

Integrated Landscape Management: North Slope Rapid Ecoregional Assessment

The Ecosystem Approach to Management of Arctic Ecosystems: Status of Implementation

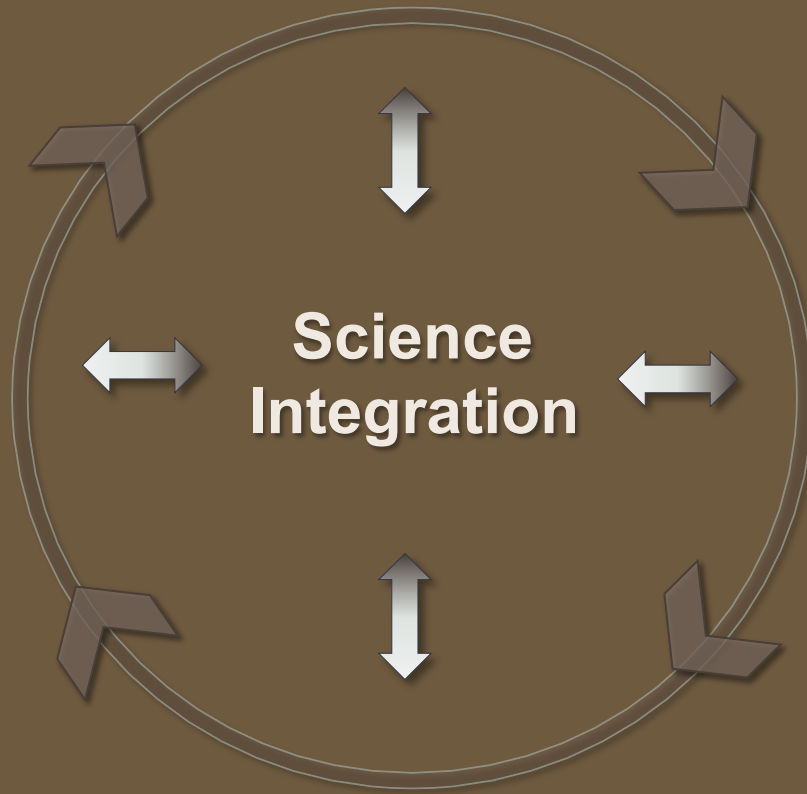
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Land (Sea-)scape Approach (DOI-wide)

Ecoregional Assessments

Monitoring Frameworks



Regional Conservation Strategy

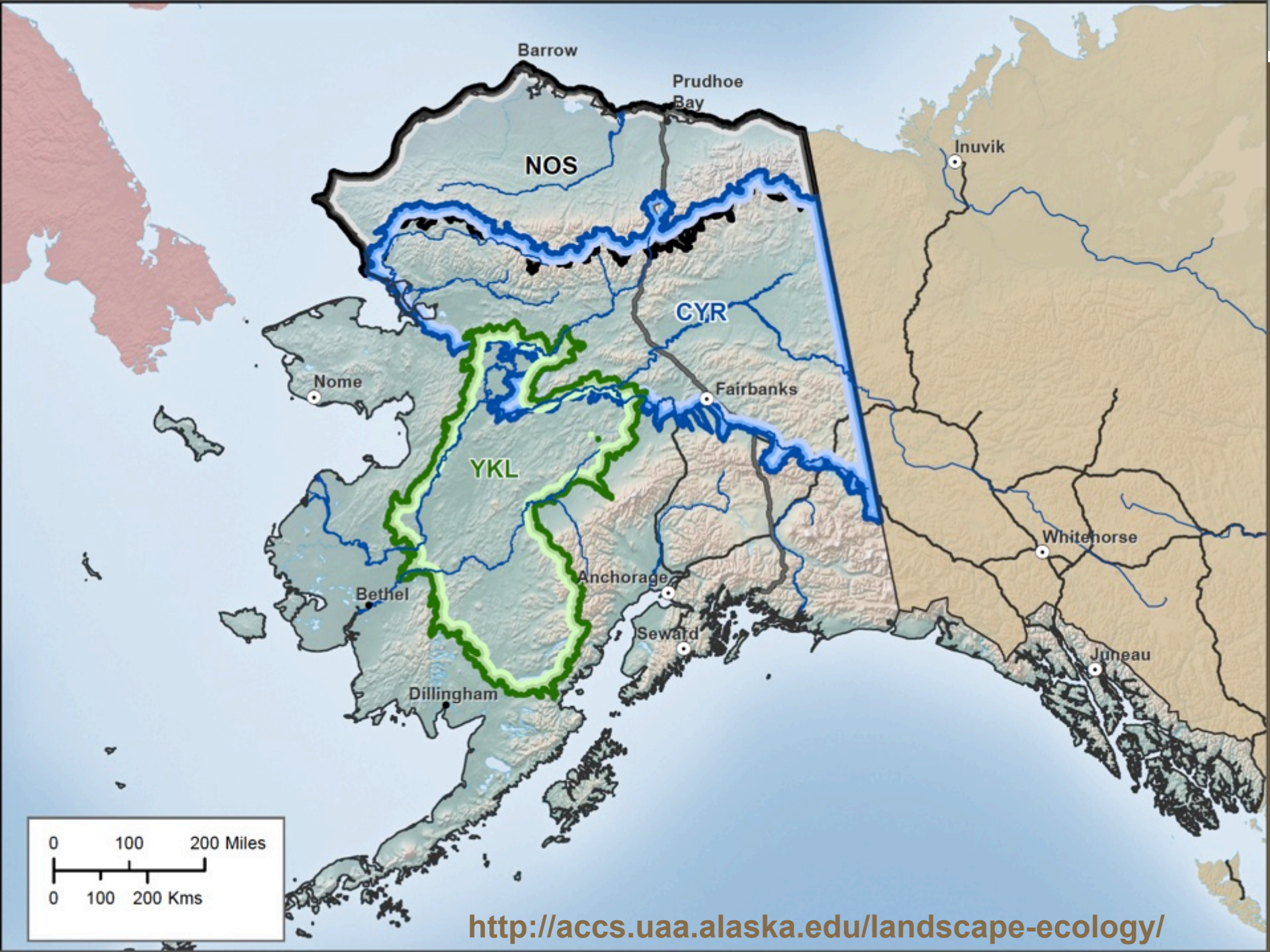
Mitigation Programs

Key Outcomes of REA

- Baseline conservation data synthesis
- Distribution models for key ecosystem resources
 - Conceptual model of how the ecosystem works
 - Follows the *coarse-filter/fine-filter* approach
- Distribution models for major agents of change
 - Climate, wildfire, invasive species, human development and *permafrost*
- Intersection of two to show current and future (2025 & 2060) condition of ecological resources

Six elements of EA

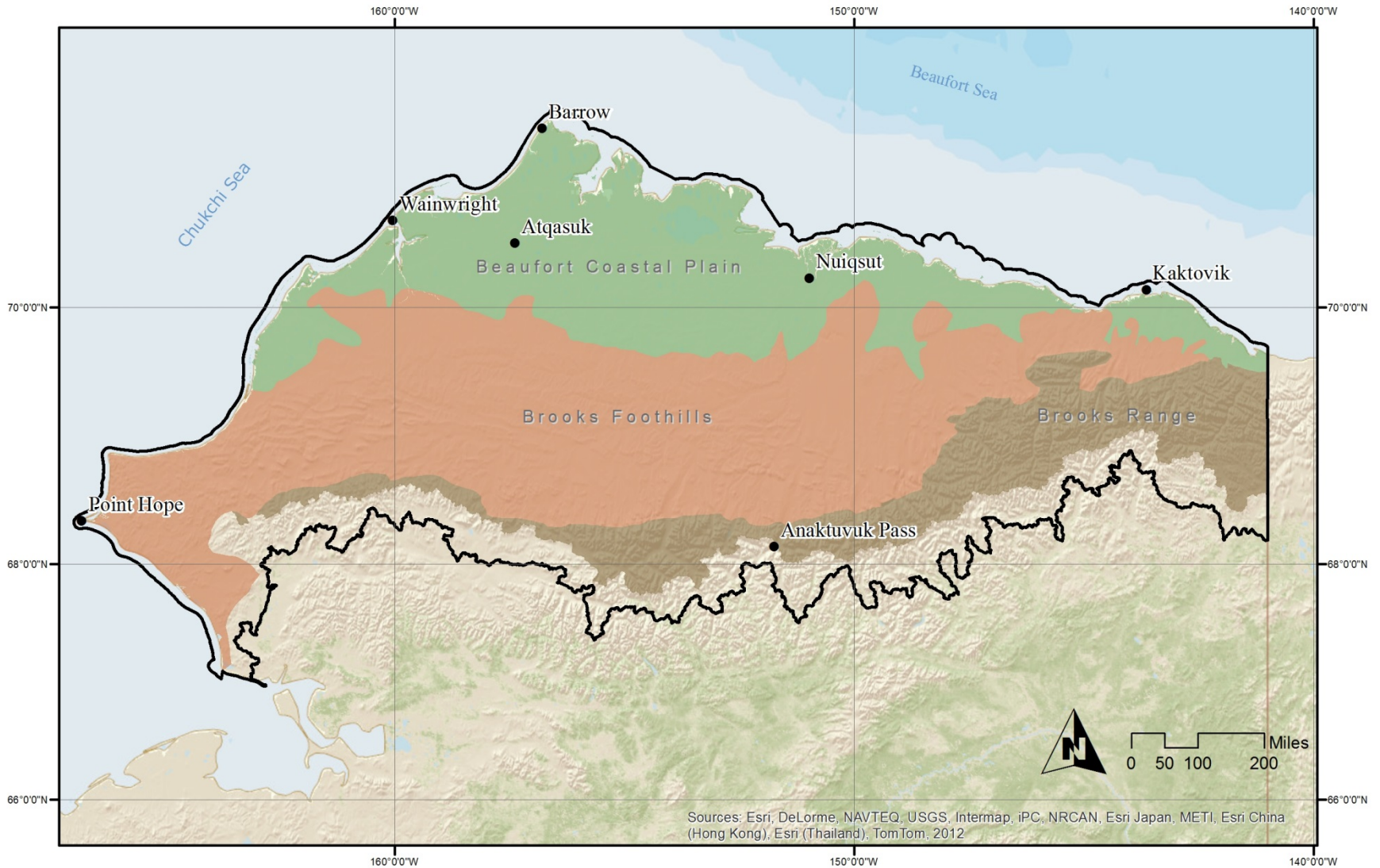
- Identify the ecosystem
- Describe the ecosystem
- Set ecological objectives
- Assess the ecosystem
- Value the ecosystem
- Manage human activities



North Slope Ecoregion Assessment Area

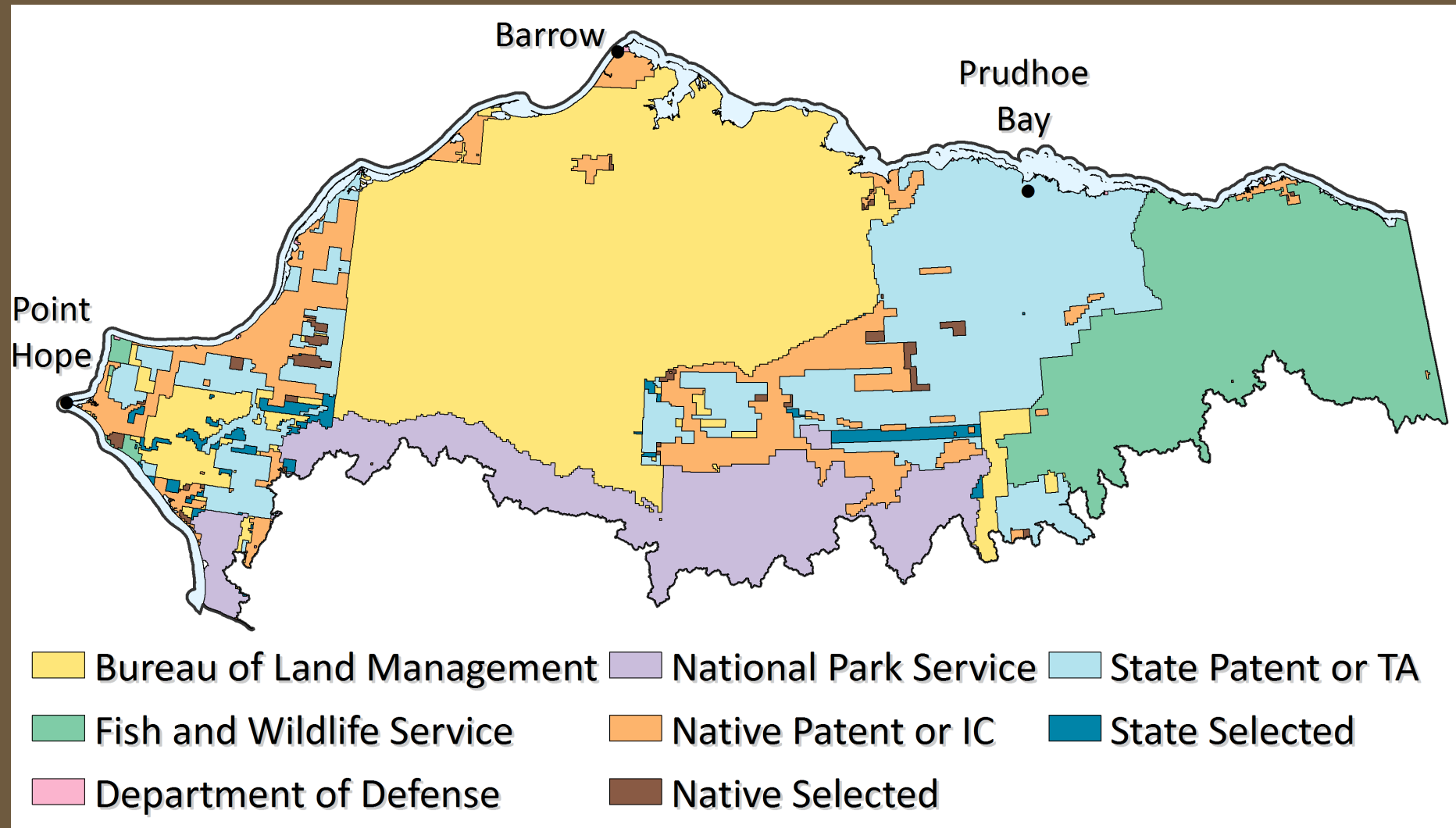


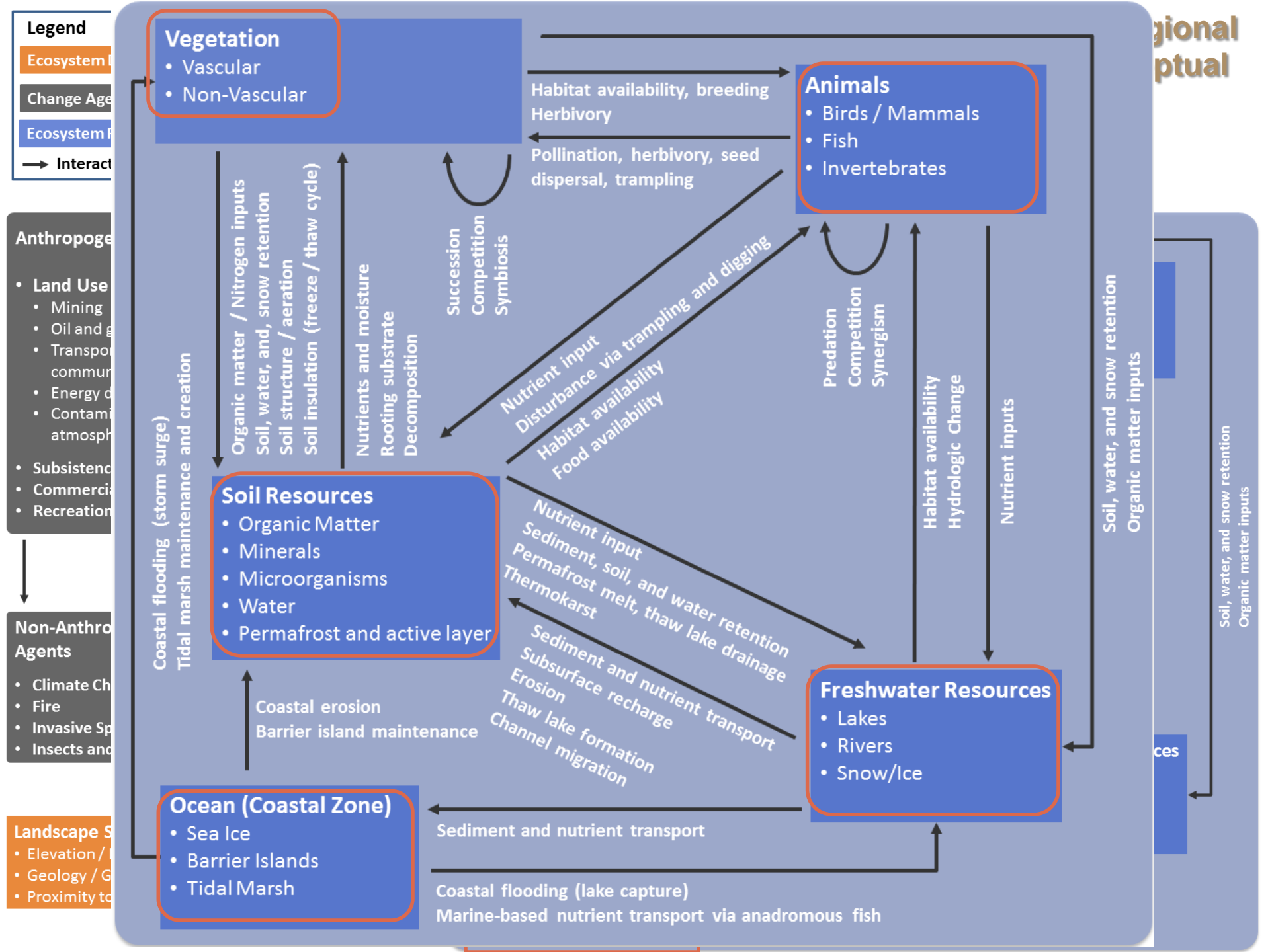
Beaufort Coastal Plain Brooks Foothills Brooks Range Assessment Boundary



Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2012

Land Management of North Slope





Key Terrestrial Habitats

Coastal plain moist tundra
Sand sheet wetland
Sand sheet moist tundra
Coastal plain wetland



Alpine dwarf shrub
Foothills tussock tundra
Barrier islands/spits
Tidal marsh



Coastal plain matrix forming habitat supporting many species



Rare ecosystem with high bird use

Key Terrestrial Species

Caribou

Nearctic brown lemming

Arctic fox

Lapland longspur

Raptor *concentration areas*

Willow ptarmigan

Greater white-fronted goose



Important as consumers and as prey. Important subsistence resources.

Key Aquatic Habitats

Deep Lakes



Overwintering habitat for fish

Shallow Lakes



Summer foraging habitats

Large and Small Streams



High stream connectivity in the summer, source of freshwater and silt to river deltas; important spawning, rearing, and overwintering habitat.

Key Aquatic Species

Broad whitefish



Arctic grayling



Chum salmon



Dolly Varden



Burbot

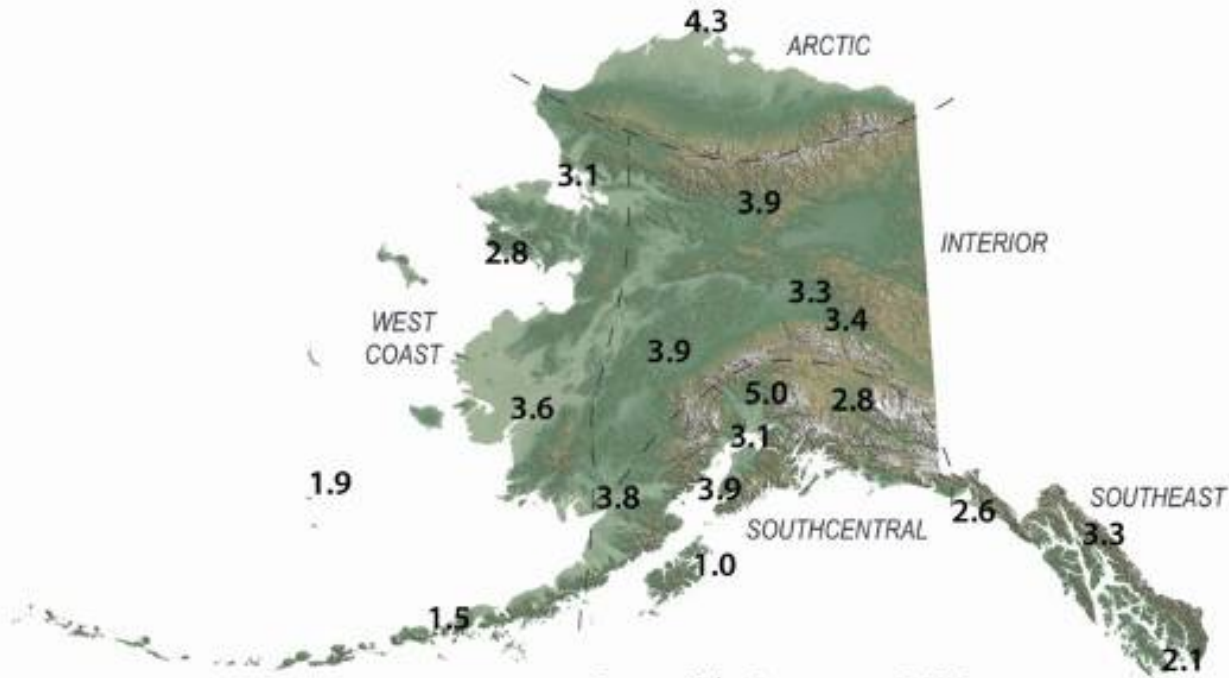


Change Agents

Fire

Invasive Species

Total Change in Mean Annual Temperature (°F), 1949 - 2008



Statewide Average: 3.1°F

Climate Change

Alaska Climate Research Center

Geophysical Institute, University of Alaska Fairbanks



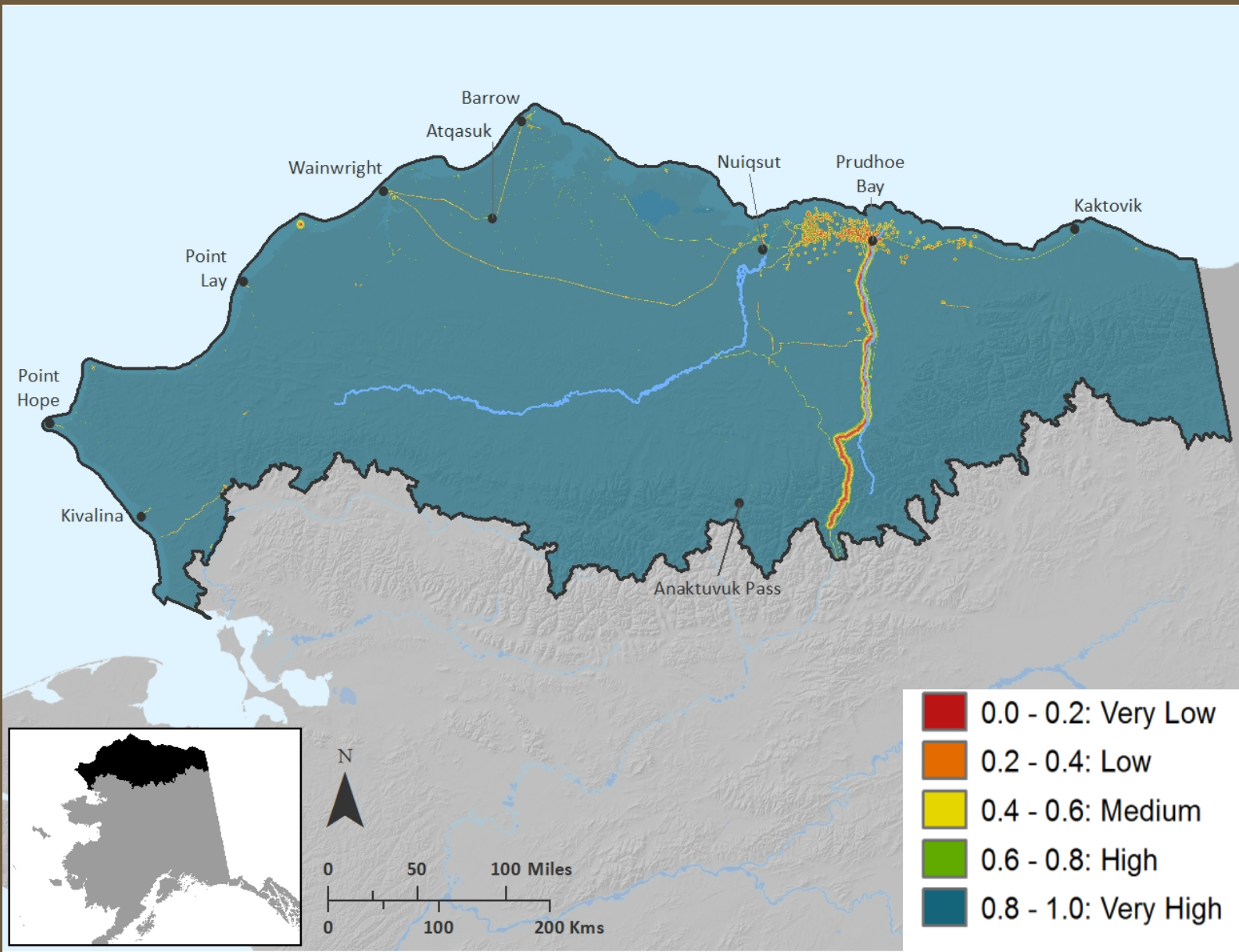
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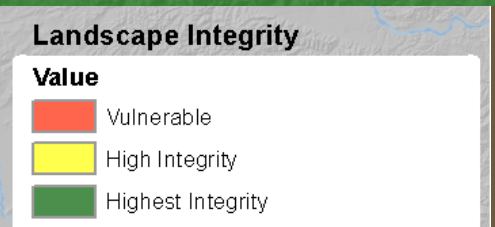
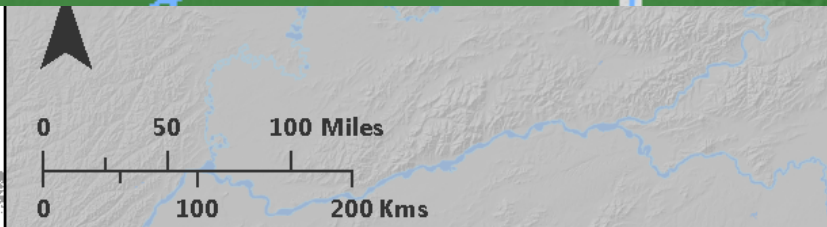
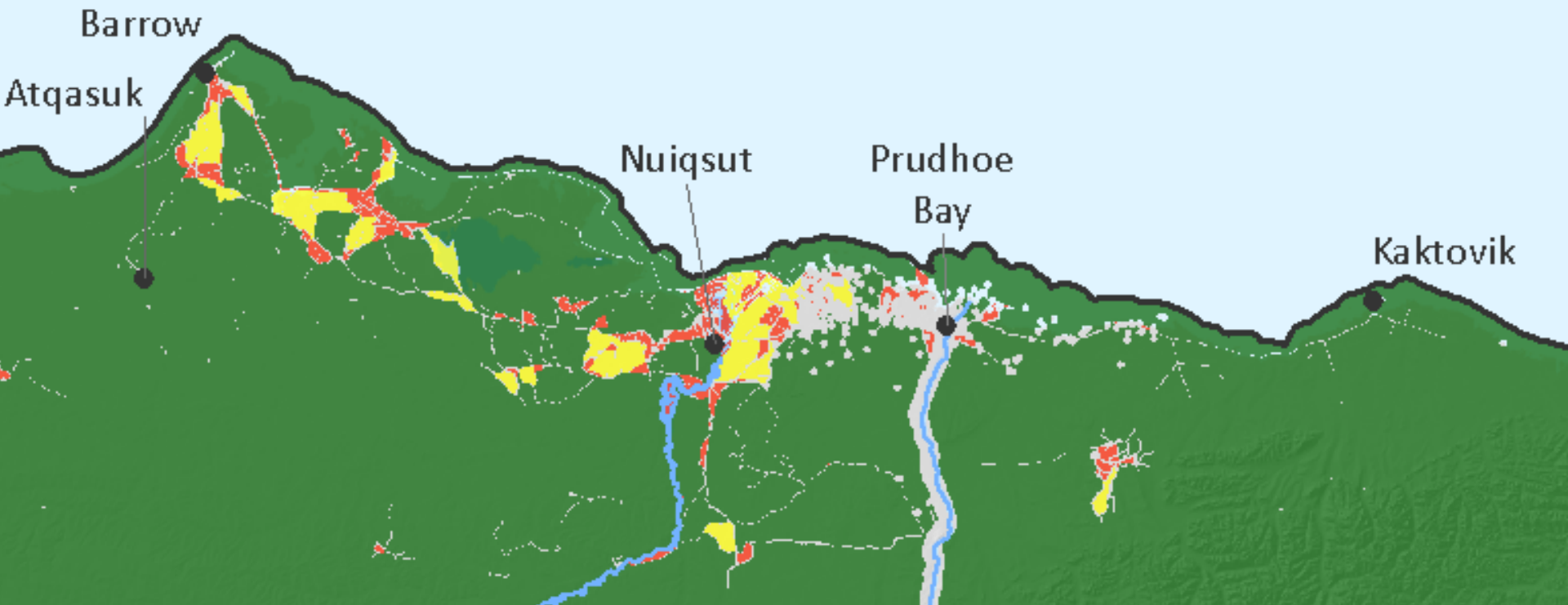
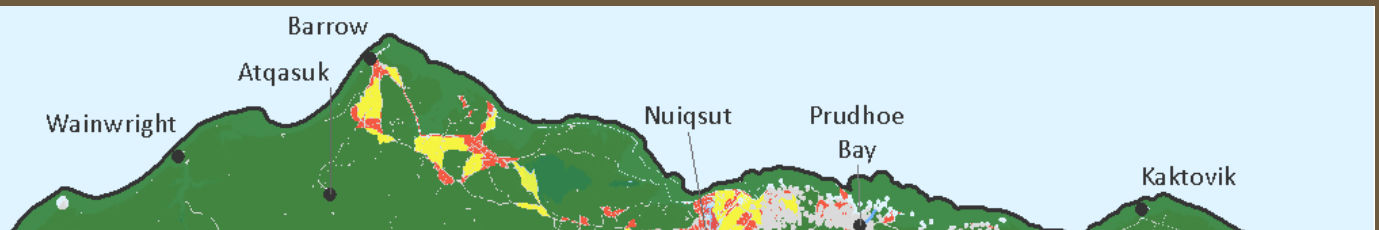
Integration

- Landscape condition
- Assess current and future *status* of key species and habitats
 - Combined to get a sense of ecological integrity
- Assess key attributes of species and habitats that make them susceptible to change
- Cumulative stressor index

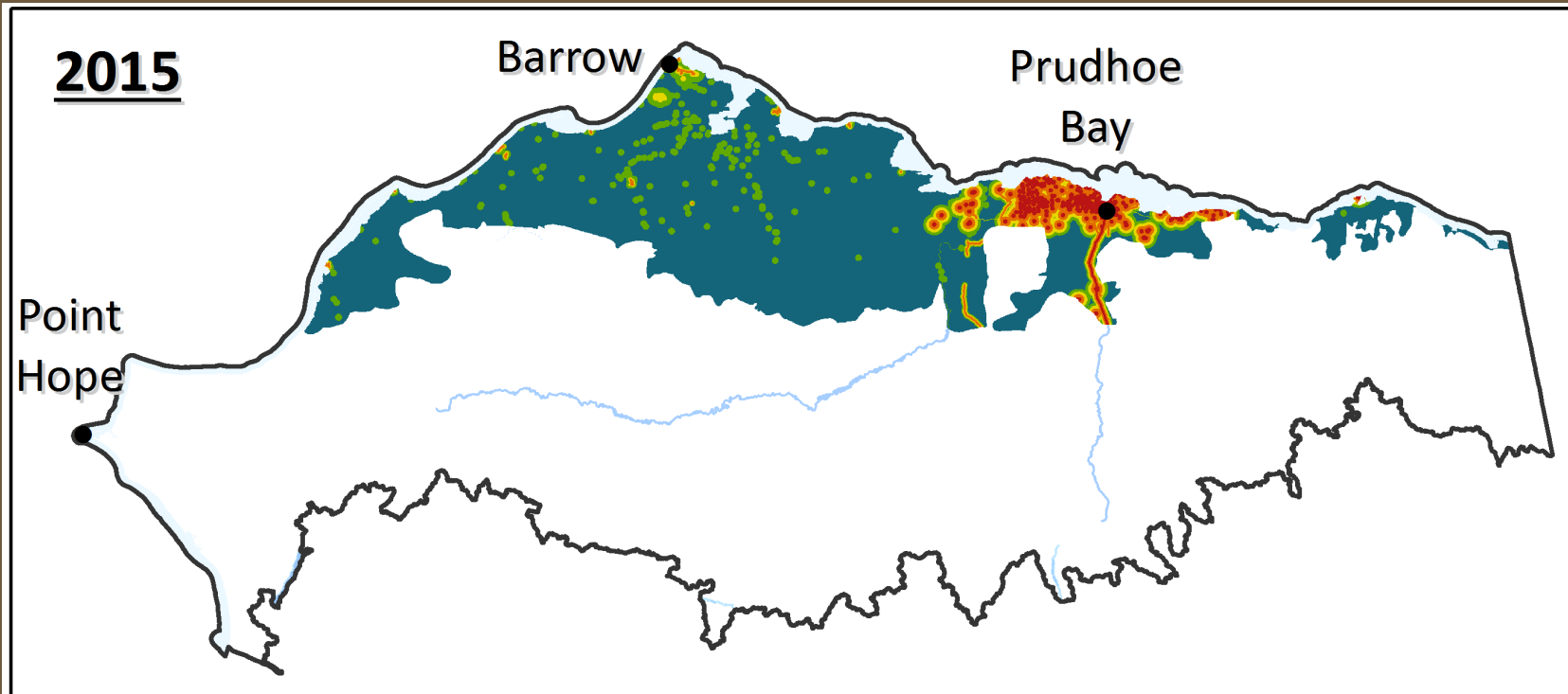
Landscape Condition Model



Landscape Integrity



Species Status



Very Low Low Medium High Very High

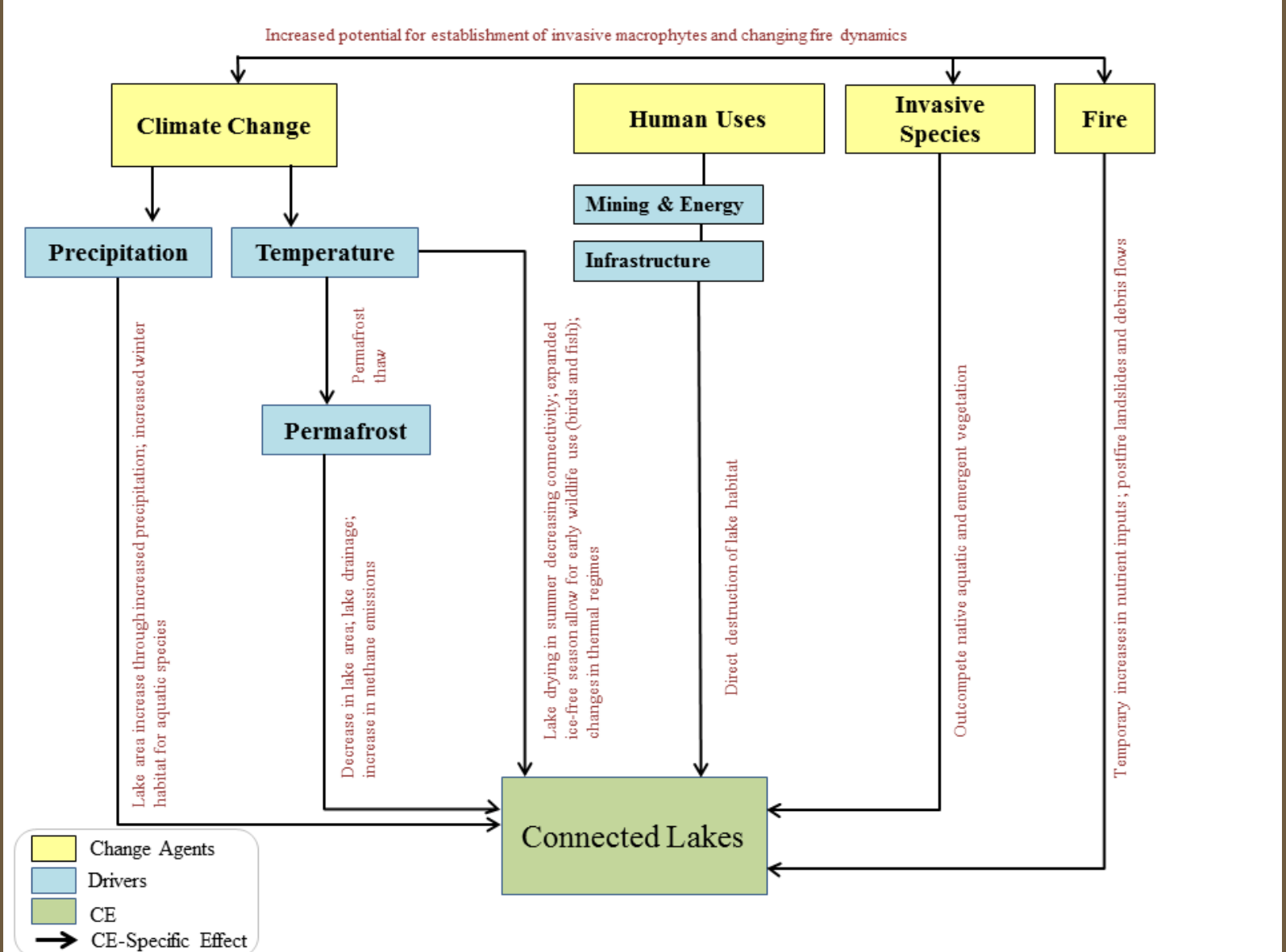
Low condition near high density nesting areas

Negative impacts on population

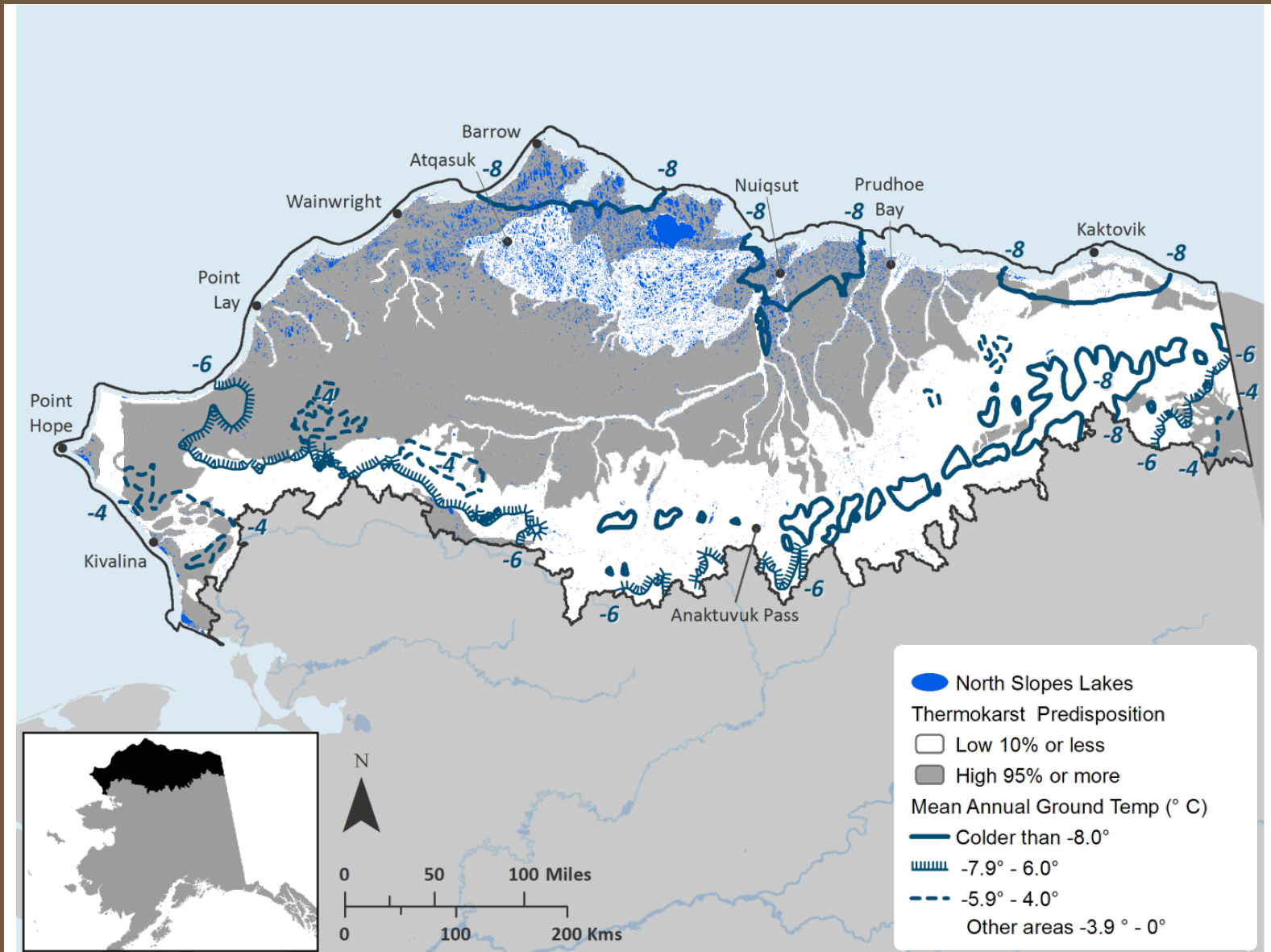
Possible increase in **predators**



Habitat Conceptual Model

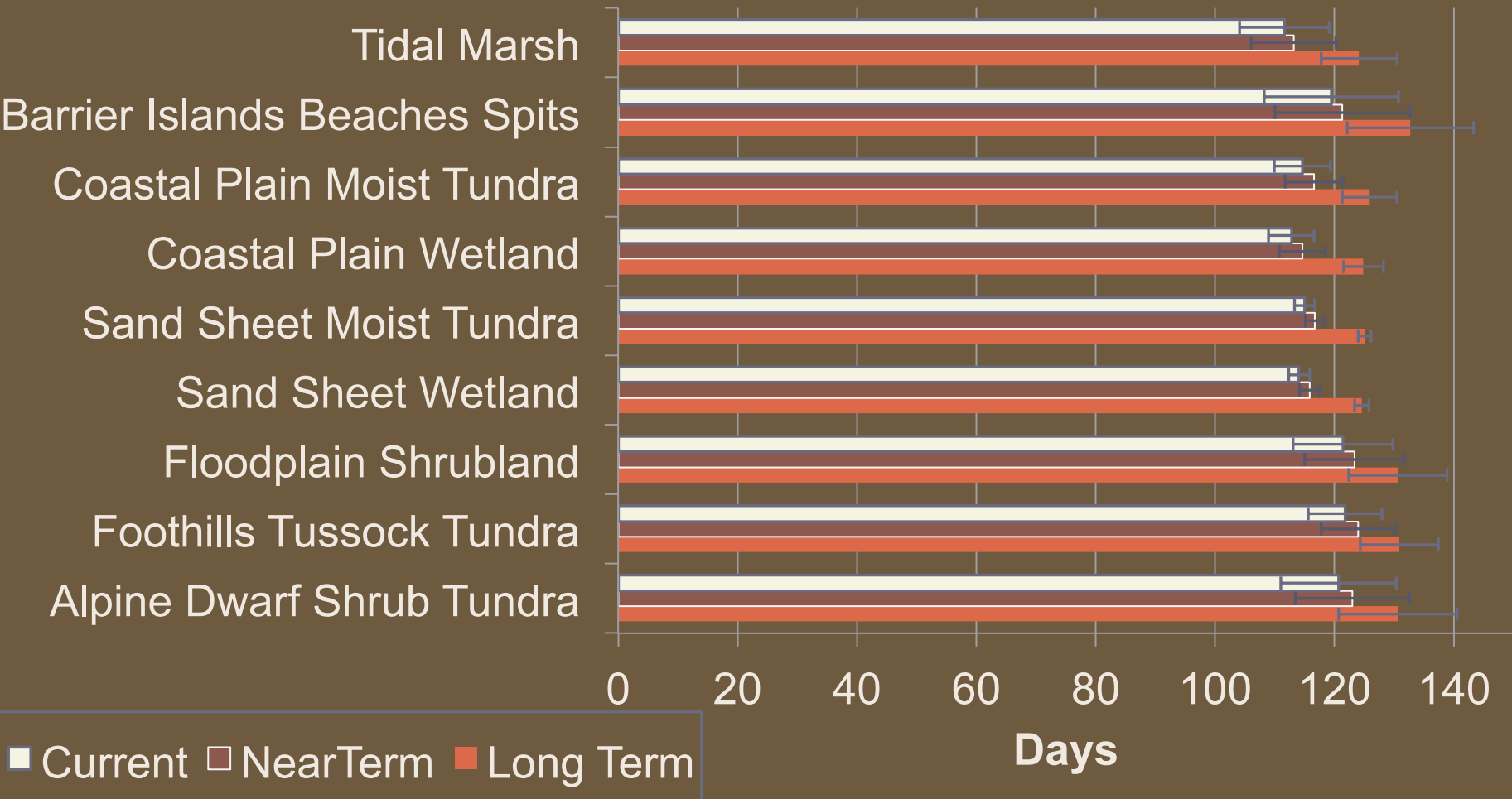


Ecosystem Intactness

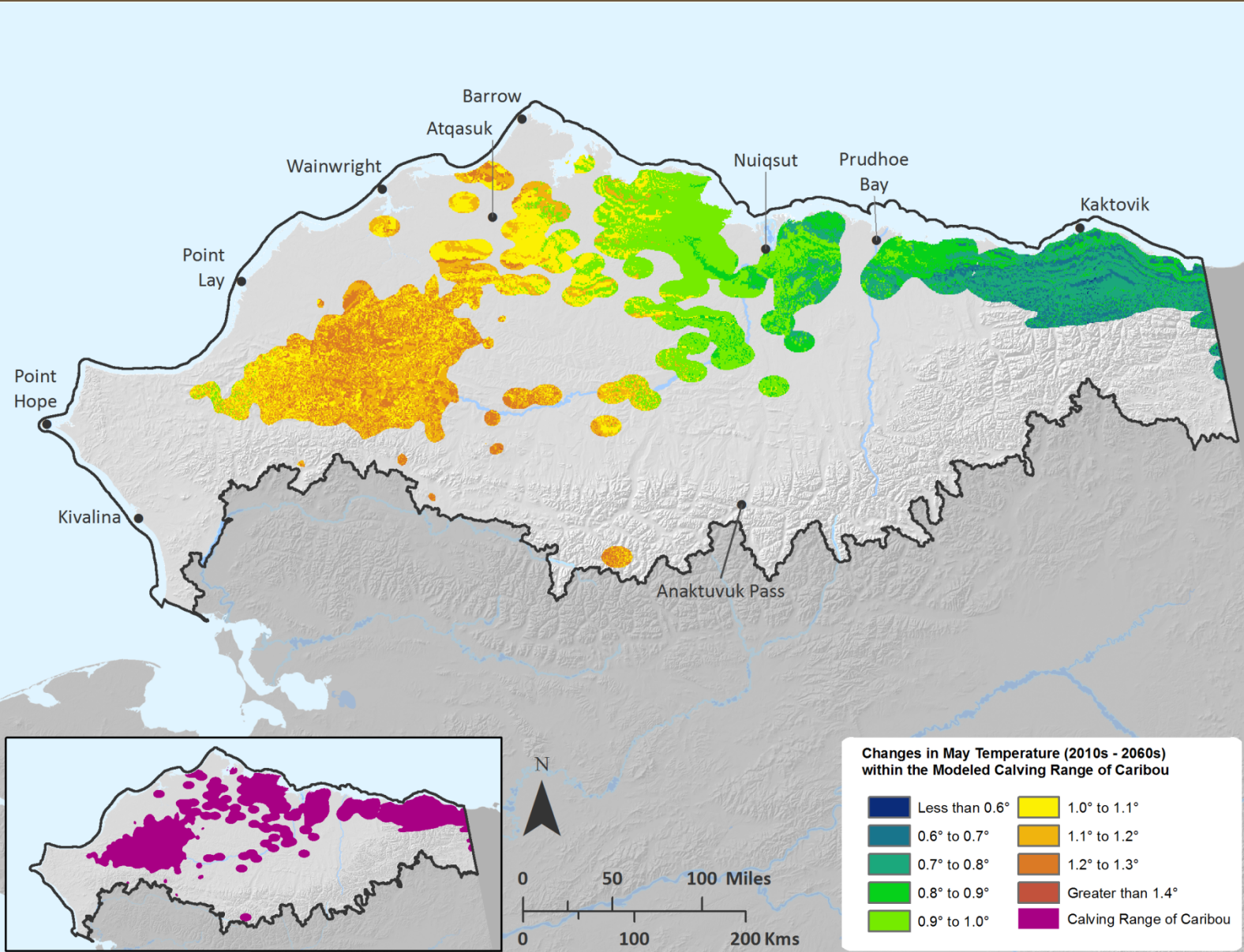


Ecosystem Intactness

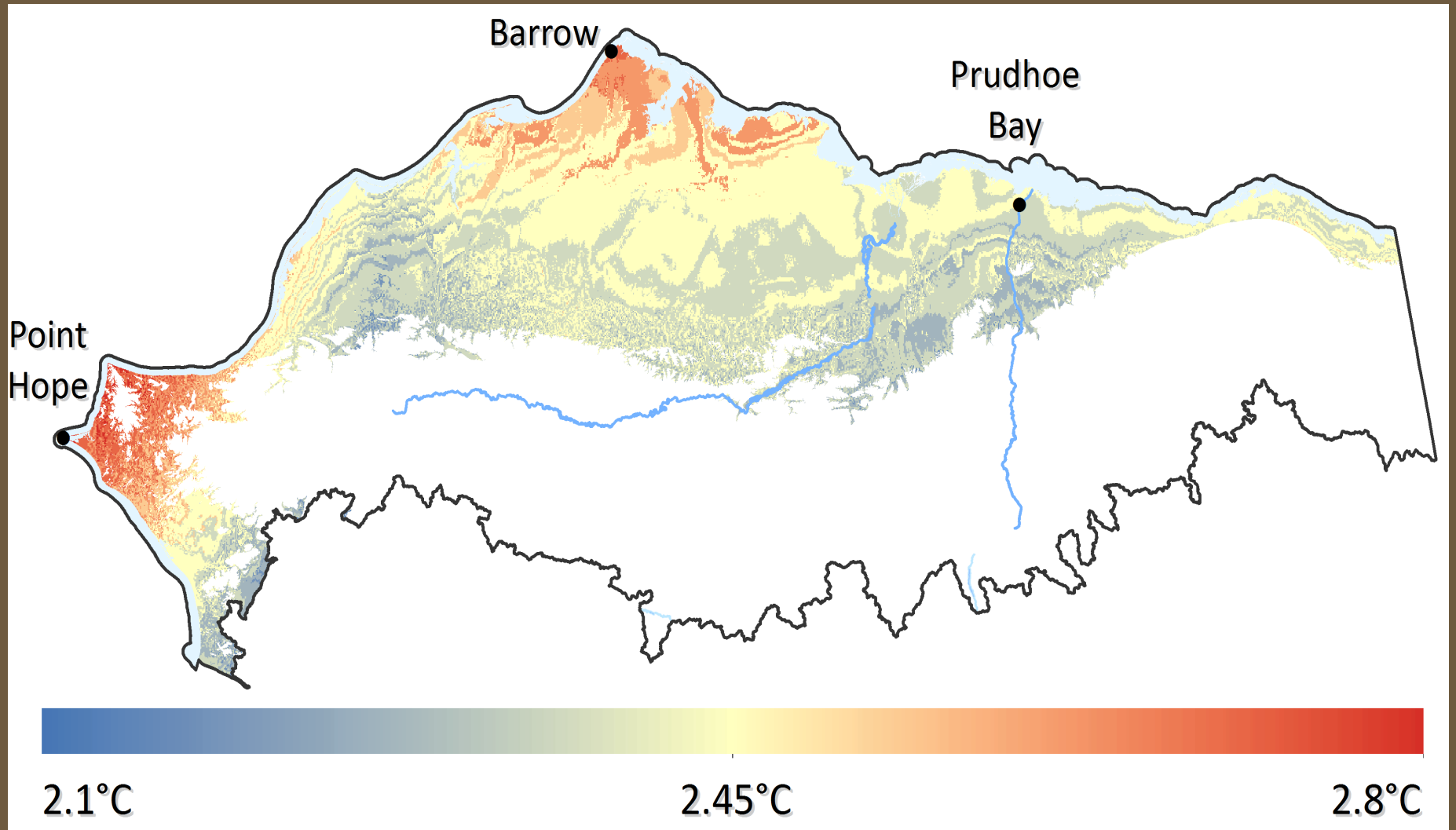
Length of Growing Season



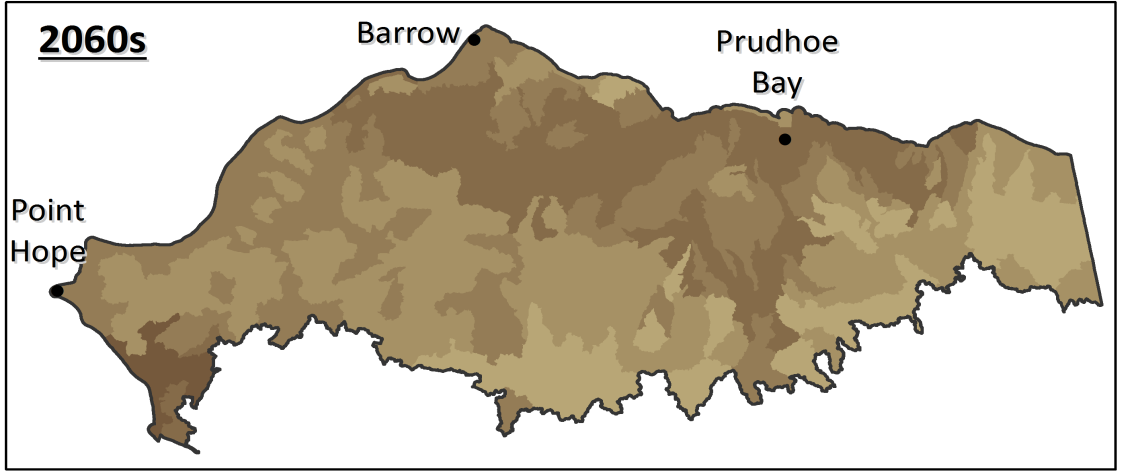
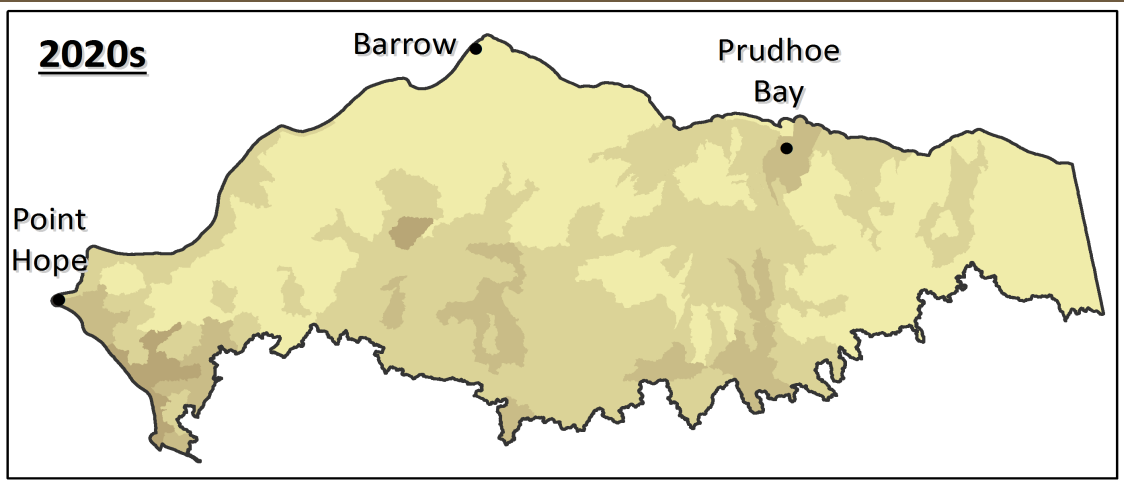
Ecosystem Intactness



Warming Impacting Arctic Foxes



Cumulative Stressors



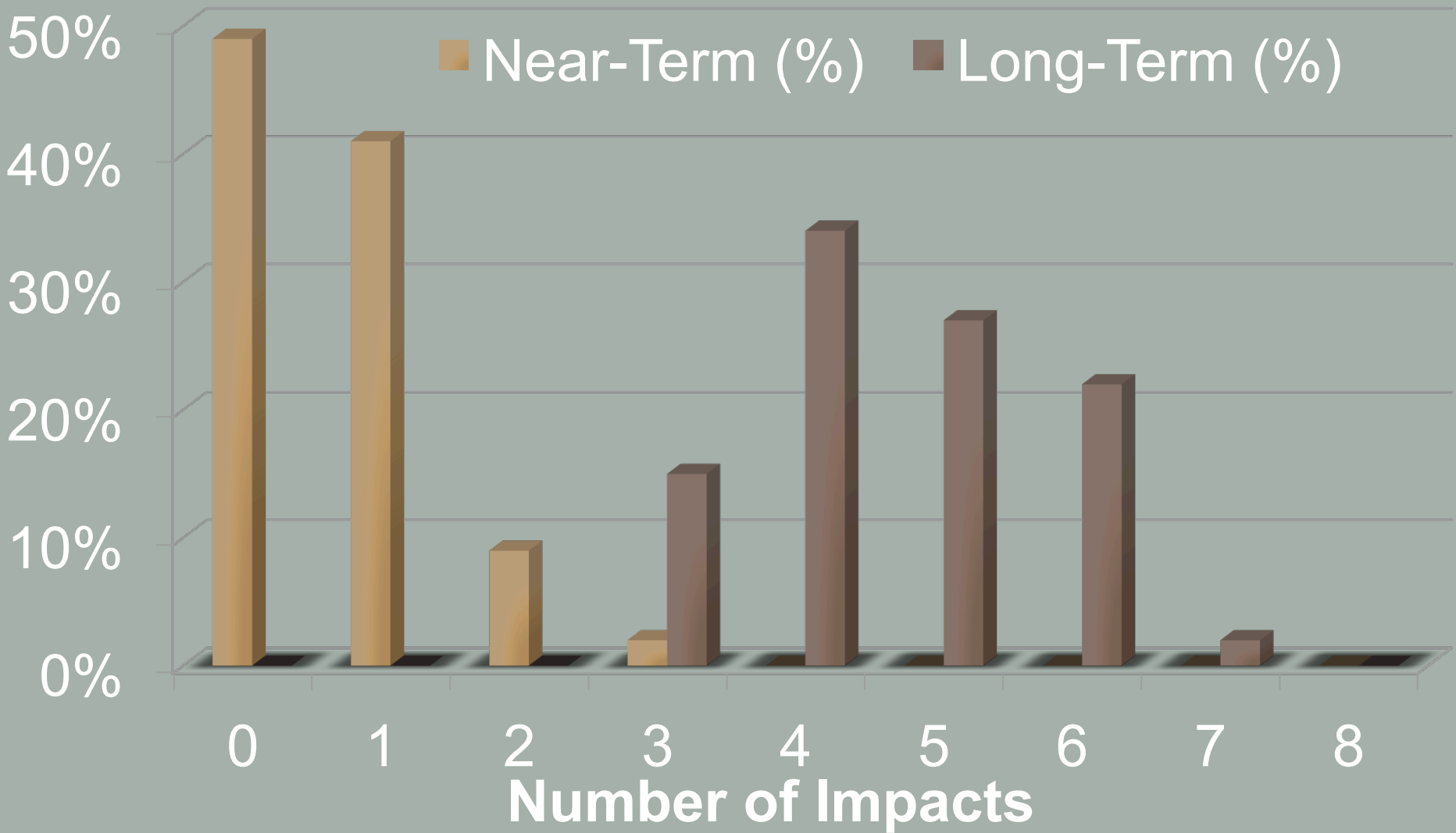
0 (No Anticipated Change)

8 (High Potential Change)

Change Agents:

- January Temp
- July Temp
- Annual precipitation
- Permafrost
- Active Layer
- Relative flammability
- Human footprint
- Invasive species vulnerability

Cumulative Stressors



Conclusion

- Rapid Ecoregional Assessments provide foundation for EA
- REA takes systems approach to defining status and trends
- Addresses the multiple levels of stressors and proposes measures of ecological integrity that can be rapidly updated

Next Steps

- Explore ranges of different future conditions
 - Ecological scenario analysis
- Integrate with LME/Marine Spatial Planning
 - Especially since communities use portfolio approach to subsistence
- Empower Community-Based Observers

Acknowledgements

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Assessment Management Team

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- North Slope Science Initiative

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Cumulative Stressors

