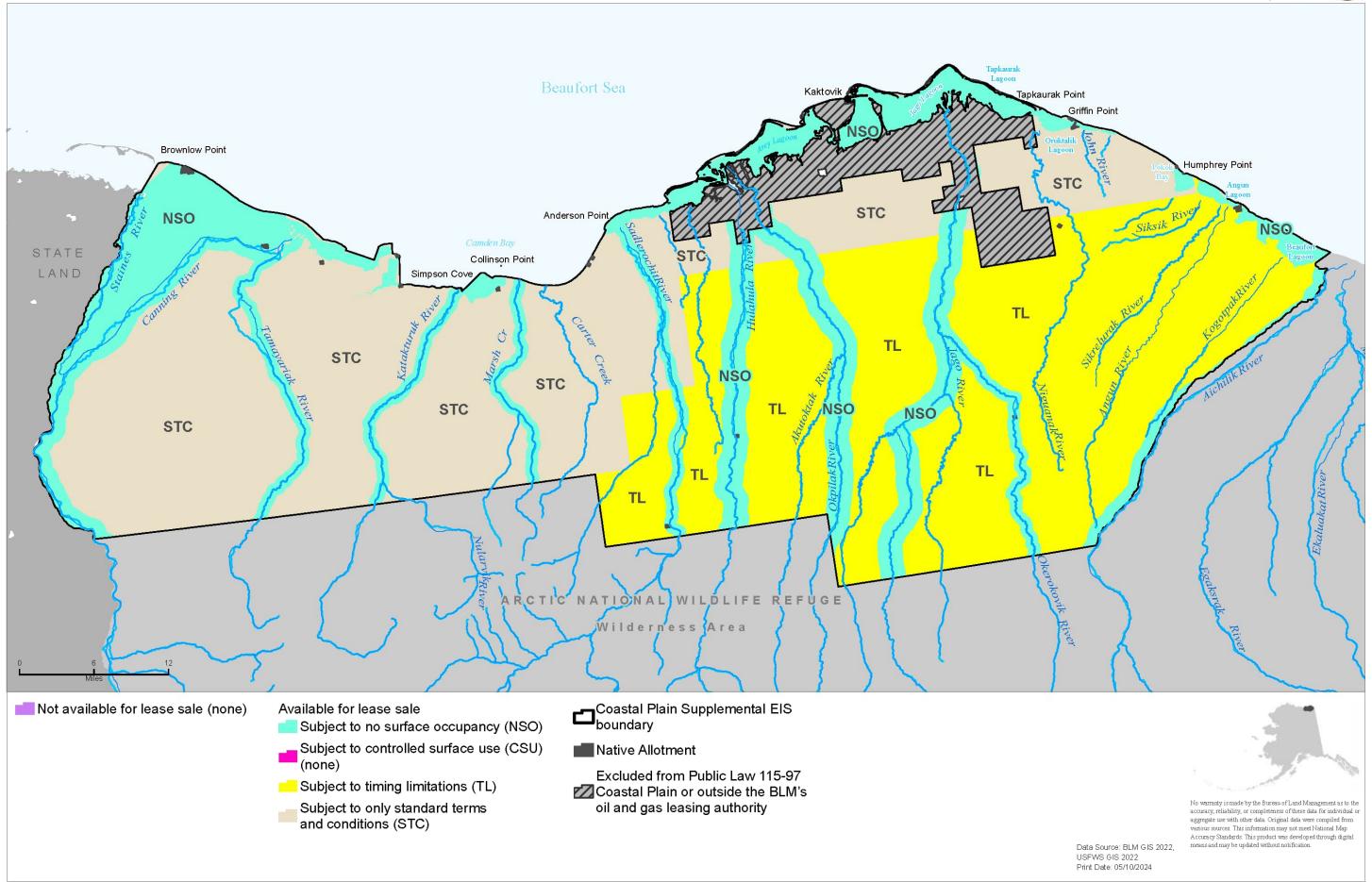
	A. Maps and Figures
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Coastal Plain Oil and Gas Leasing Program	





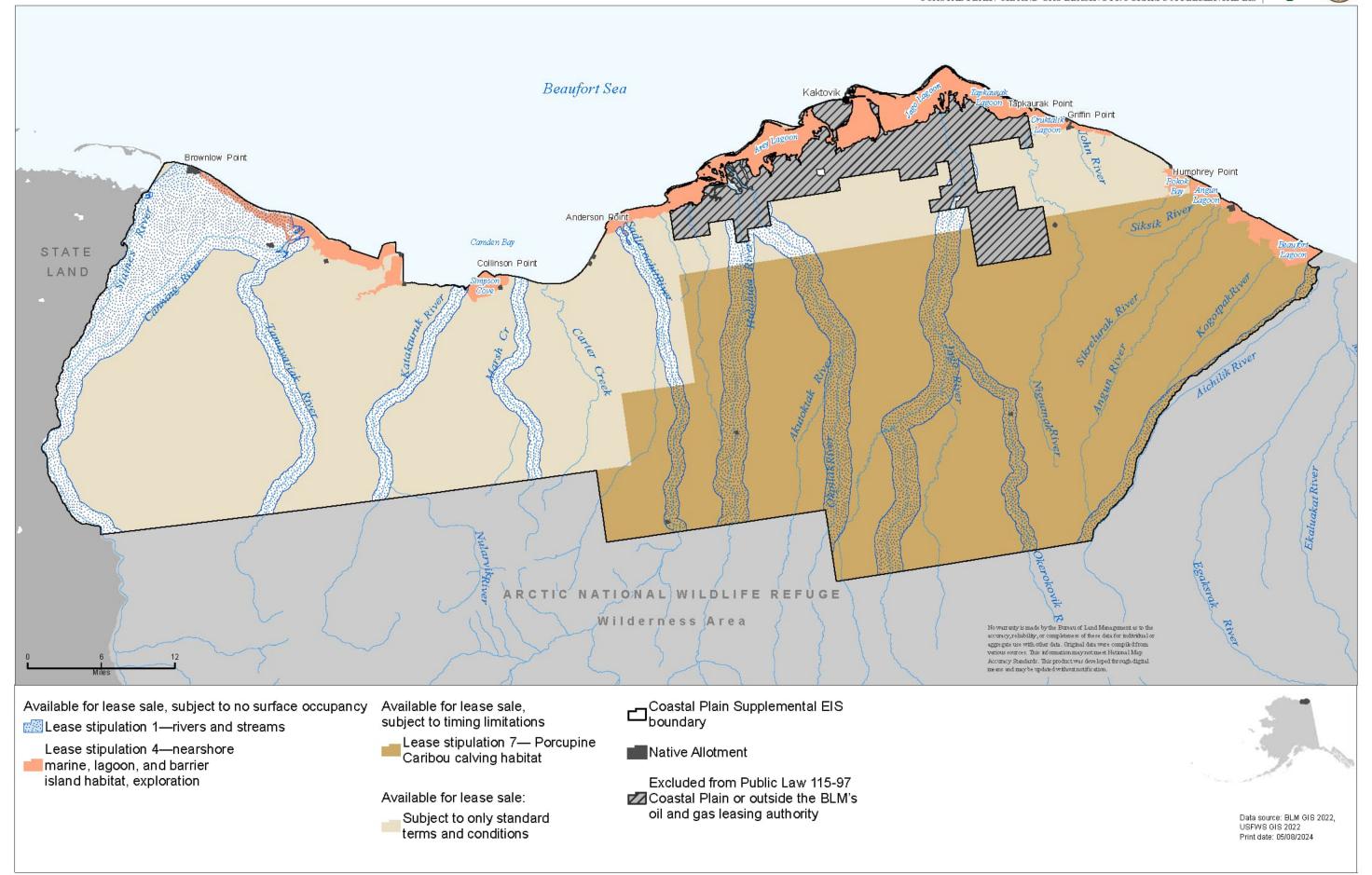




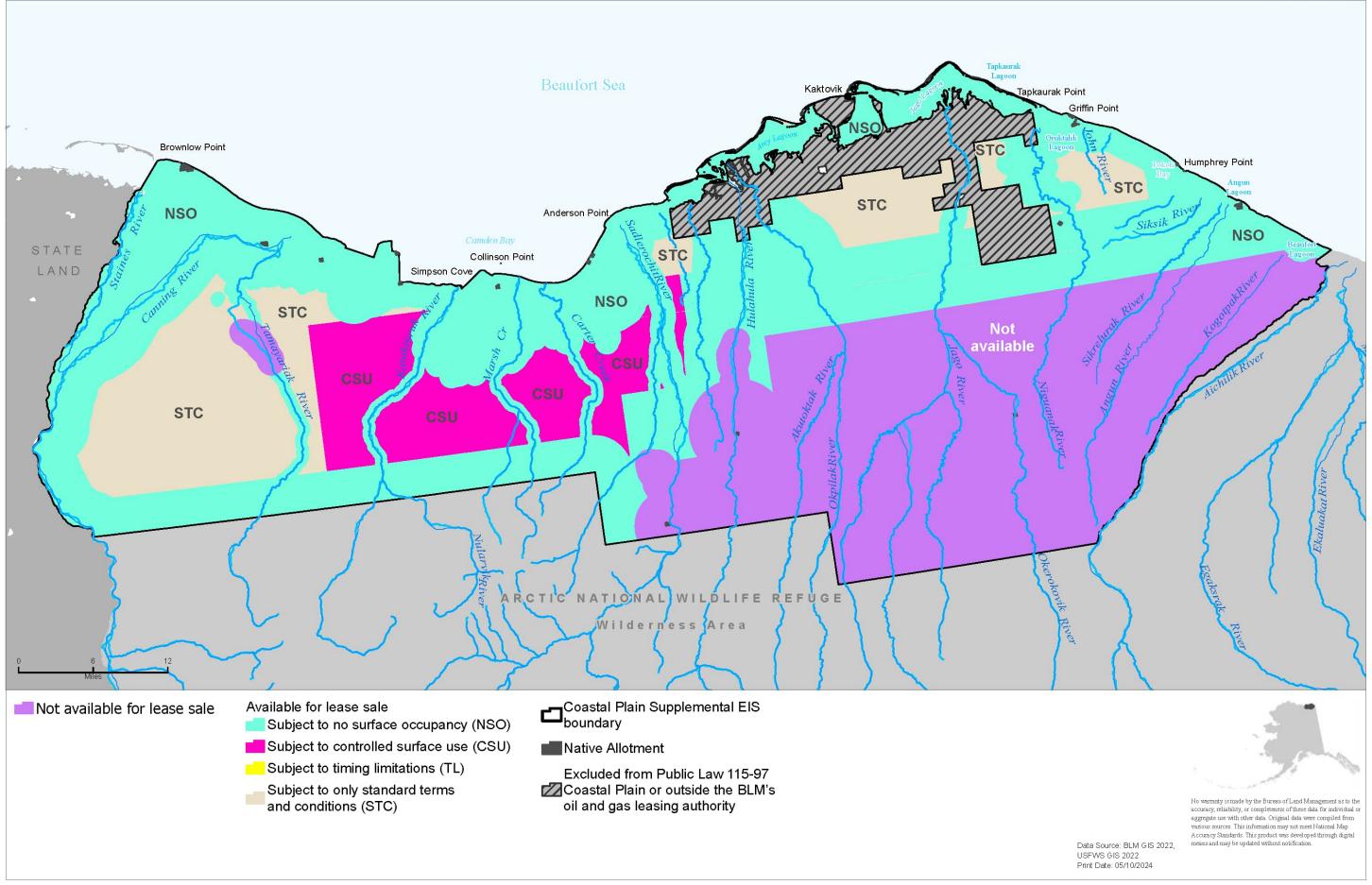






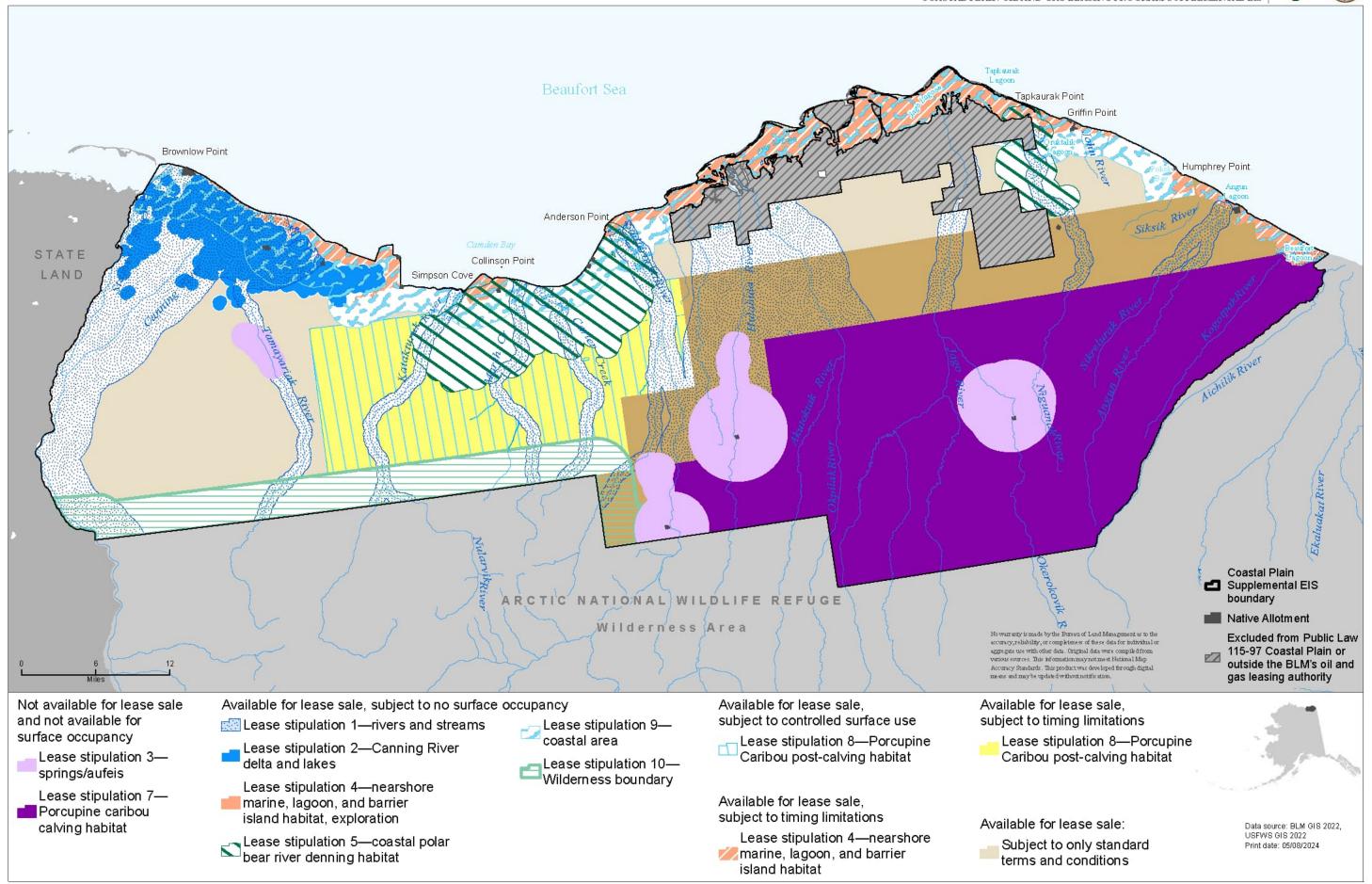




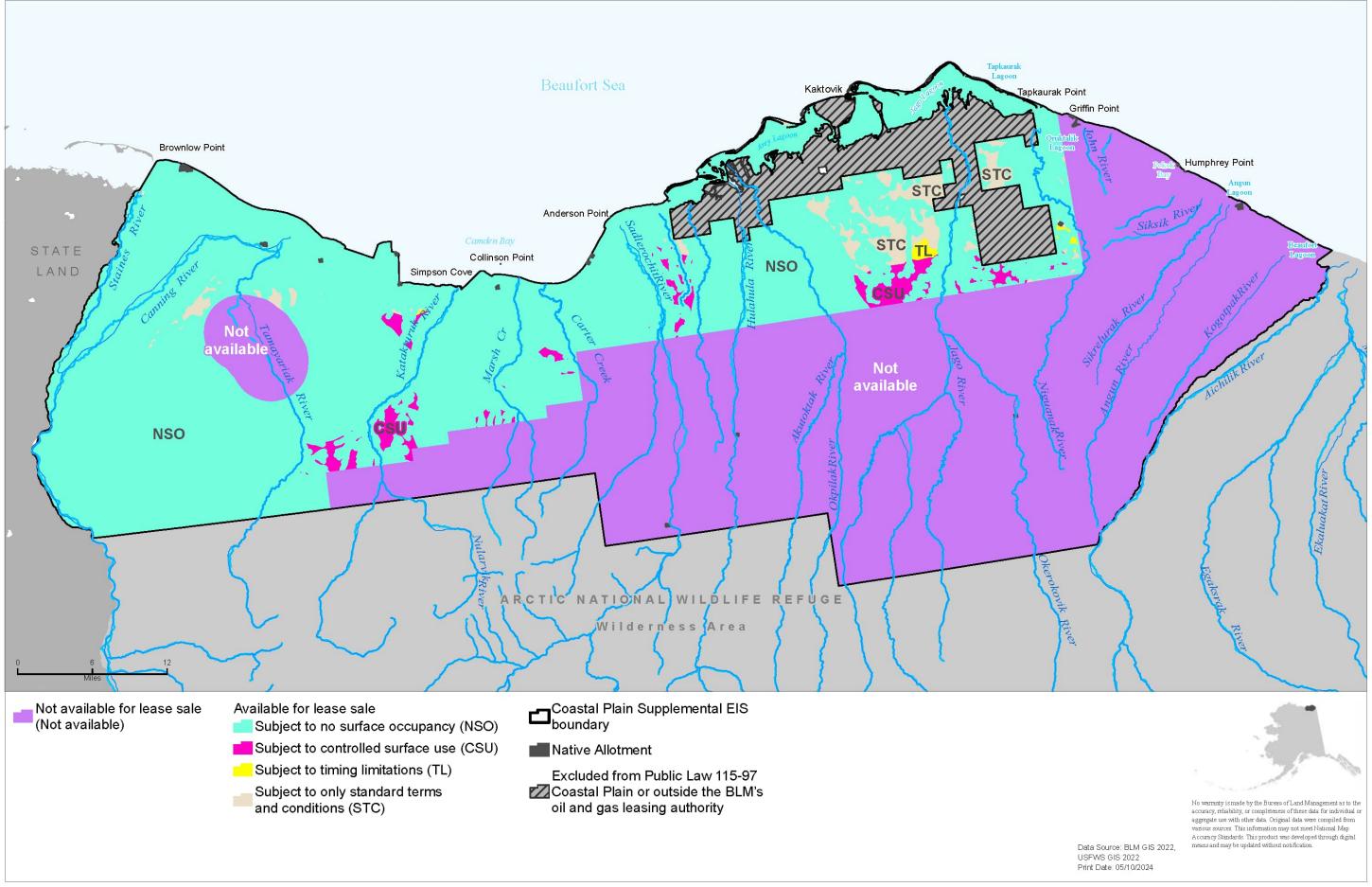






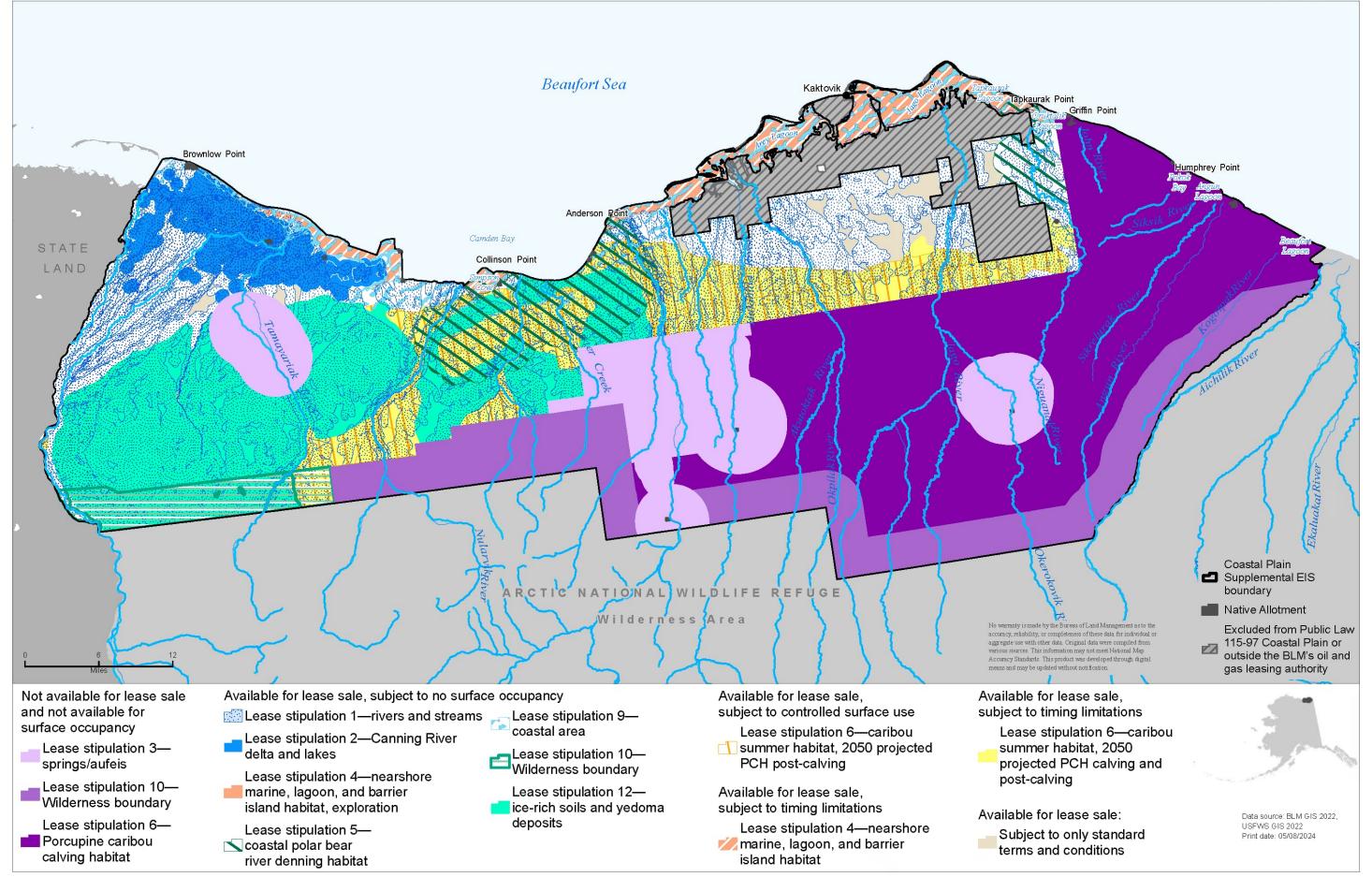




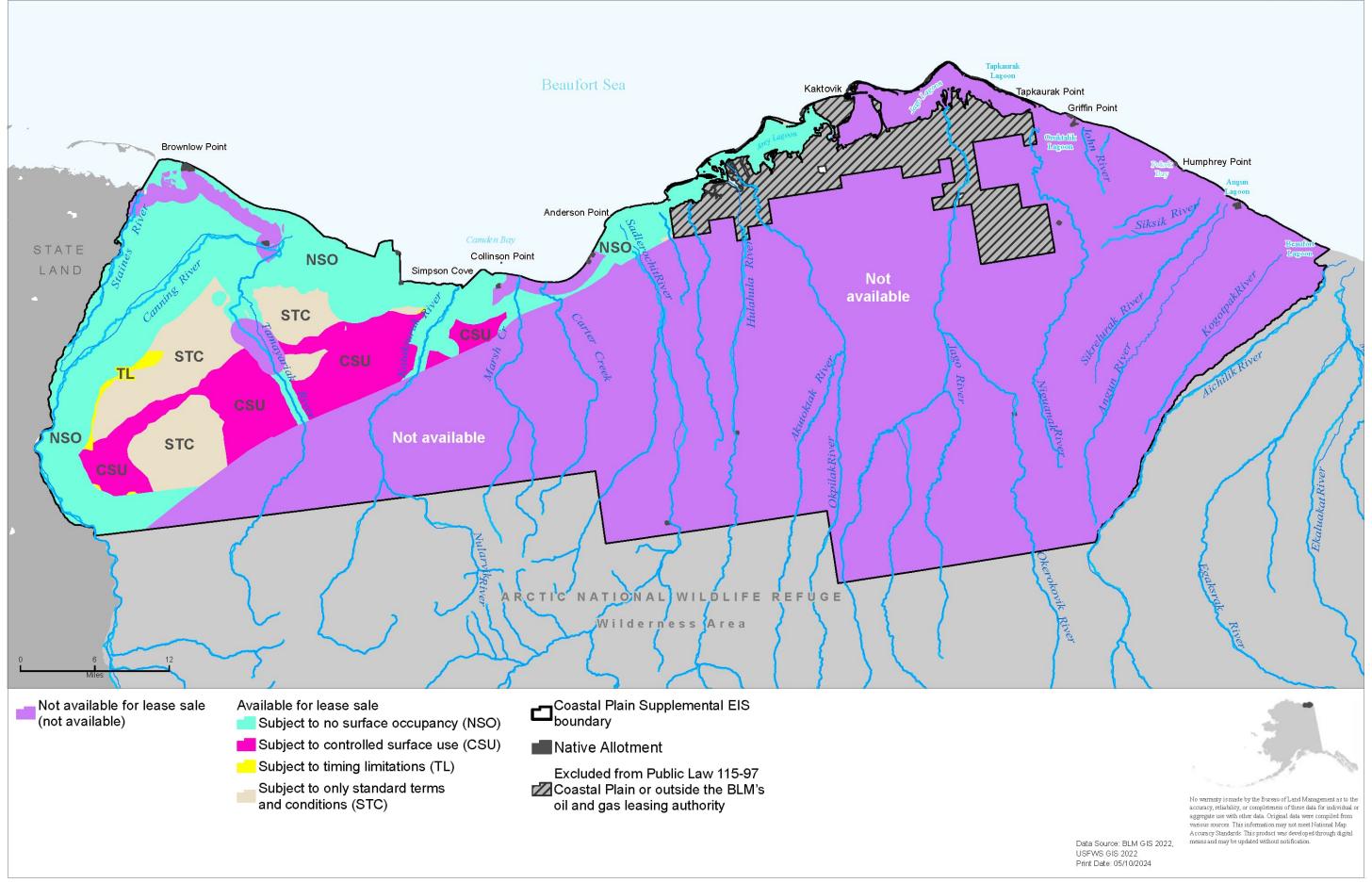






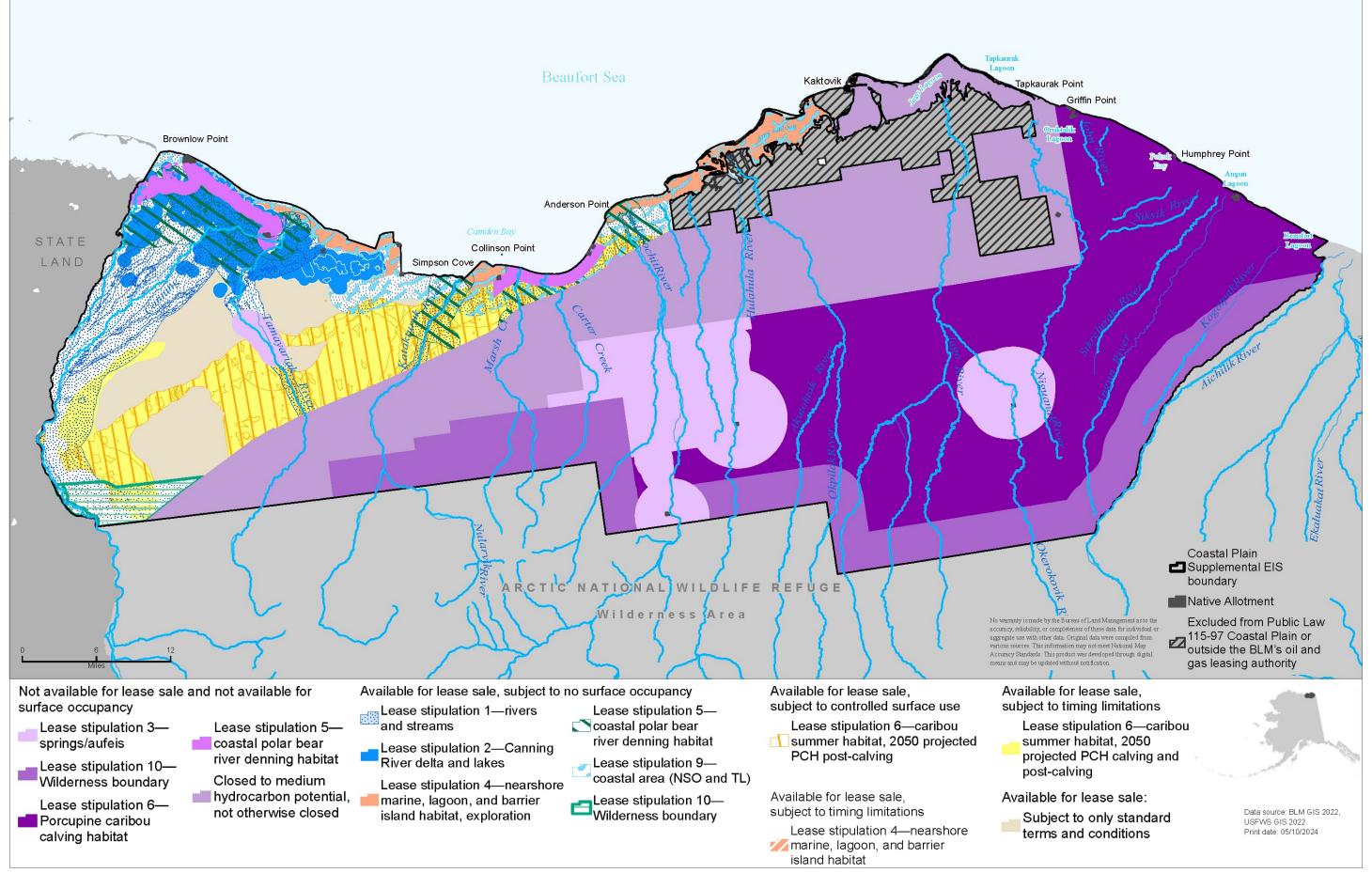




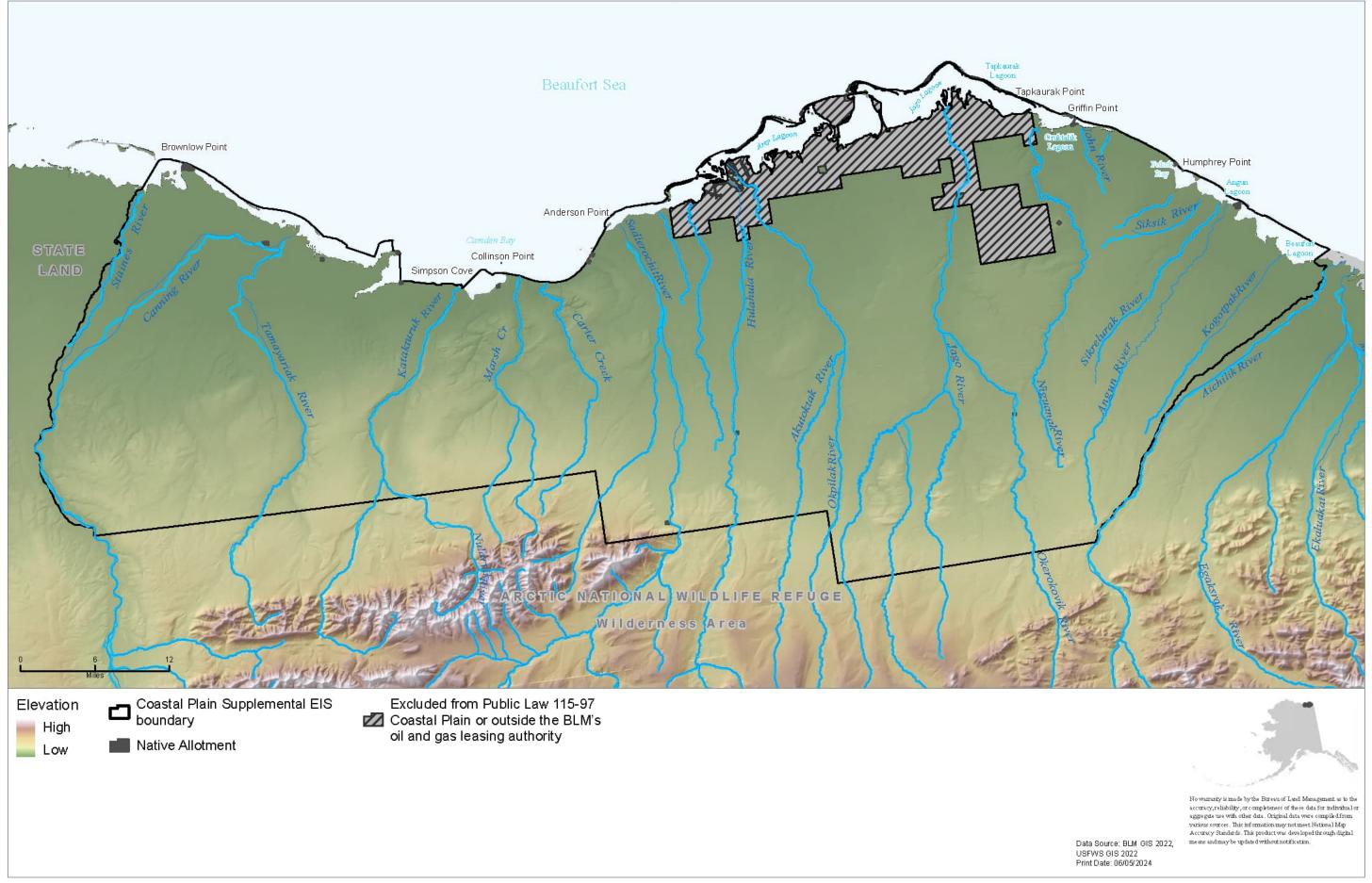






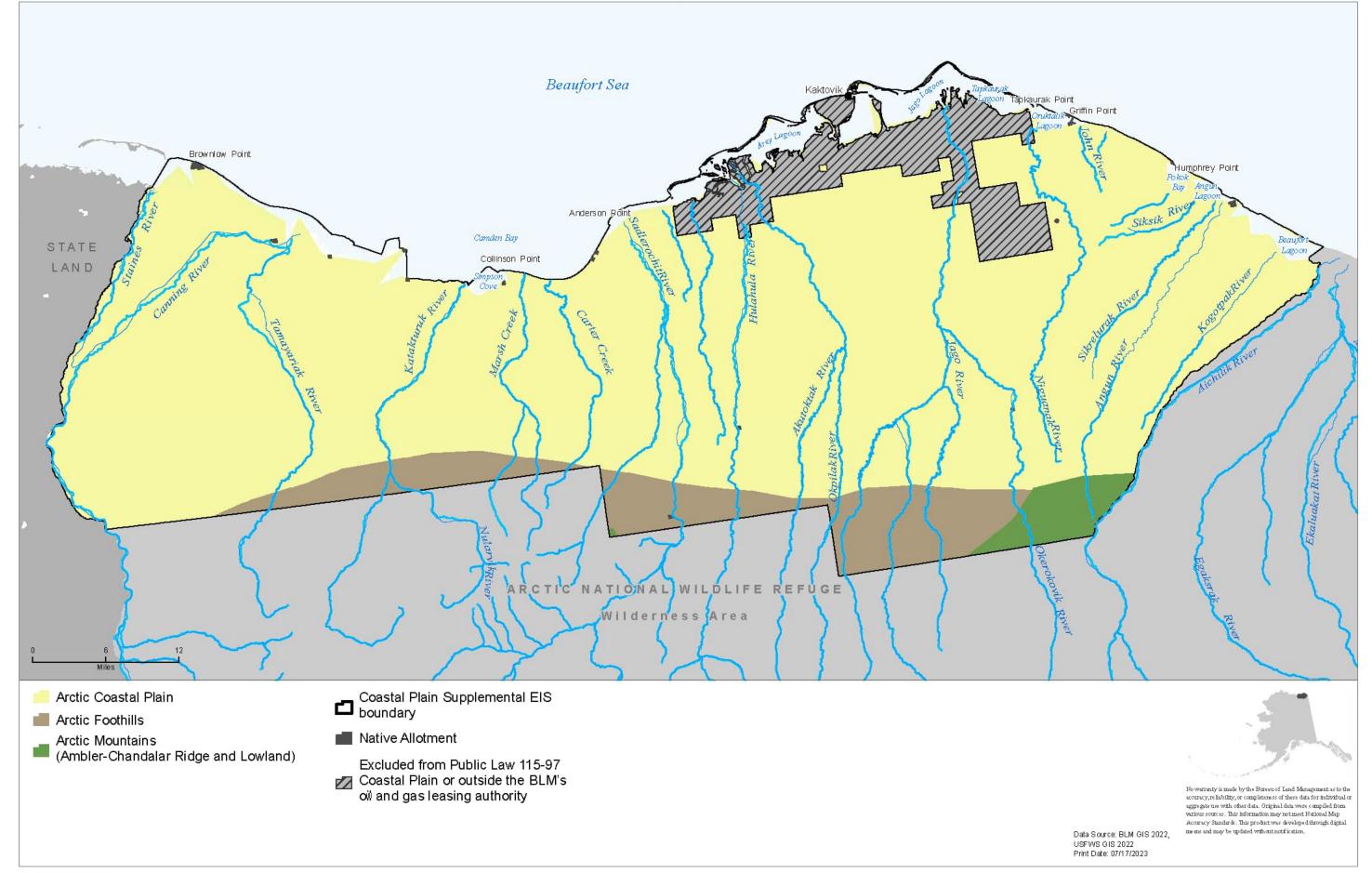








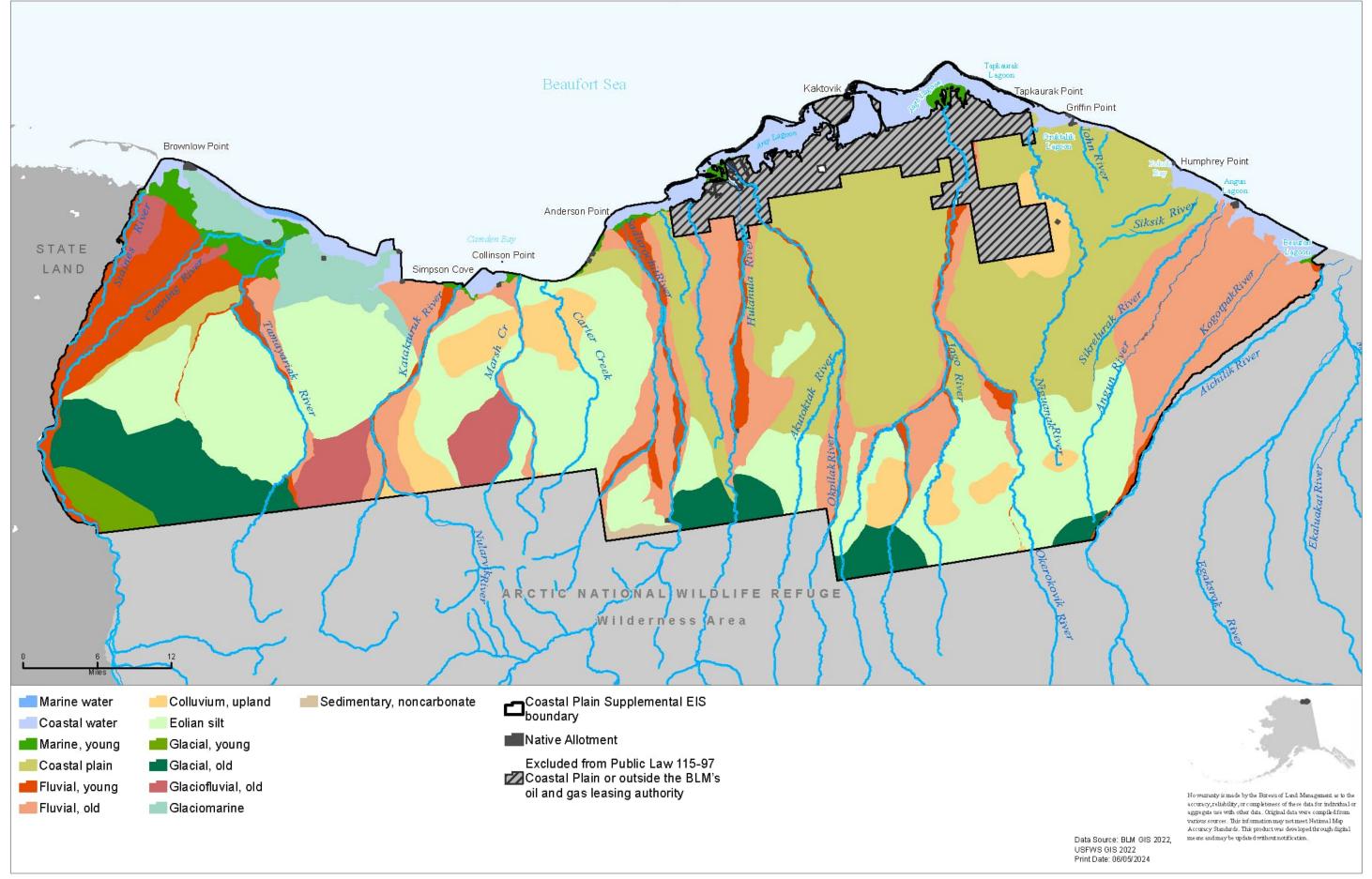




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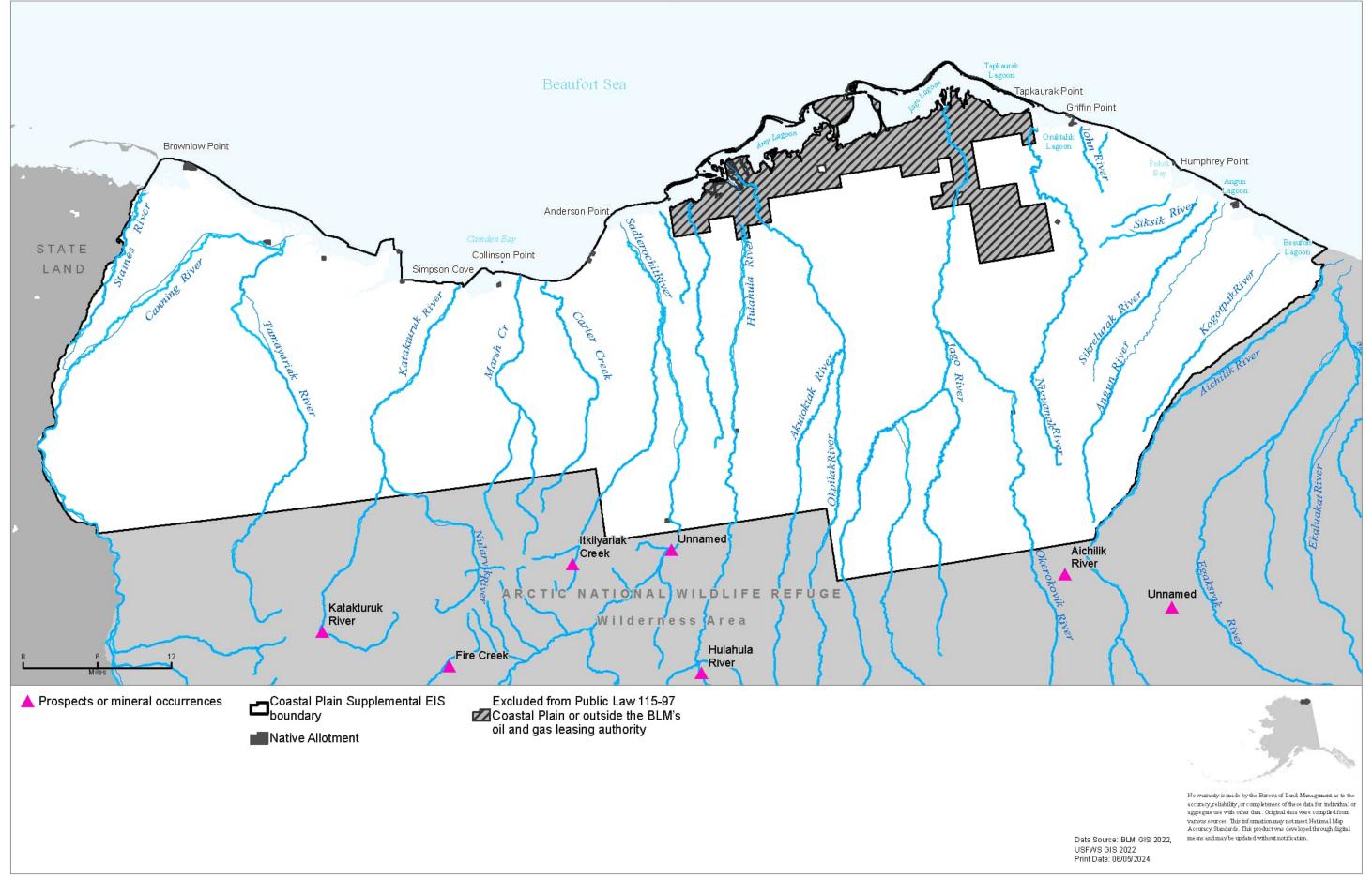






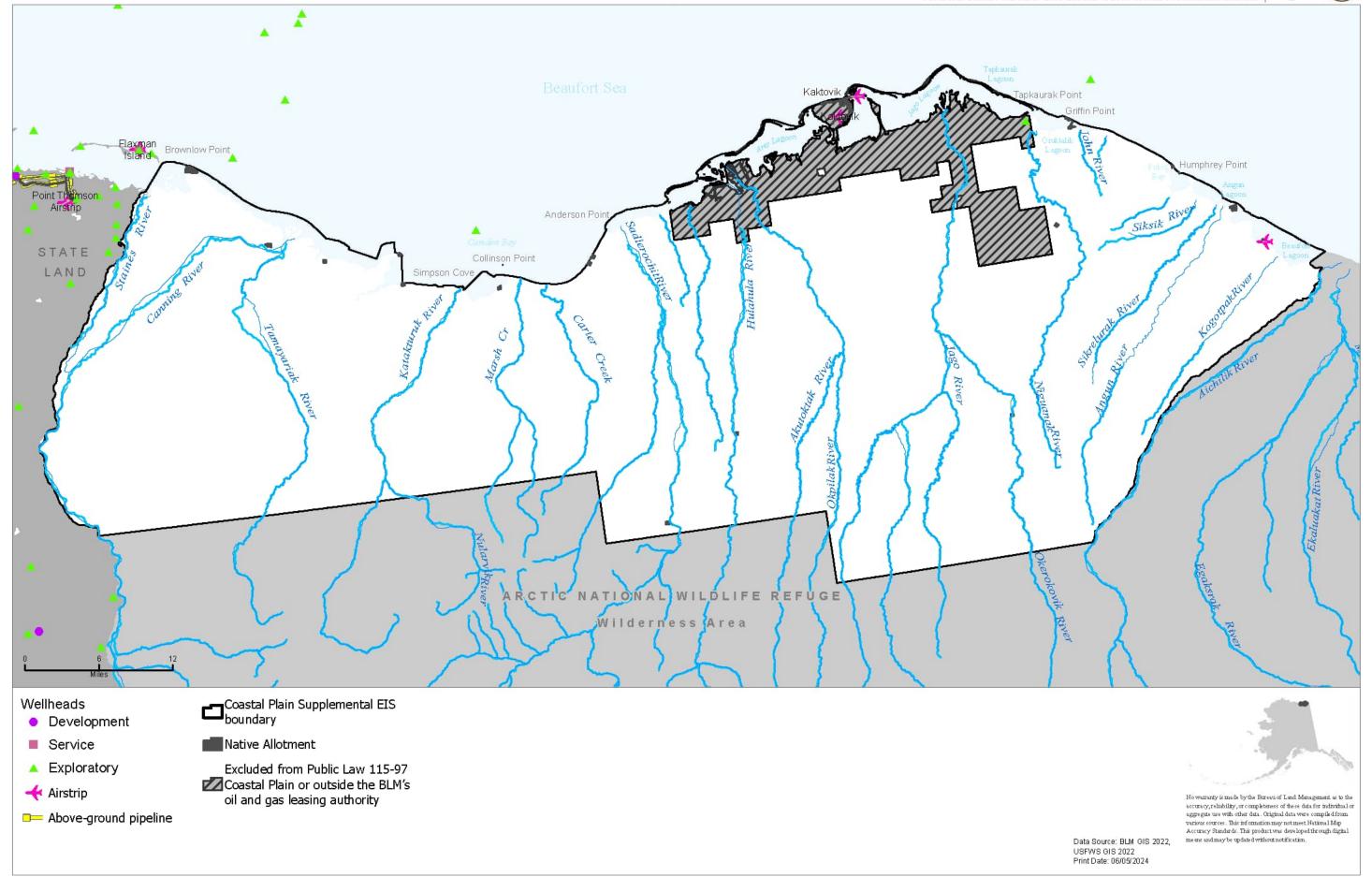






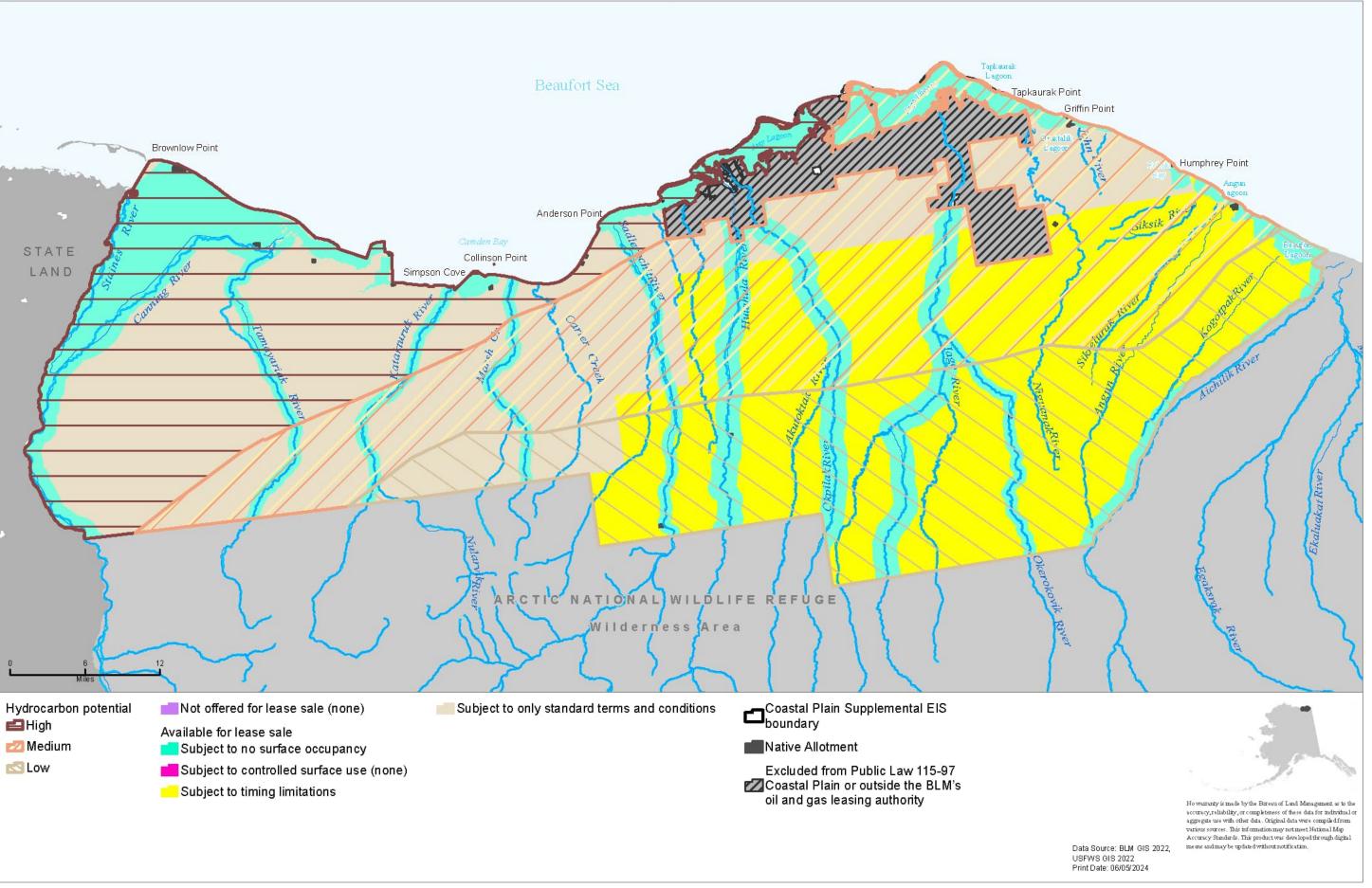






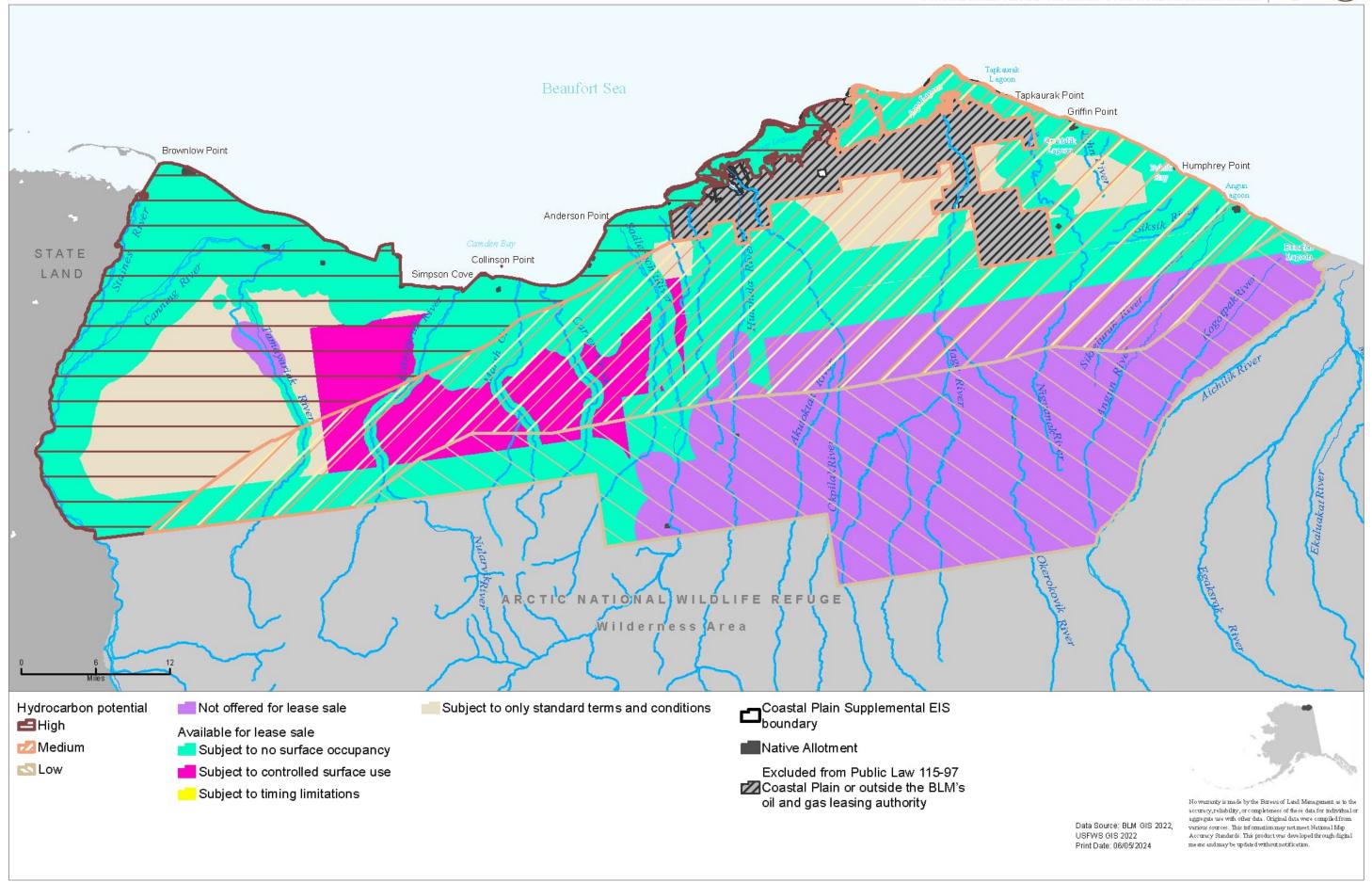






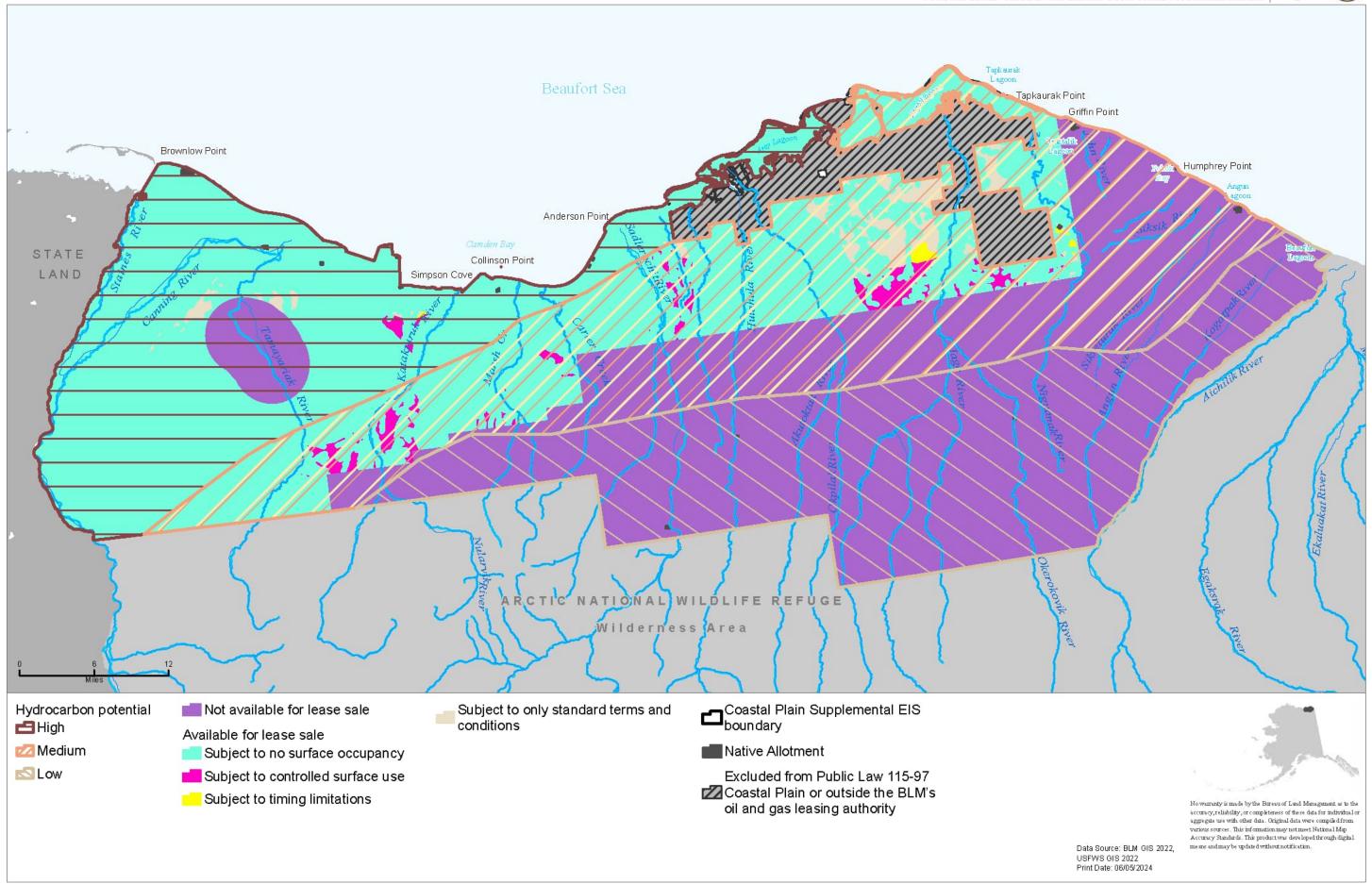






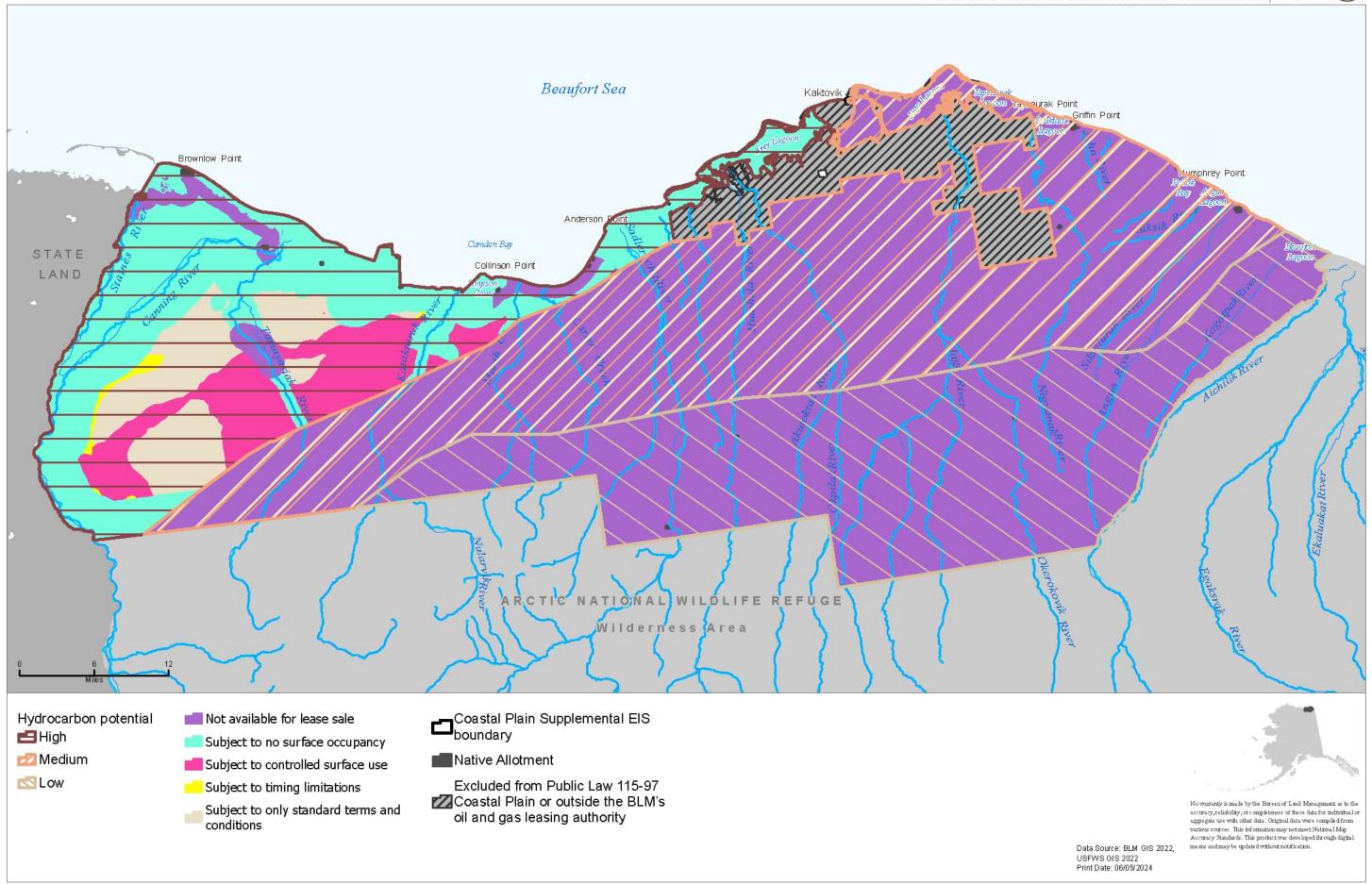


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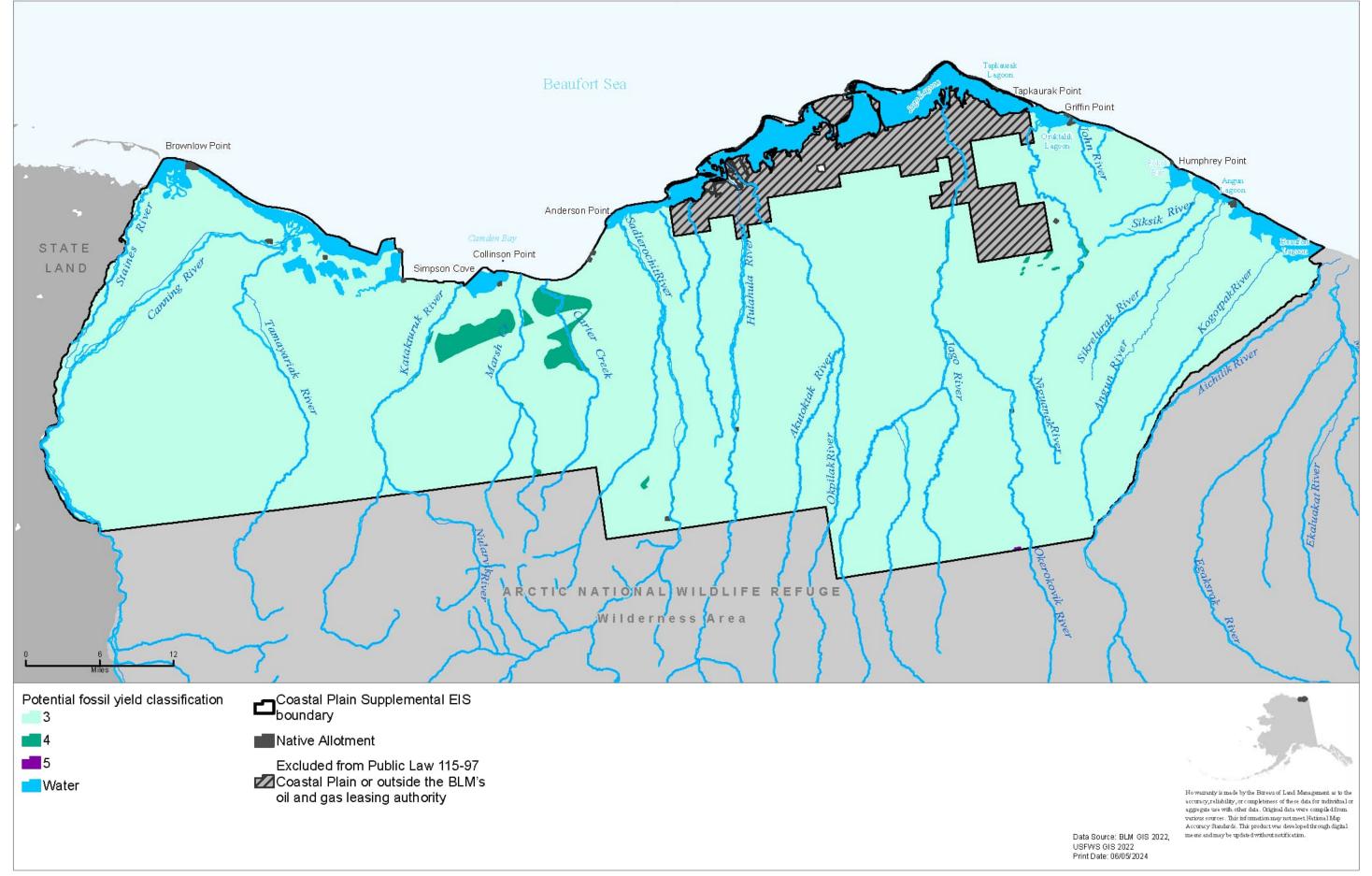






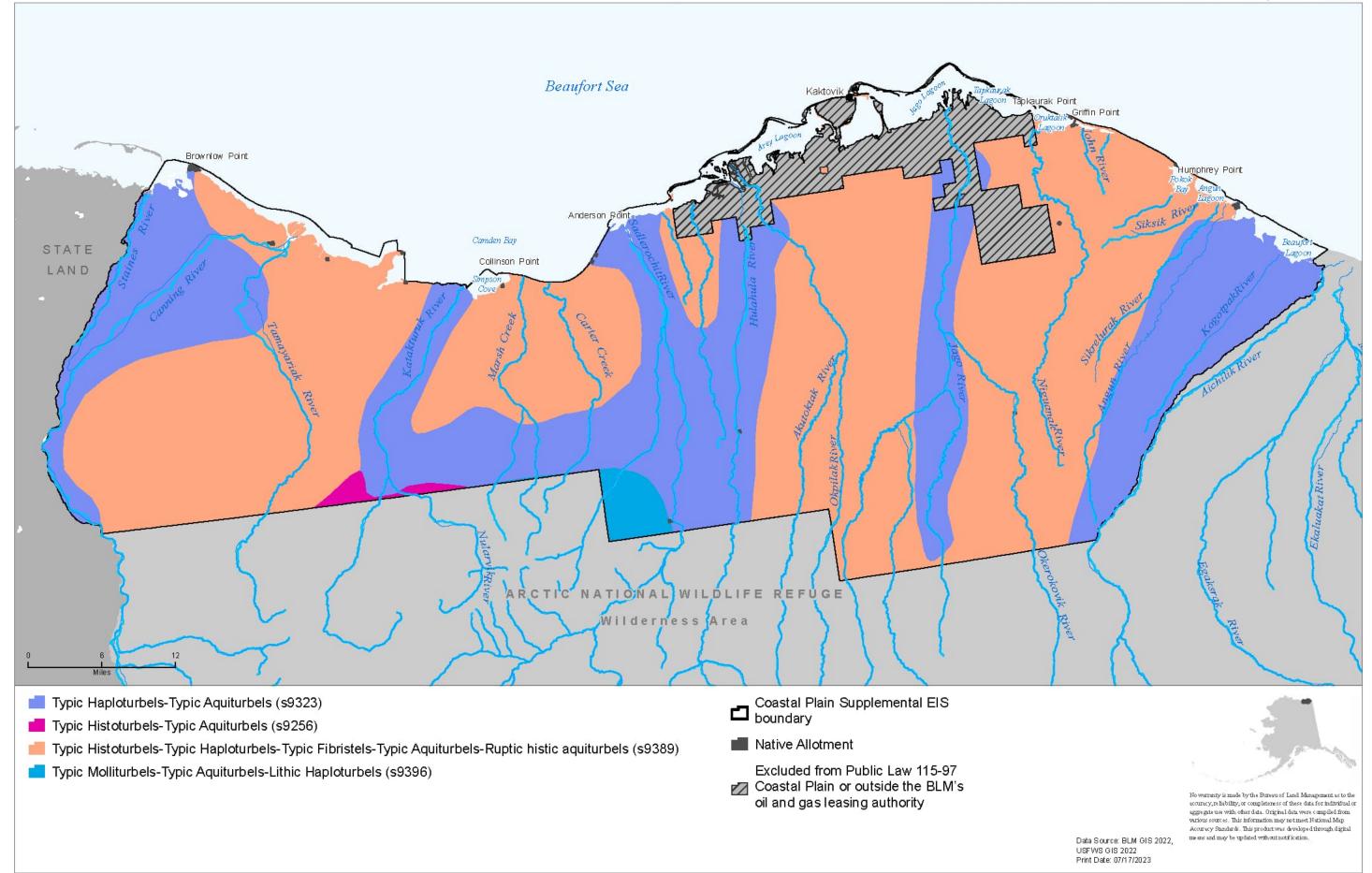




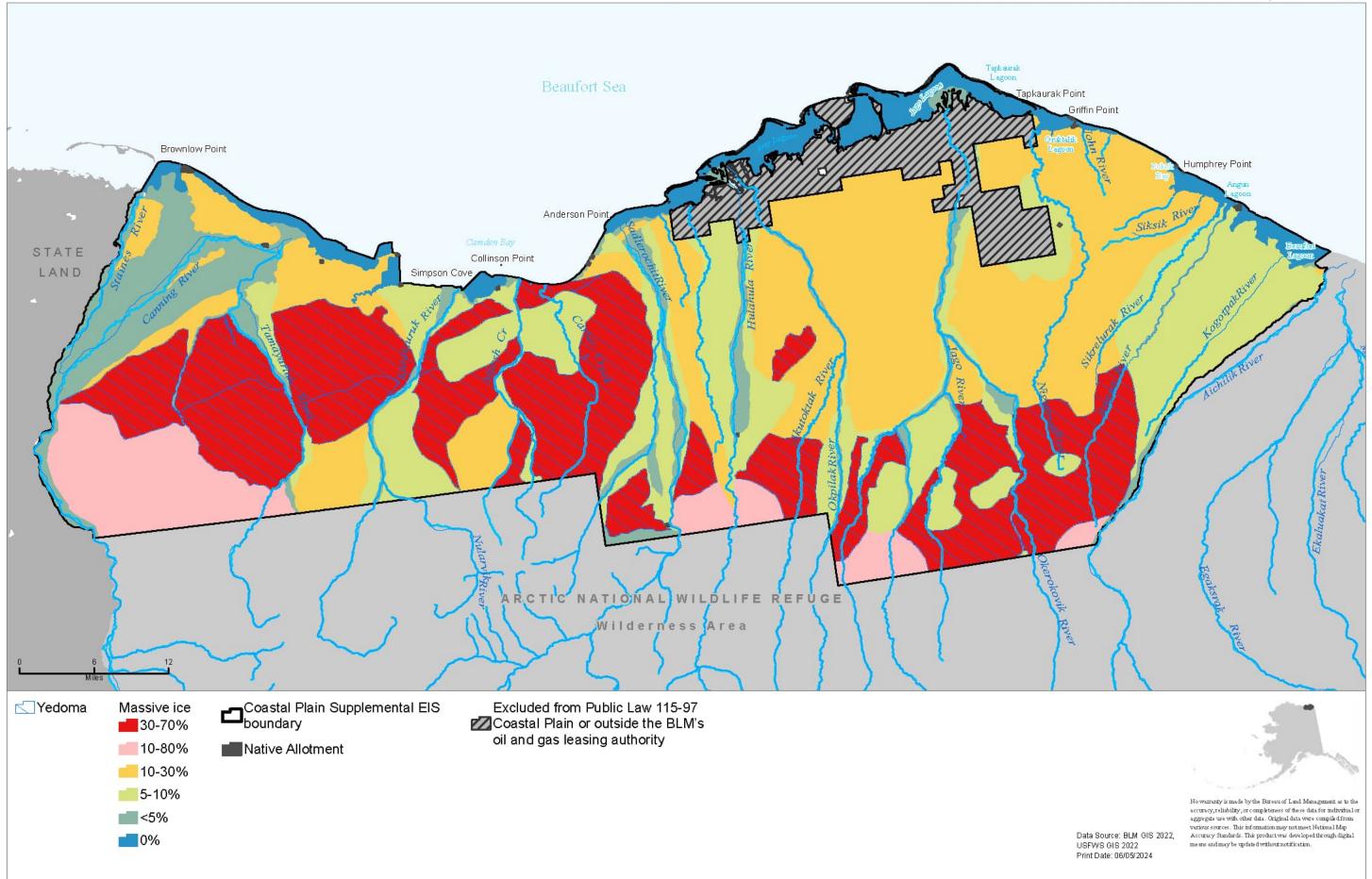






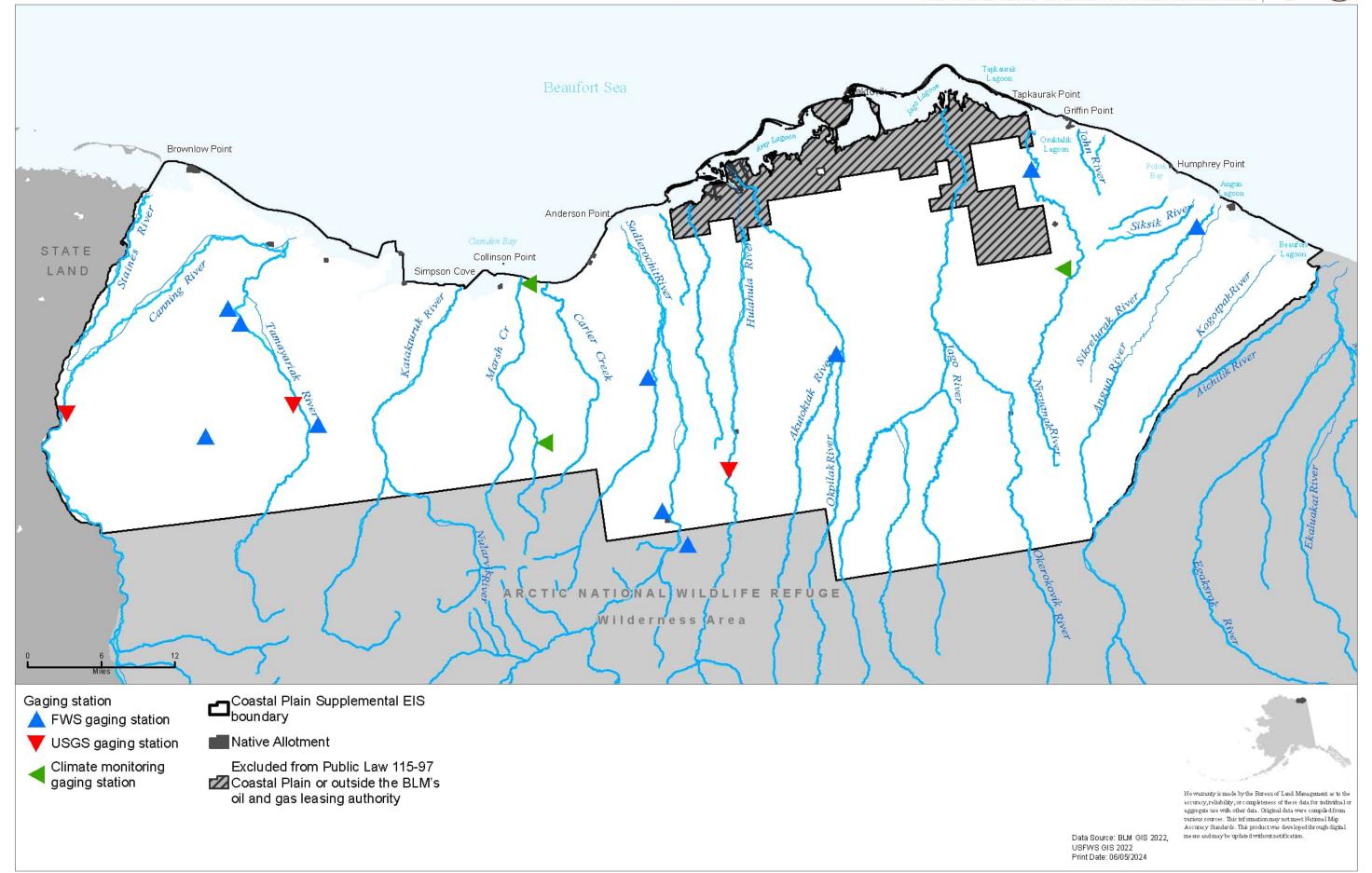




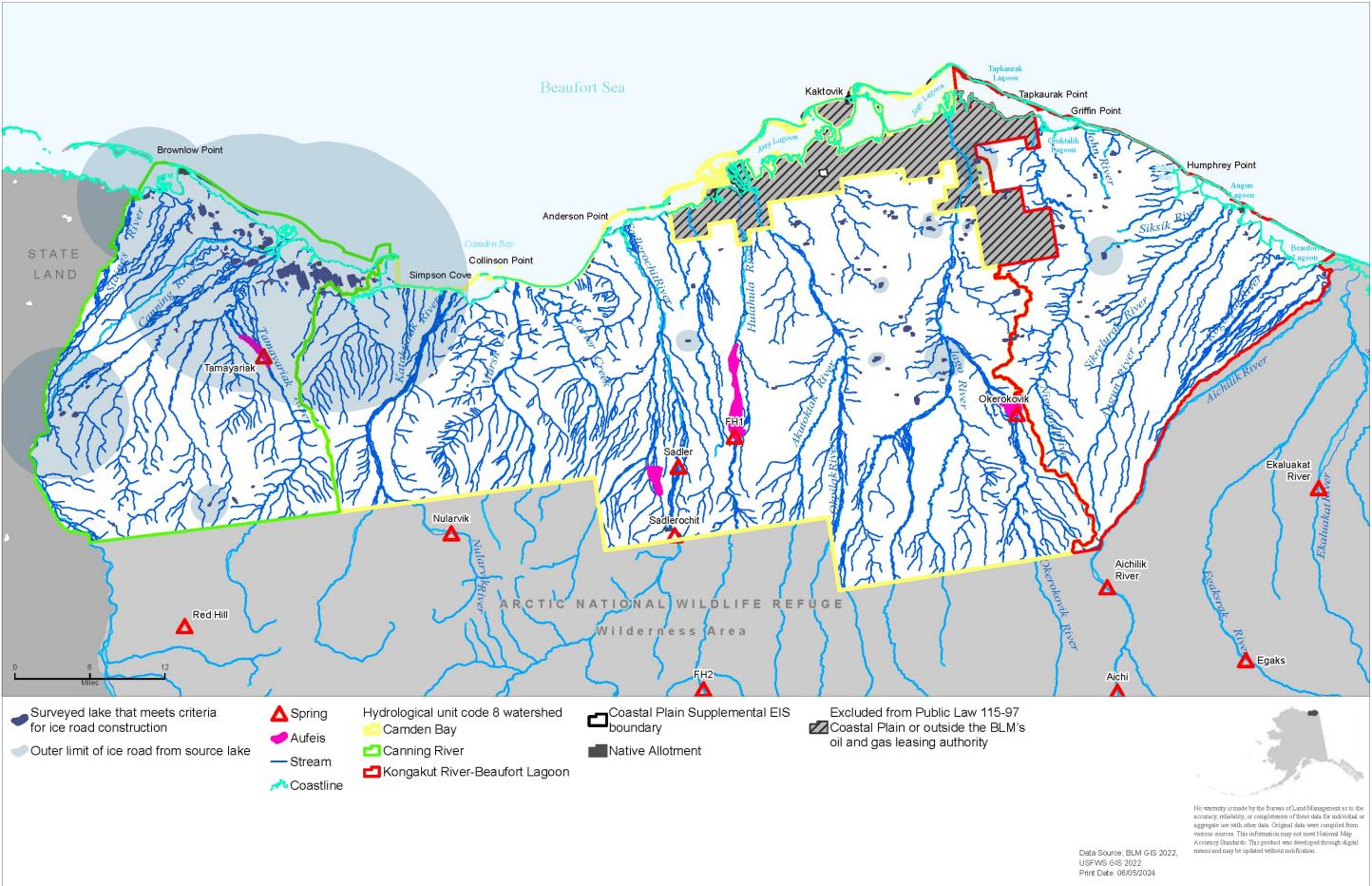




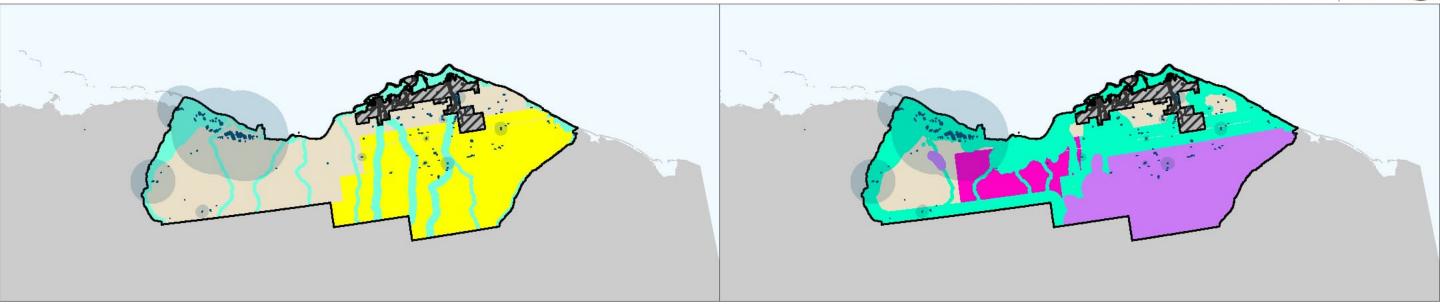












#### Alternative B

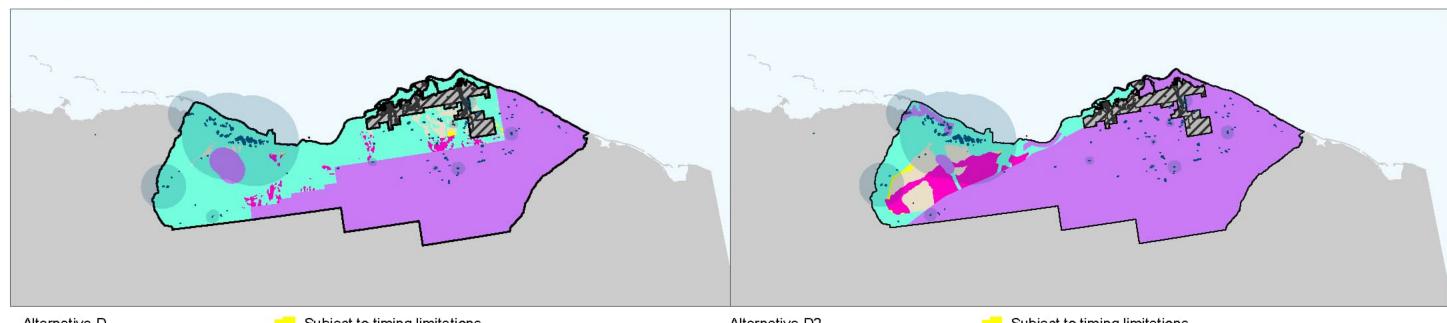
- Subject to no surface occupancy
- Subject to timing limitation
- Subject to only standard terms and conditions
- Surveyed lake that meets criteria for ice road construction
- Outer limit of ice road from source lake
- Coastal Plain Supplemental EIS boundary
- Excluded from Public Law 115-97 Coastal Plain or outside the BLM's oil and gas leasing authority

### Alternative C

Not available for lease sale

Available for lease sale

- Subject to no surface occupancy
- Subject to controlled surface use Subject to timing limitations
- Subject to only standard terms and conditions
- Surveyed lake that meets criteria for ice road construction
- Outer limit of ice road from source lake



## Alternative D

Not available for lease sale

Available for lease sale

- Subject to no surface occupancy
- Subject to controlled surface use
- Subject to timing limitations
- Subject to only standard terms and conditions
- Surveyed lake that meets criteria for ice road construction
- Outer limit of ice road from source lake

## Alternative D2

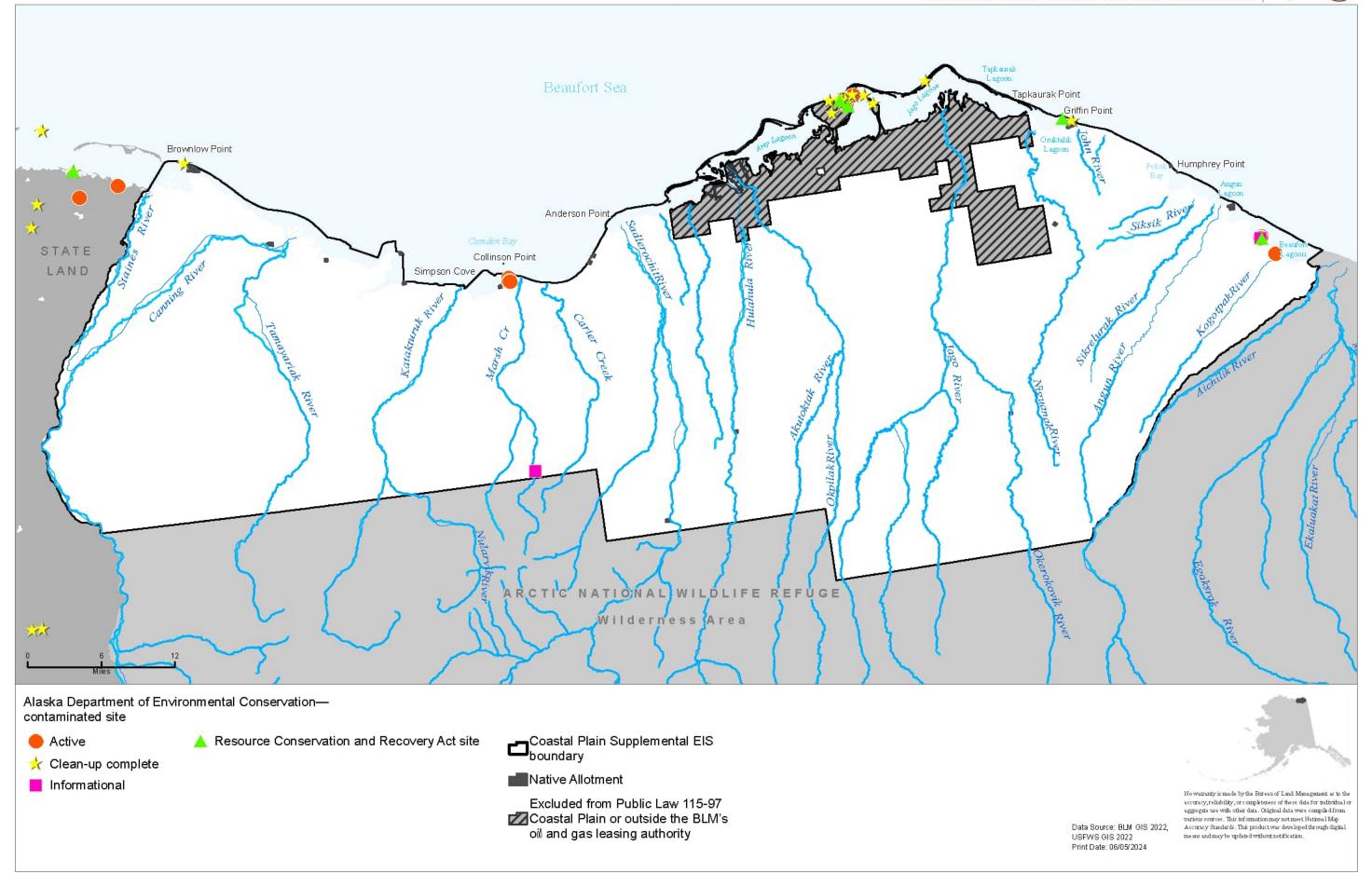
Not available for lease sale

Available for lease sale

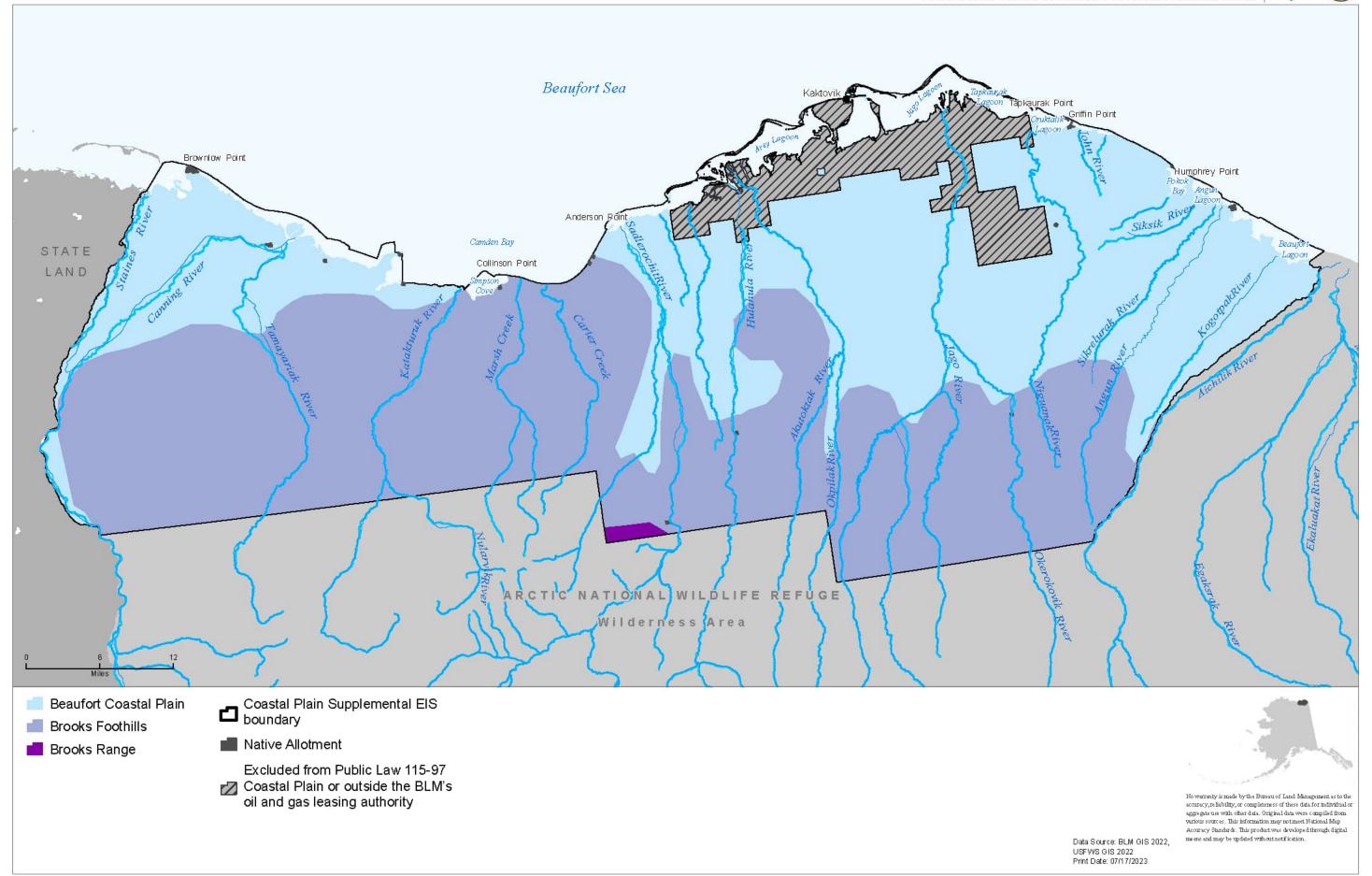
- Subject to no surface occupancy
- Subject to controlled surface use
- Subject to timing limitations
- Subject to only standard terms and conditions
- Surveyed lake that meets criteria for ice road construction
- Outer limit of ice road from source lake



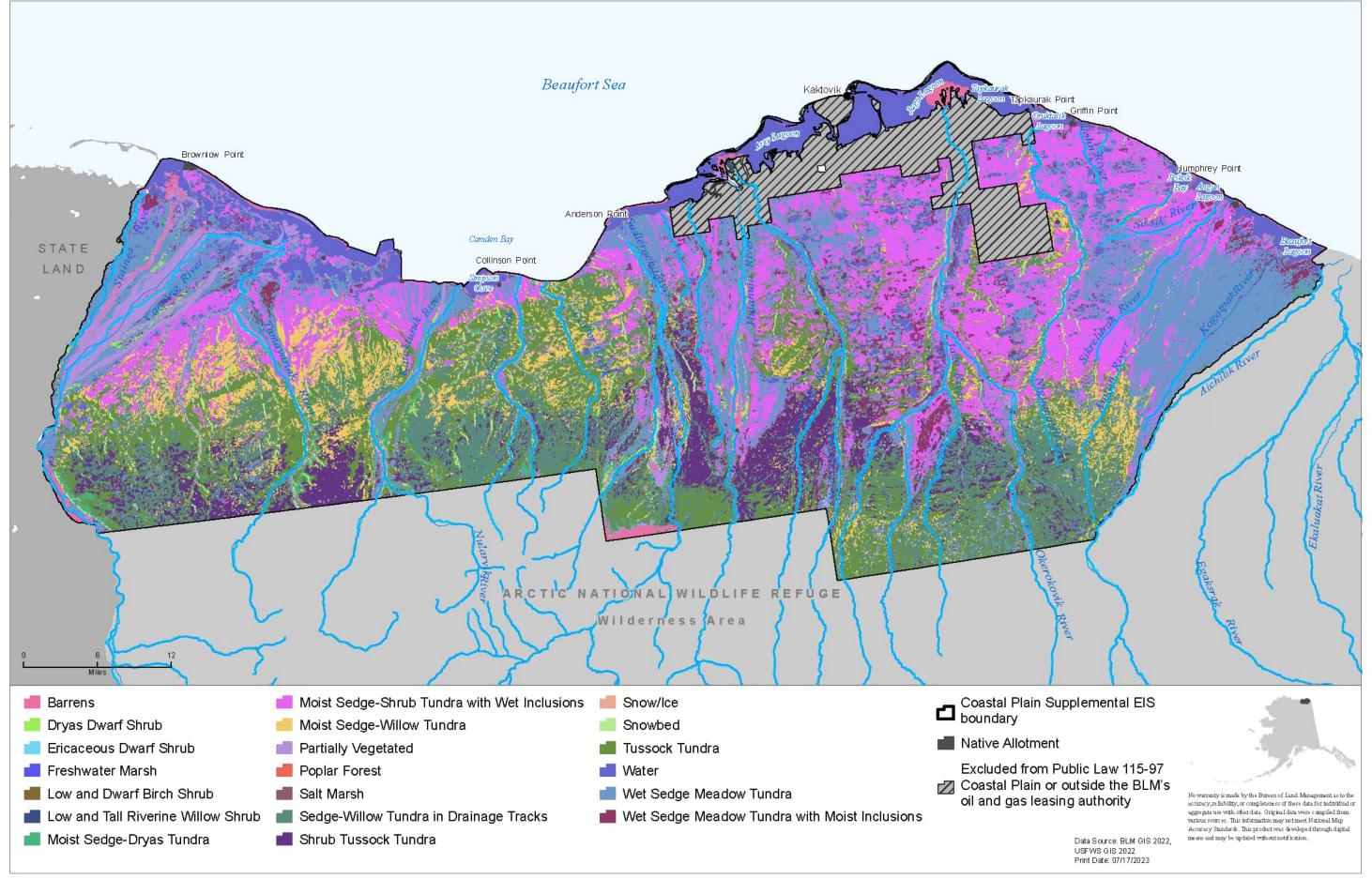




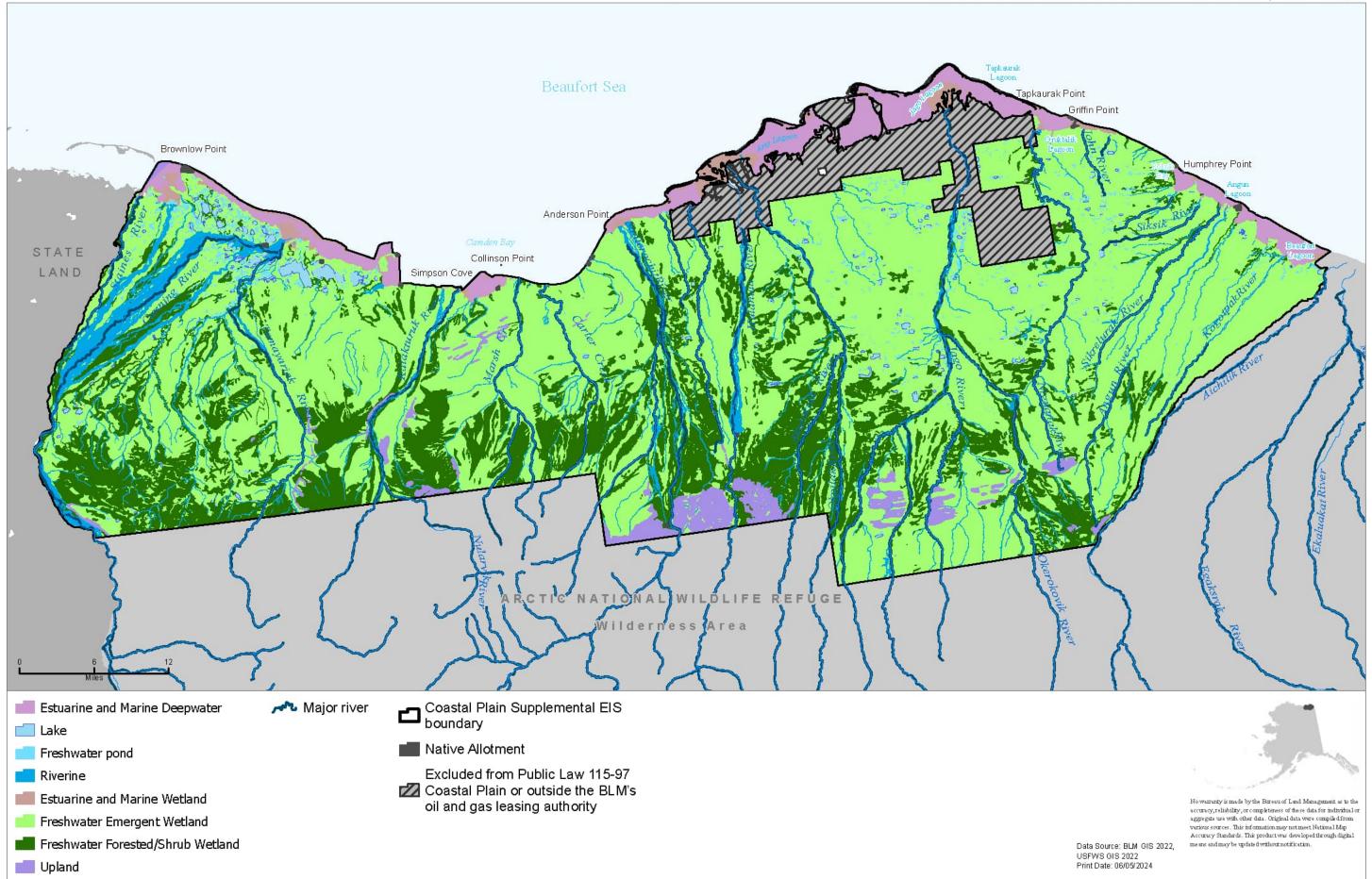






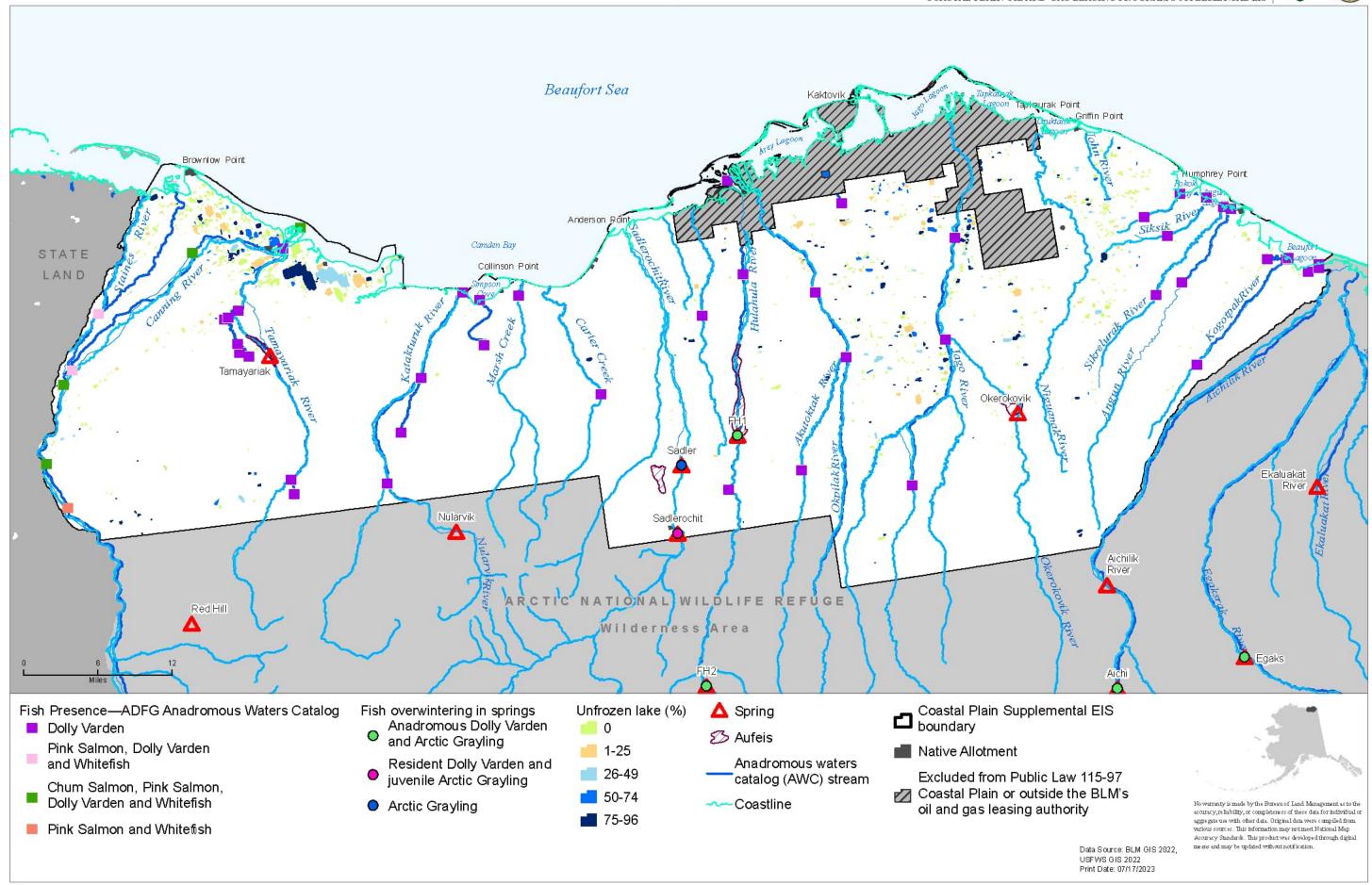






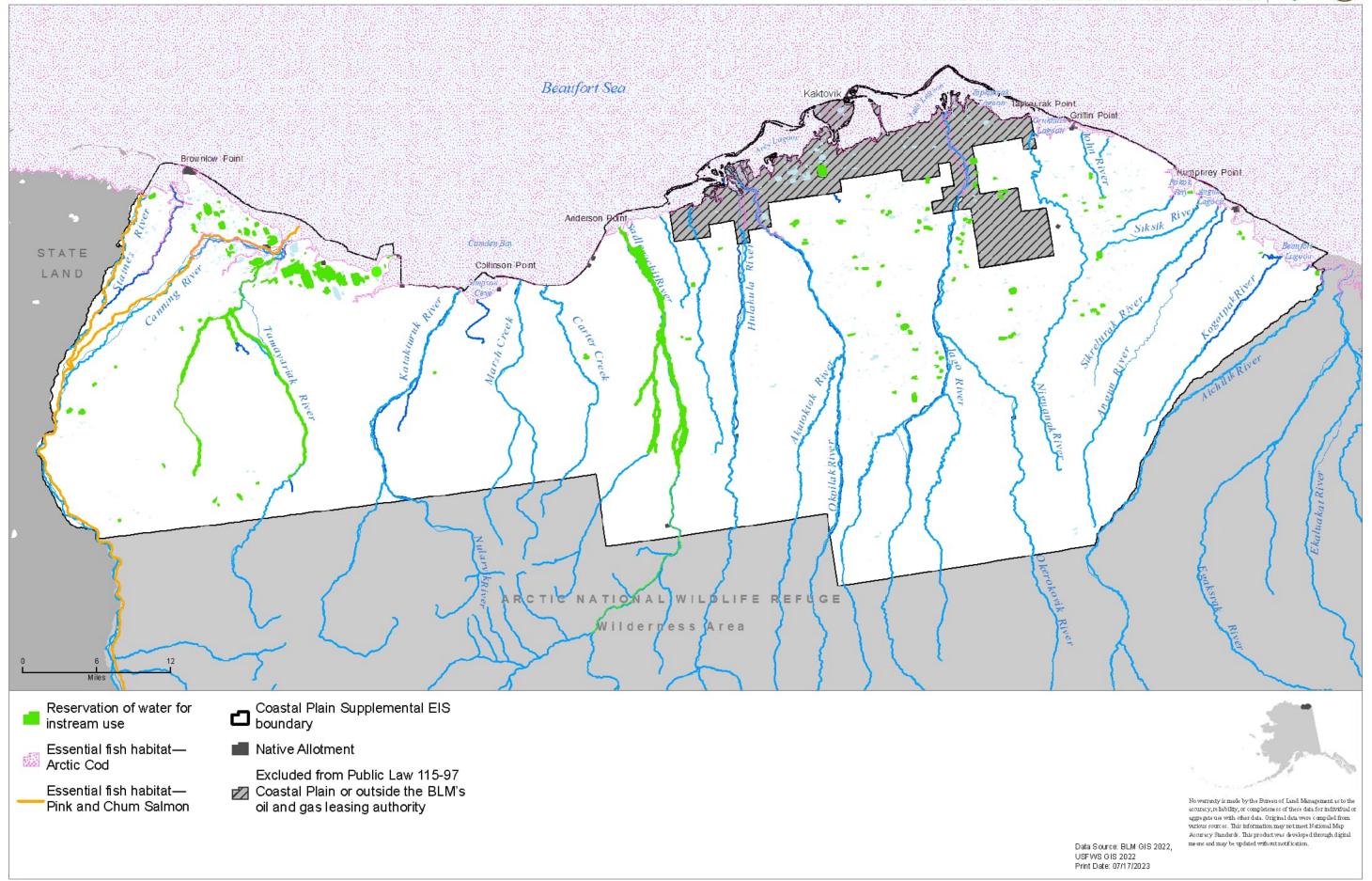


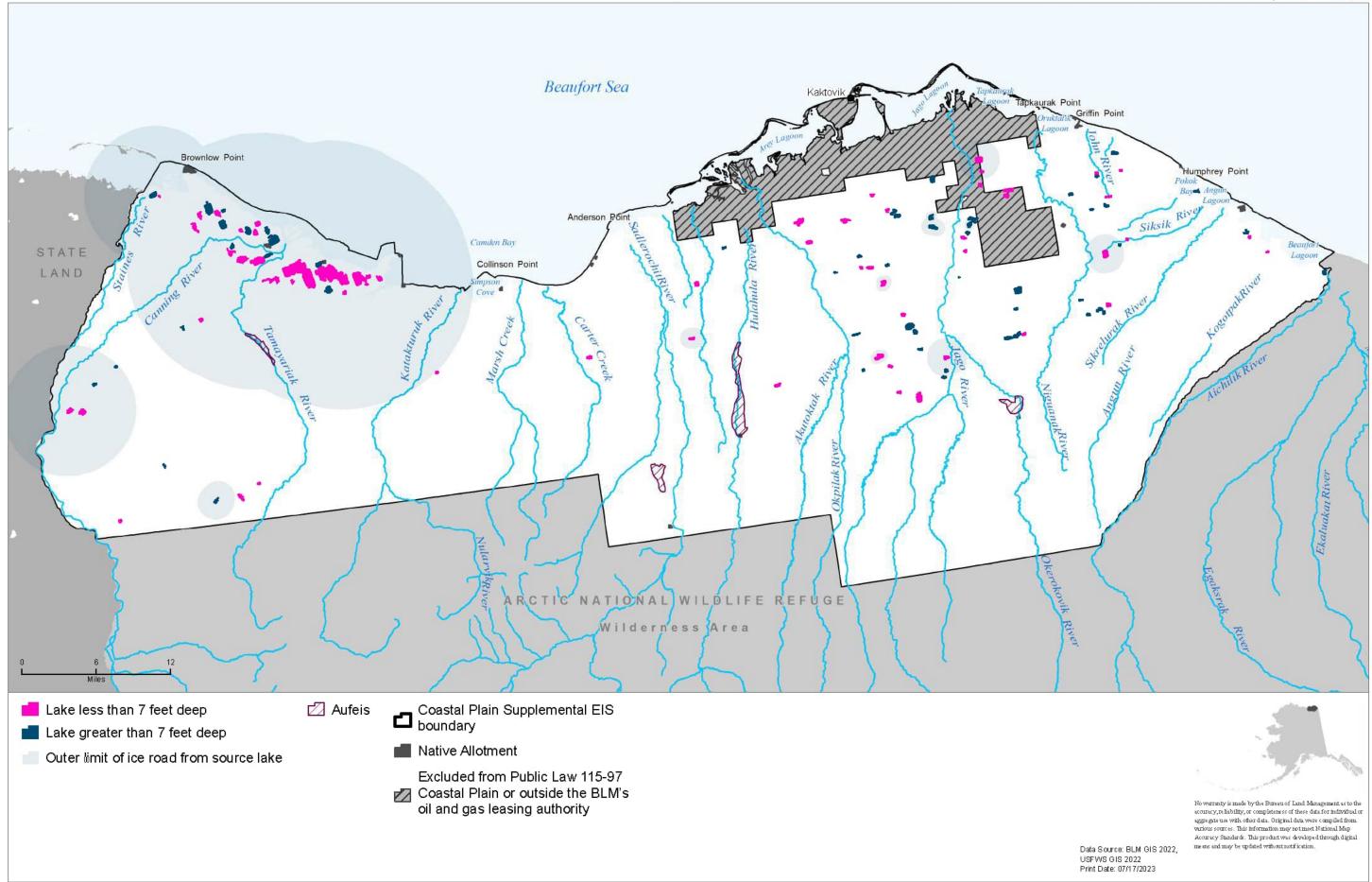






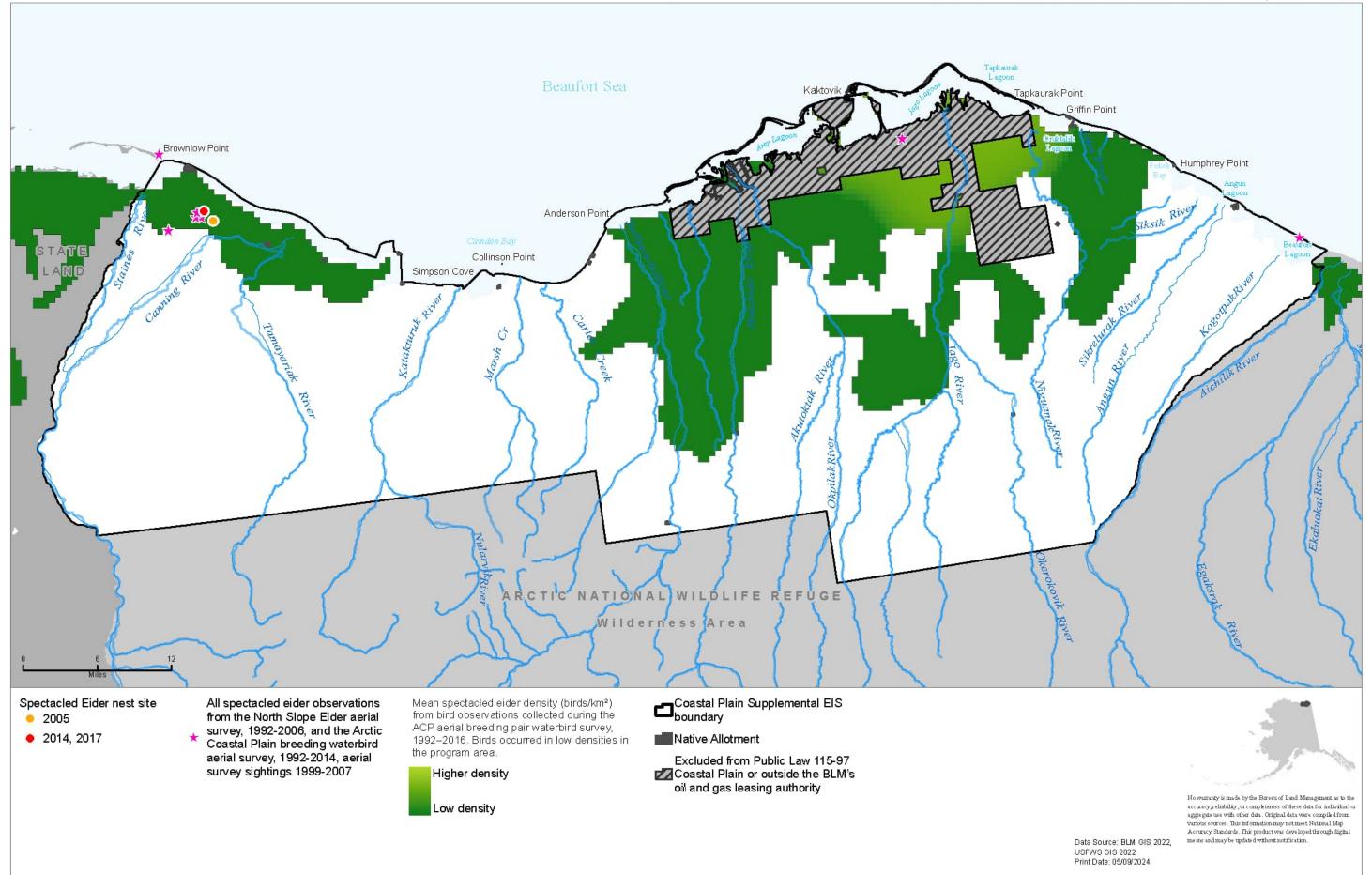




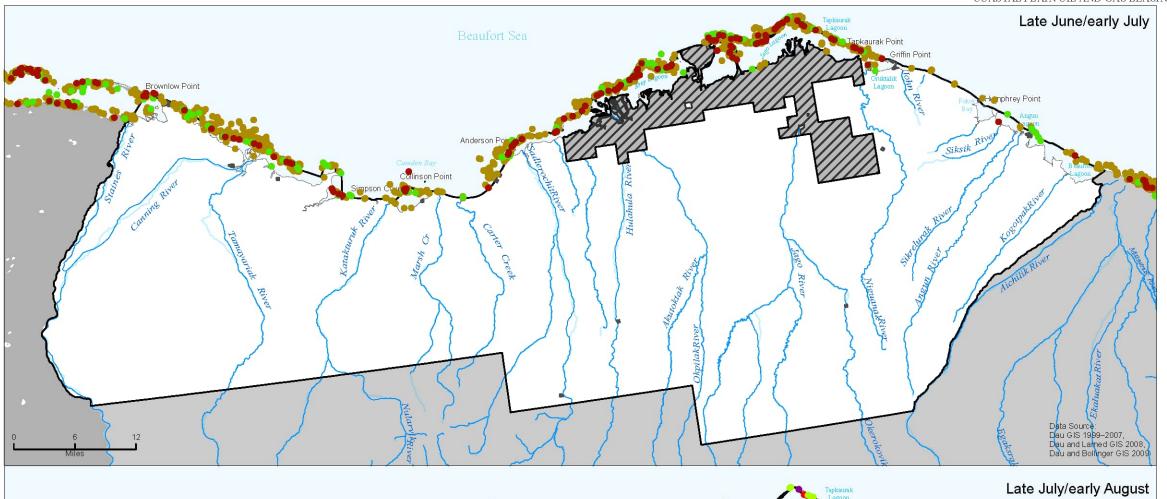






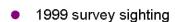






## Common Eider Survey

- 1999-2007 survey sighting
- 2008 survey sighting
- 2009 survey sighting
- Native Allotment
- Coastal Plain Supplemental EIS boundary
- Excluded from Public Law 115-97
  Coastal Plain or outside the BLM's oil and gas leasing authority



- 2001 survey sighting
- 2002 survey sighting
- 2003 survey sighting

Data Source: USFWS GIS 2018b Print Date: 06/05/2024

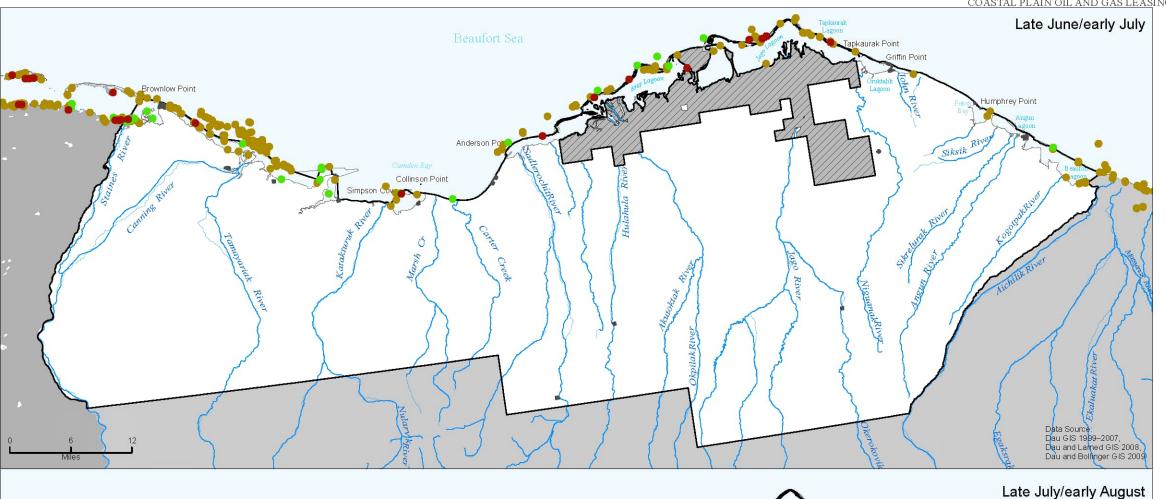


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Data Source: USFWS GIS 2018b Print Date: 06/05/2024

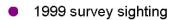




Beaufort Sea

## King Eider Survey

- 1999-2007 survey sighting
- 2008 survey sighting
- 2009 survey sighting
- Native Allotment
- Coastal Plain Supplemental EIS boundary
- Excluded from Public Law 115-97 Coastal Plain or outside the BLM's oil and gas leasing authority

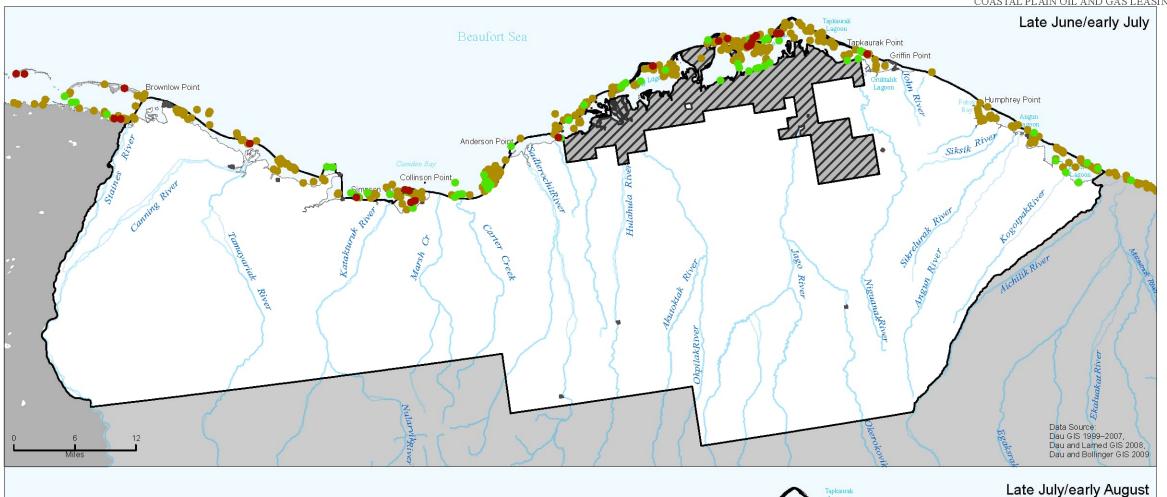


- 2001 survey sighting
- 2002 survey sighting
- 2003 survey sighting



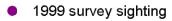
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## Surf Scoter Survey

- 1999-2007 survey sighting
- 2008 survey sighting
- 2009 survey sighting
- Native Allotment
- Coastal Plain Supplemental EIS boundary
- Excluded from Public Law 115-97
  Coastal Plain or outside the BLM's oil and gas leasing authority



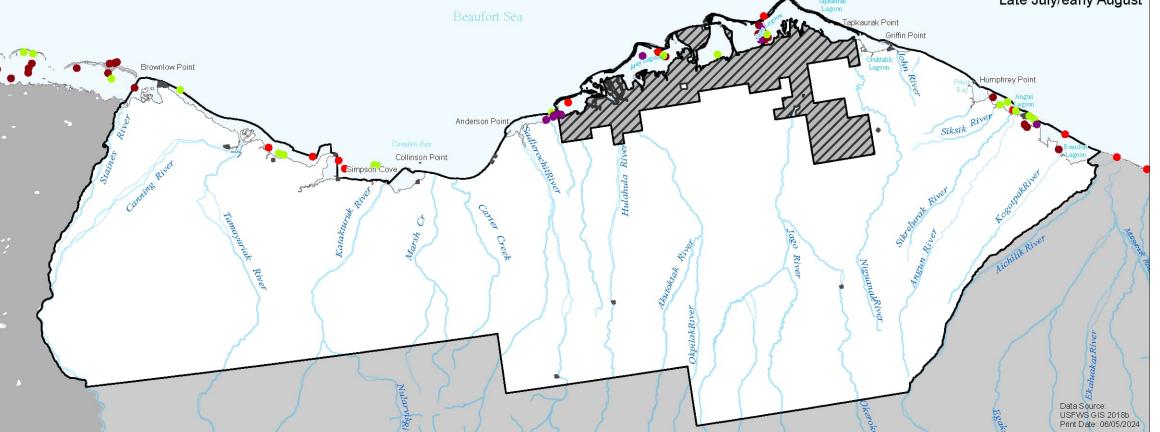
2001 survey sighting

2002 survey sighting

2003 survey sighting

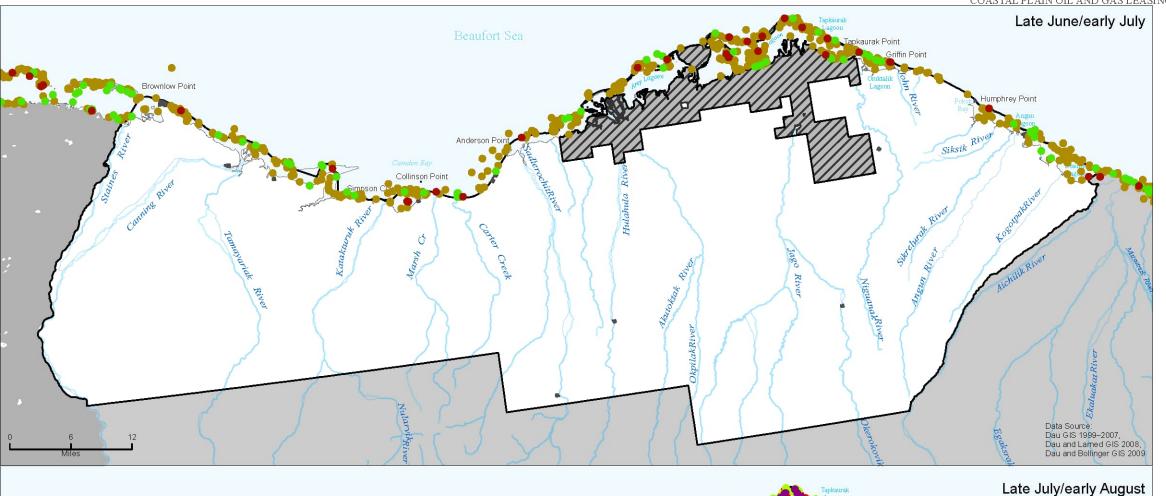


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# Long Tailed Duck Survey

- 1999-2007 survey sighting
- 2008 survey sighting
- 2009 survey sighting
- Native Allotment
- Coastal Plain Supplemental EIS boundary
- Excluded from Public Law 115-97 Coastal Plain or outside the BLM's oil and gas leasing authority

- 1999 survey sighting
- 2001 survey sighting
- 2002 survey sighting
- 2003 survey sighting

Data Source: USFWS GIS 2018b Print Date: 06/05/2024



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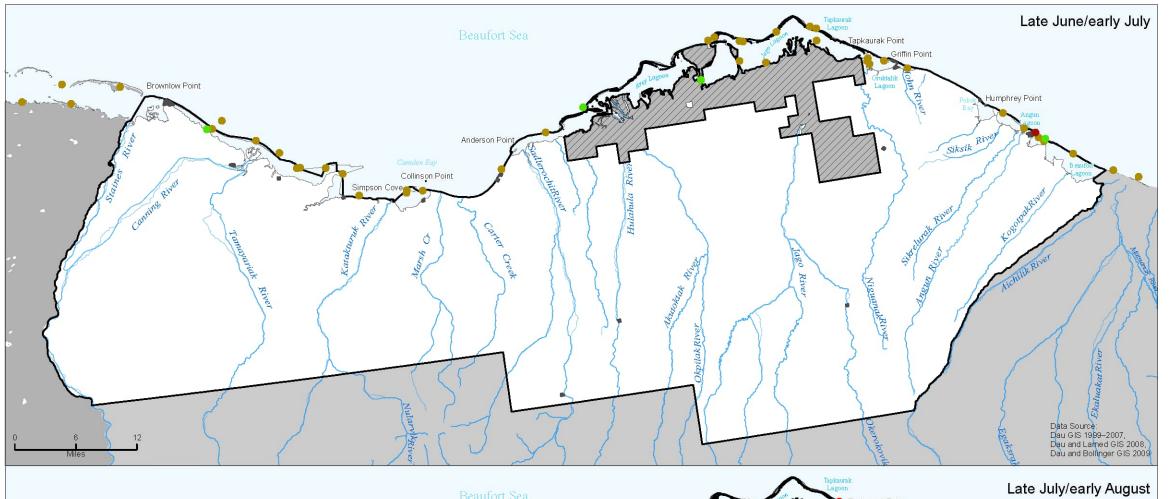


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Data Source: USFWS GIS 2018b Print Date: 06/05/2024







## Yellow-Billed Loon Survey

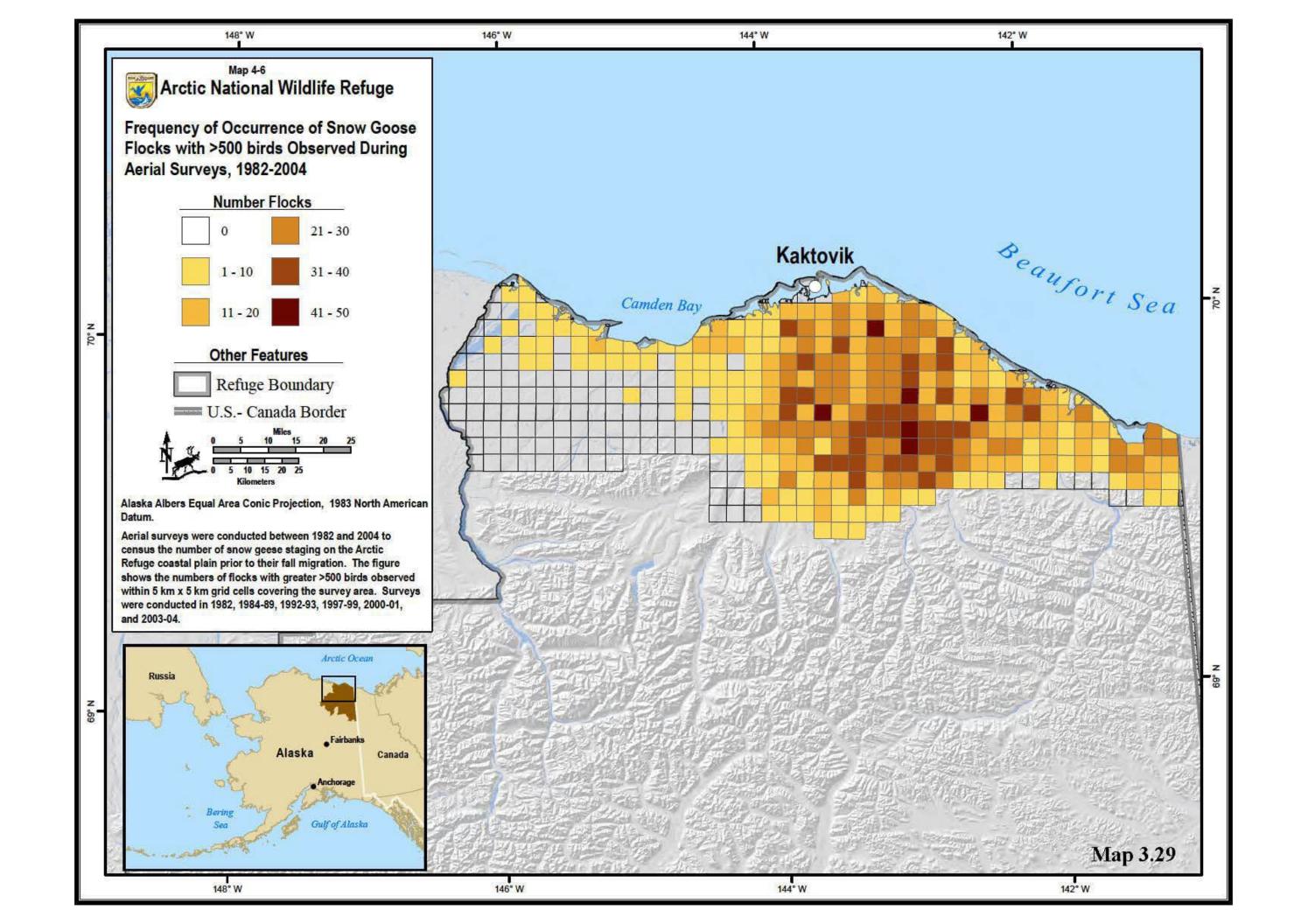
- 1999-2007 survey sighting
- 2008 survey sighting
- 2009 survey sighting
- Native Allotment
- Coastal Plain Supplemental EIS boundary
- Excluded from Public Law 115-97 oil and gas leasing authority

- 1999 survey sighting
- 2001 survey sighting
- 2002 survey sighting
- 2003 survey sighting



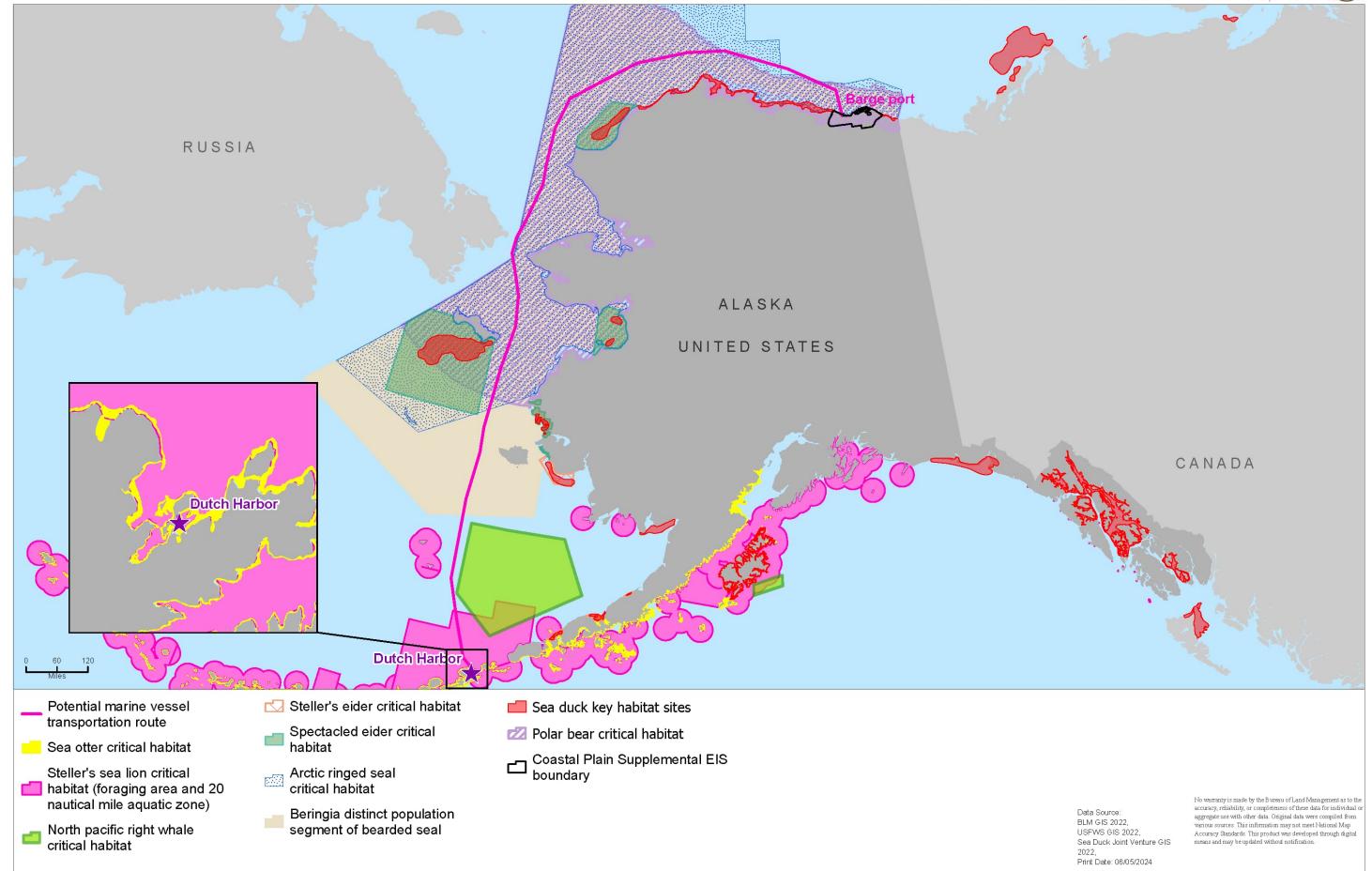
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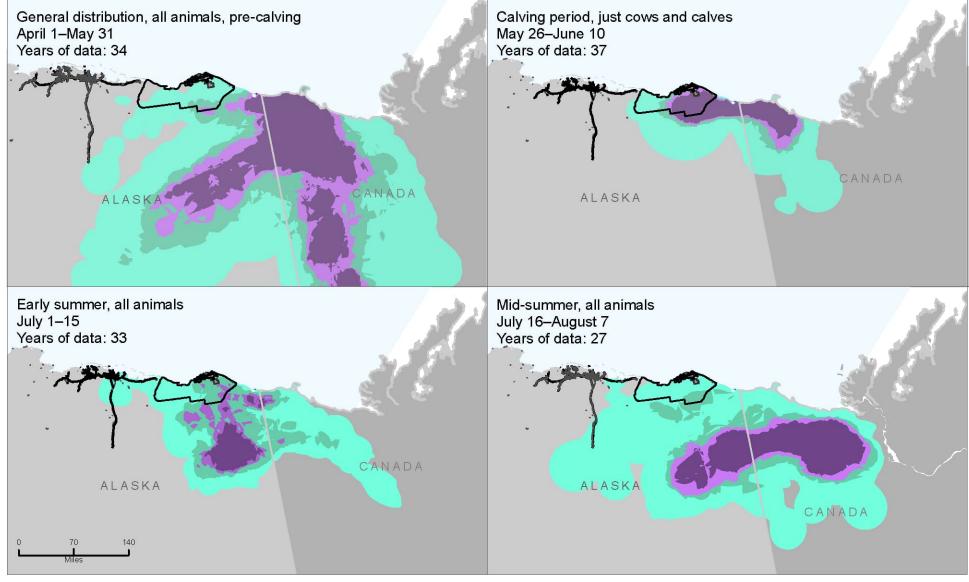


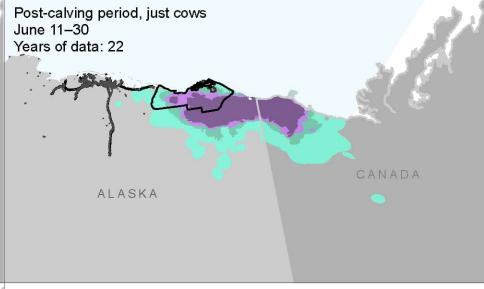












Environment Yukon used data from radio collars deployed on caribou from the Porcupine Caribou Herd to calculate the area used by caribou in each season for every year with a minimum of 30 caribou locations using Kernel Density Estimation. The resulting annual distributions were then used to calculate the percentage of years an area was used during each season. Calculations were based on the 95% contour from kernel density estimates (e.g., an area estimated to contain approximately 95% of the caribou) calculated using Geospatial Modelling Environment software. The plug-in bandwidth estimator was used when sample size was ≥50 and the likelihood cross-validation bandwidth estimator was used when sample size was <50.

Percent of years that caribou are present

<20%

20–30%

30-40%

≥40%

Existing oil and gas roads or pipelines

Coastal Plain Supplemental EIS boundary

> **Excluded from Public** Law 115-97 Coastal

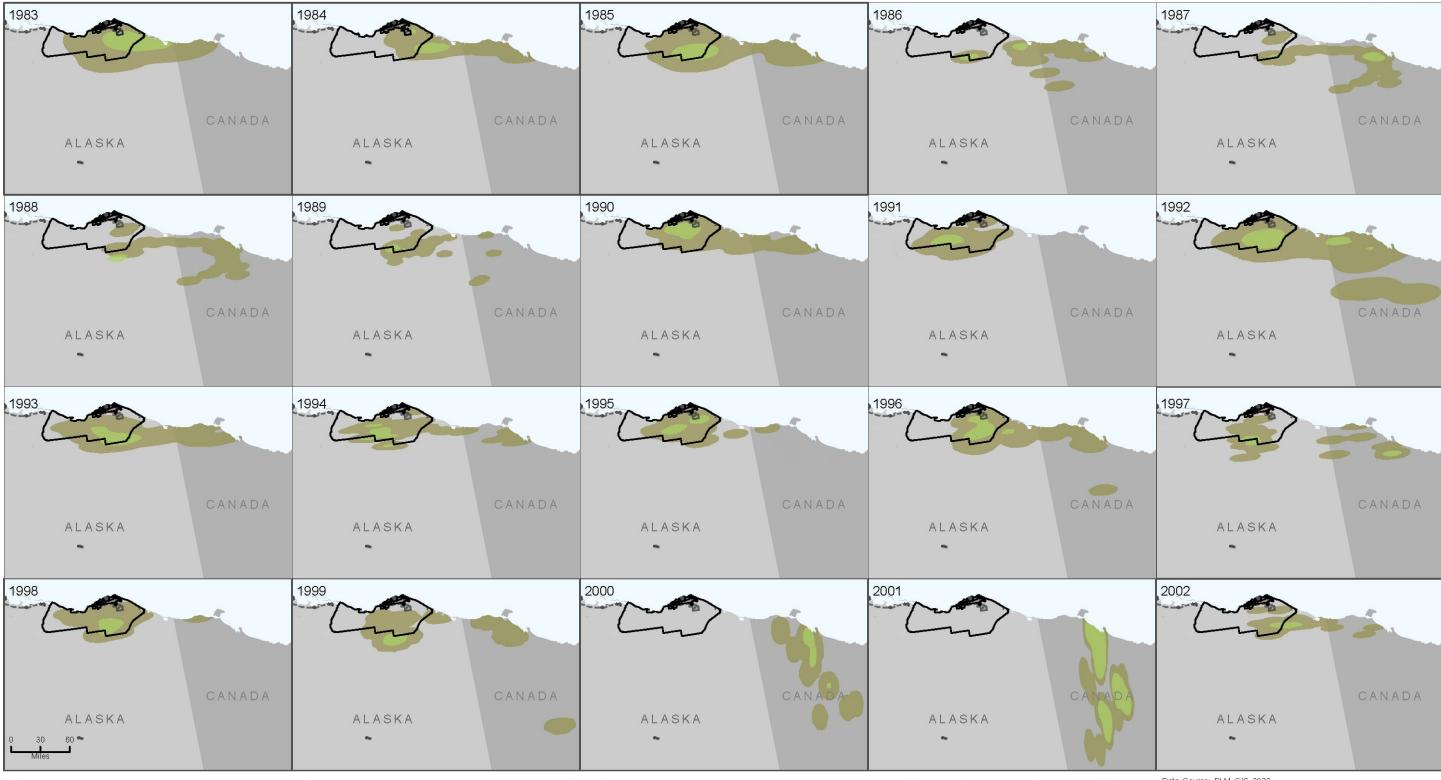
Plain or outside the BLM's oil and gas leasing authority



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Data Source: BLM GIS 2022, USFWS GIS 2022, Environment Yukon GIS 2018 Print Date: 05/10/2024





Concentrated calving area

Annual calving ground

Public Law 115-97 Coastal Plain

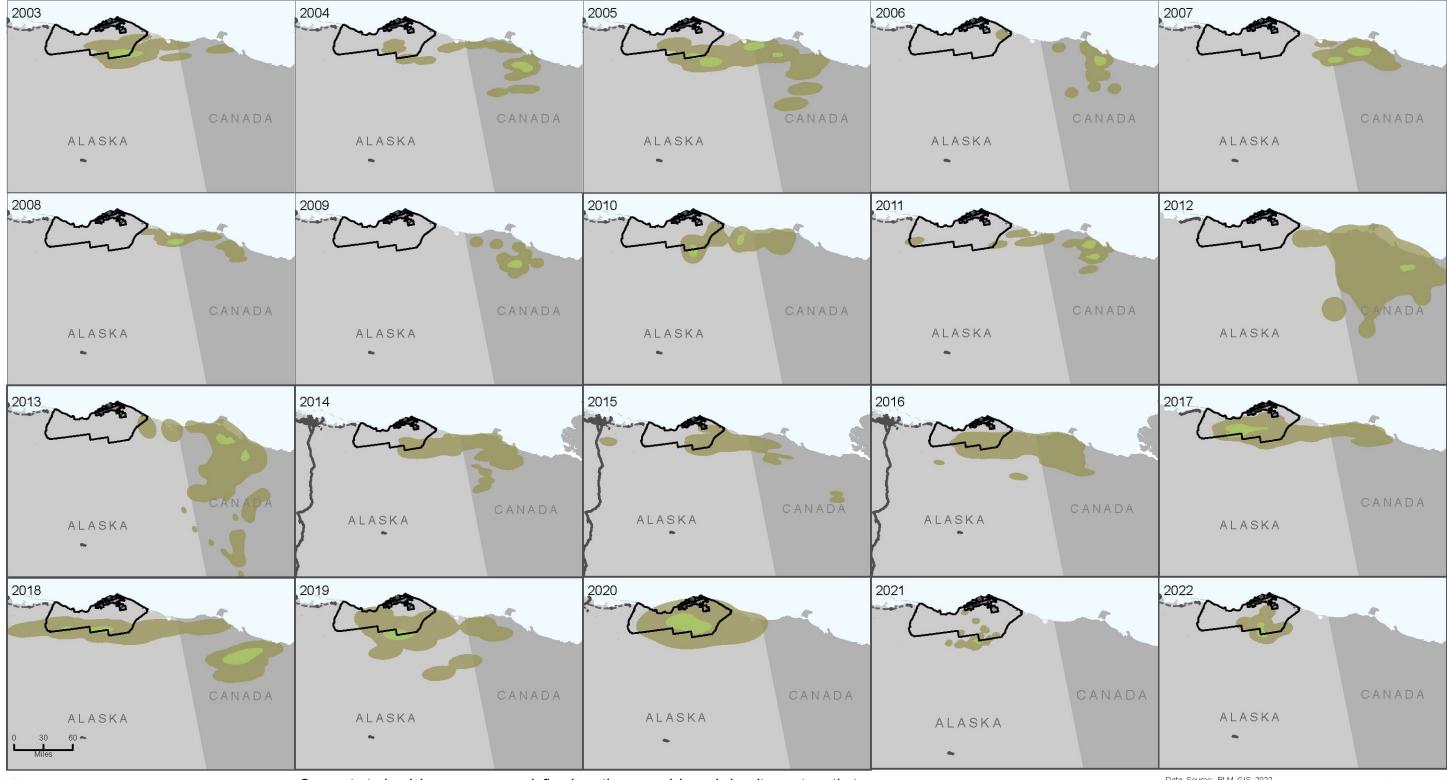
Existing oil and gas roads or pipelines

Concentrated calving areas were defined as the annual kernel density contour that included areas with greater than average calving density and annual calving grounds were defined as the 99% kernel density utilization distributions obtained from annual calving sites (Griffith et al. 2002, USFWS 2015). GIS layers were created by Alaska Department of Fish and Game following methods of Griffith et al. (2002). No concentrated calving area data for 2014, 2015, 2016. Annual calving ground data for 2010, 2012, 2013, 2014, 2015, 2016, 2017 were calculated as 95% kernel density utilization distributions of female caribou by Environment Yukon.

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Data Source: BLM GIS 2022, USFWS GIS 2022, ADFG GIS 2019, and Environment Yukon GIS 2019 Print Date: 06/05/2024





Concentrated calving area

Annual calving ground

Public Law 115-97 Coastal Plain

Existing oil and gas roads or pipelines

Concentrated calving areas were defined as the annual kernel density contour that included areas with greater than average calving density and annual calving grounds were defined as the 99% kernel density utilization distributions obtained from annual calving sites (Griffith et al. 2002, USFWS 2015). GIS layers were created by Alaska Department of Fish and Game following methods of Griffith et al. (2002). No concentrated calving area data for 2014, 2015, 2016. Annual calving ground data for 2010, 2012, 2013, 2014, 2015, 2016, 2017 were calculated as 95% kernel density utilization distributions of female caribou by Environment Yukon.

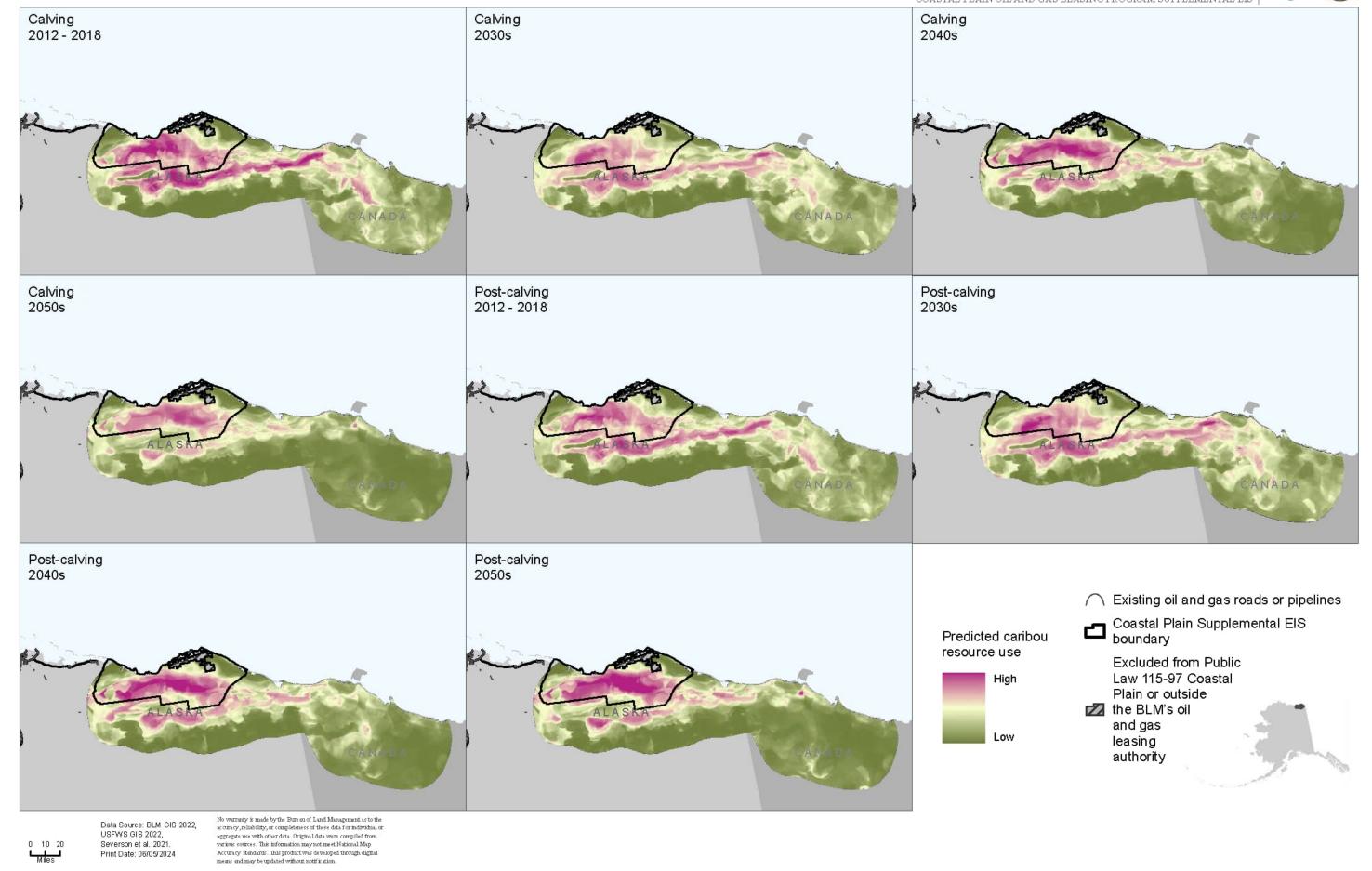
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Data Source: BLM GIS 2022, USFWS GIS 2022, ADFG GIS 2019 and Print Date: 06/05/2024





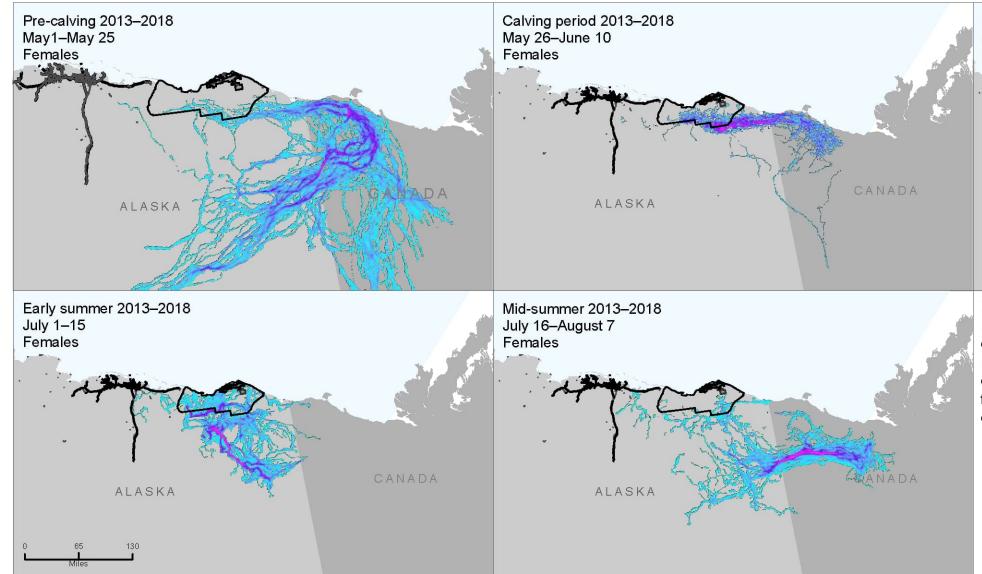




Severson et al. 2021. Print Date: 06/05/2024







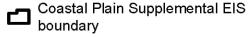
Post-calving period 2013-2018 June 11-30 Females CANADA ALASKA

Percent of collared caribou using an area was calculated using dynamic Brownian Bridge Movement Models run on locations of female caribou outfitted with GPS collars 2013-2018 (telemetry database from Environment Yukon). The 95% utilization distribution was calculated for each individual caribou with at least 30 locations per season. Results for all individuals were overlaid to determine the percent of collared caribou using each pixel.

Percent of collared caribou



Existing oil and gas roads or pipelines

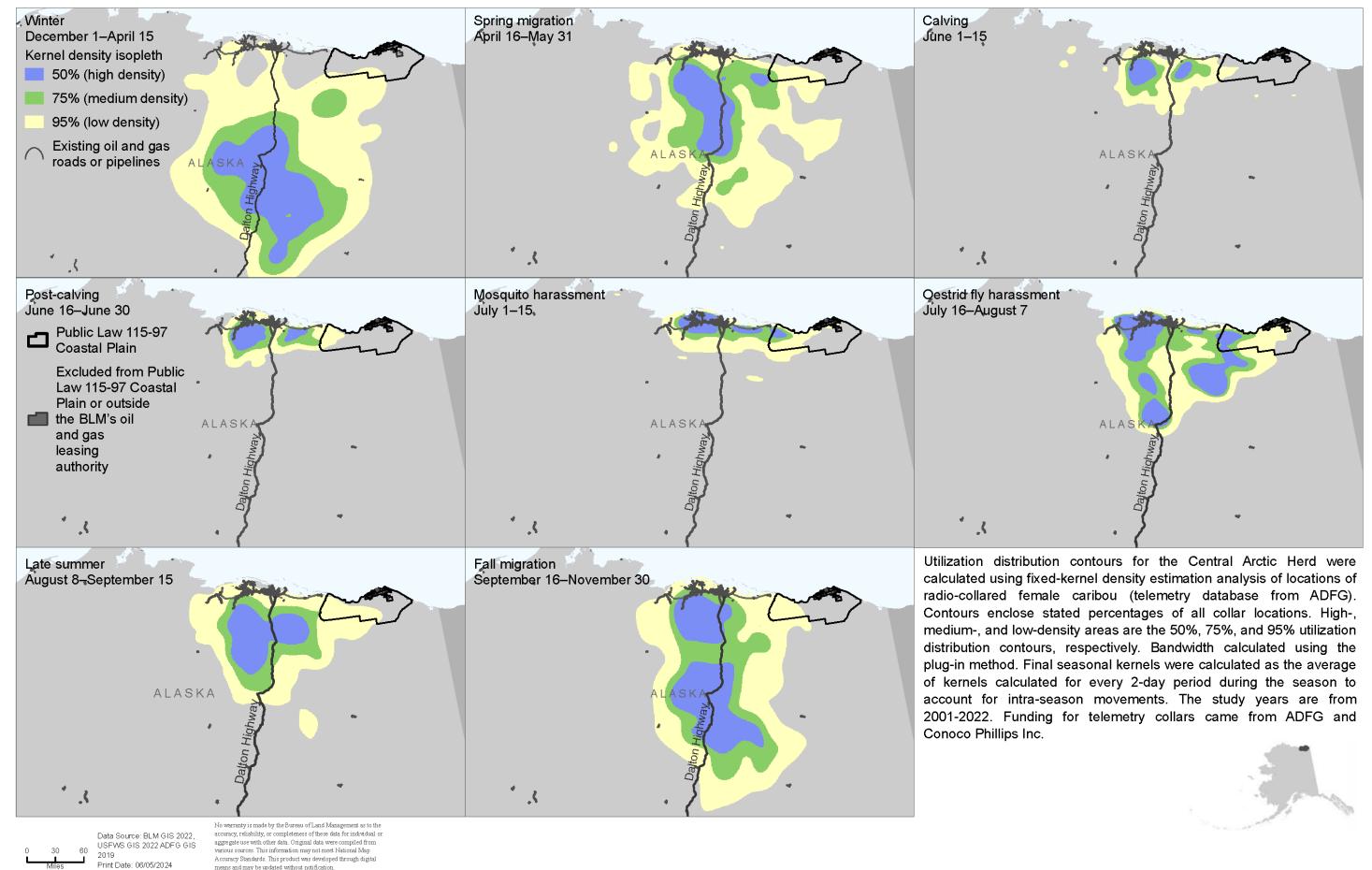


Excluded from Public Law 115-97 Coastal Plain or outside the BLM's oil and gas leasing authority

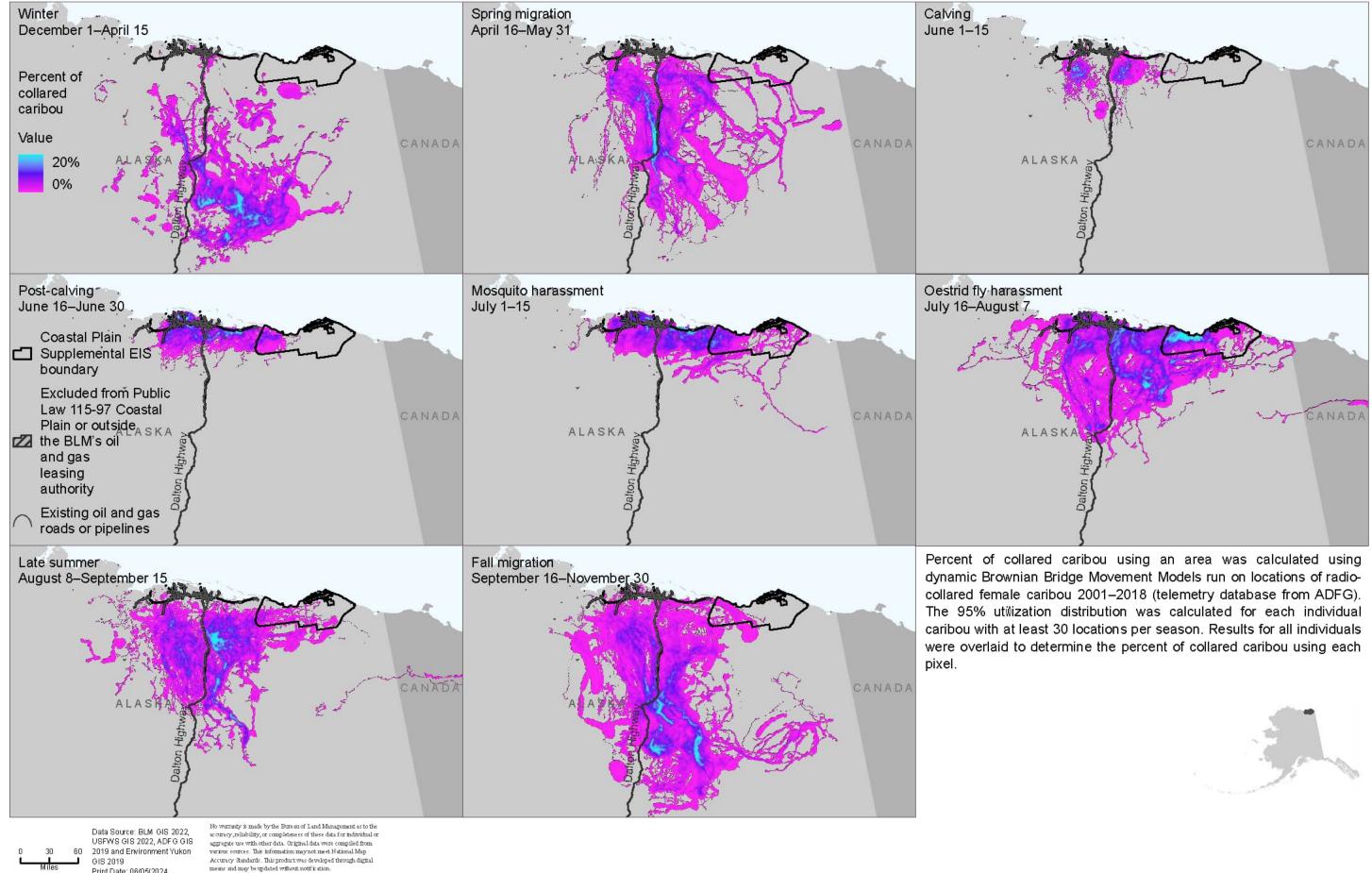


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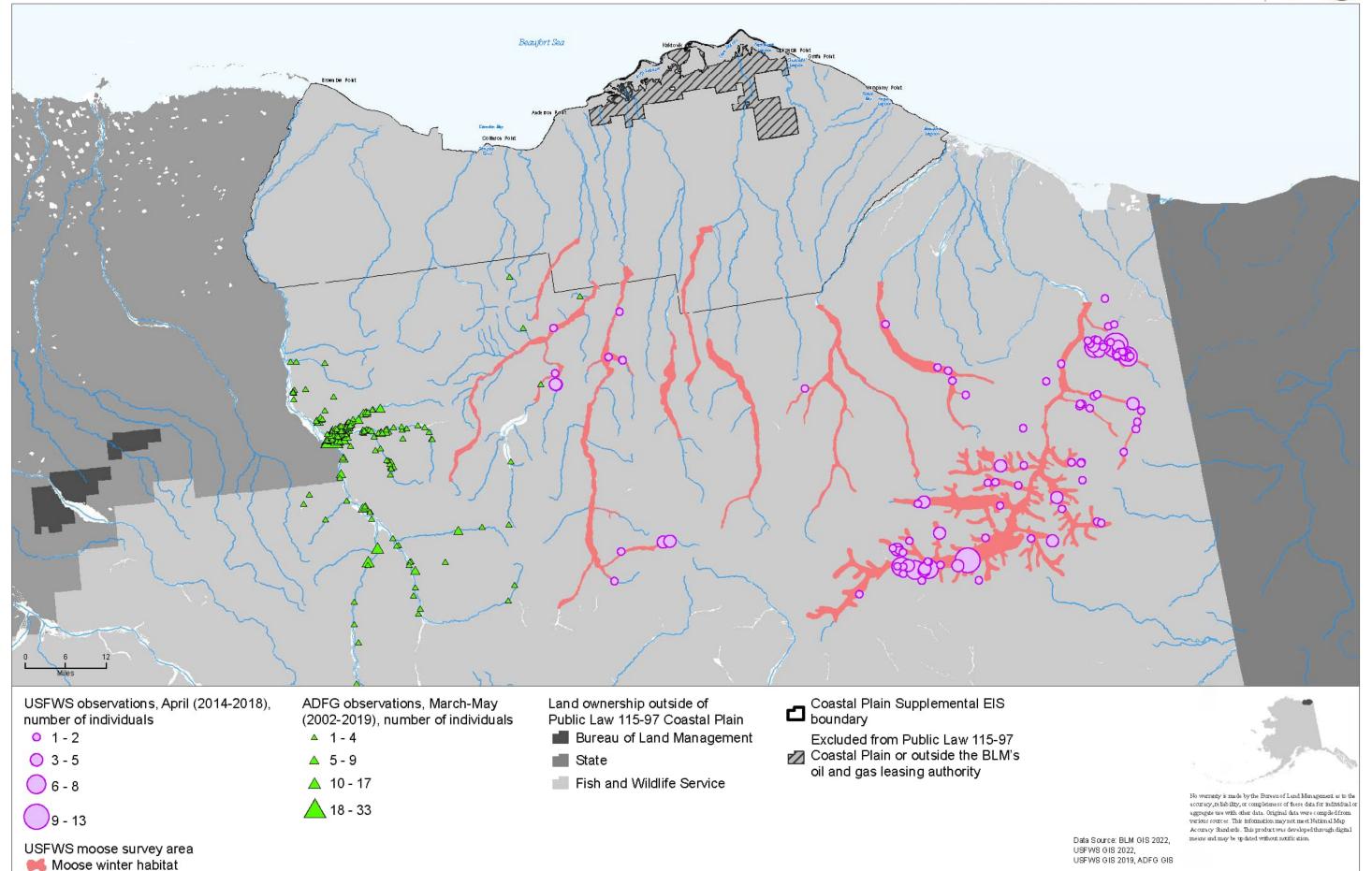




Print Date: 06/05/2024







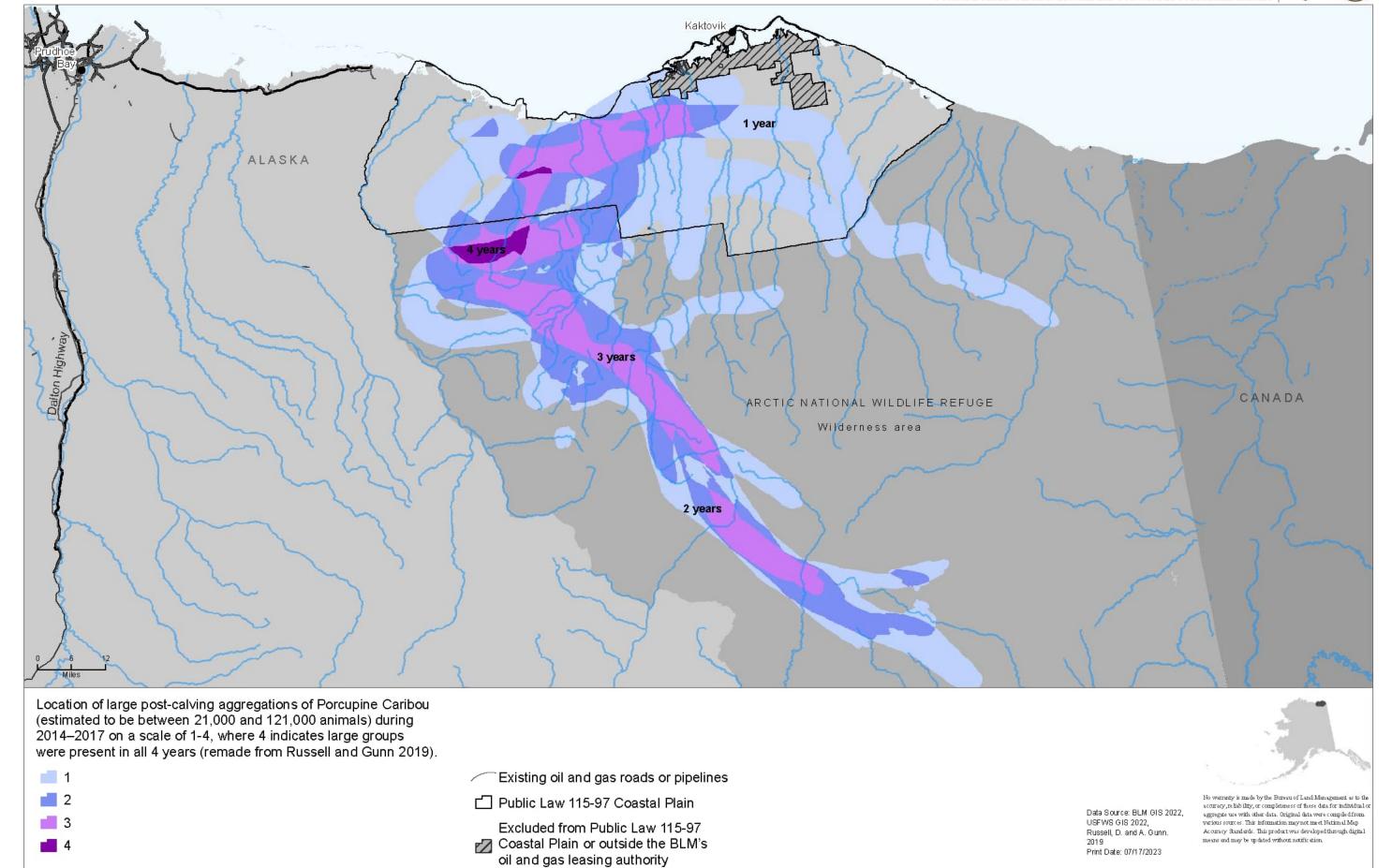
Movement of Large Post-Calving Groups of Porcupine Caribou

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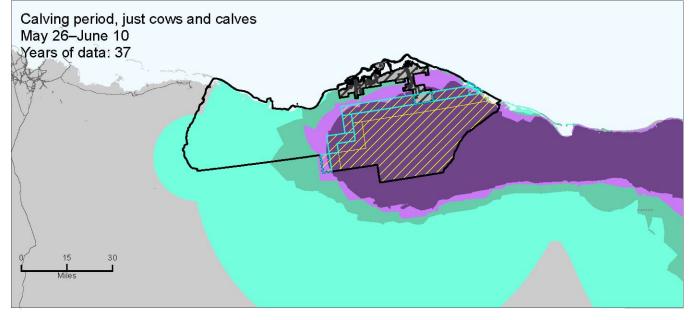


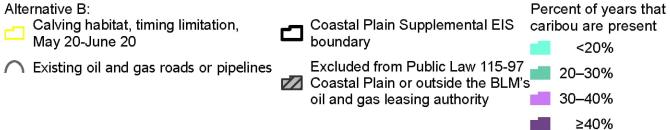


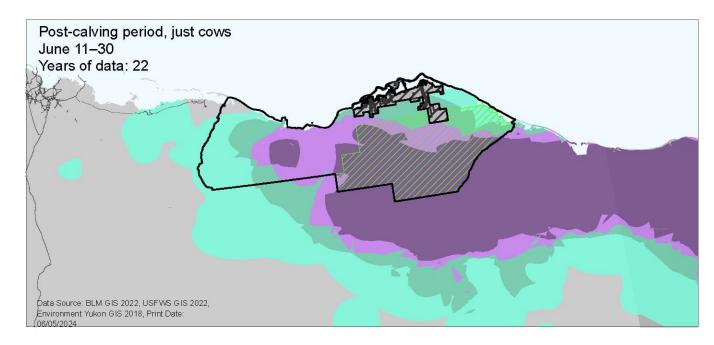
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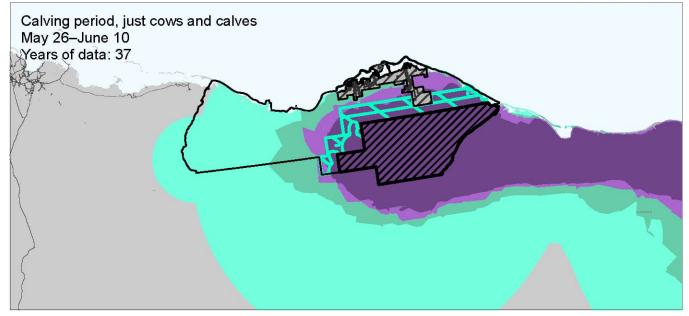




#### Alternative B:

Porcupine Caribou post-calving habitat, required operating procedure 23

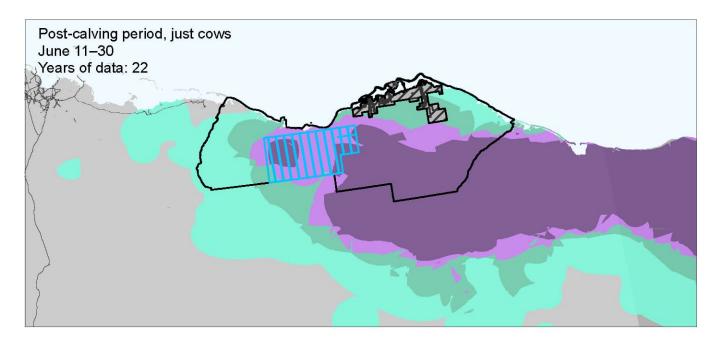
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.





Porcupine Caribou calving habitat, not offered for lease sale

Porcupine Caribou calving habitat, no surface occupancy



#### Alternative C:

Porcupine Caribou post-calving habitat, controlled surface use and timing limitation,

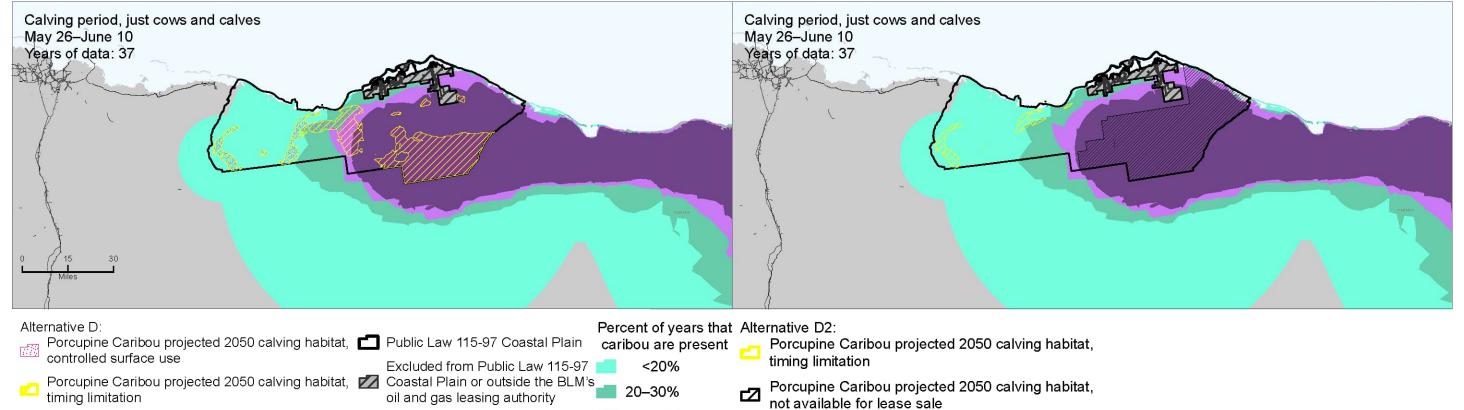
June 15-July 20

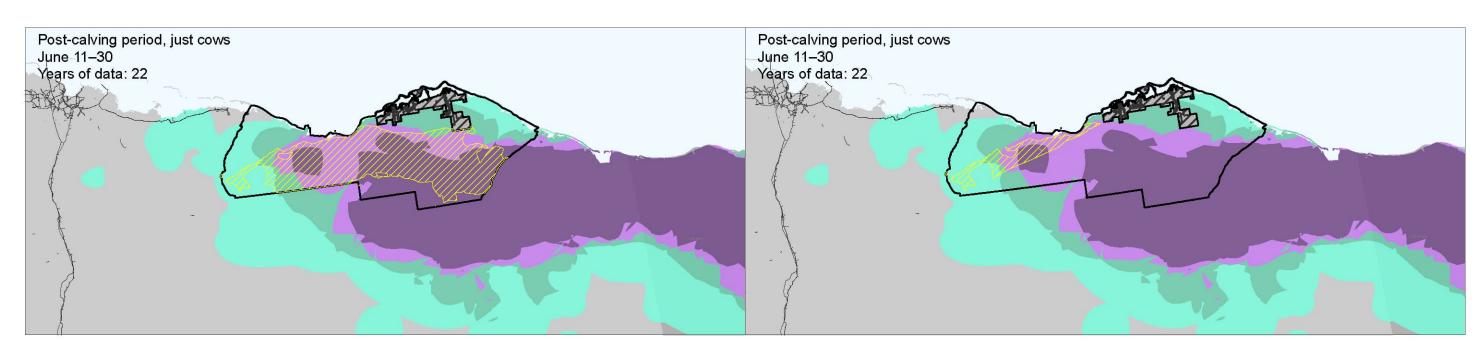


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30-40%

≥40%

#### Alternative D: Porcupine Caribou projected 2050 post-calving habitat, timing limitation

Existing oil and gas roads or pipelines

#### Alternative D2:

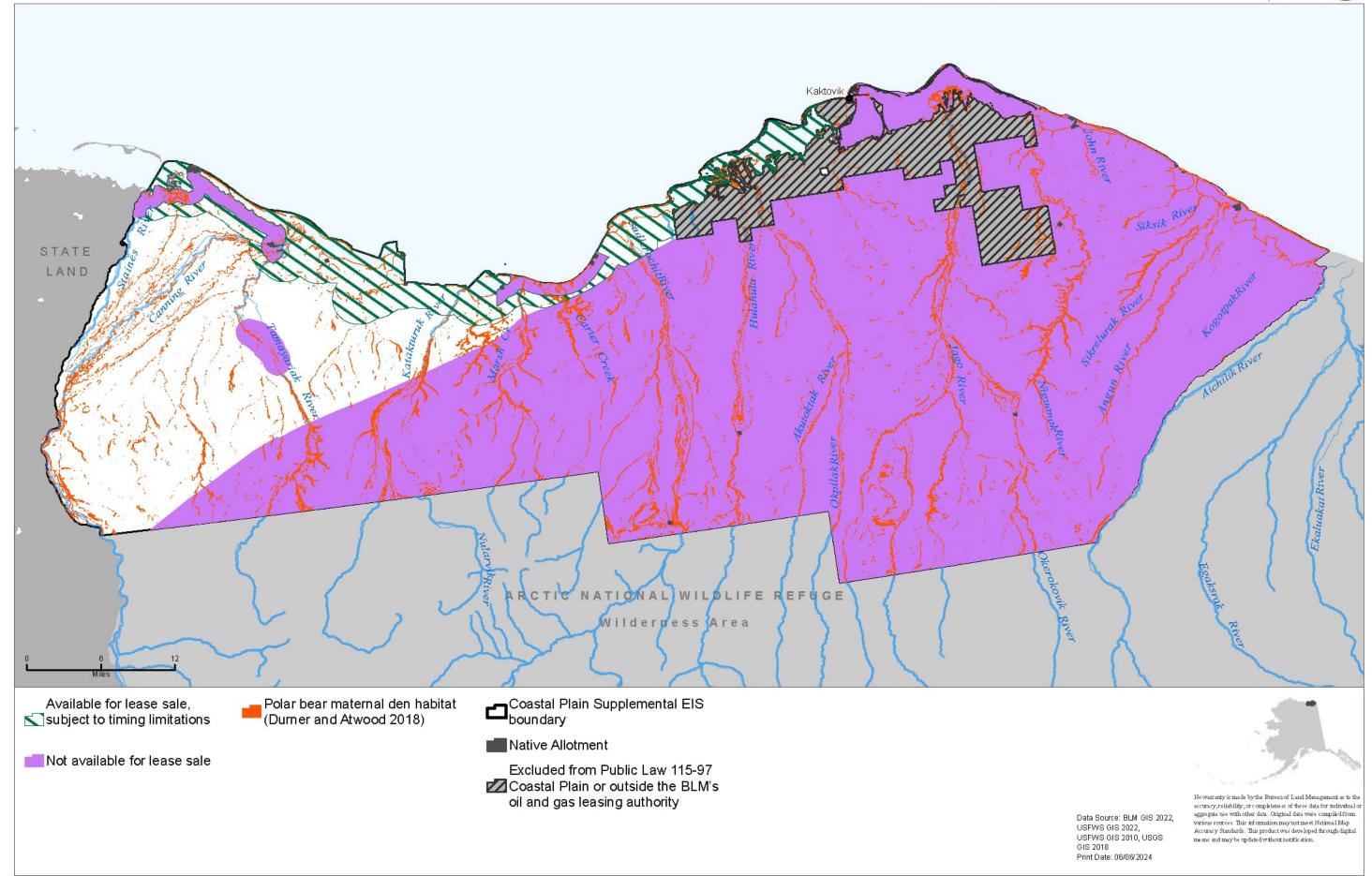
Porcupine Caribou projected 2050 calving habitat, timing limitation

Data Source: BLM GIS 2022, USFWS GIS 2022, Environment Yukon GIS 2018, Print Date: 06/06/2024

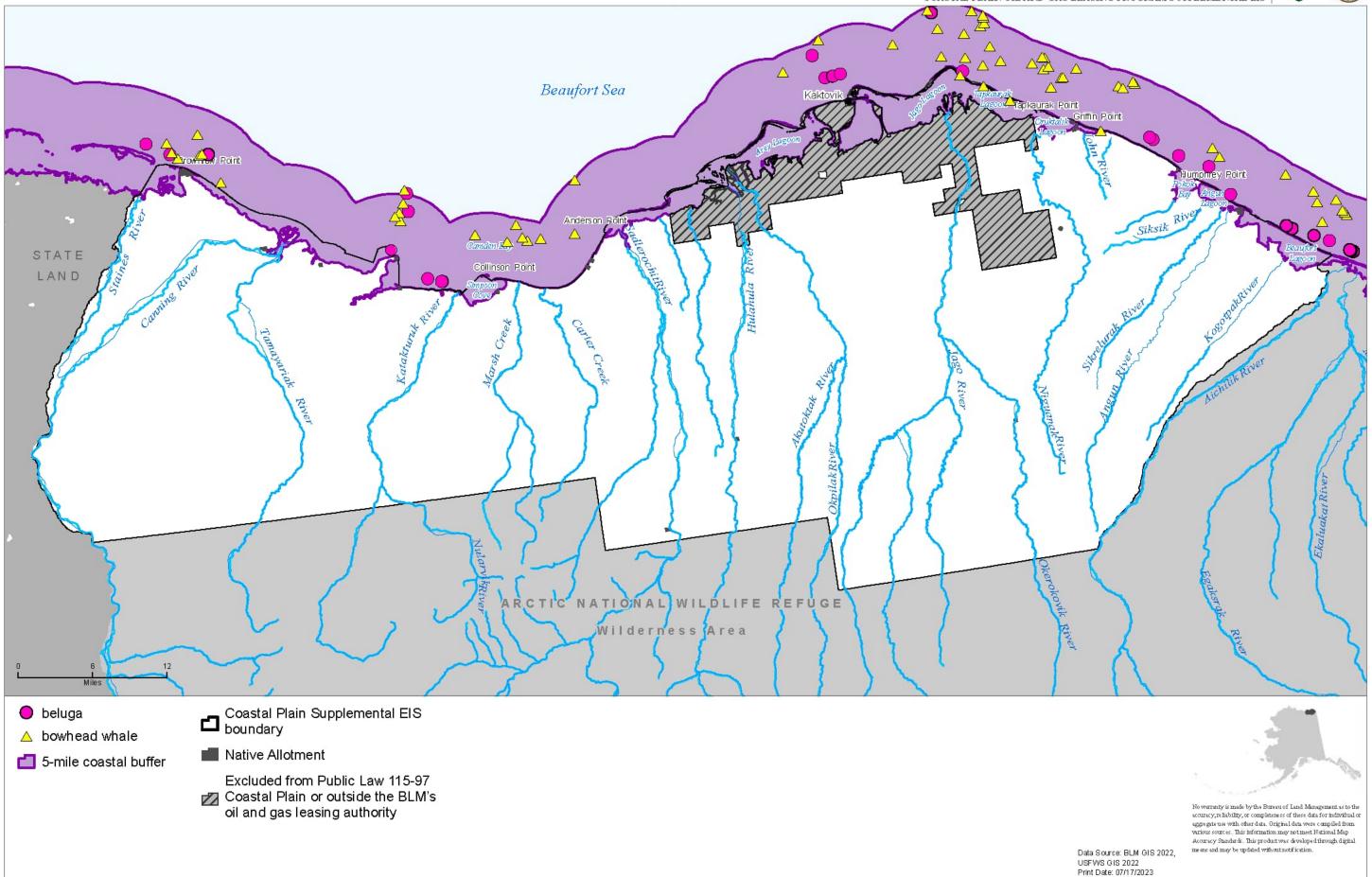
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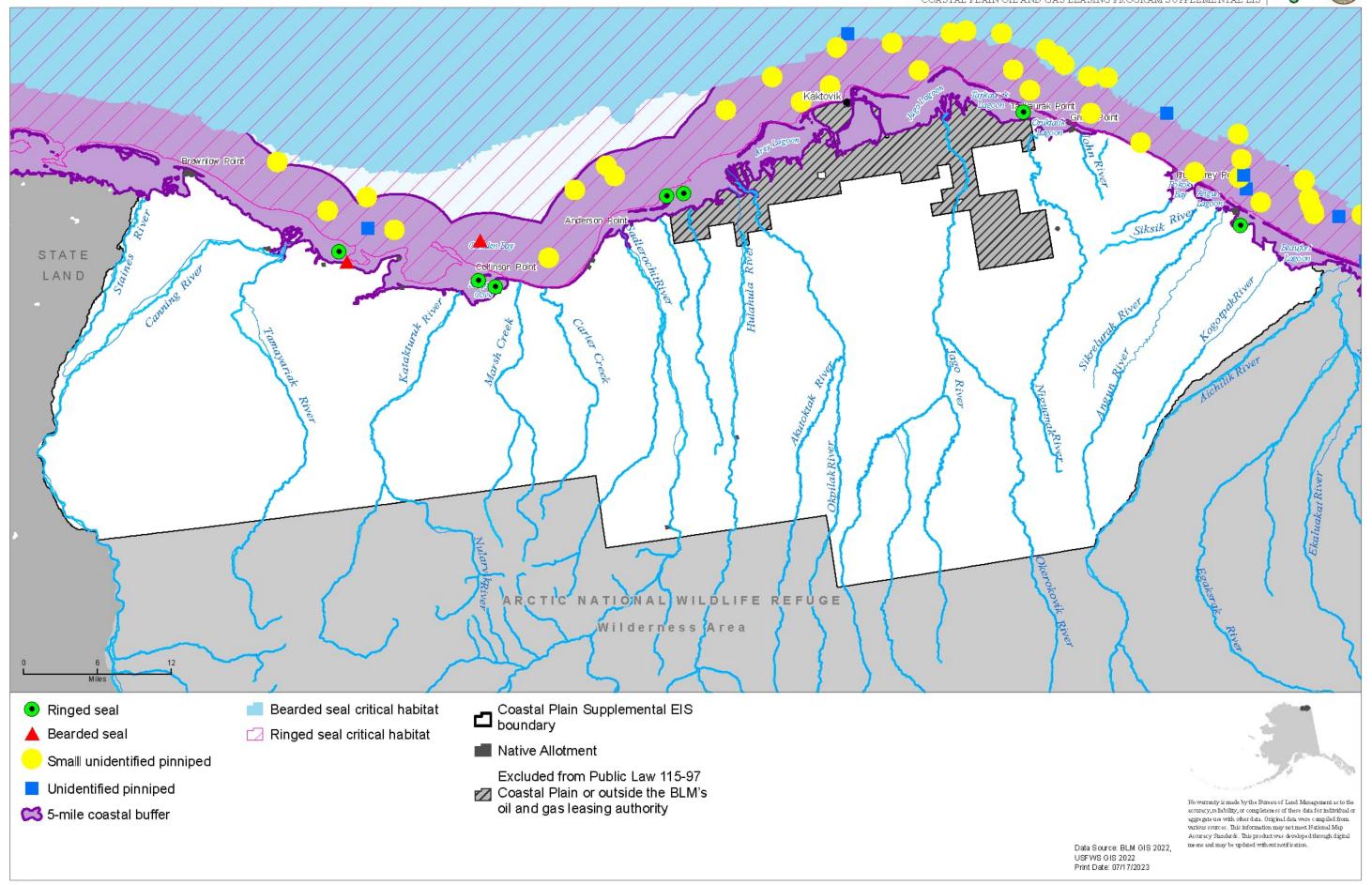












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80 acres



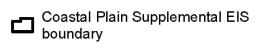
Native allotment

37 acres

U.S. Fish and Wildlife Service

State

■ Water

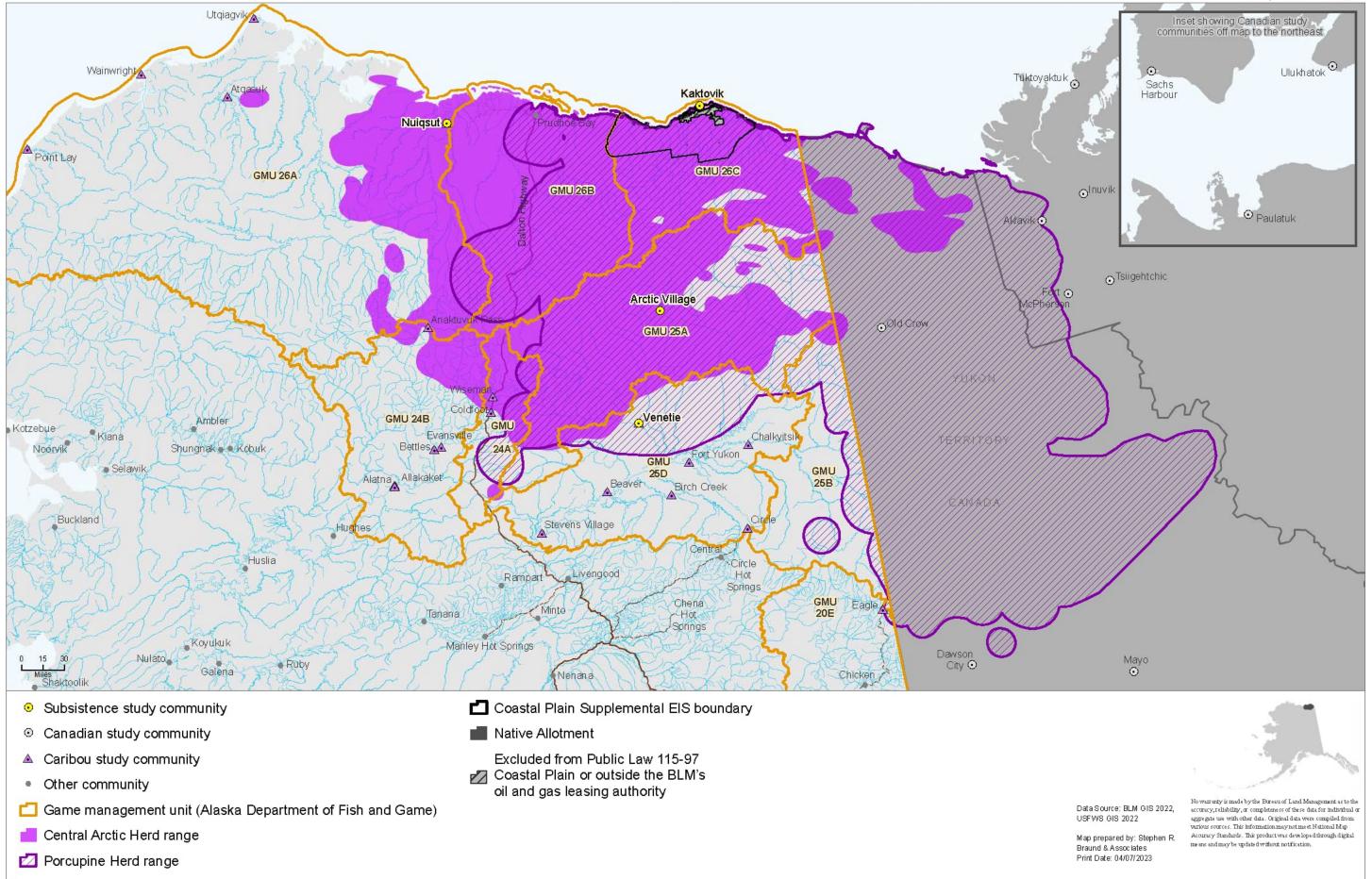


Excluded from Public Law 115-97 Coastal Plain or outside the BLM's oil and gas leasing authority



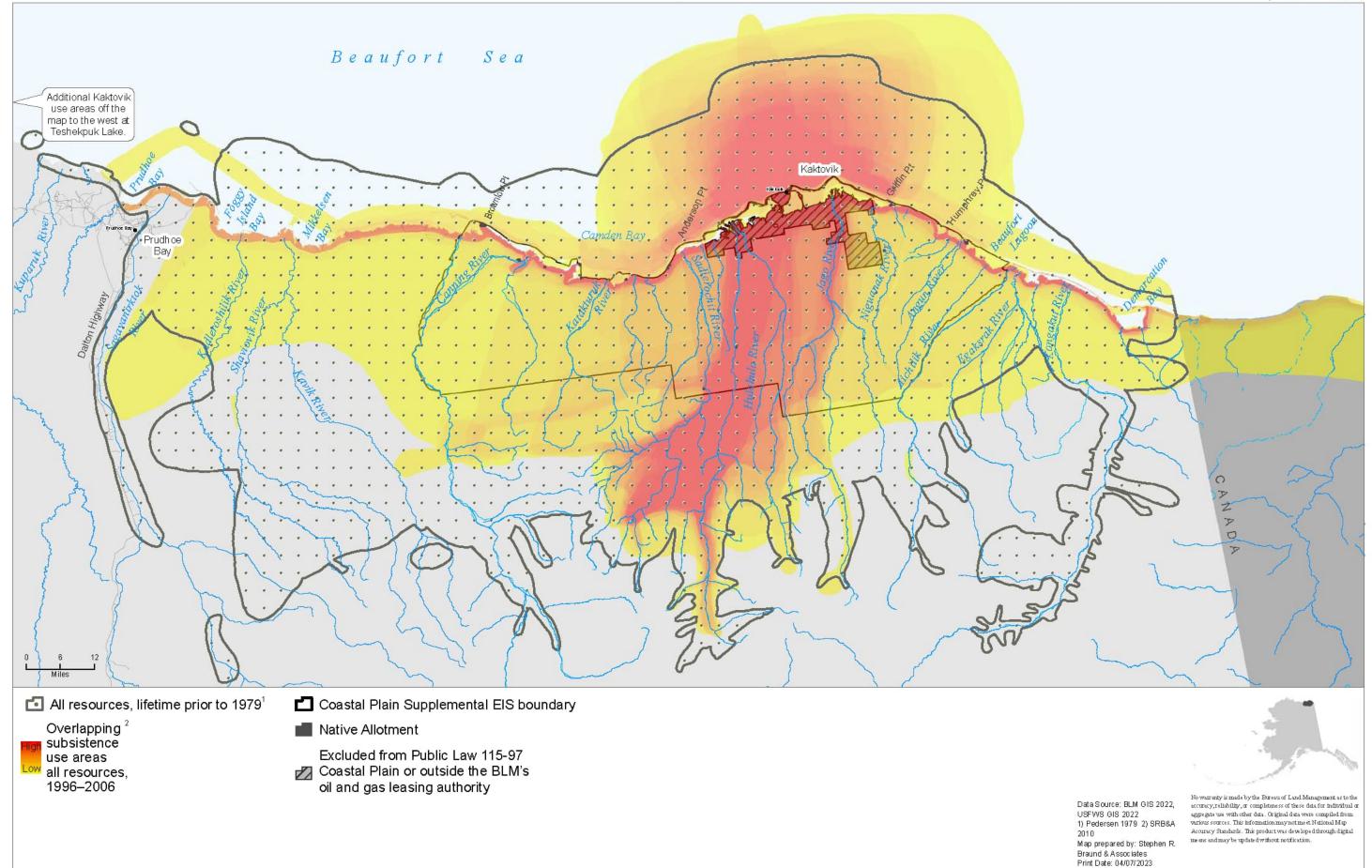
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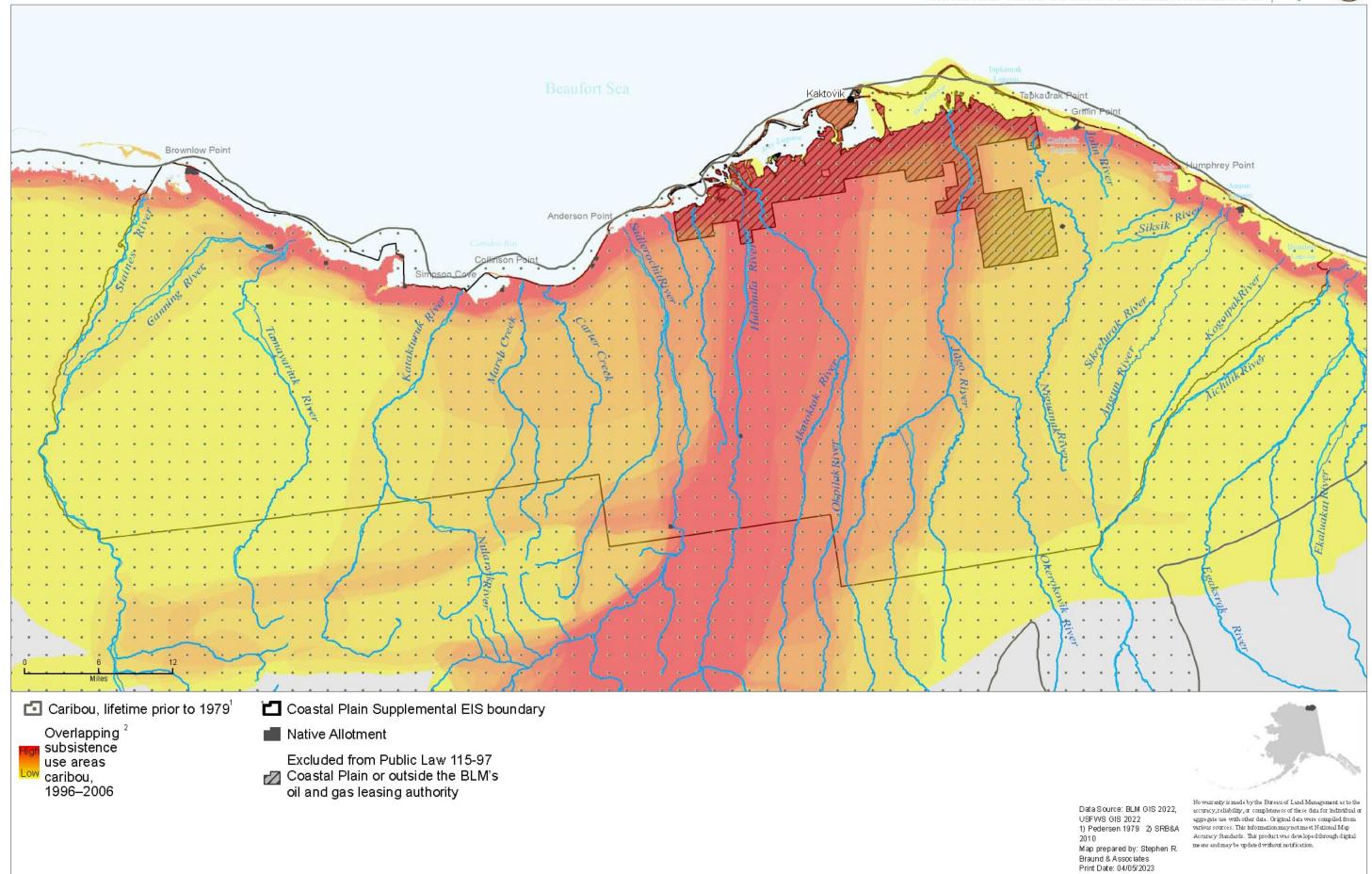




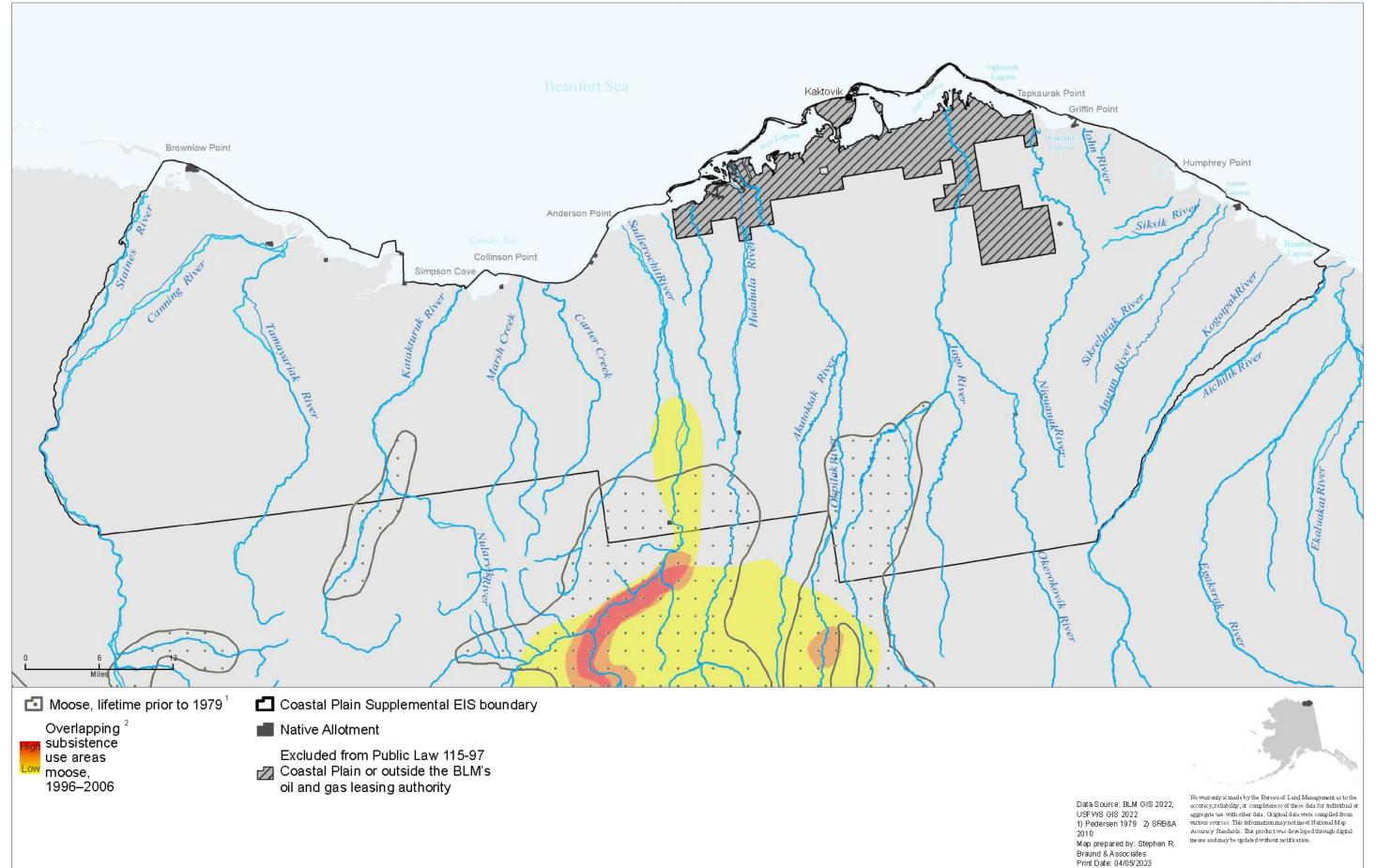




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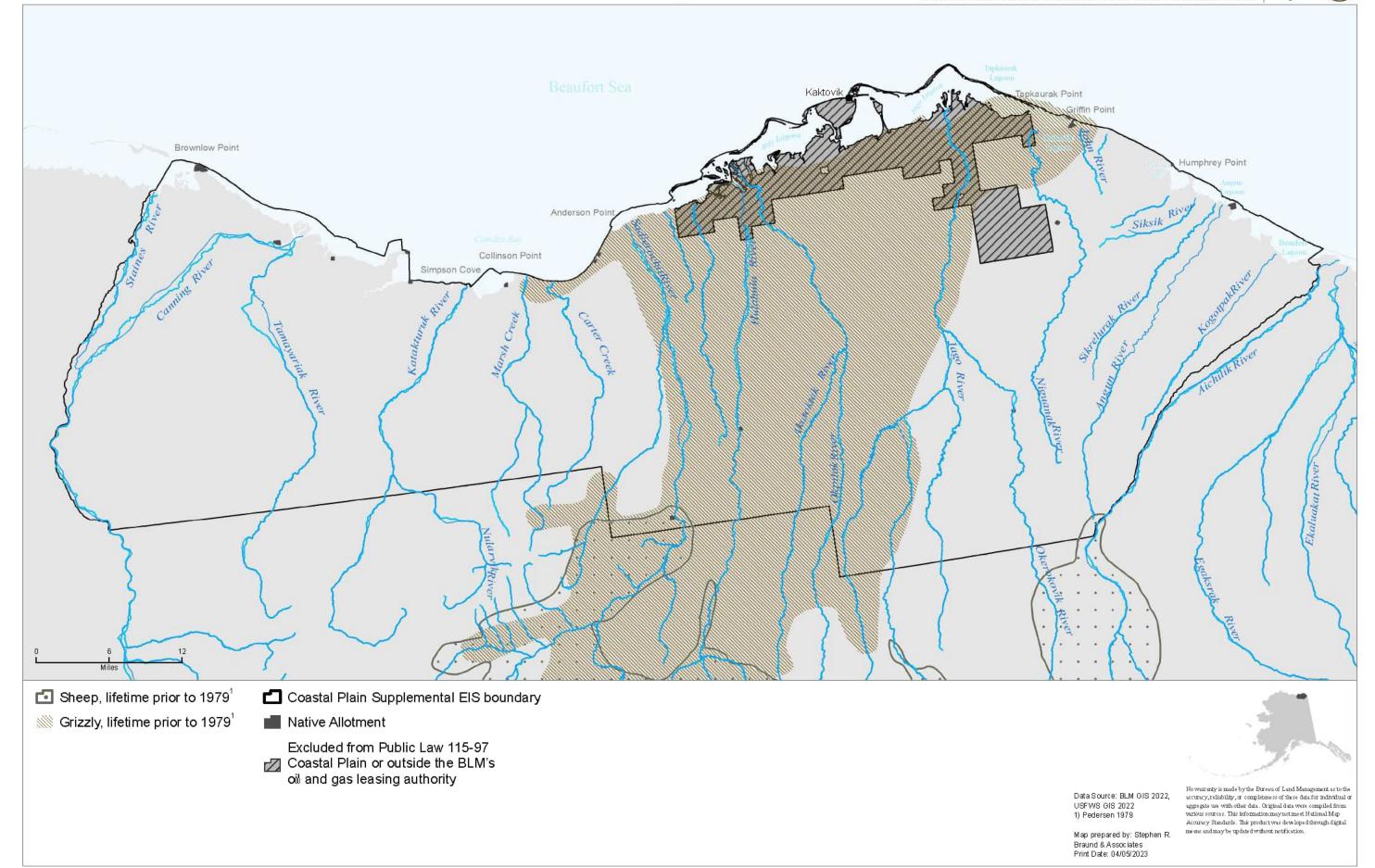






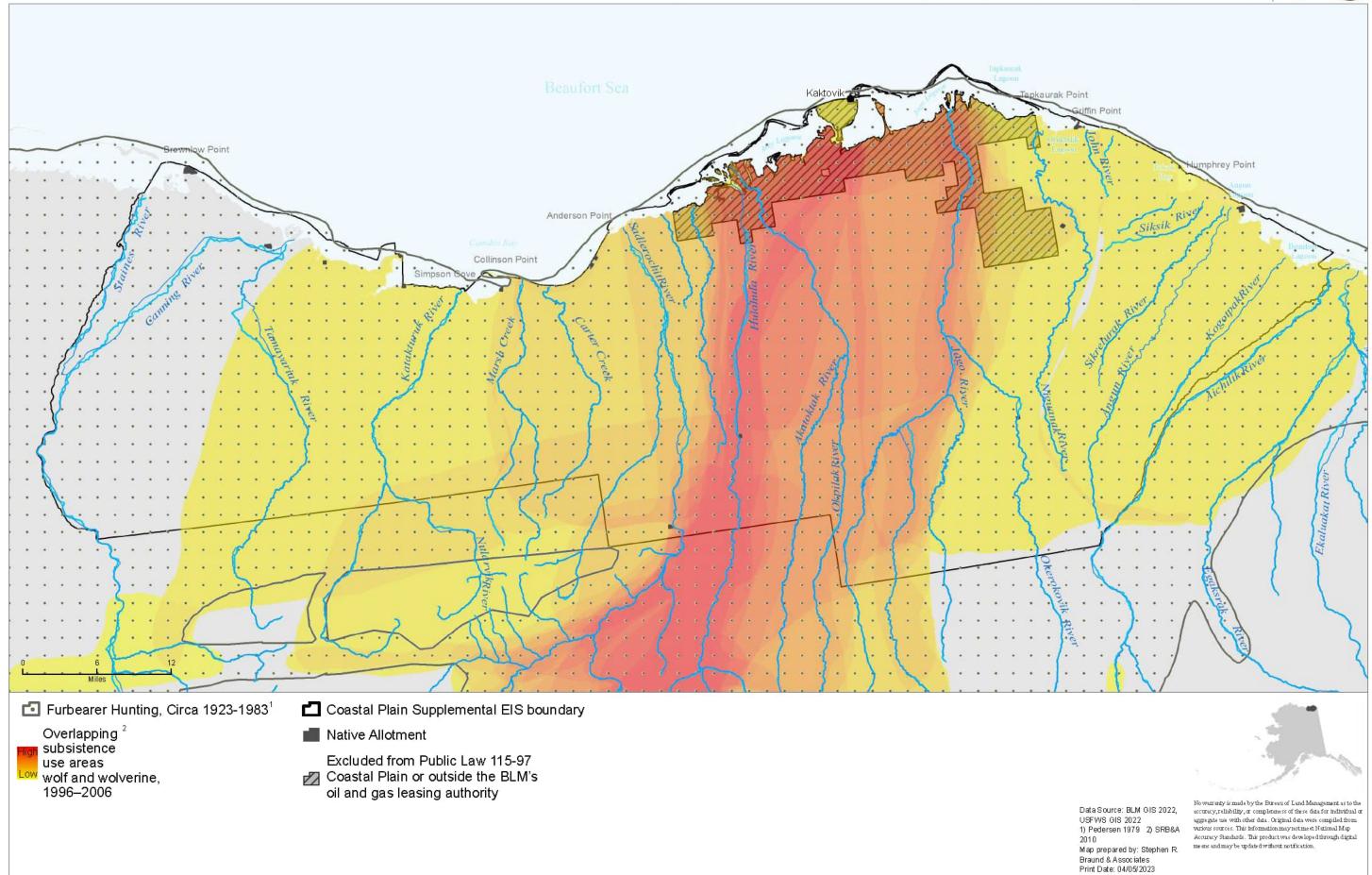






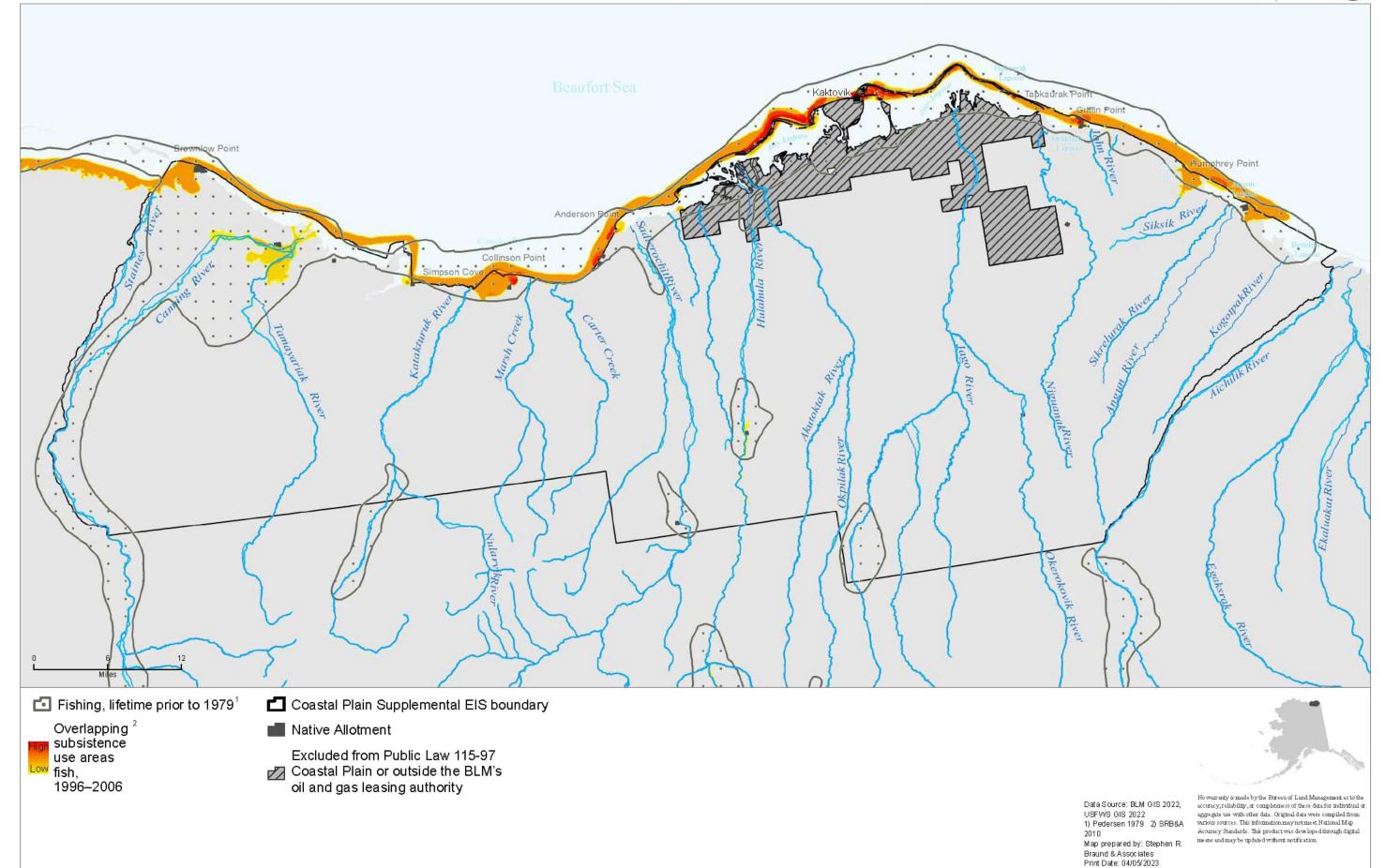






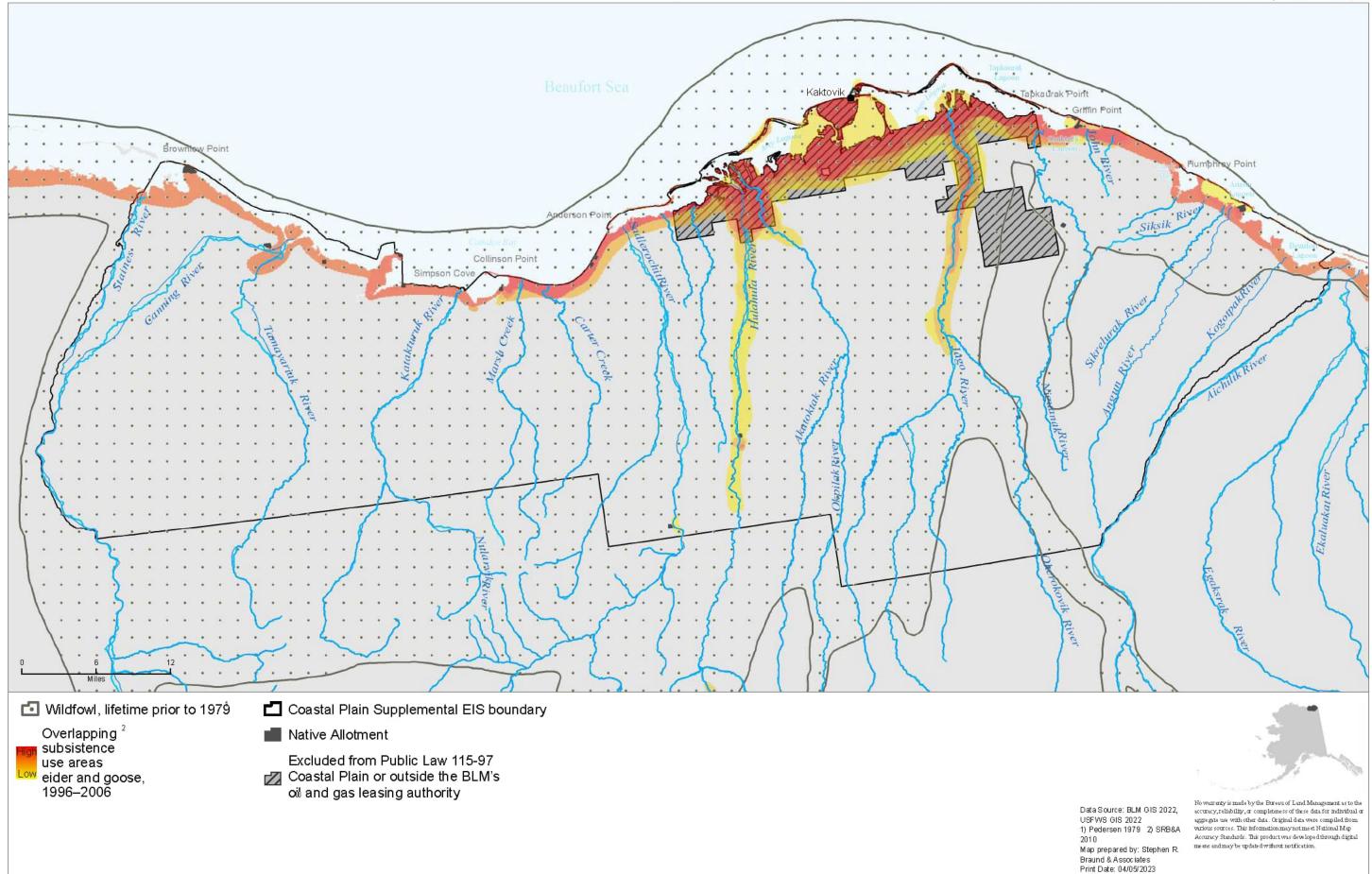






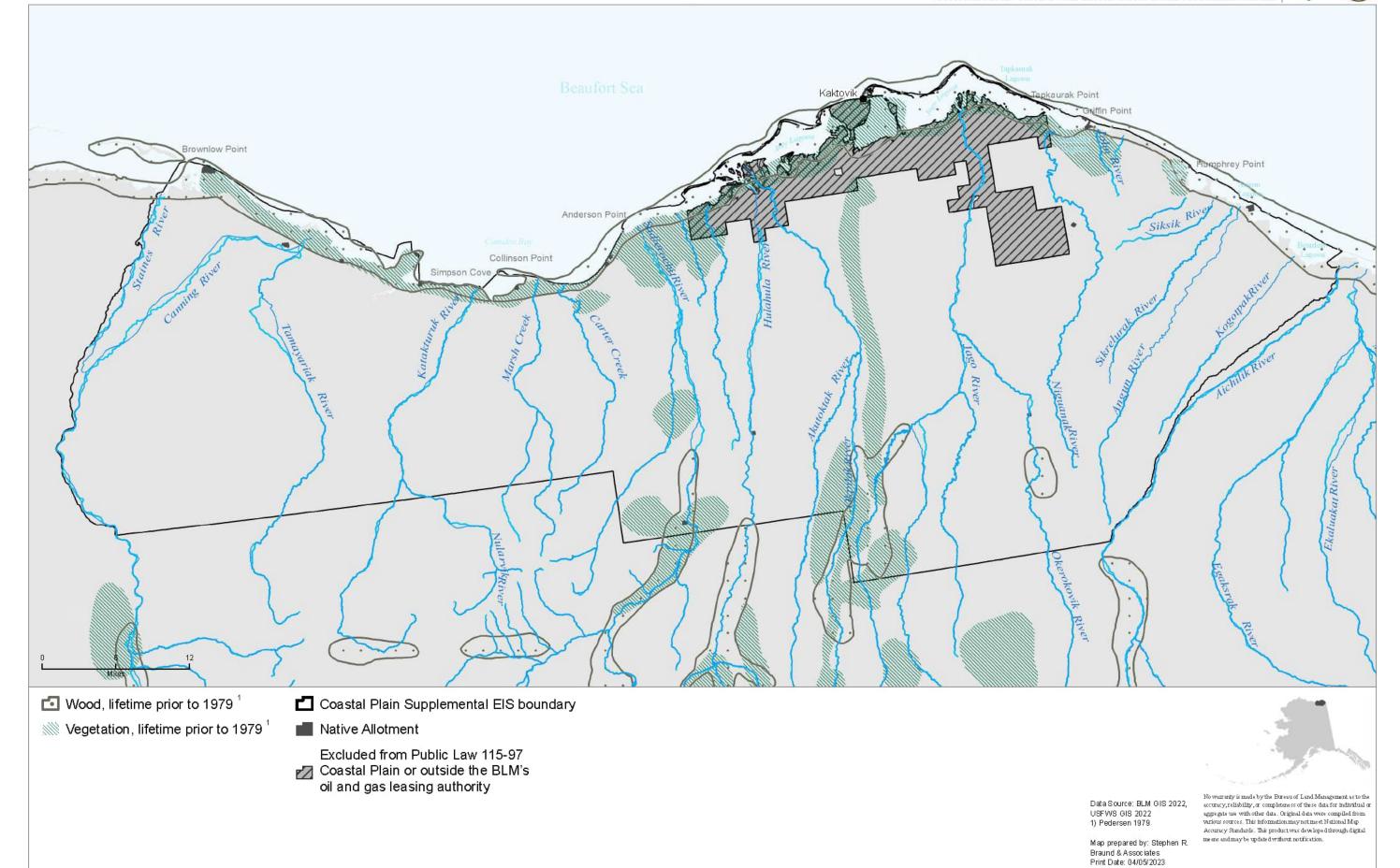




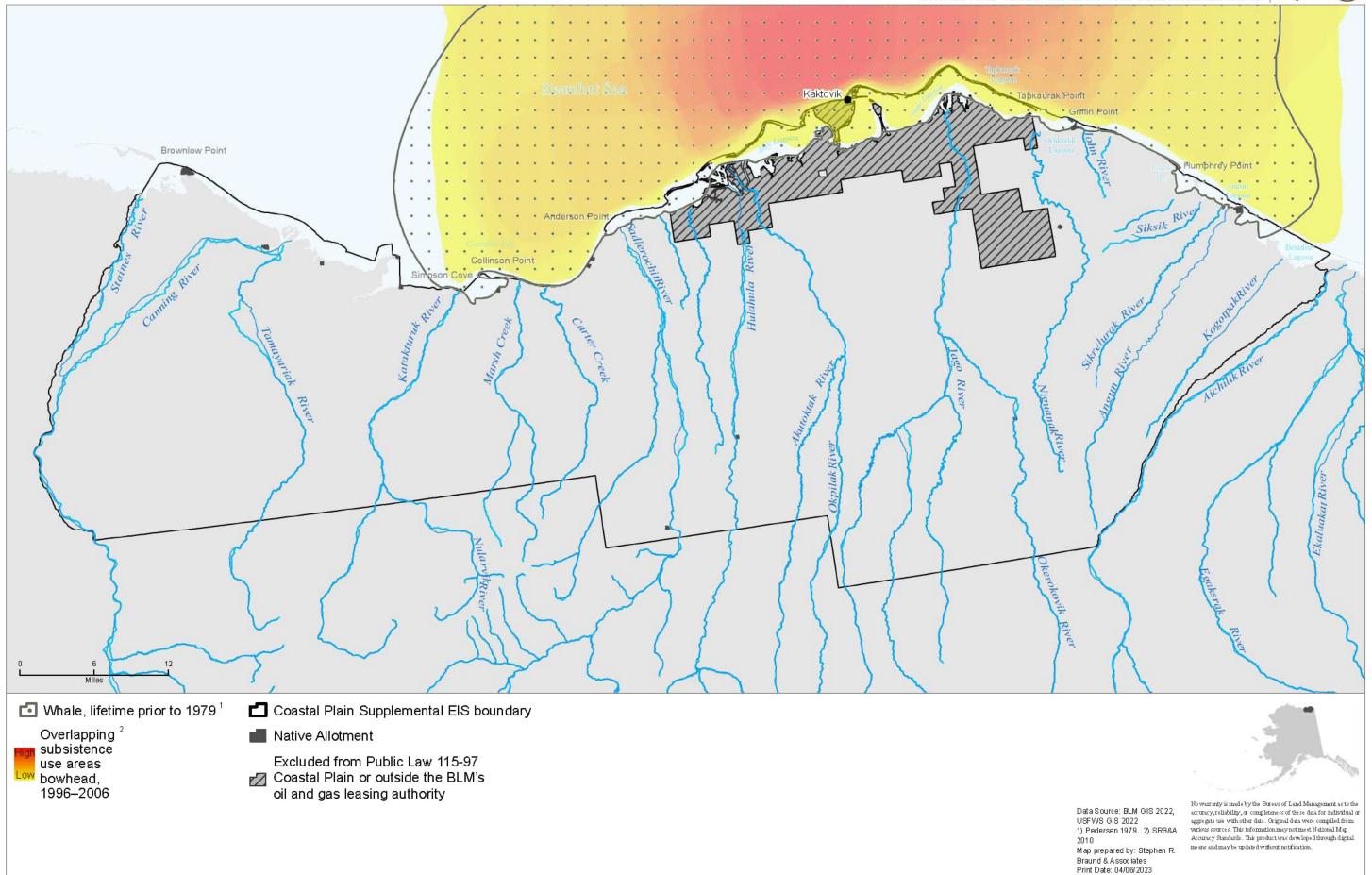




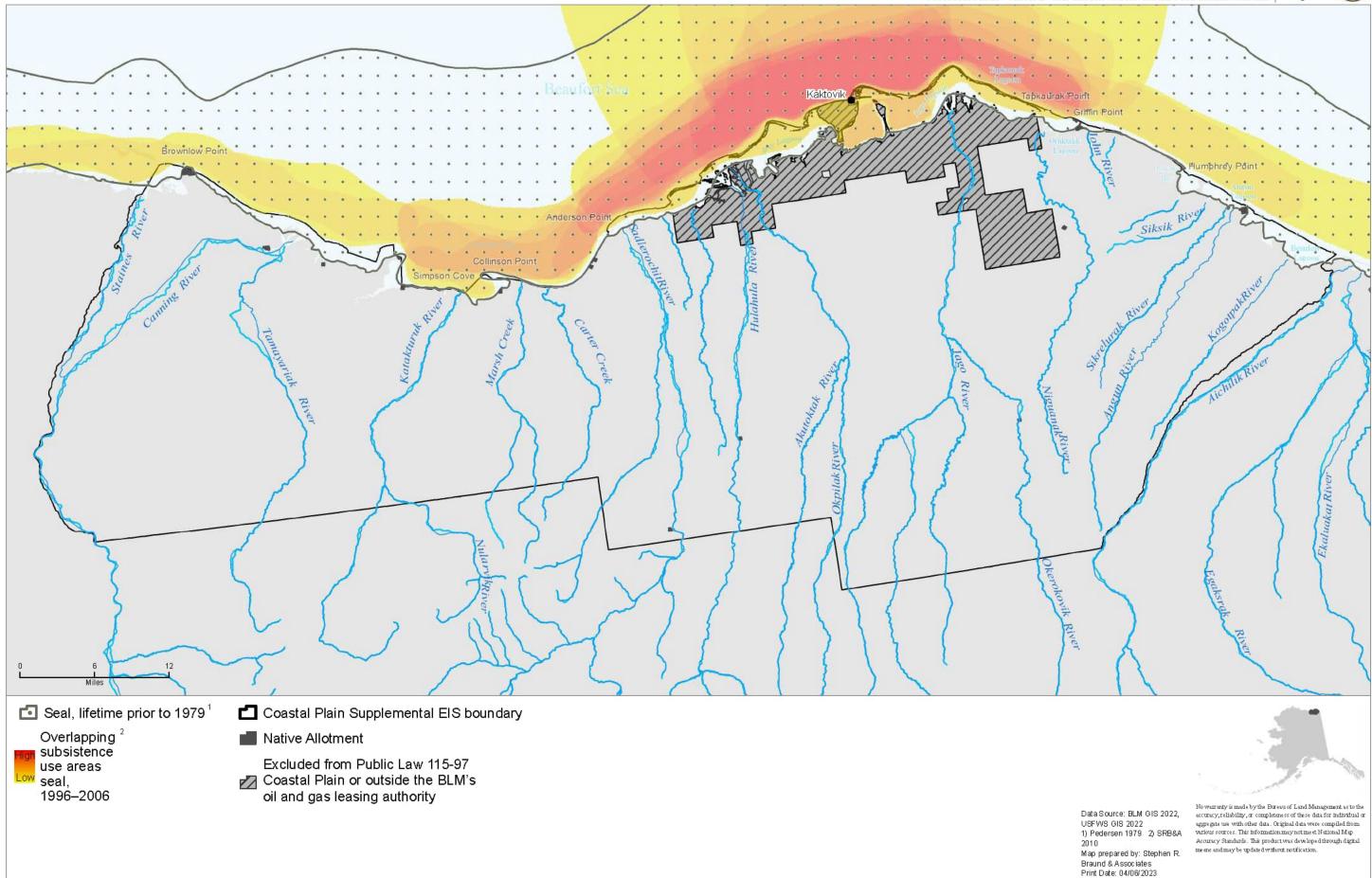






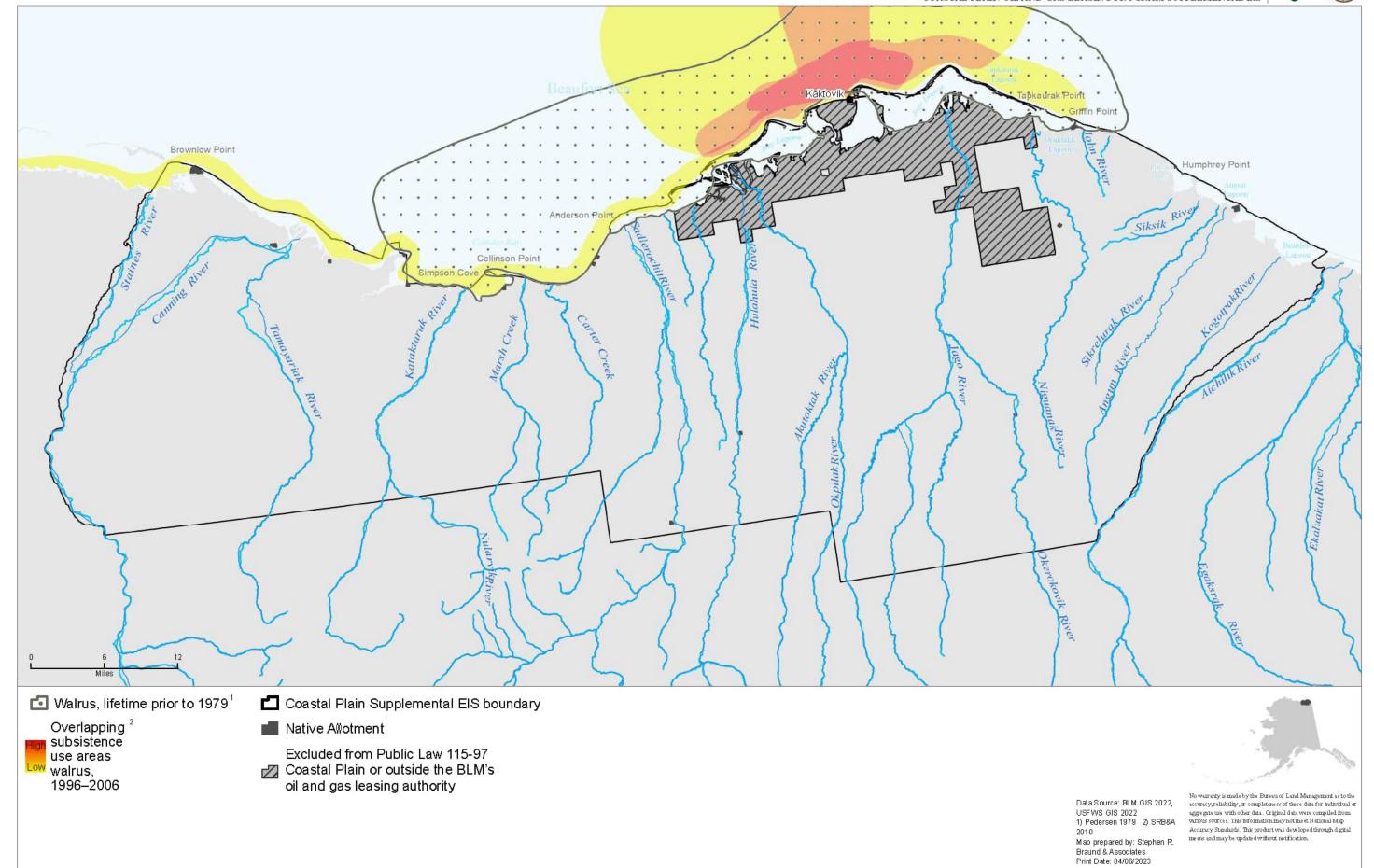






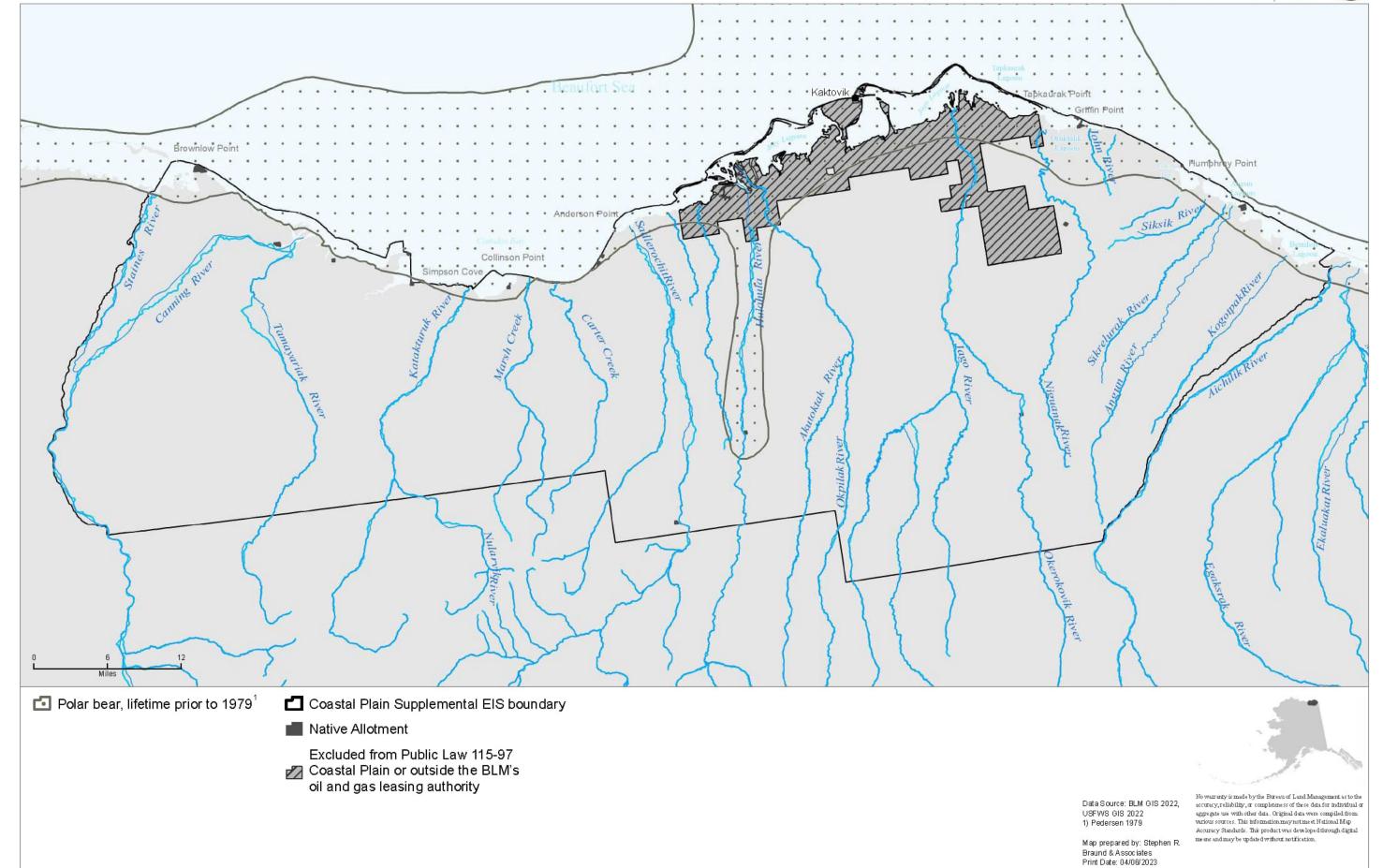
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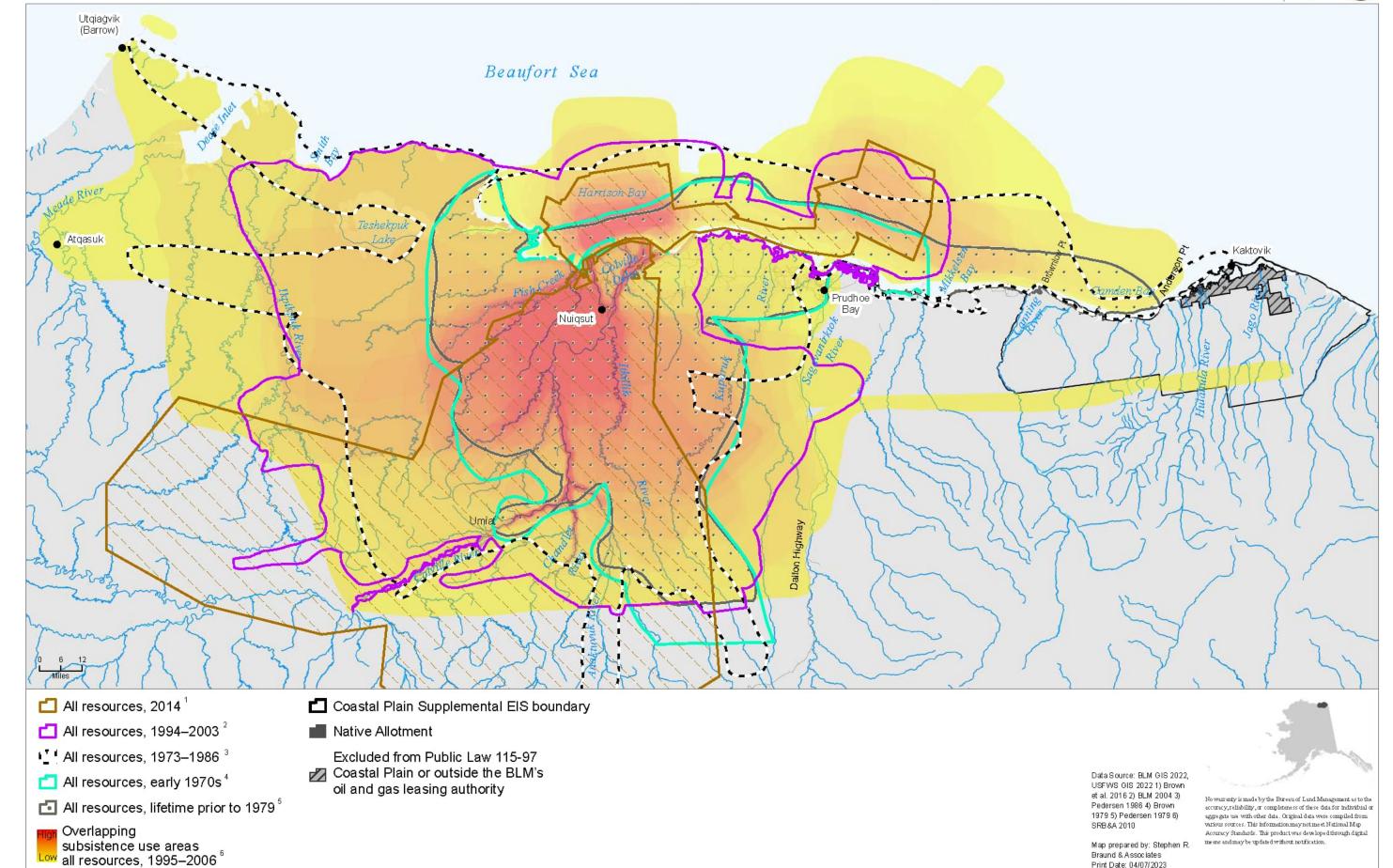
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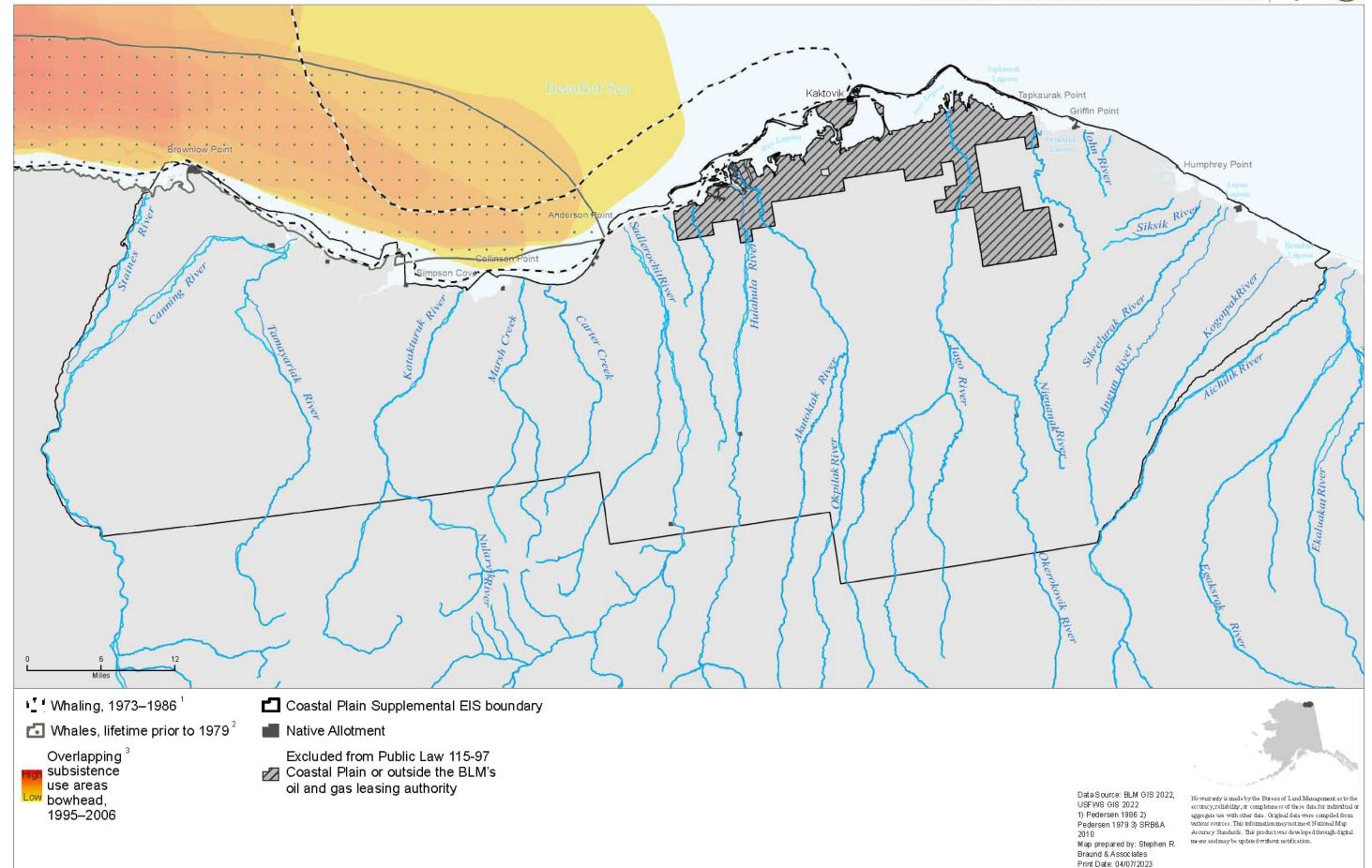




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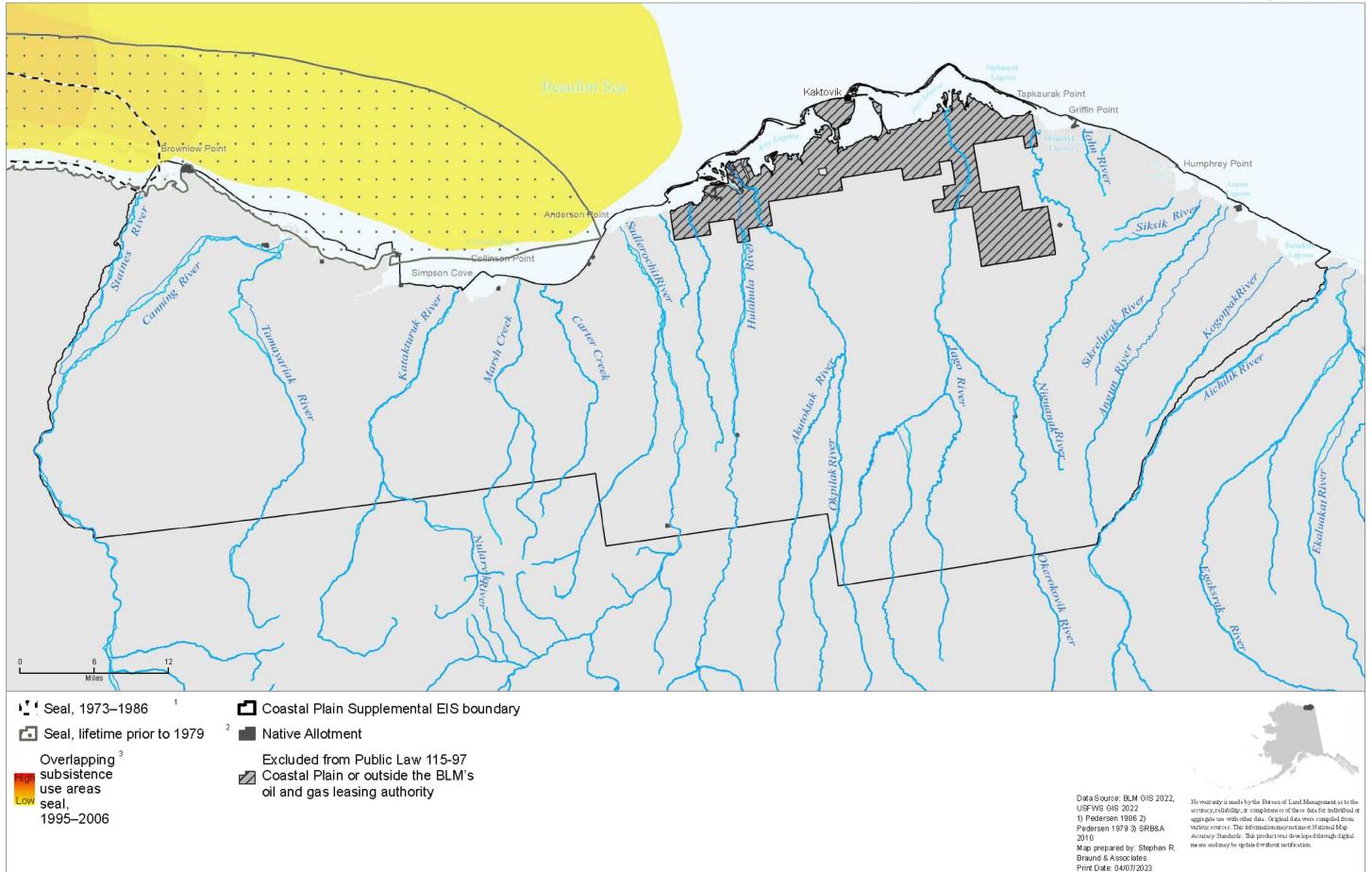






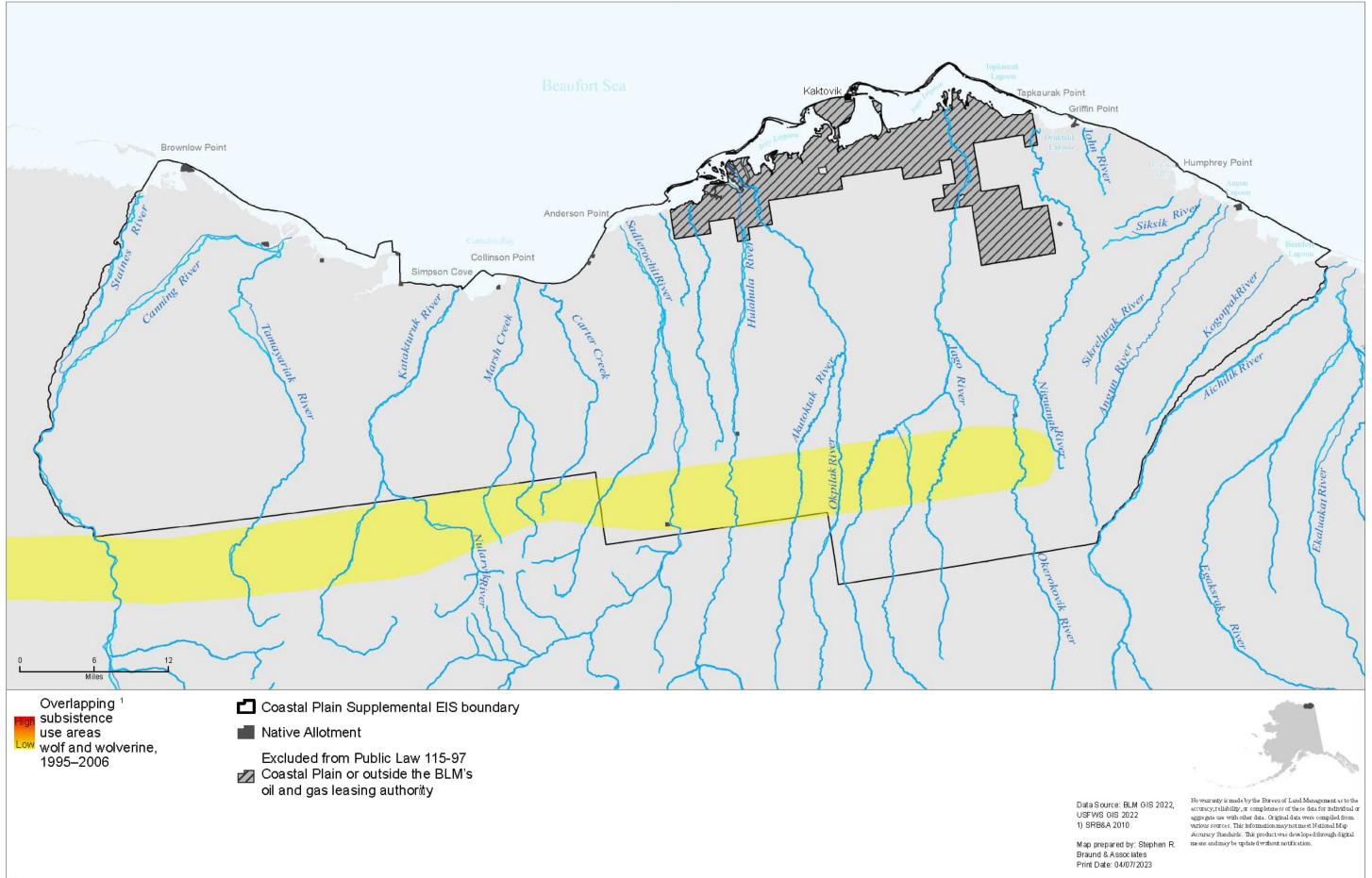


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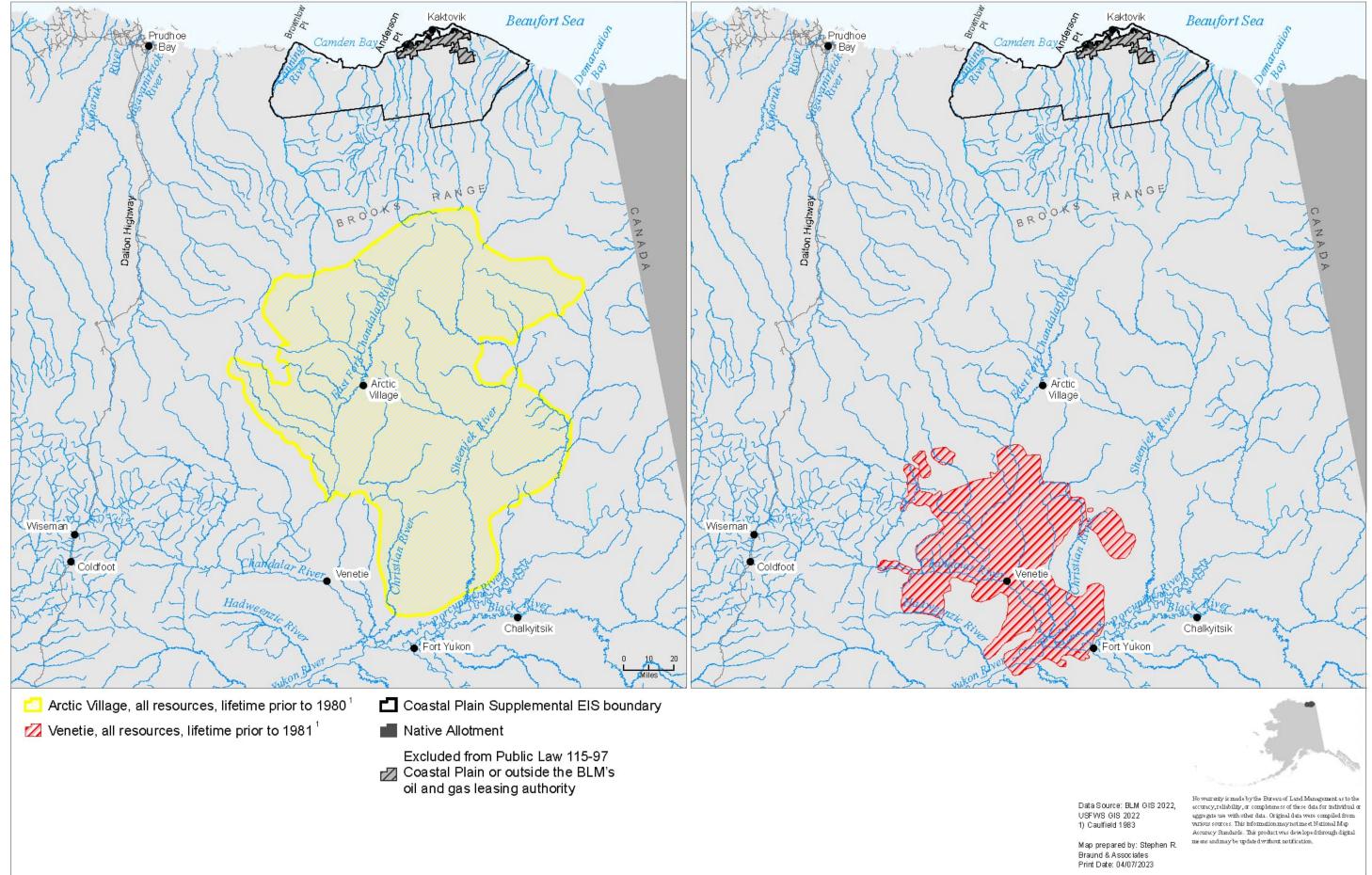


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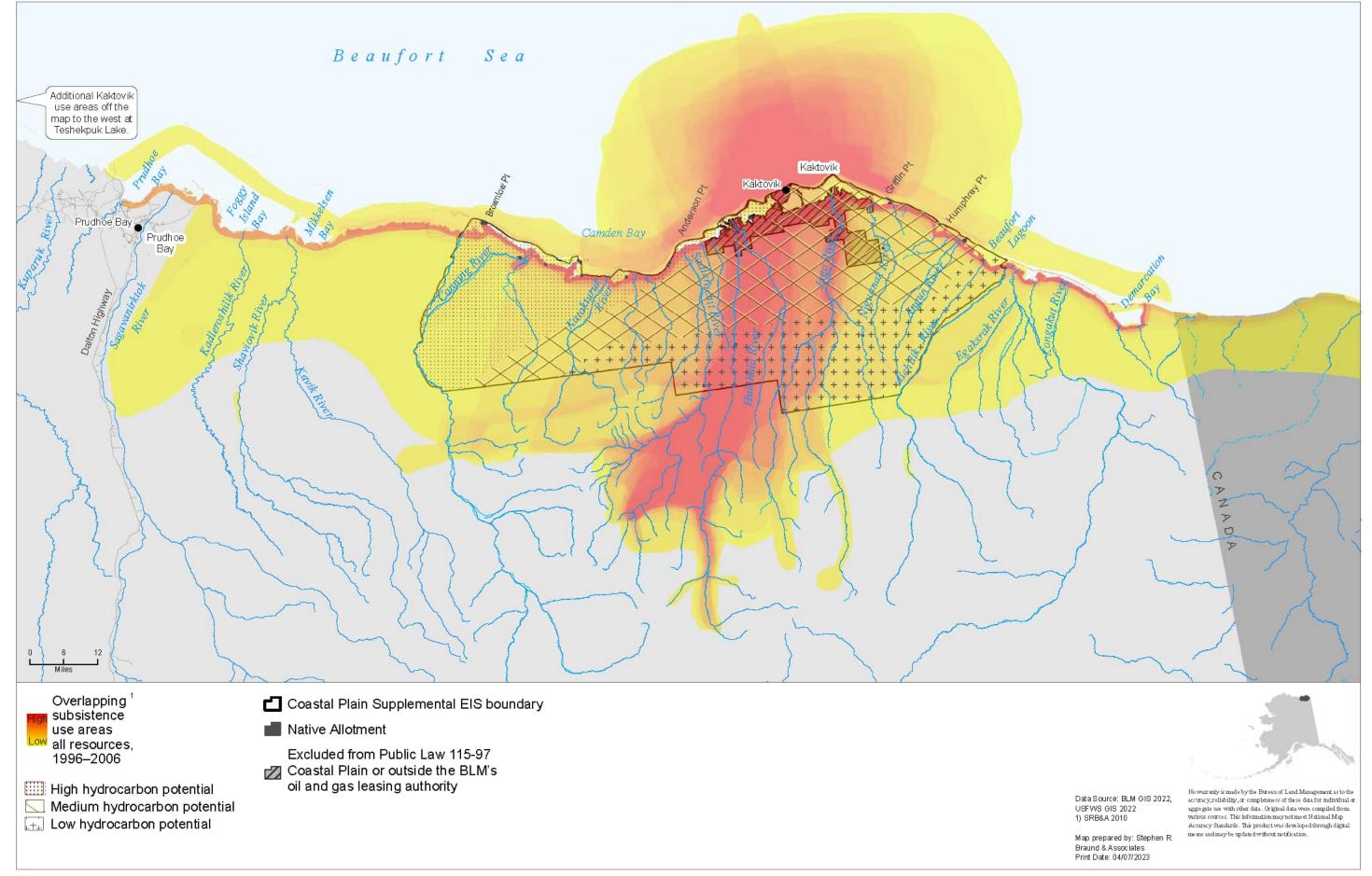




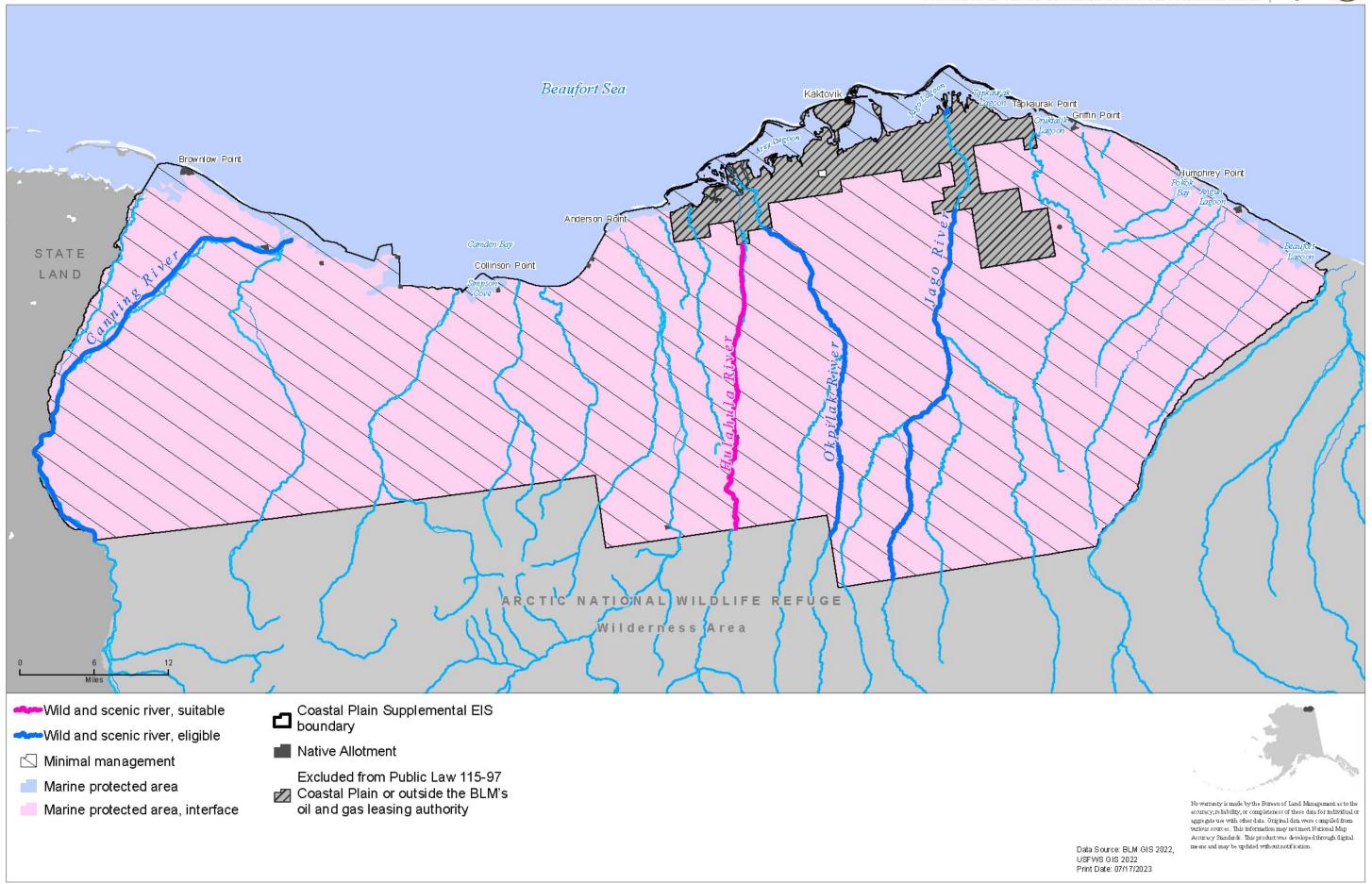


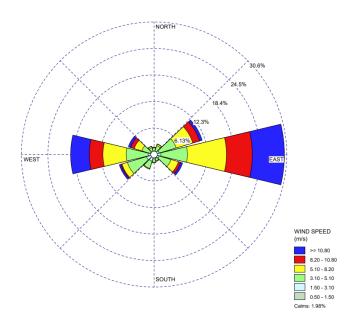






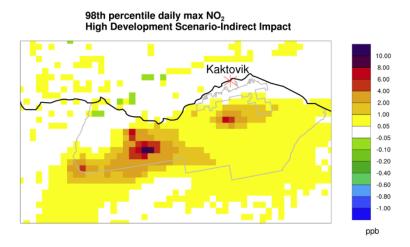




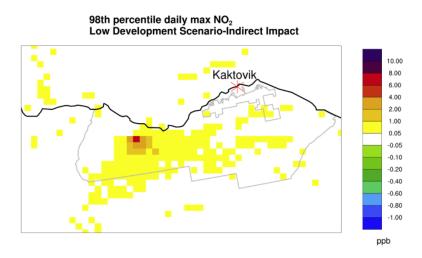


Source: Iowa State University (copyright: used with permission), Iowa Environmental Mesonet (IEM) website: <a href="http://mesonet.agron.iastate.edu/">http://mesonet.agron.iastate.edu/</a>

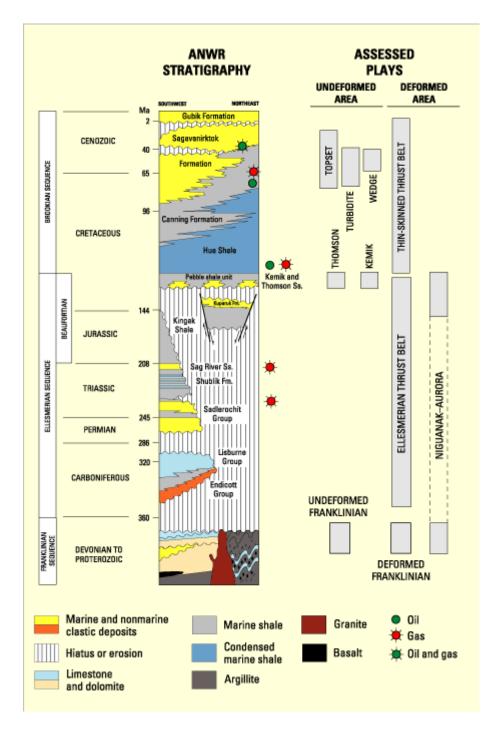
Figure 3-1: Wind Rose Plot for Barter Island, Kaktovik, Alaska



**Figure 3-2.** Modeled Spatial Distribution of NO<sub>2</sub> impacts Due to the Hypothetical Oil and Gas Development under Alternative B.

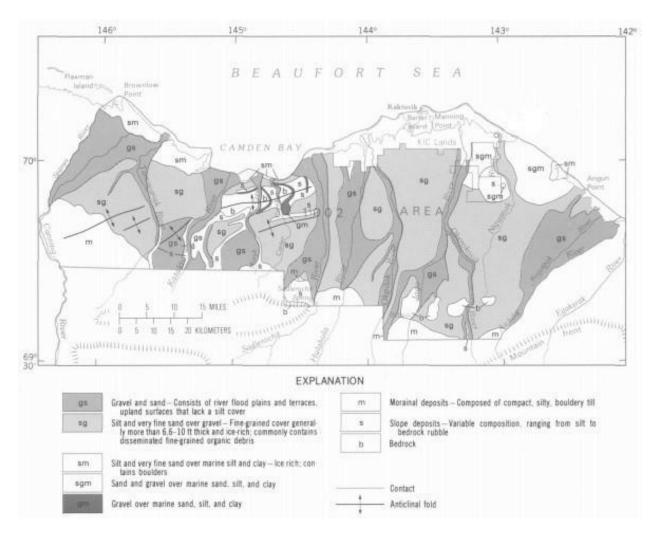


**Figure 3-3.** Modeled Spatial Distribution of NO<sub>2</sub> impacts due to the Hypothetical Oil and Gas Development under Alternative D.



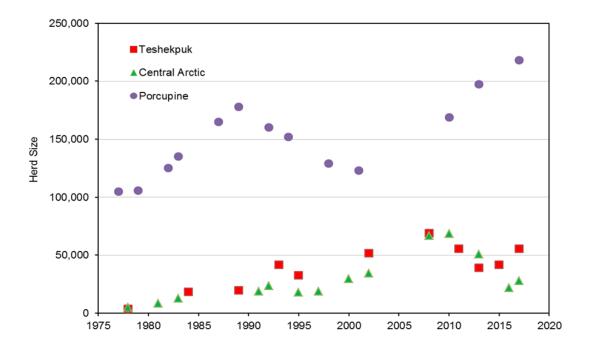
Source: US Geological Survey (USGS 1998b) Fact Sheet 0028-02 Figure 3

Figure 3-4: Stratigraphy of the Coastal Plain



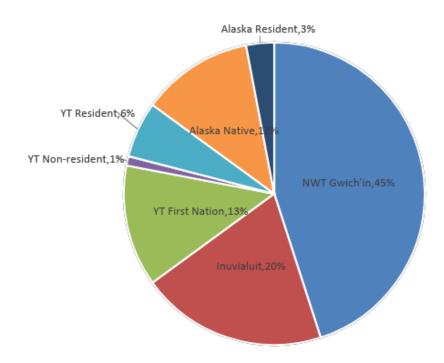
Source: Clough et al. 1987

Figure 3-5: Generalized Surficial Deposits of the Coastal Plain Area



Source: Lenart 2018

Figure 3-6: Population Size of Three Caribou Herds in Arctic Alaska, 1977-2017



Source: Porcupine Caribou Management Board 2010

**Figure 3-7**: Average Portion of Harvest of Porcupine Caribou Herd Between the US and Canada (1992-1994)



Figure 3-8: Visual Resources Photo 1

Typical layout for central processing facility with airstrip and pipeline (Alpine CPF on State land).



Figure 3-9: Visual Resources Photo 2

Typical layout for exploration well with ice pad and ice road (Stony Hill well site in NPR-A).