Rapid Ecoregional Assessments

Jamie Trammell

Landscape Ecologist

Assistant Professor of Environmental Studies

Alaska Natural Heritage Program
Alaska Center for Conservation Science
University of Alaska Anchorage

Geography & Environmental Studies
University of Alaska Anchorage

BLM
Rapid Ecoregional Assessment

Project Team

University of Alaska

- Alaska Center for Conservation Science
  - Alaska Natural Heritage Program (AKNHP-UAA)
- Geography and Environmental Studies Department (GES-UAA)
- Institute of Social and Economic Research (ISER - UAA)
- Scenarios Network for Alaska & Arctic Planning (SNAP - UAF)
- Margaret J King & King & Associates

Bureau of Land Management

- National Operation Center (NOC)
- Alaska State Office
- Anchorage, Central Yukon and Arctic Field Office

Review

Bureau of Land Management

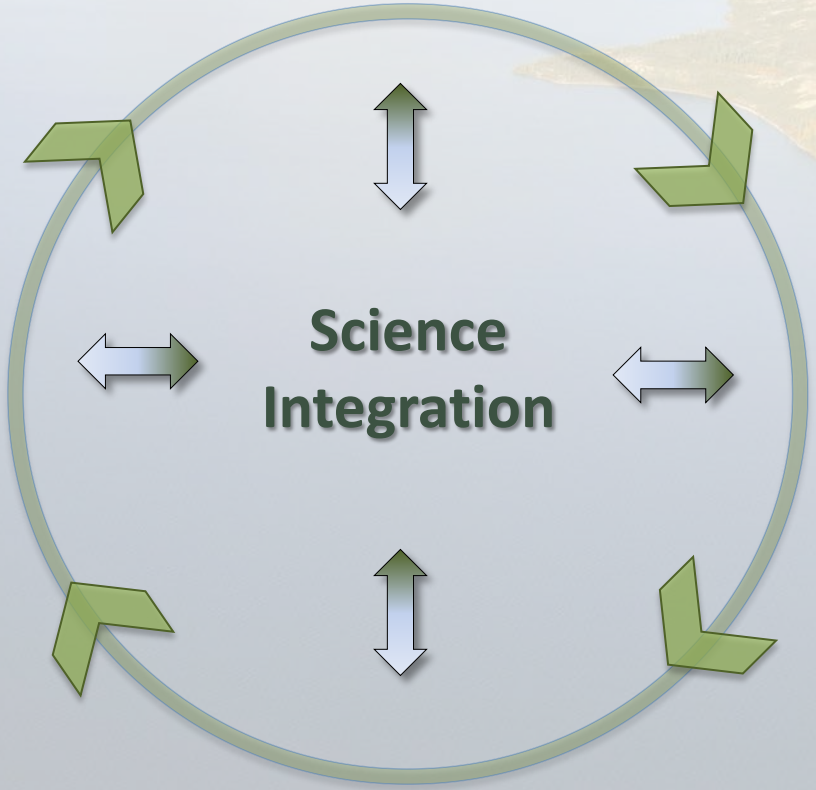
- Scott Guyer
- Aliza Segal
- Karen Kelleher
- Jason Taylor
- Travis Haby
- Tim Hammond
- Cindy Hamfler

Assessment Management Team

- Bureau of Land Management
- Fish and Wildlife Service
- National Park Service
- Alaska Department of National Resources
- Alaska Department of Fish and Game
- US Geological Survey
- North Slope Science Initiative
- North Slope Borough
- North Star Borough
- Northwest Arctic Borough

Landscape Approach

Rapid Ecoregional Assessments



Monitoring Frameworks

Regional Conservation Strategy

Mitigation Programs

What is a Rapid Ecoregional Assessment?

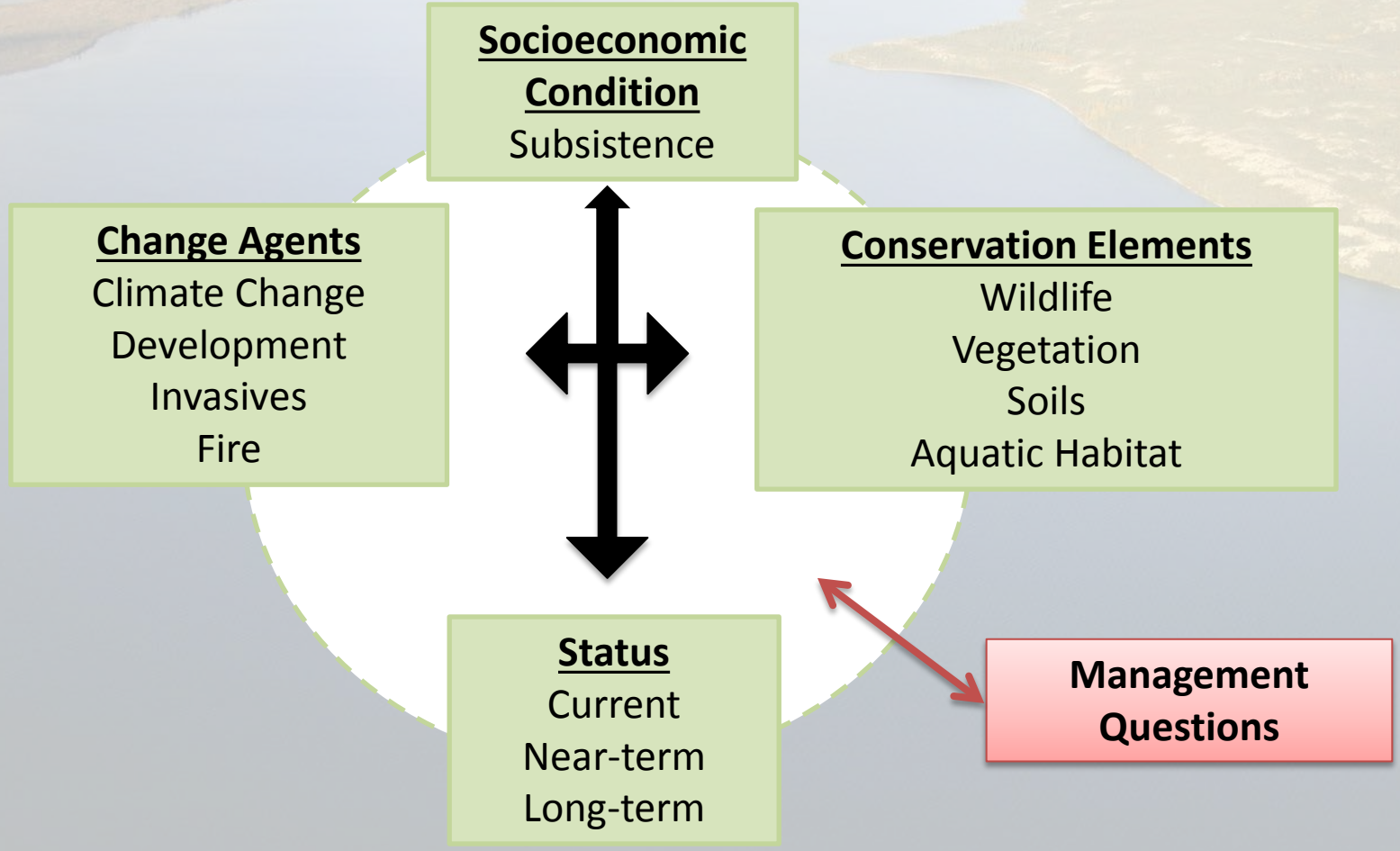
Determine ecological values, conditions, and trends within large, regionally connected areas that have similar environmental characteristics

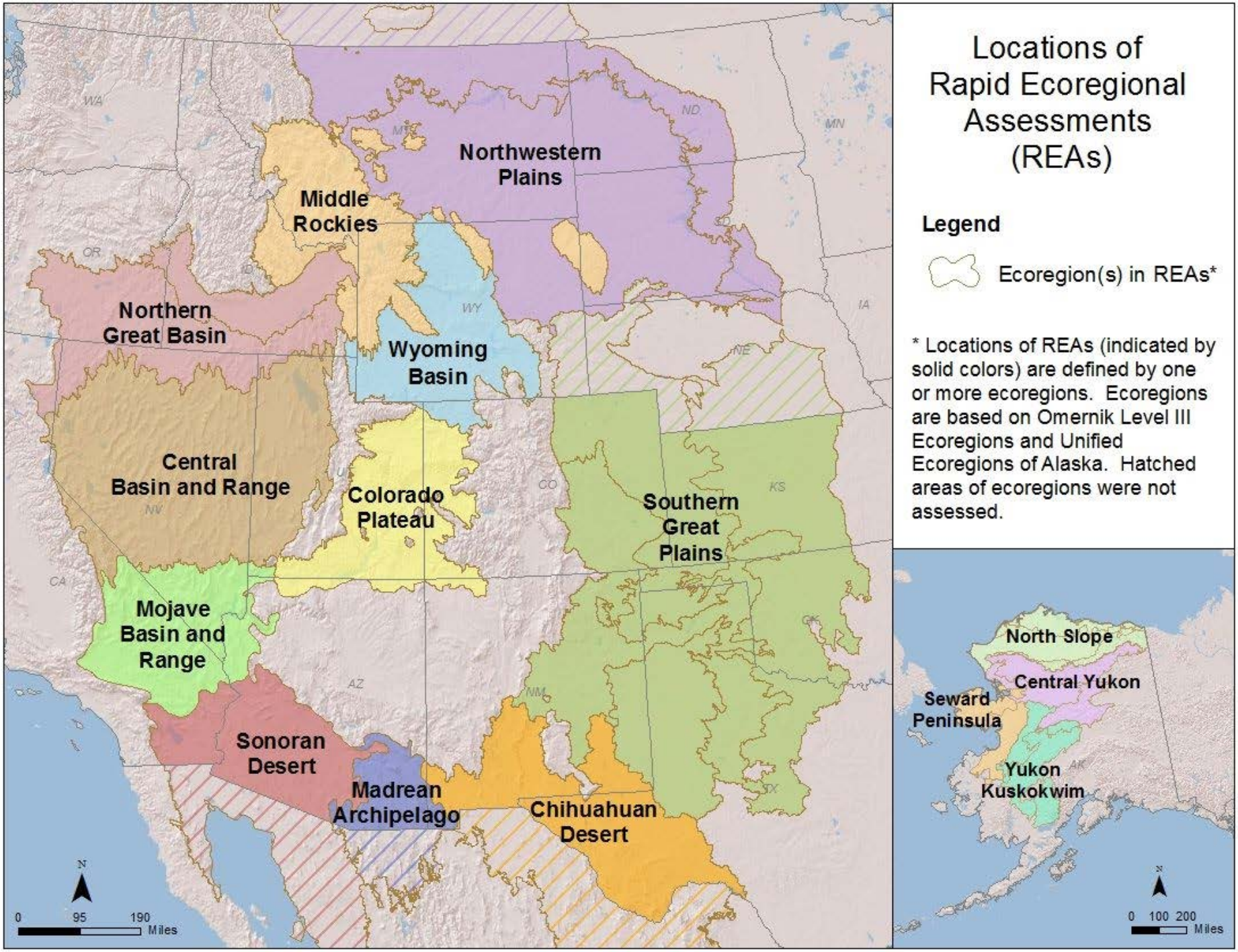
Identify important resource values and patterns of environmental change that may not be evident on smaller scales

Gauge the potential of these species and habitats to be affected by *change agents*

What is an REA?

An REA is a rapid assessment of an ecoregion's key elements (Conservation Elements), the landscape-drivers (Change Agents) that impact them, and their current and future status.




Locations of Rapid Ecoregional Assessments (REAs)
Legend
Ecoregion(s) in REAs*
* Locations of REAs (indicated by solid colors) are defined by one or more ecoregions. Ecoregions are based on Omernik Level III Ecoregions and Unified Ecoregions of Alaska. Hatched areas of ecoregions were not assessed.
Northwestern Plains
Middle Rockies
Northern Great Basin
Wyoming Basin
Central Basin and Range
Colorado Plateau
Southern Great Plains
Mojave Basin and Range
Sonoran Desert
Madrean Archipelago
Chihuahuan Desert
North Slope
Central Yukon
Seward Peninsula
Yukon Kuskokwim
WA
OR
CA
ID
NV
MT
WY
AZ
CO
NM
ND
SD
NE
KS
OK
TX
MN
IA
AK
N
0 95 190 Miles
N
0 100 200 Miles

Selecting Conservation Elements and Change Agents: Integration of Management and Science

BLM

Rapid Ecoregional Assessment

Management Question Tract

Identify *regional* needs of resource managers

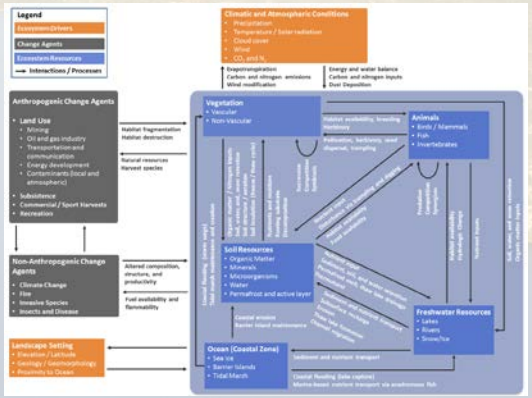
Identification of species/habitats and landscape drivers that are significant for resource managers

Management and ecosystem-derived CEs and CAs are integrated to create a final suite for consideration by the AMT.

Science/Ecosystem Tract

Identification of regionally significant CEs and CAs integral to model

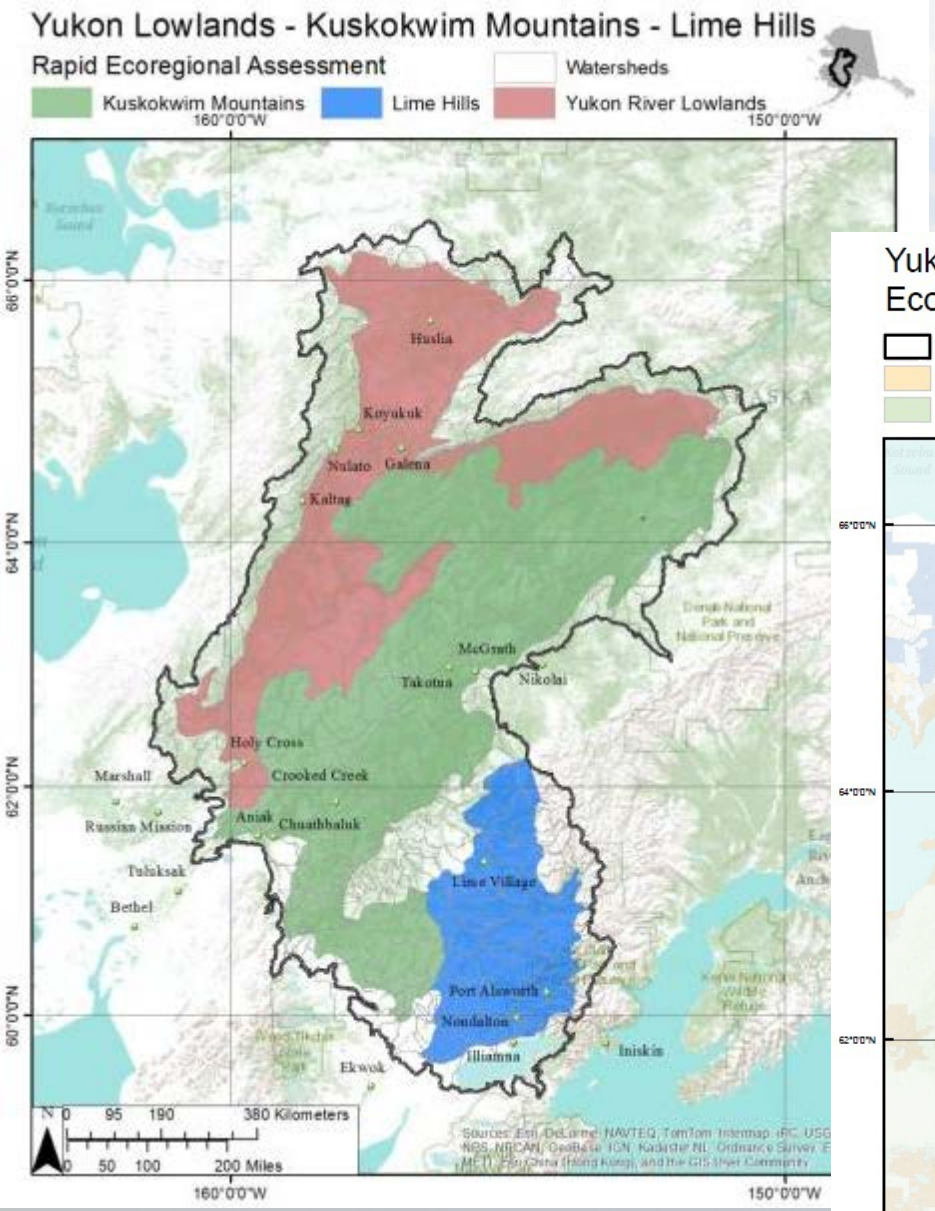
Conceptual Model

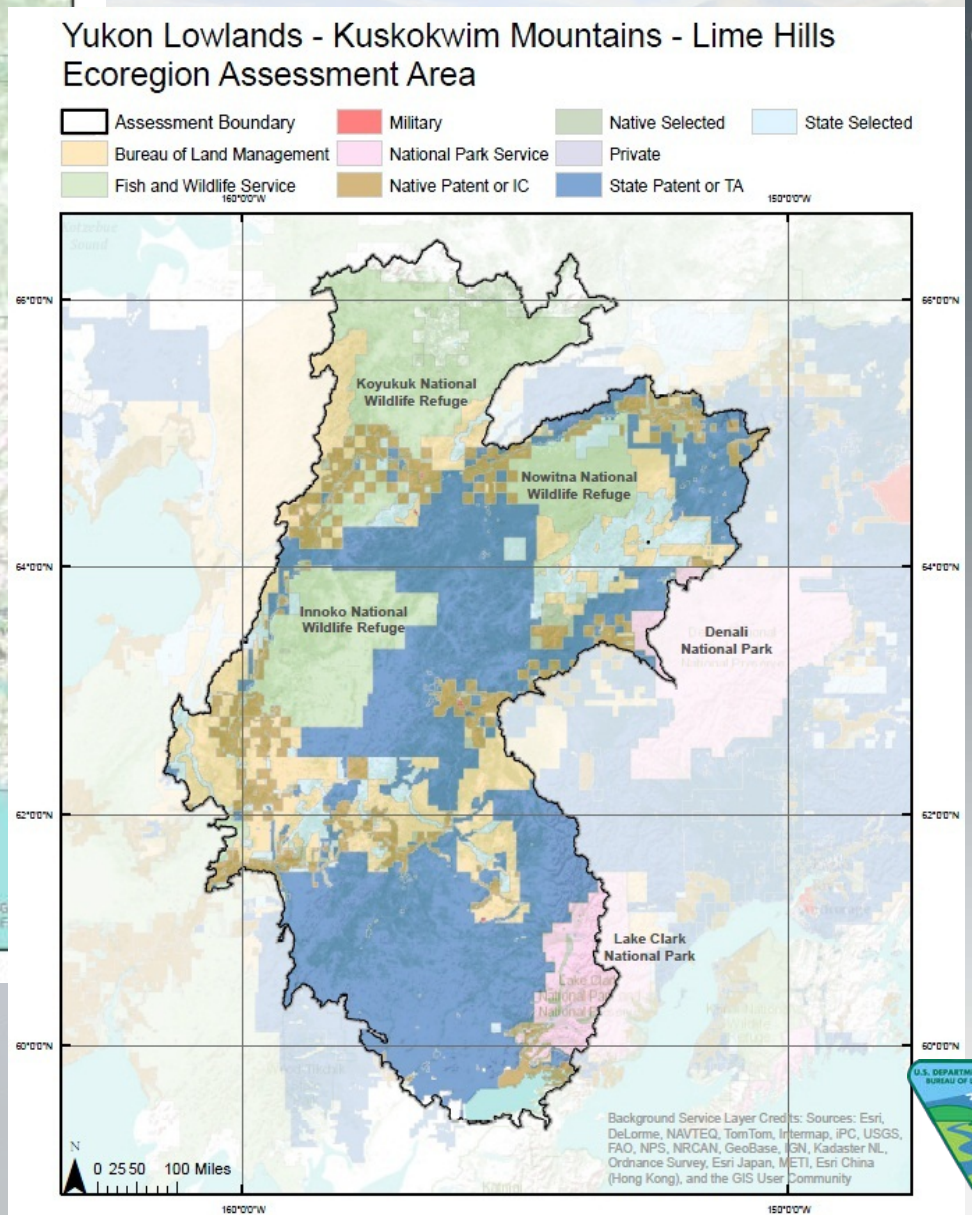


REA Boundaries in Alaska

BLM

Rapid Ecoregional Assessment





BLM

Rapid Ecoregional Assessment

North Slope Ecoregion Land Ownership

Bureau of Land Management (BLM)
Department of Defense (DOD)
Fish and Wildlife Service (FWS)
Joint State and Native
National Park Service (NPS)
Native American Land
Private Conservation Land
Private
State
Assessment Boundary

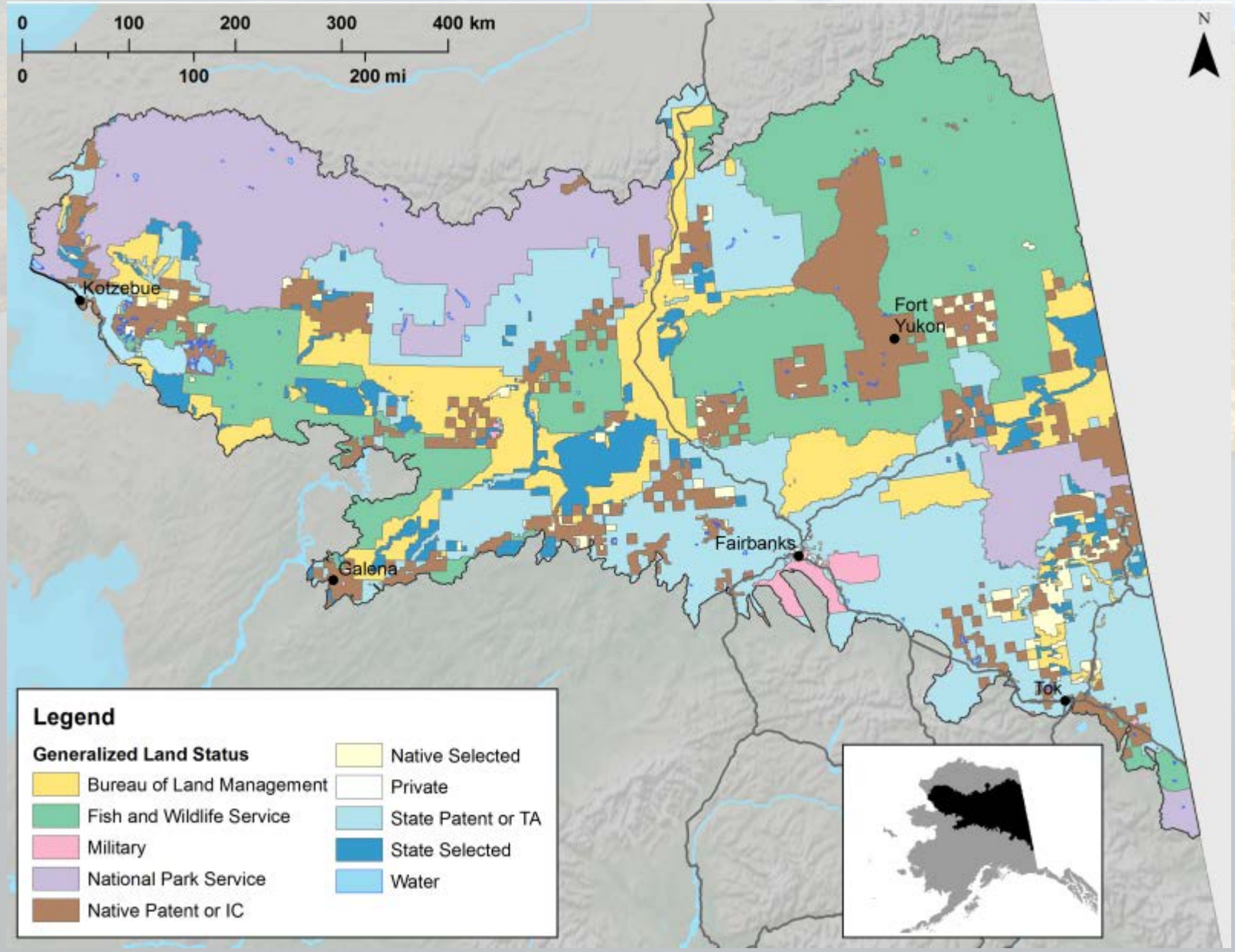
160°0'0"W
150°0'0"W
140°0'0"W
70°0'0"N
68°0'0"N
66°0'0"N

Beaufort Sea
Chukchi Sea
Barrow
Wainwright
Atqasuk
Nuiqsut
Kaktovik
Beaufort Coastal Plain
Brooks Foothills
Brooks Range
Point Hope
Anaktuvuk Pass

N
0 50 100 200 Miles

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

Central Yukon REA Land Stewardship



BLM

Rapid Ecoregional Assessment

Conservation Elements

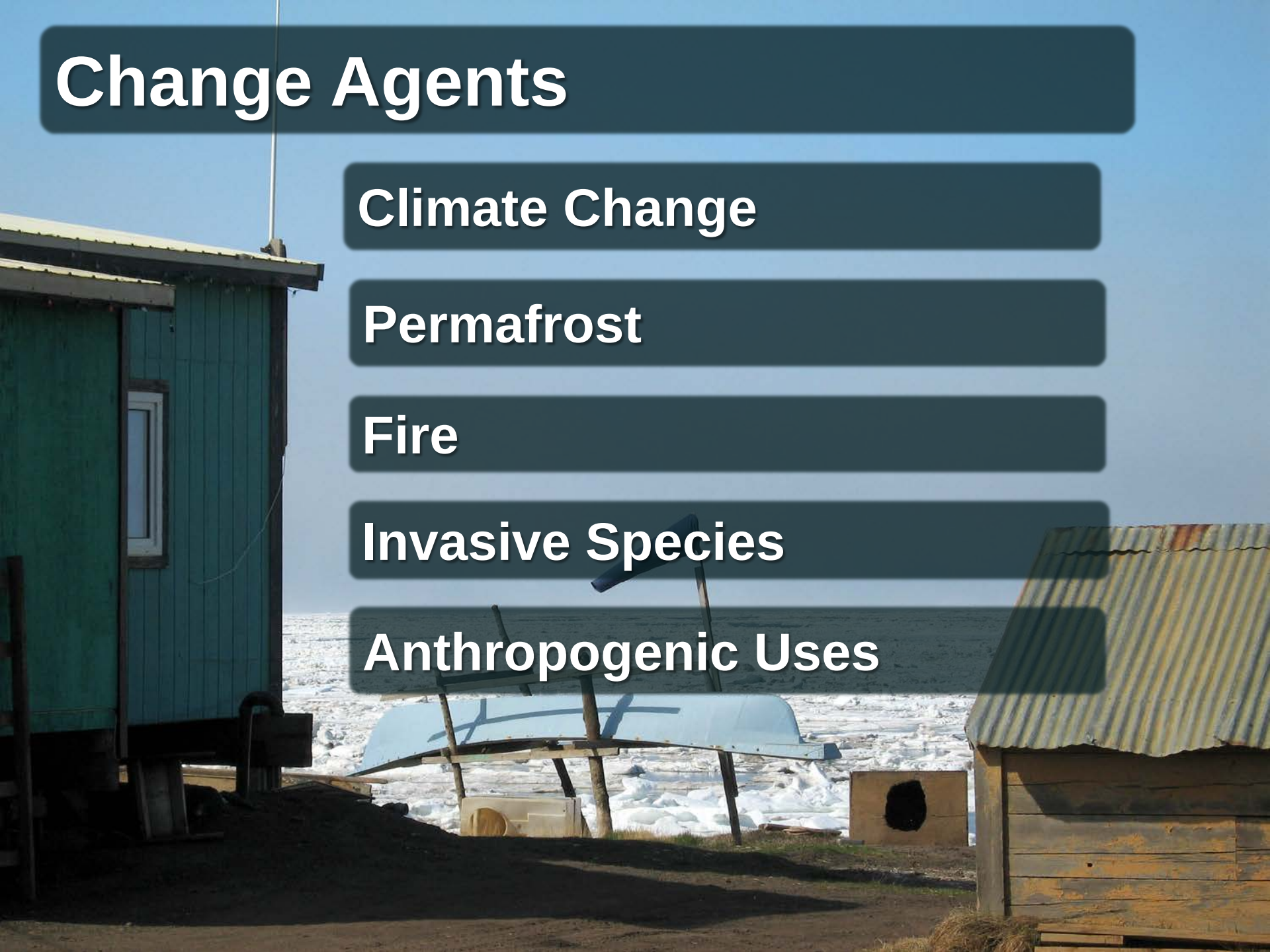
Regionally important terrestrial ecological features, functions, or services

Regionally important aquatic ecological features, functions, or services

Native fish, wildlife, or plants of **regional concern**

Change Agents

- Climate Change
- Permafrost
- Fire
- Invasive Species
- Anthropogenic Uses



Integrated Analyses

- Assess status of key ecological values
- Forecast trends
- Identify management opportunities
- Identify data gaps and science needs
- Provide information and tools… but do not make decisions or allocate resources

Key Outcomes from an REA

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

Spatial Data

BLM

Rapid Ecoregional Assessment

Management Questions

Delphi method of prioritizing 20-30 Management Questions to guide assessment

BLM

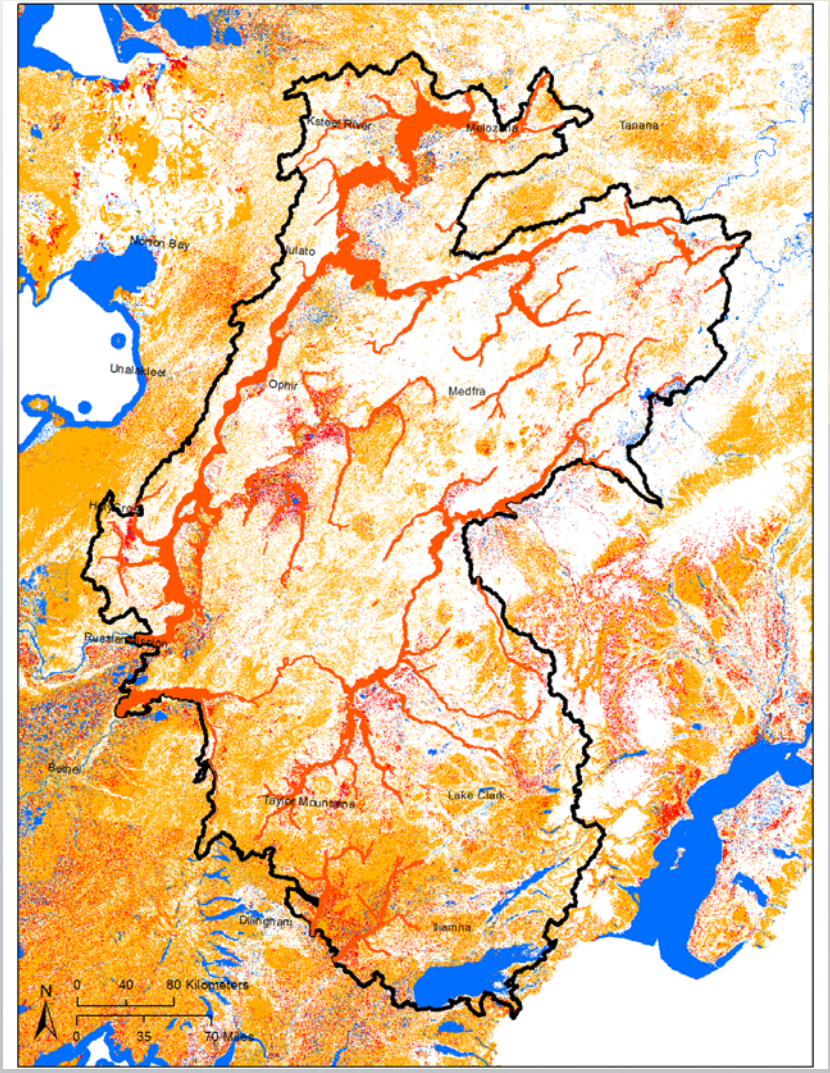
Rapid Ecoregional Assessment

Example MQ from YKL REA

Is there musk ox habitat in the region, and, if so, how might it change in the future?

Landcover classes and floodplains that could support Musk Ox

Winter and Summer Vegetation (landcover classes)	
Tall Shrub (Open-Closed) (Floodplain)	Good
Low Shrub (Floodplain)	Good
Herbaceous (Wet)	Good
Herbaceous (Mesic)	Good
Tall Shrub (Open-Closed)	Moderate
Low Shrub	Moderate
Low Shrub/Lichen	Moderate
Dwarf Shrub	Moderate
Dwarf Shrub-Lichen	Moderate



BLM

Rapid Ecoregional Assessment

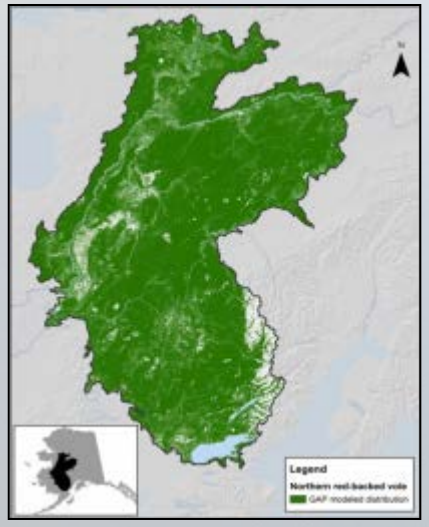
Management Questions

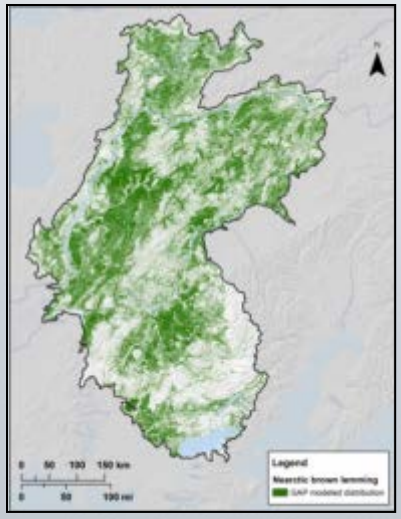
MQ 10	Where are key prey species located in the region?

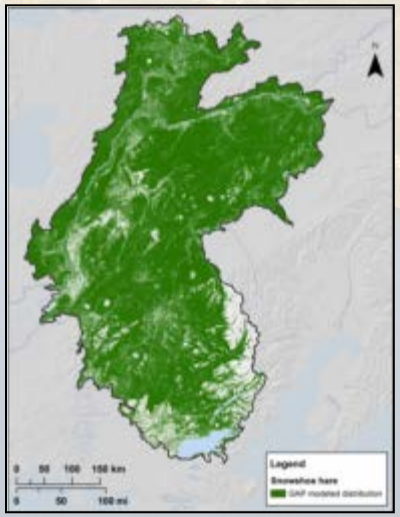
Northern red-backed vole

Nearctic brown lemming

Snowshoe hare



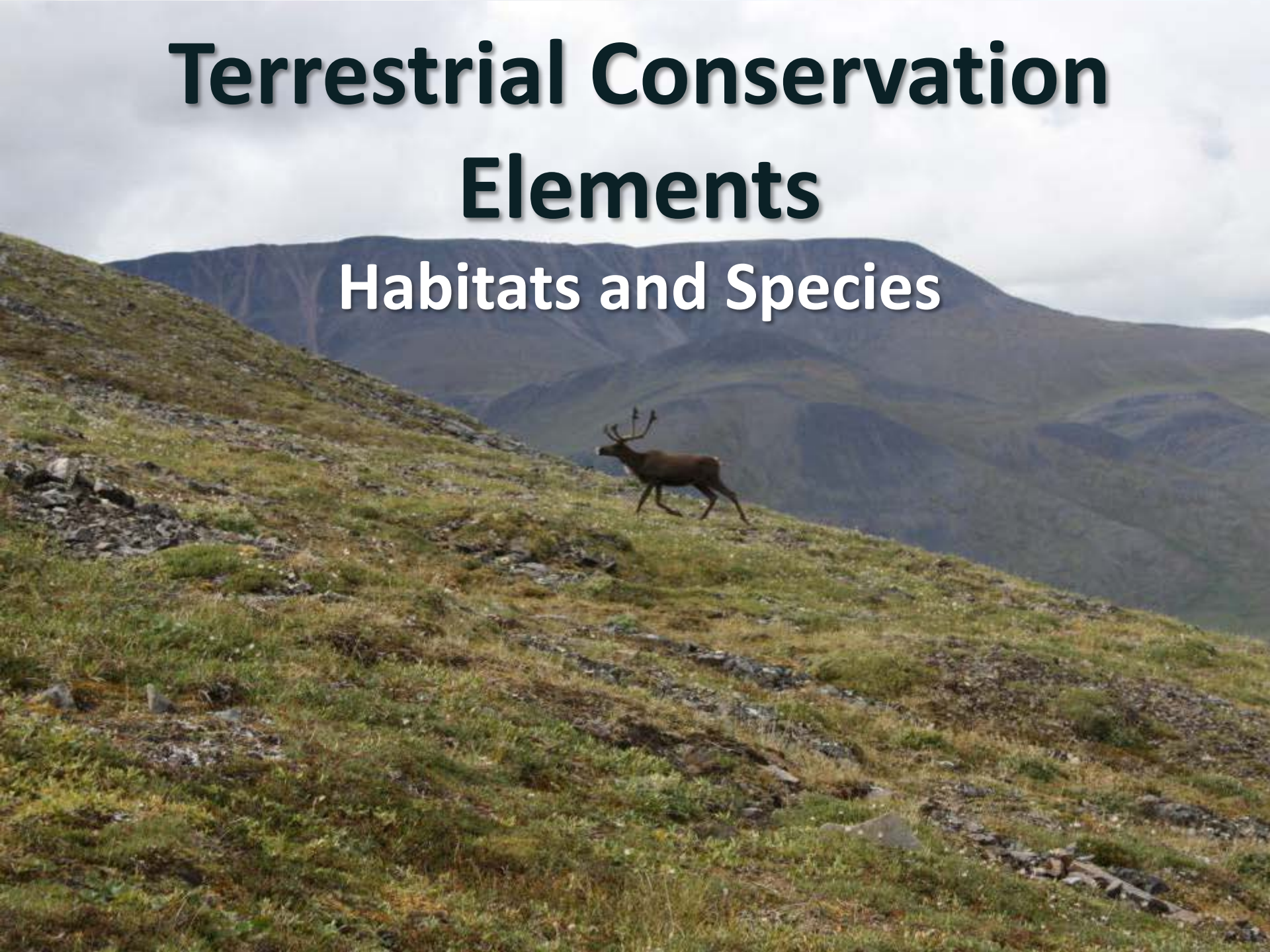




"Prey species" considered for this question include small and medium-bodied herbivores, as they provide food for a wide-range of avian and mammalian predators

Terrestrial Conservation Elements

Habitats and Species



Terrestrial Habitats

Tidal marsh

Rare ecosystem with high bird use

Marine beach

Unique vegetation for the North Slope and separate shallow lagoons

Coastal plain wetland

Coastal plain matrix forming habitat supporting many species

Coastal plain moist tundra

Coastal plain matrix forming habitat supporting many species

Terrestrial Species

Important as consumers but also as prey (including carcasses) for the large and medium-sized predators. Important subsistence resources.

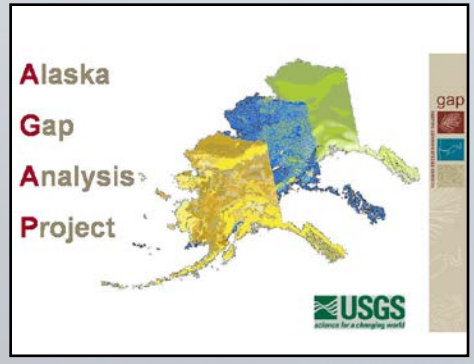
Distribution Models

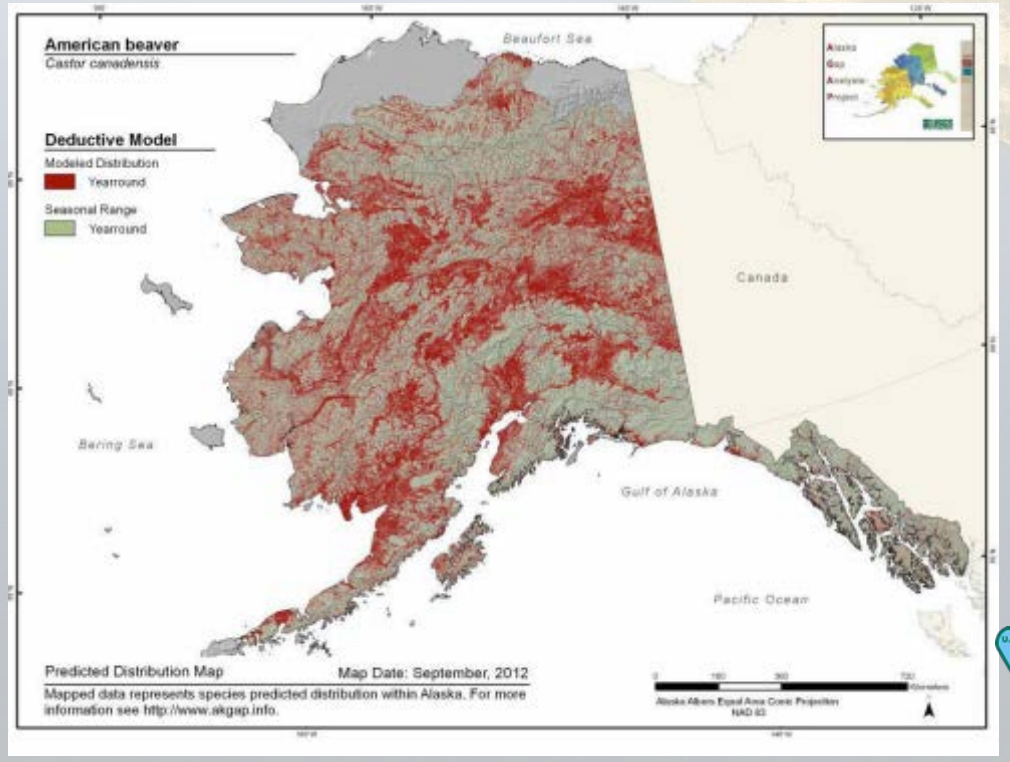
American beaver

Trumpeter swan

Gray-cheeked thrush

Snowshoe hare

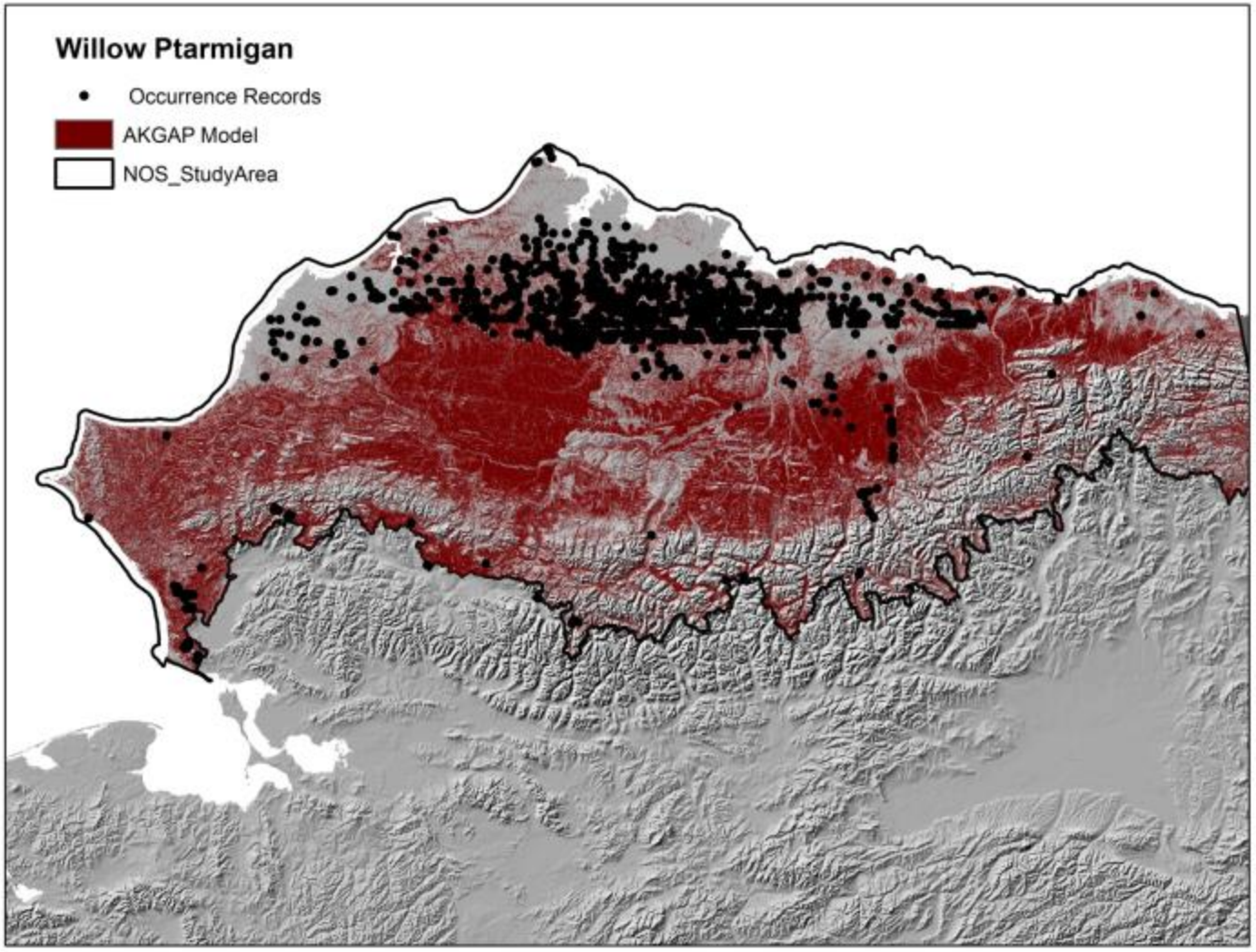




BLM

Rapid Ecoregional Assessment

Distribution Models



Aquatic Habitats

Deep Lakes

Overwintering habitat for fish.

Shallow Lakes

Summer foraging habitats.

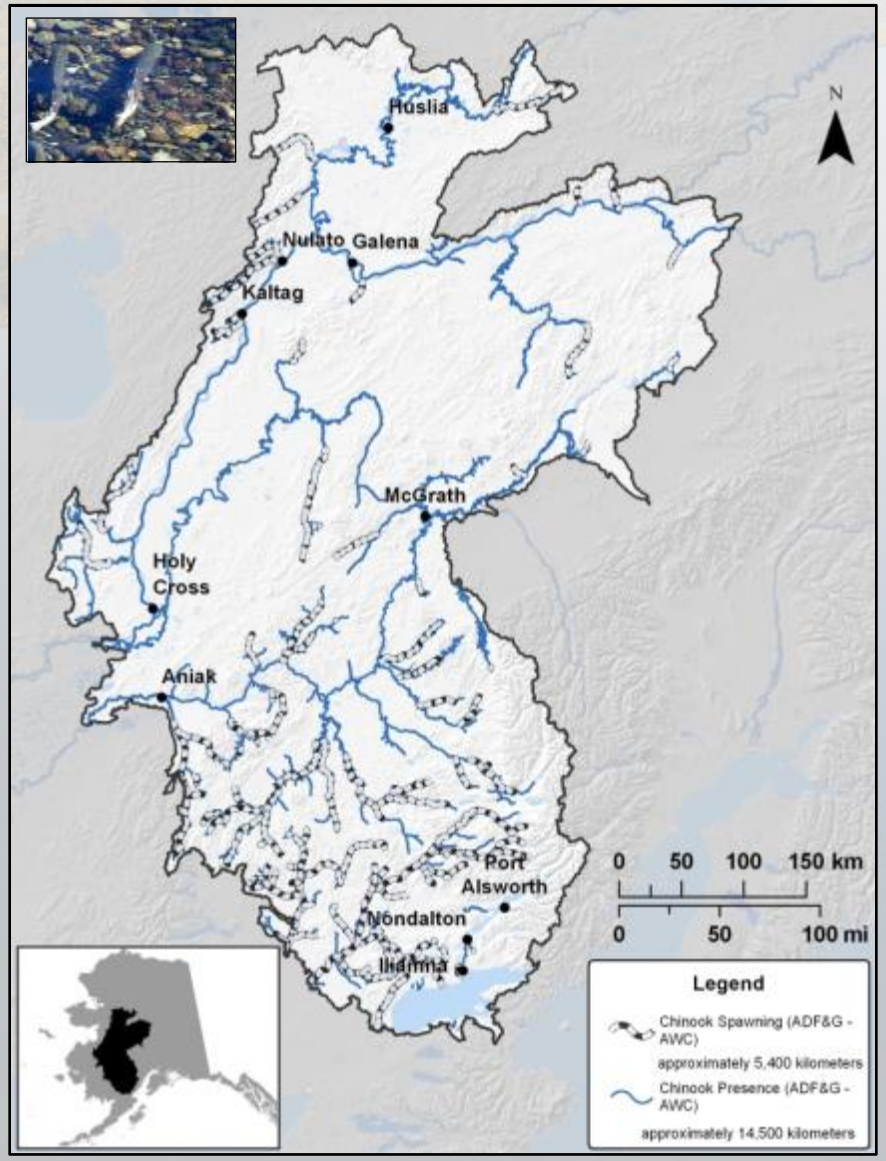
Large and Small Streams

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

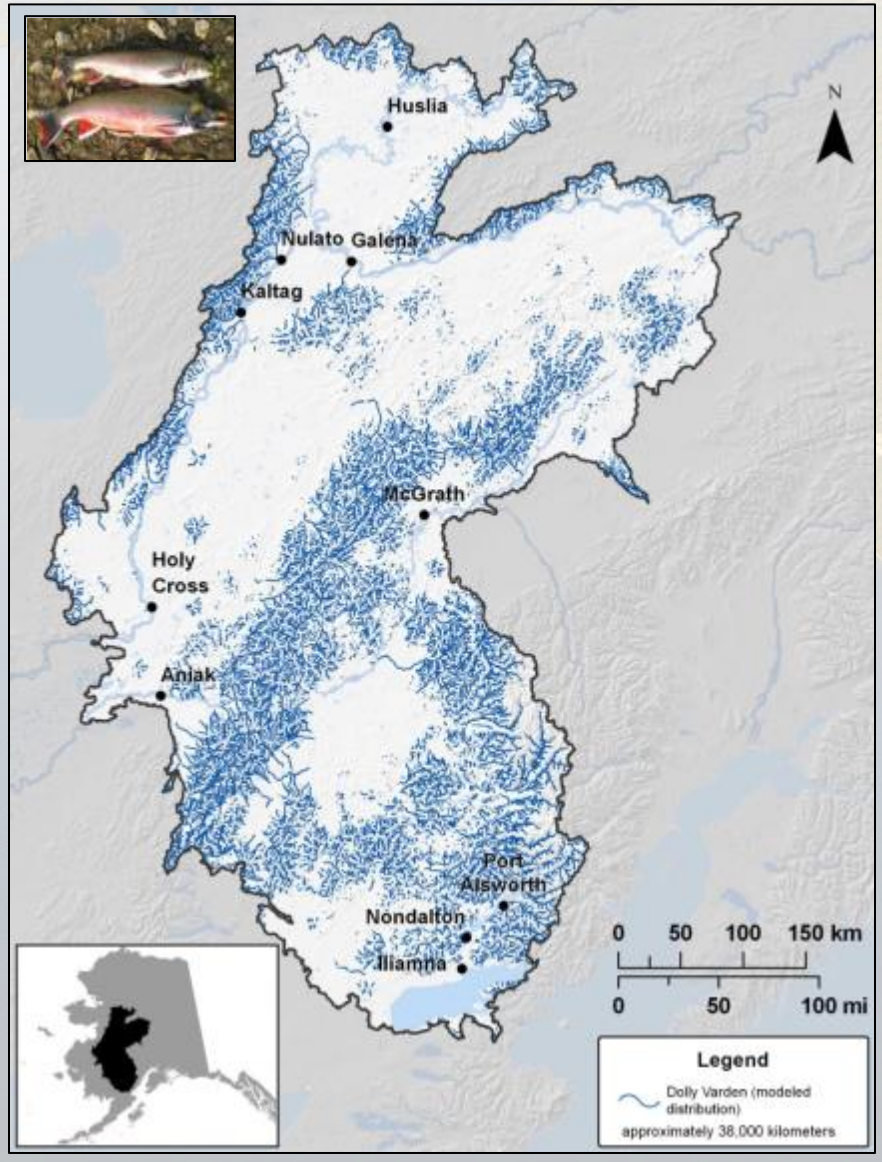
Aquatic Species

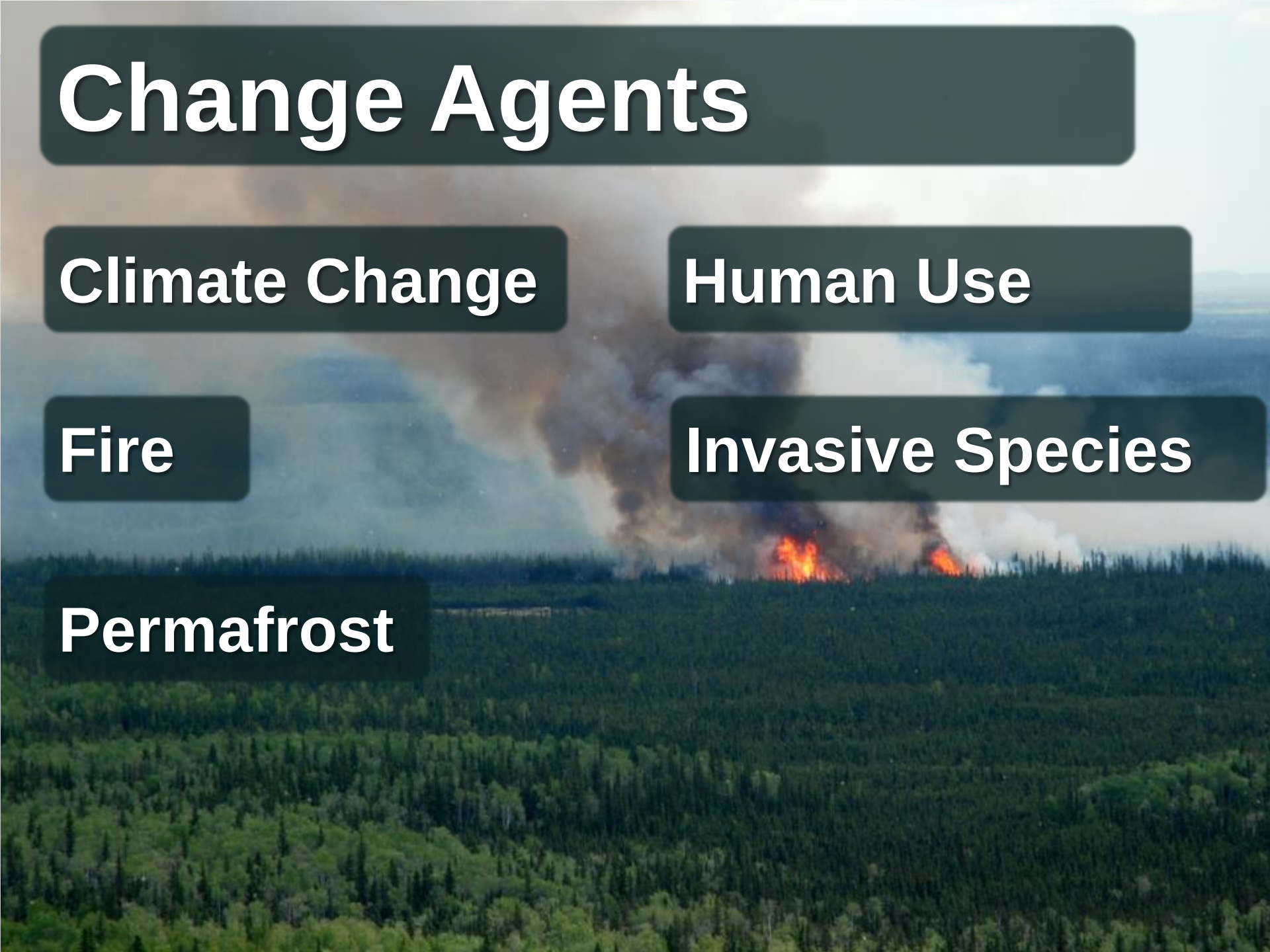
Fish Distribution Maps

Chinook salmon

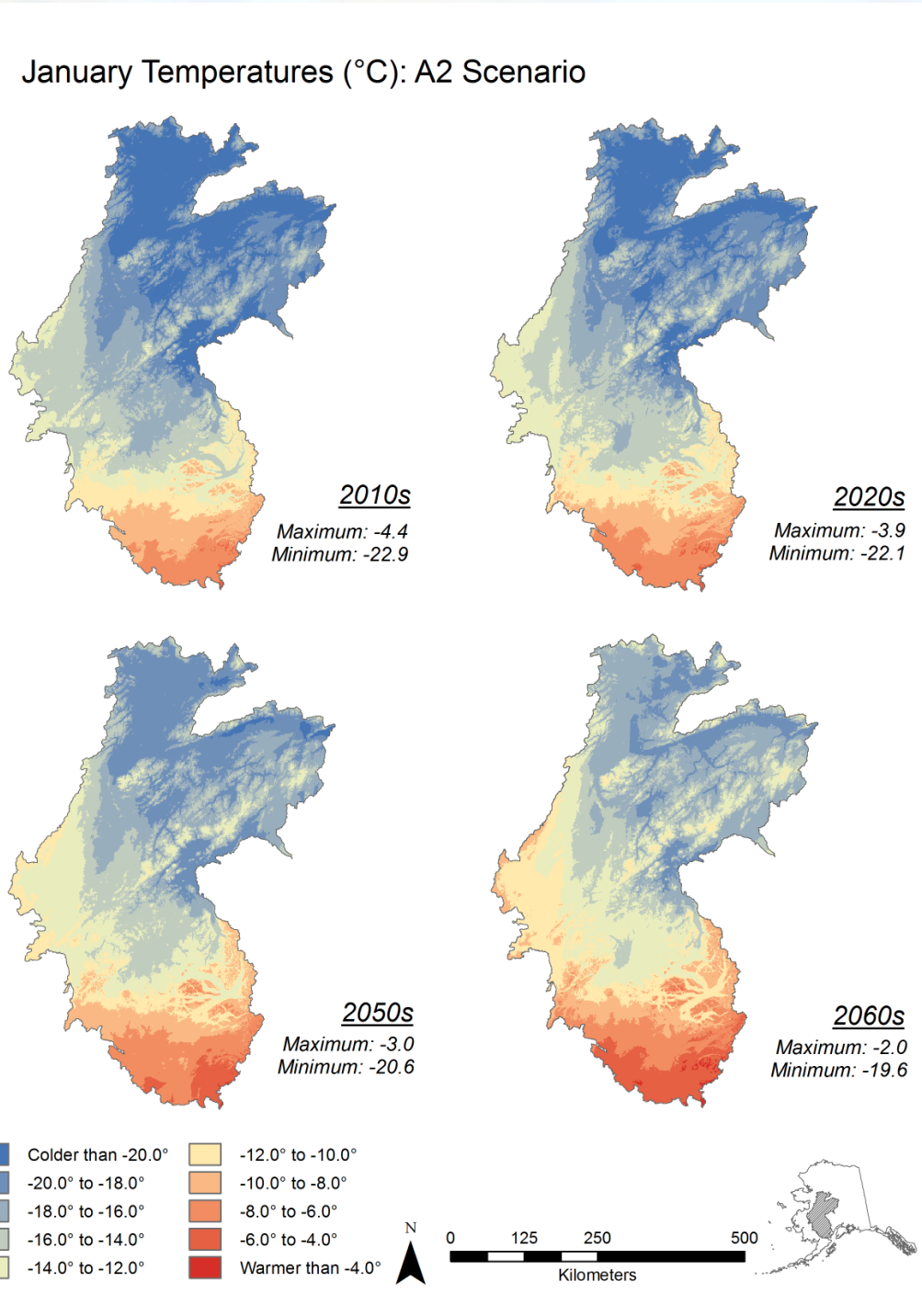


Dolly Varden

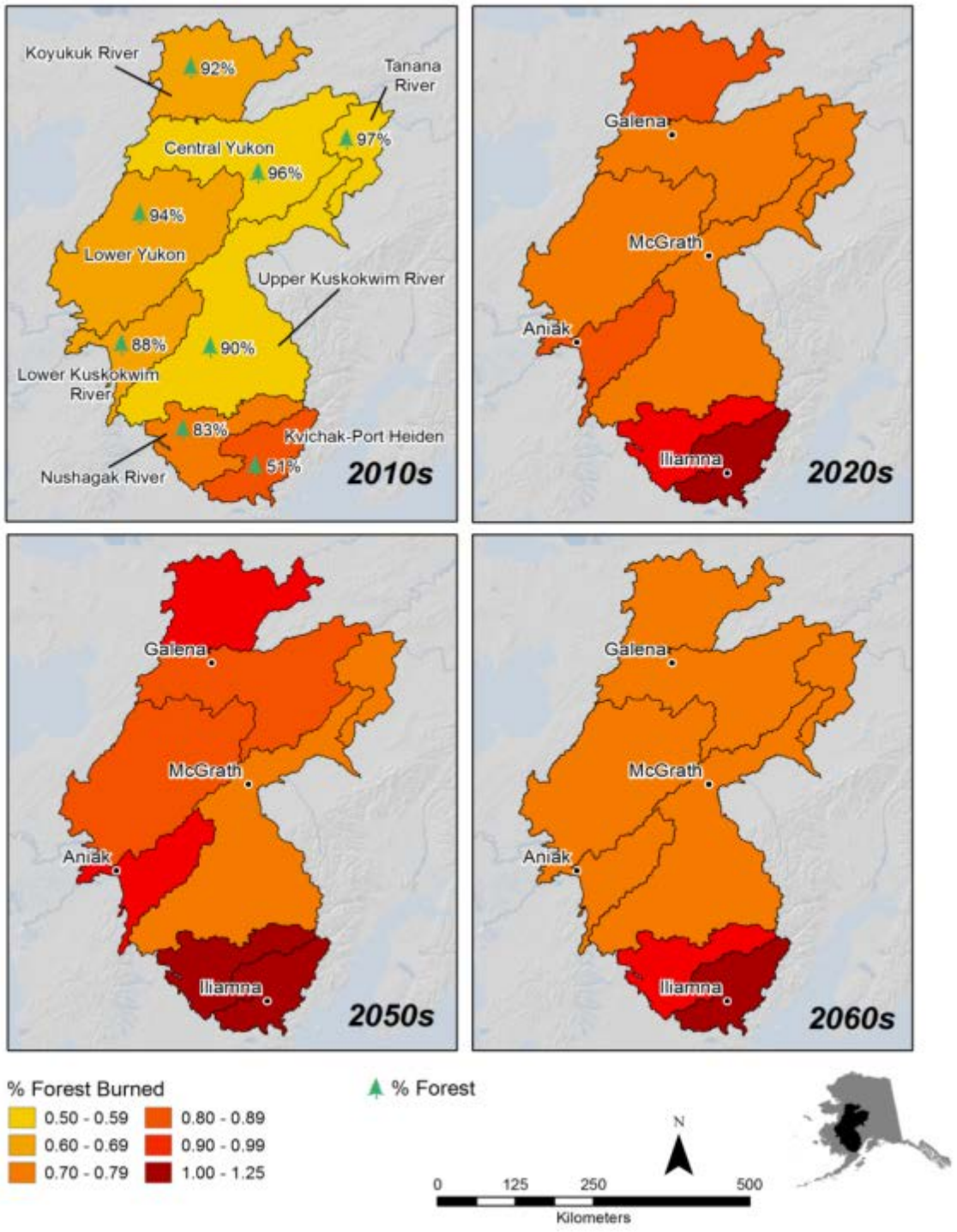



Change Agents
Climate Change
Human Use
Fire
Invasive Species
Permafrost

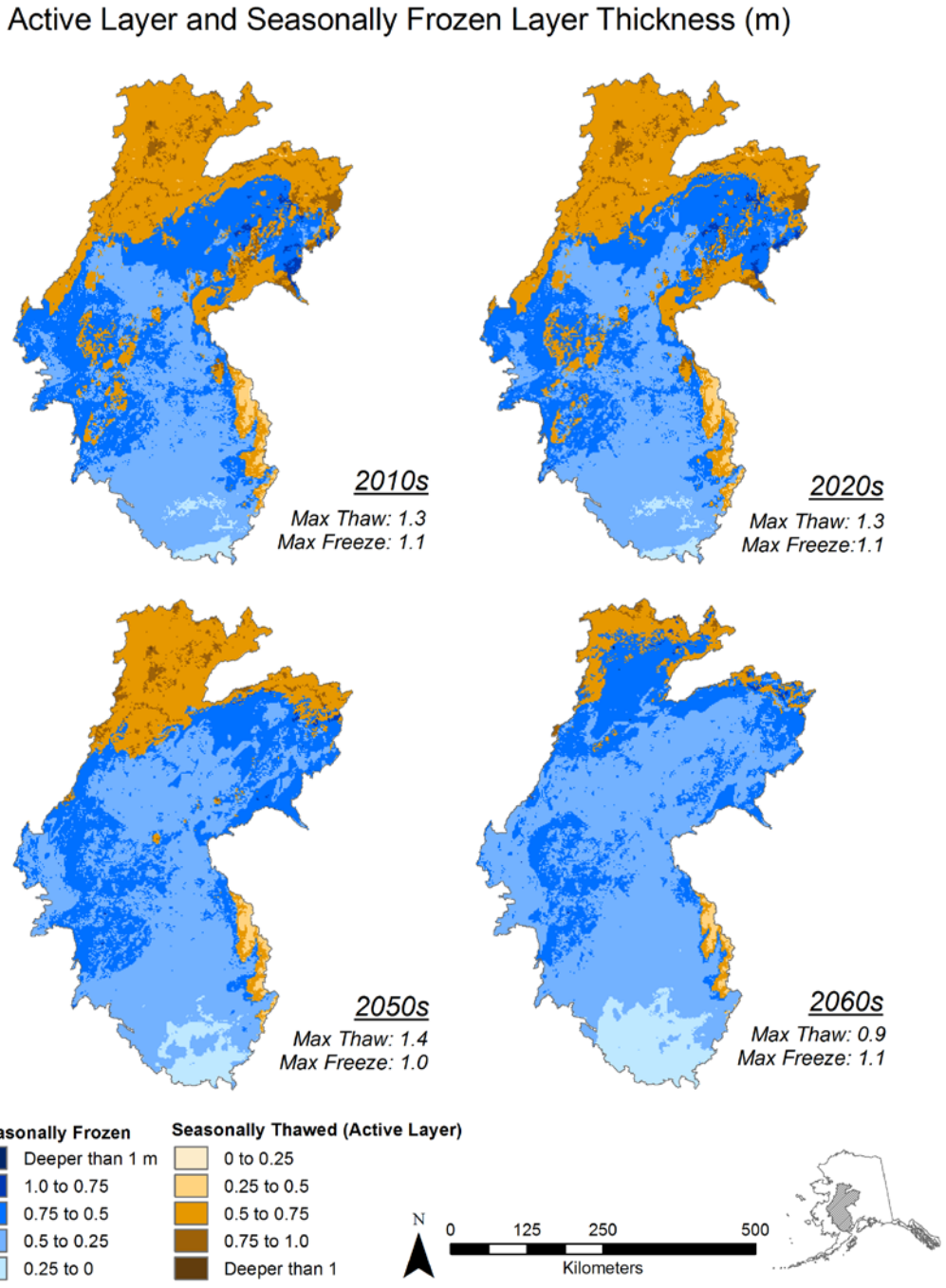
Climate Change



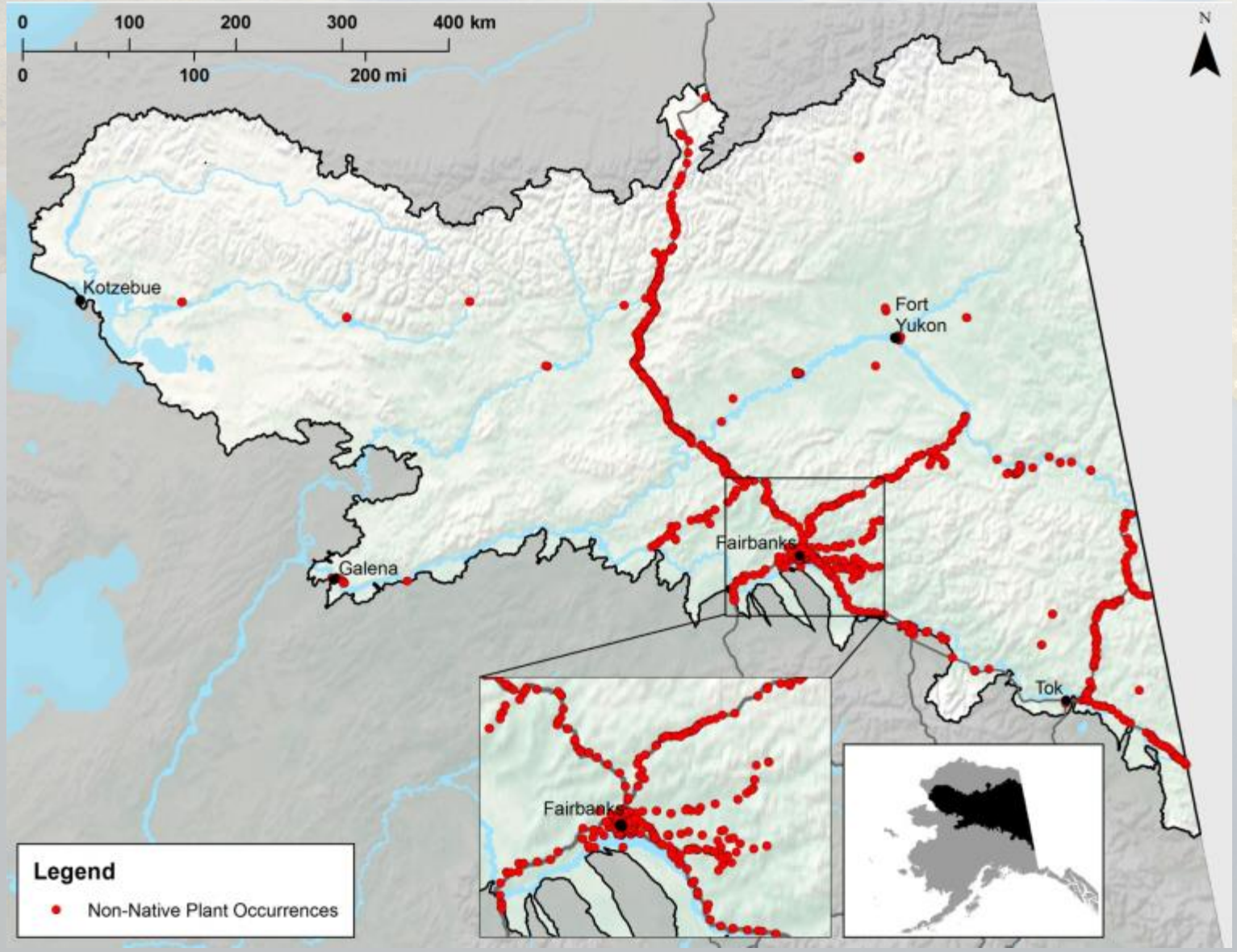
Fire


Koyukuk River
92%
Tanana River
97%
Central Yukon
96%
94%
Lower Yukon
Upper Kuskokwim River
88%
90%
Lower Kuskokwim River
83%
Kvichak-Port Heiden
51%
Nushagak River
2010s
Galena
McGrath
Aniak
Iliamna
2020s
Galena
McGrath
Aniak
Iliamna
2050s
Galena
McGrath
Aniak
Iliamna
2060s
% Forest Burned
0.50 - 0.59
0.60 - 0.69
0.70 - 0.79
0.80 - 0.89
0.90 - 0.99
1.00 - 1.25
% Forest
N
0
125
250
500
Kilometers

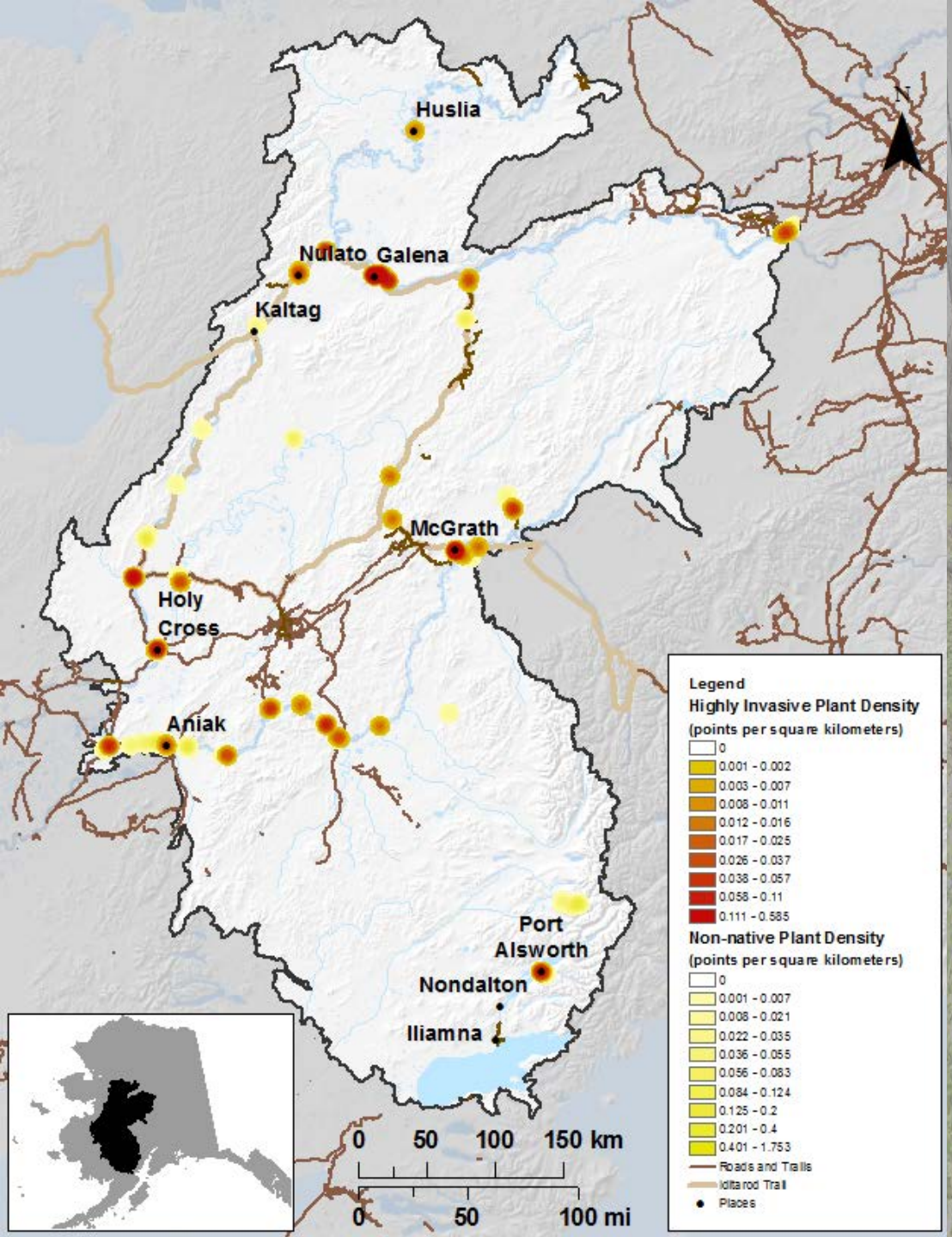
Permafrost


Active Layer and Seasonally Frozen Layer Thickness (m)
2010s
Max Thaw: 1.3
Max Freeze: 1.1
2020s
Max Thaw: 1.3
Max Freeze:1.1
2050s
Max Thaw: 1.4
Max Freeze: 1.0
2060s
Max Thaw: 0.9
Max Freeze: 1.1
Seasonally Frozen
Deeper than 1 m
1.0 to 0.75
0.75 to 0.5
0.5 to 0.25
0.25 to 0
Seasonally Thawed (Active Layer)
0 to 0.25
0.25 to 0.5
0.5 to 0.75
0.75 to 1.0
Deeper than 1
N
0
125
250
500
Kilometers

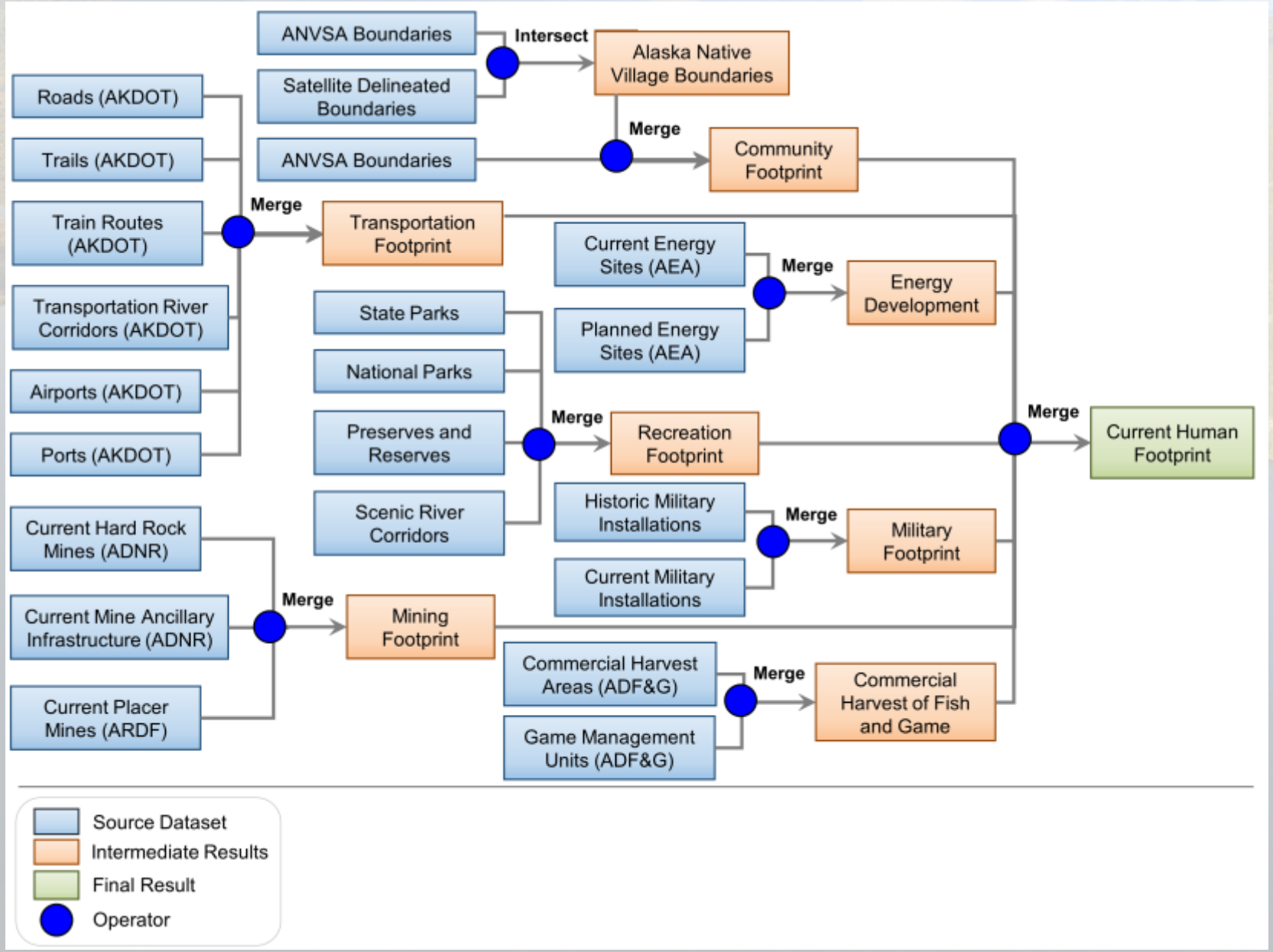
Invasive Species



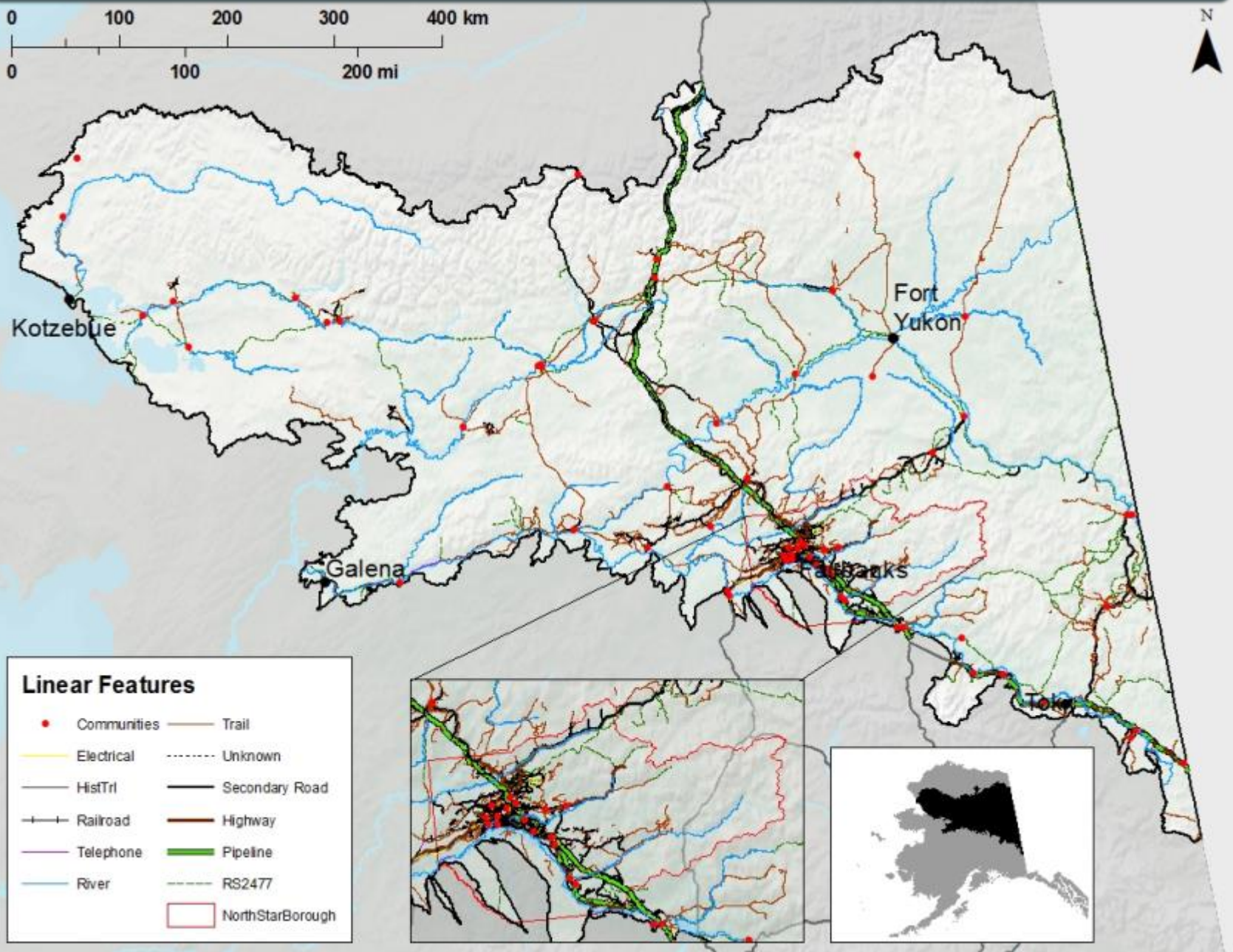
Density of Invasive Species



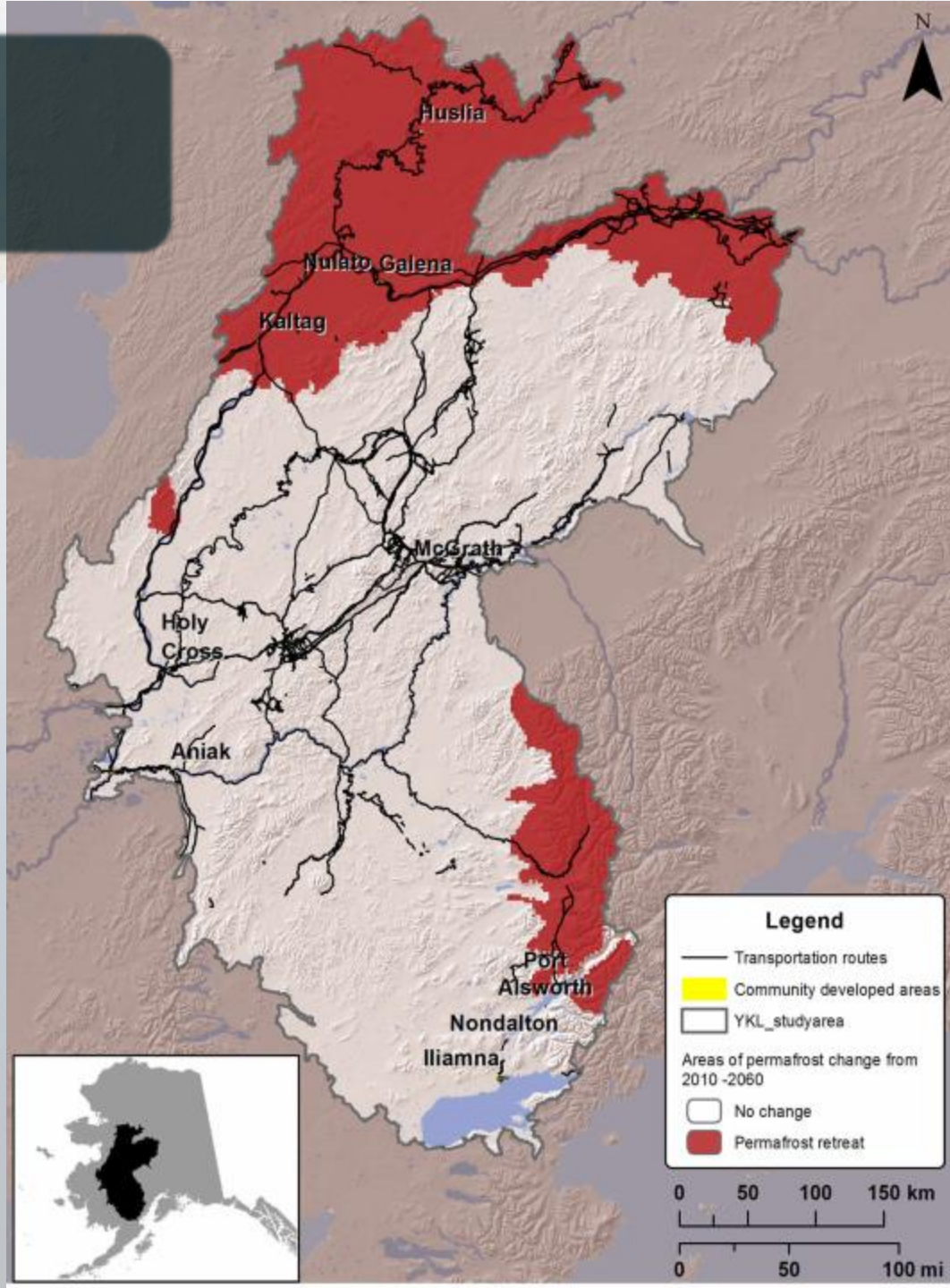
Current Human Footprint



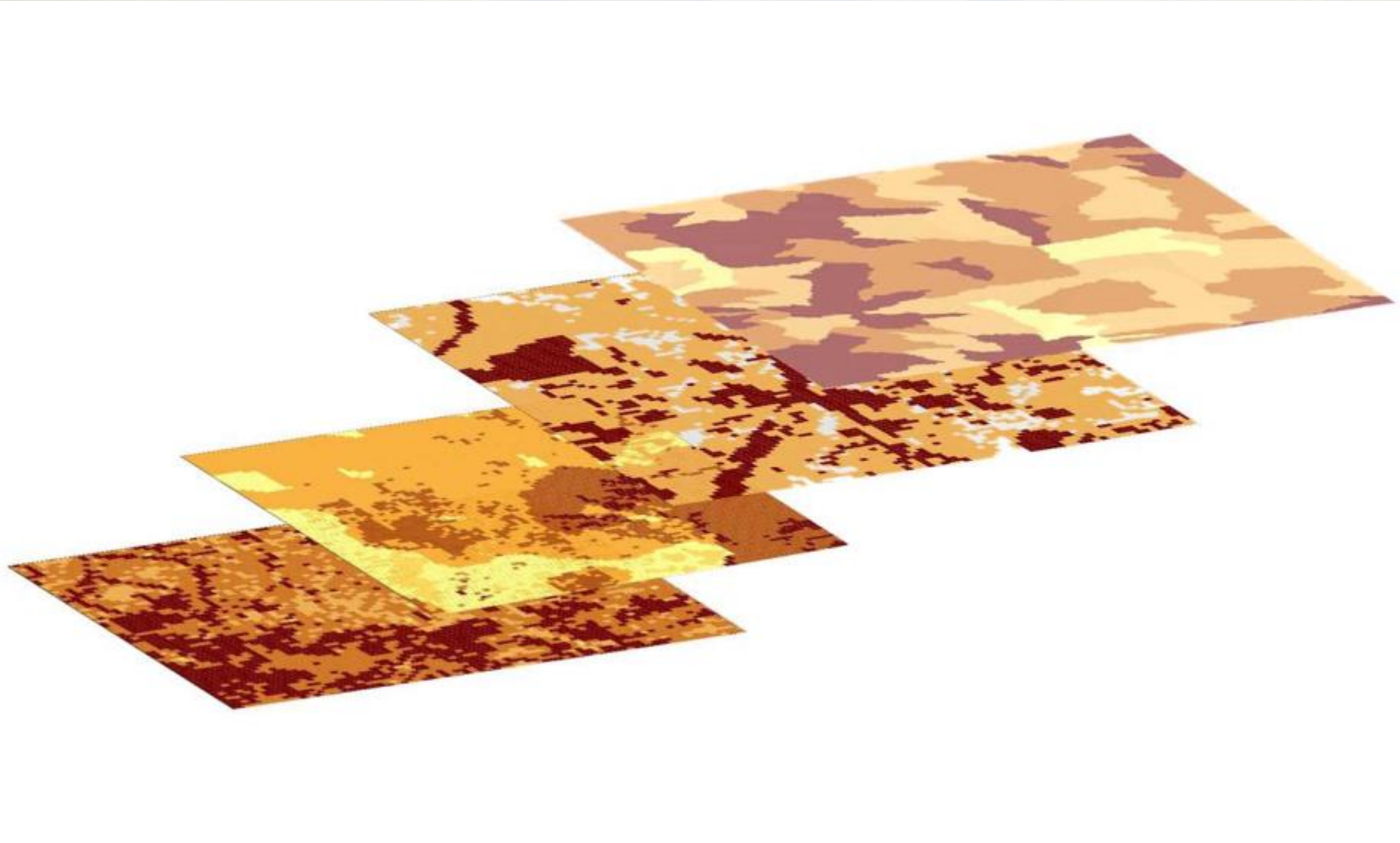
Current Human Footprint



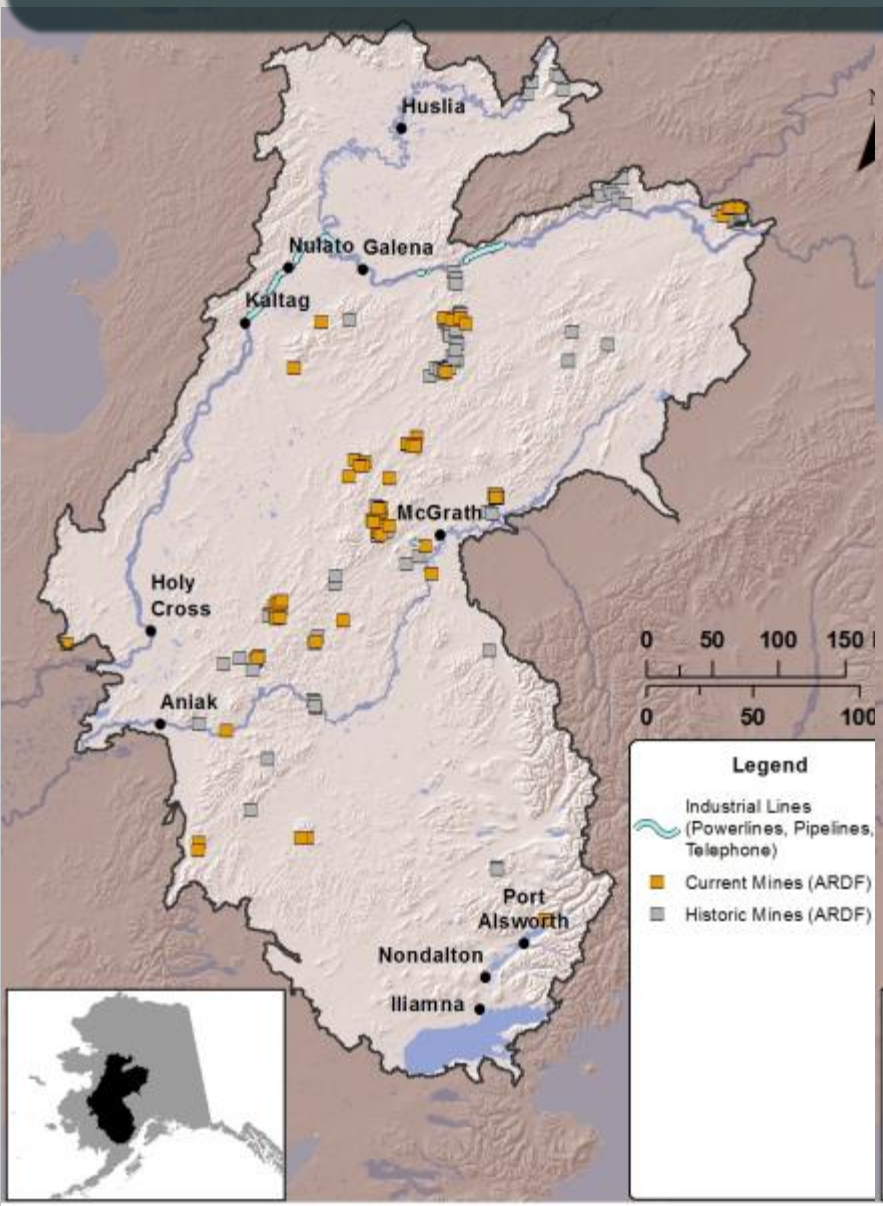
Change Agent Intersections

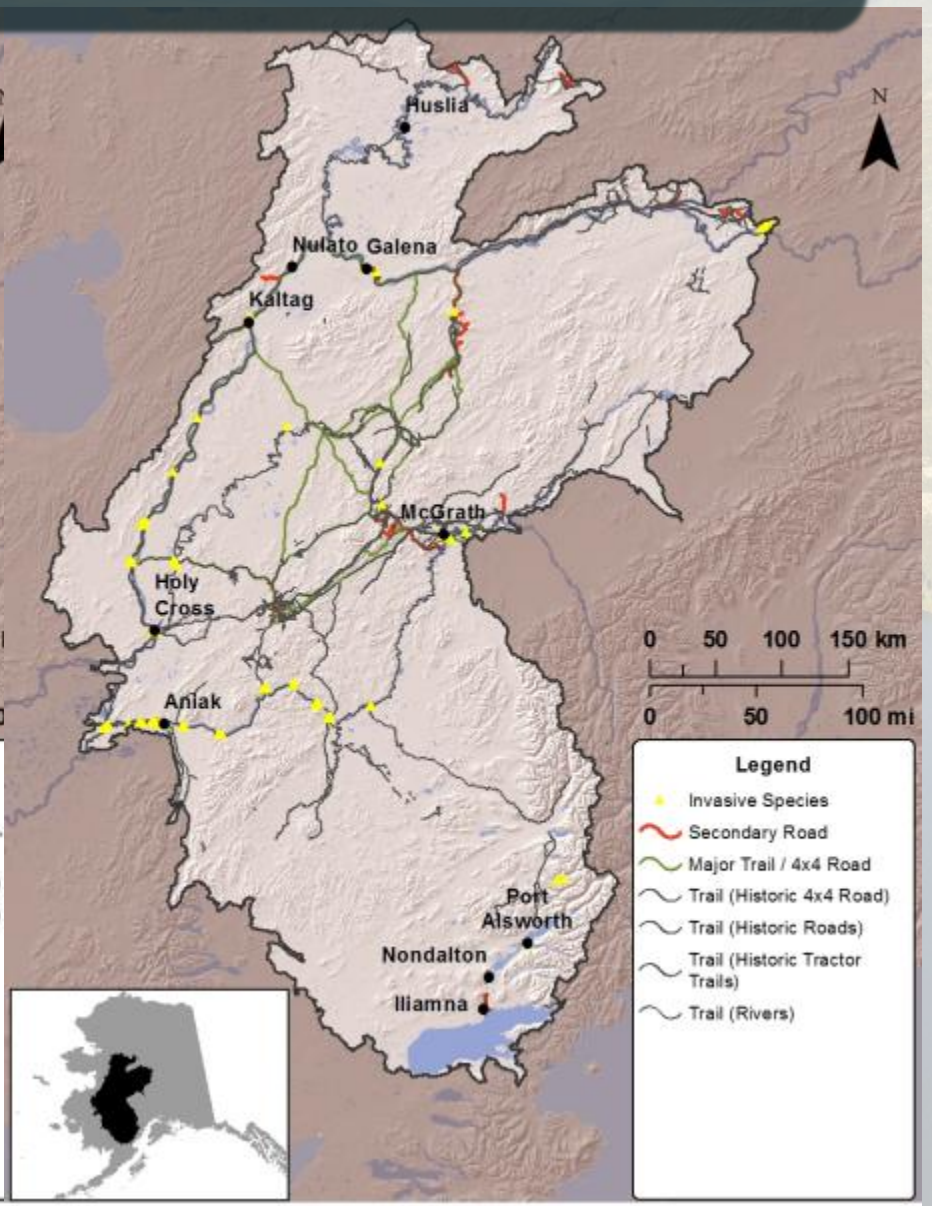


Integrated Products

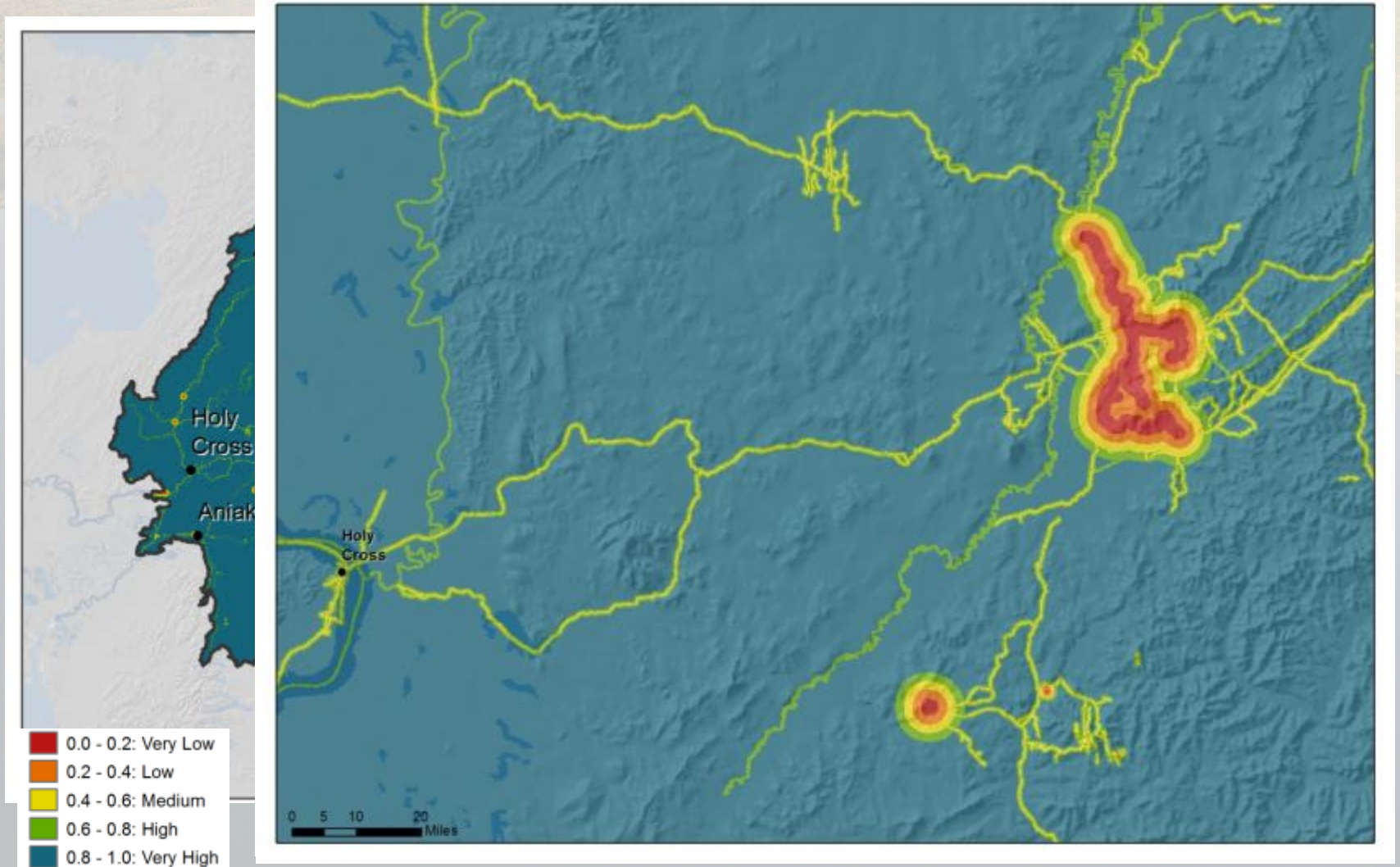


Landscape Condition Model

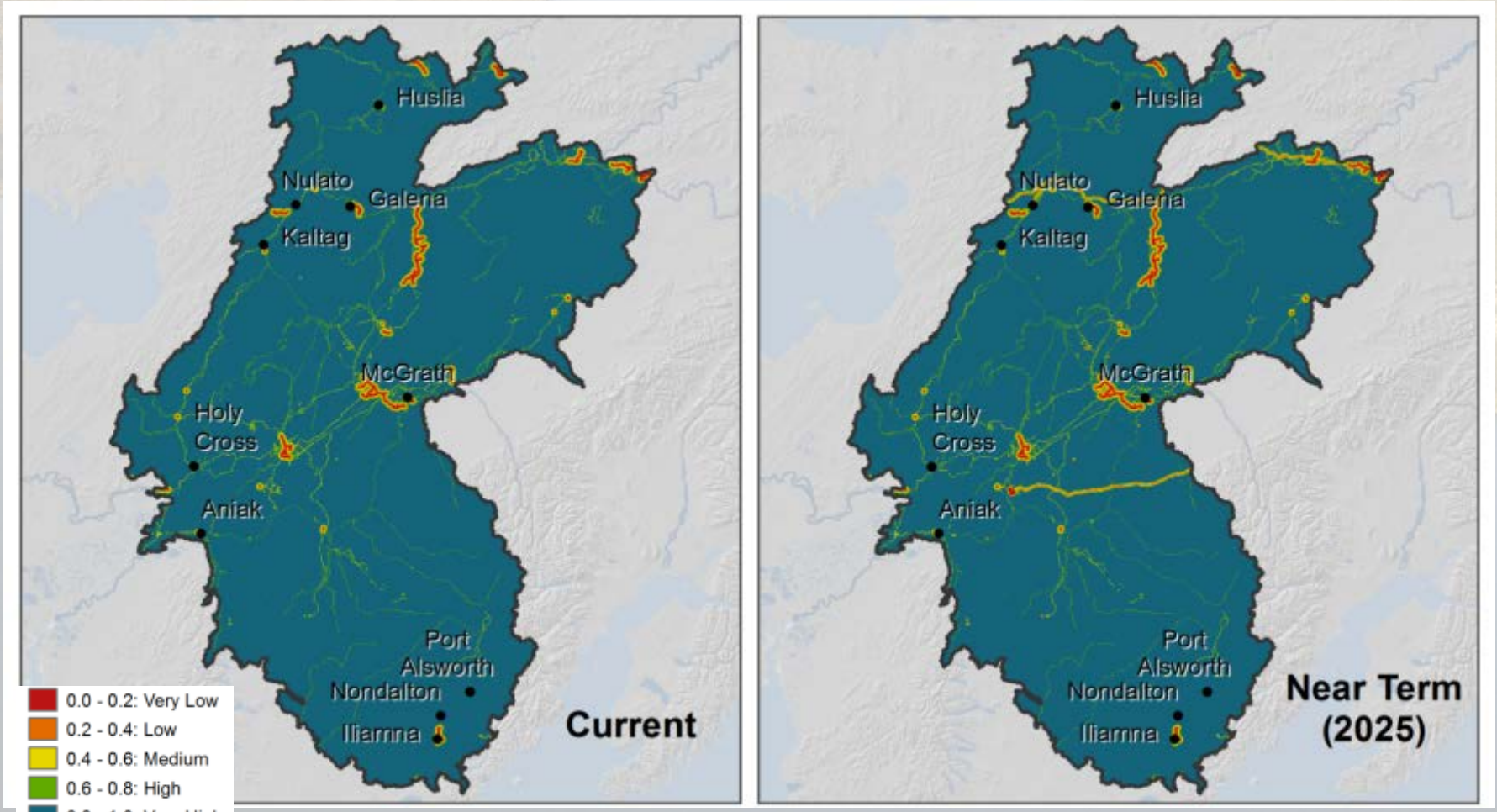




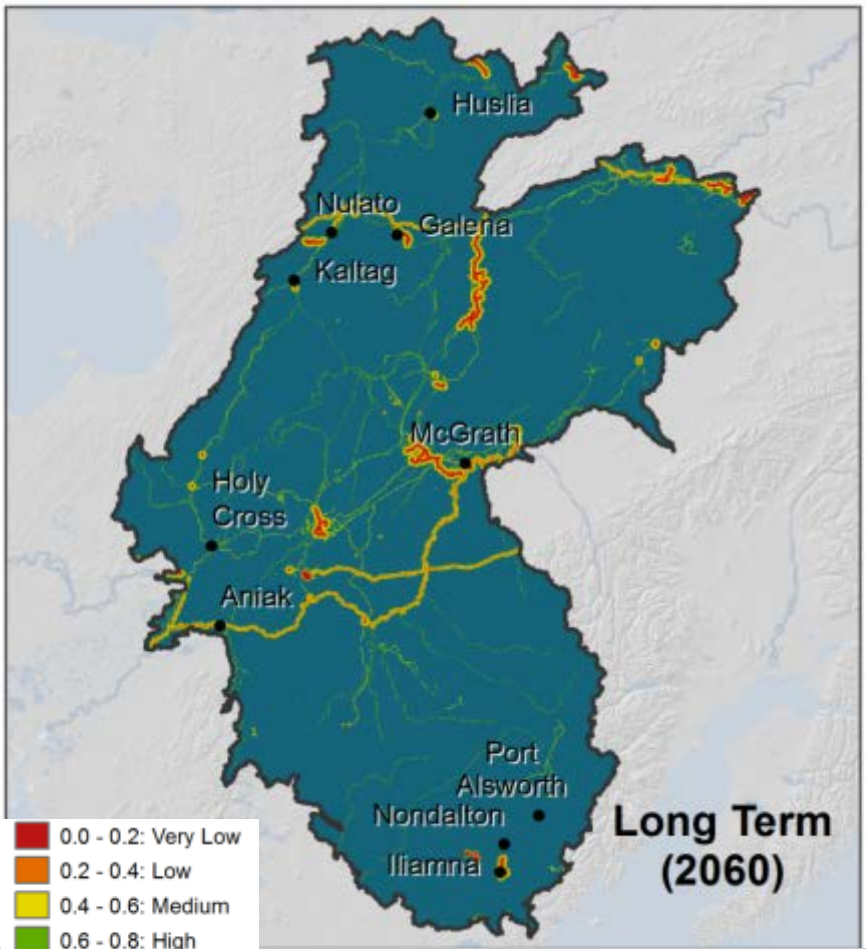
Landscape Condition Model

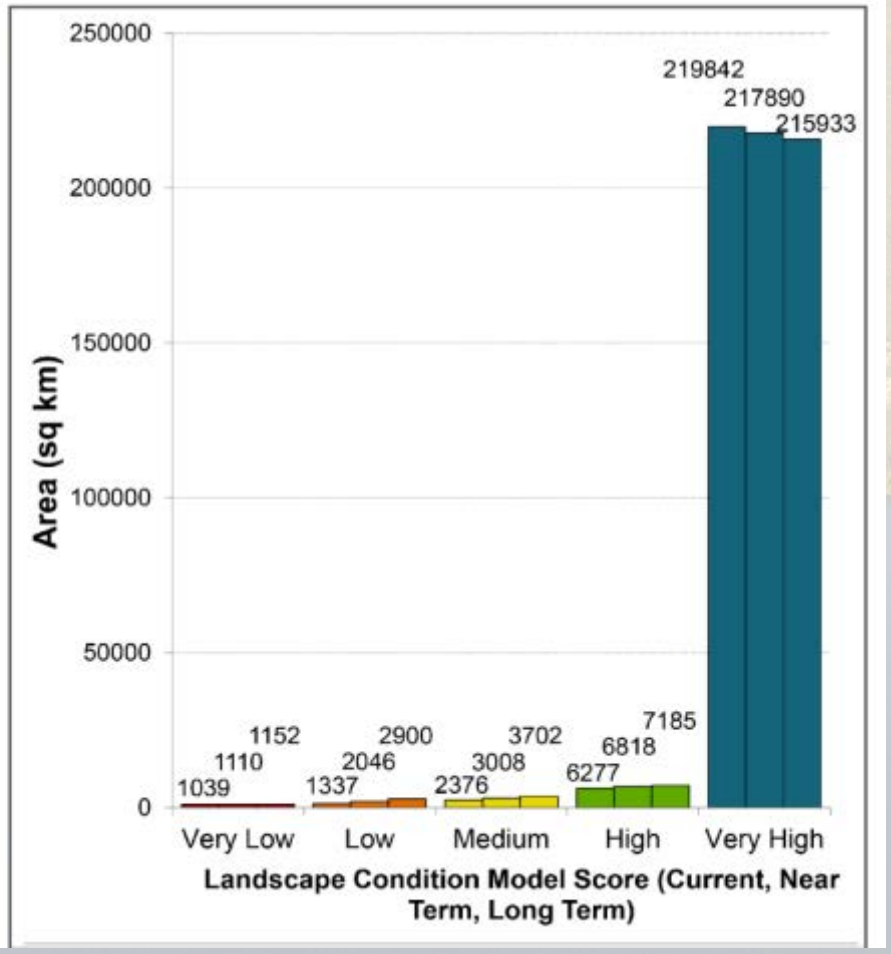


Landscape Condition Model

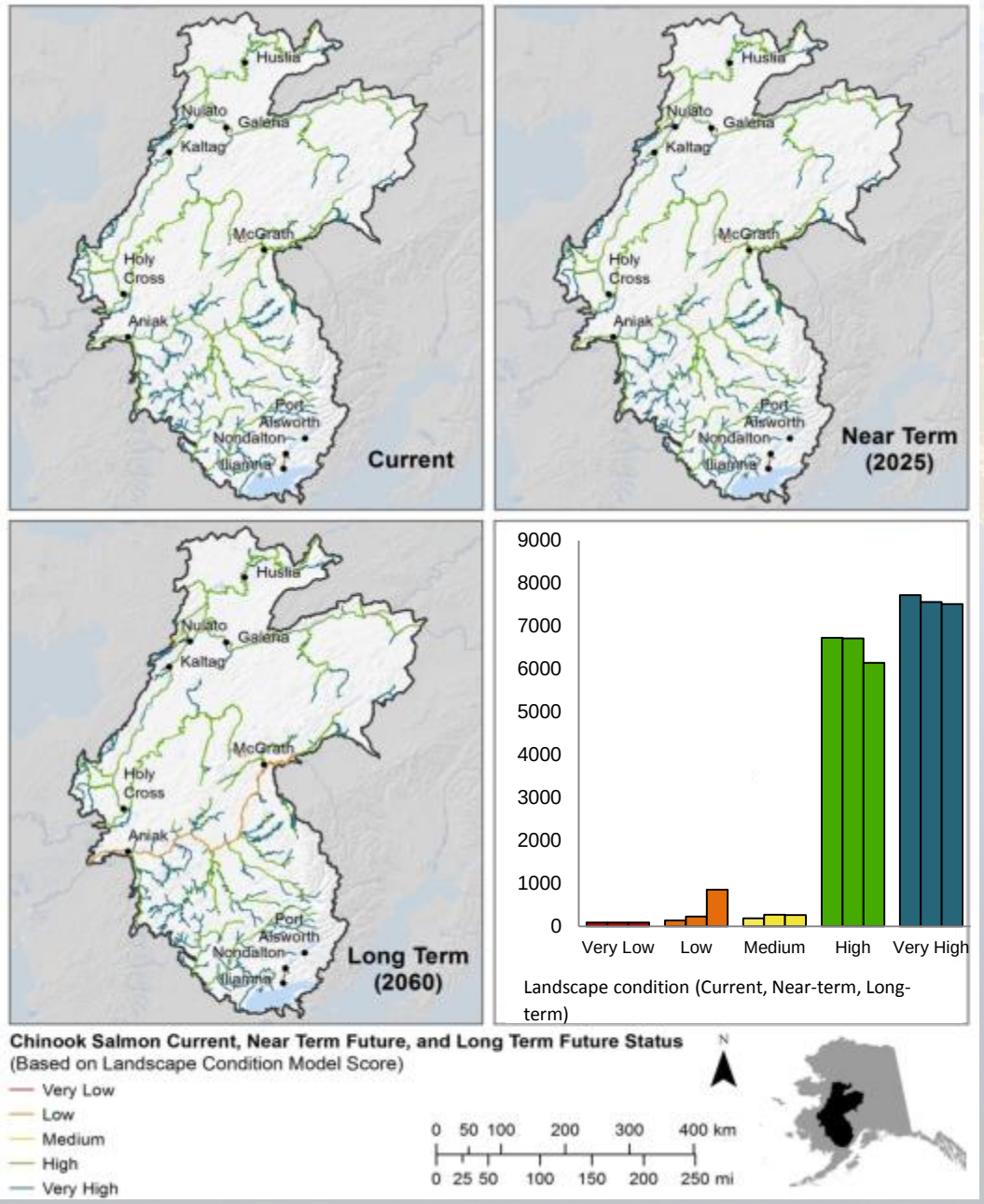


Landscape Condition Model

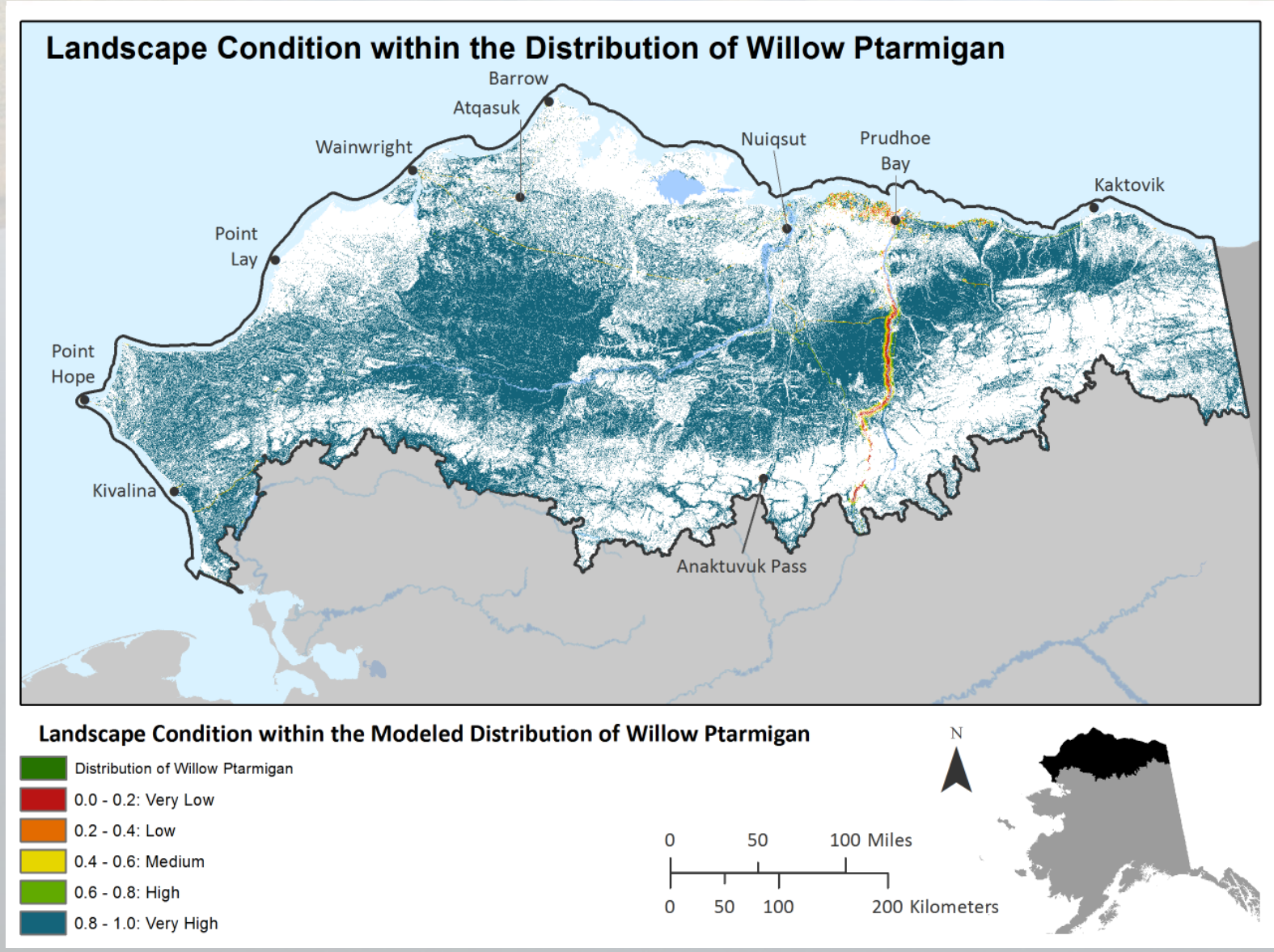




Landscape Condition Model & Fish



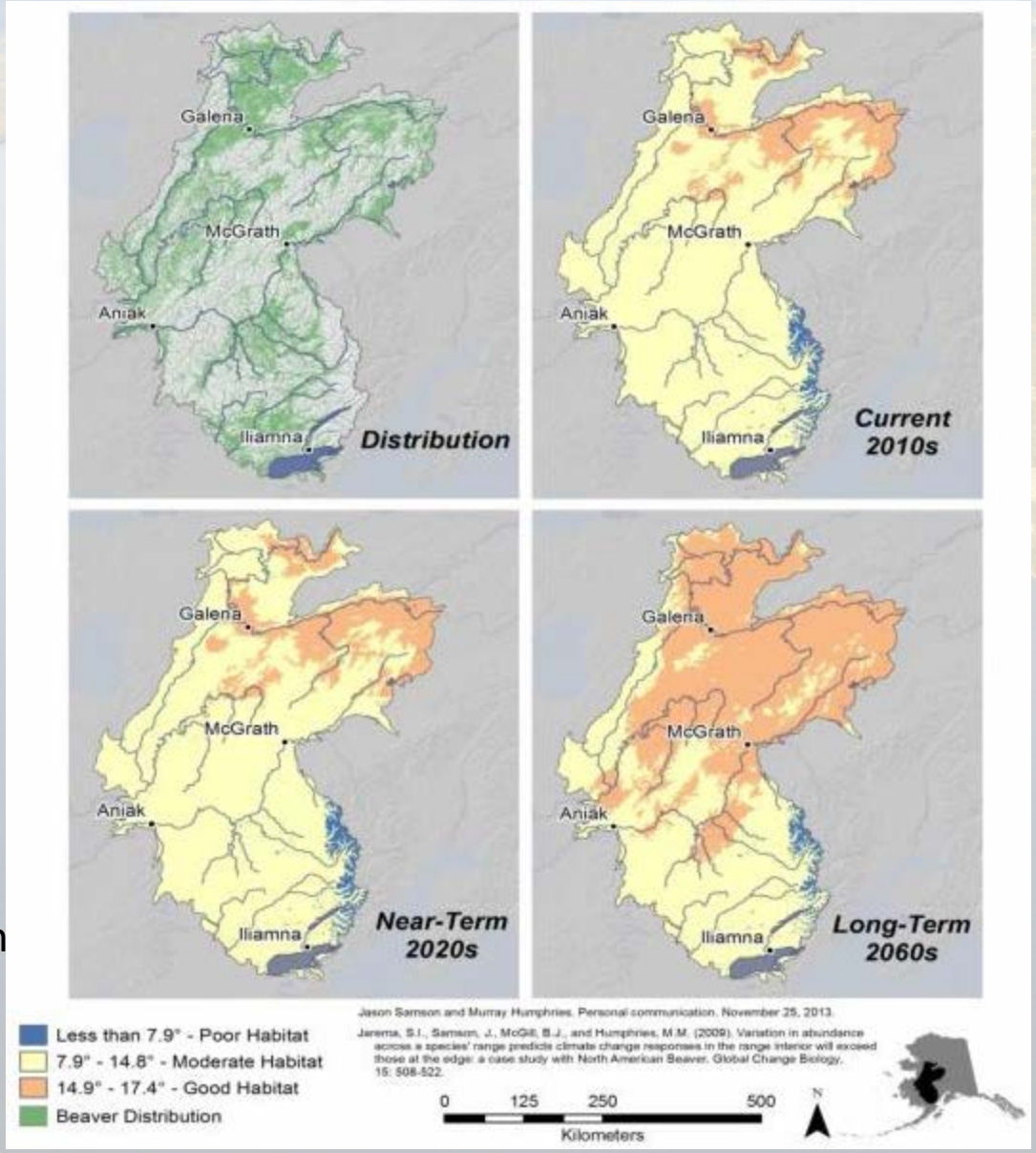
Future Species Status



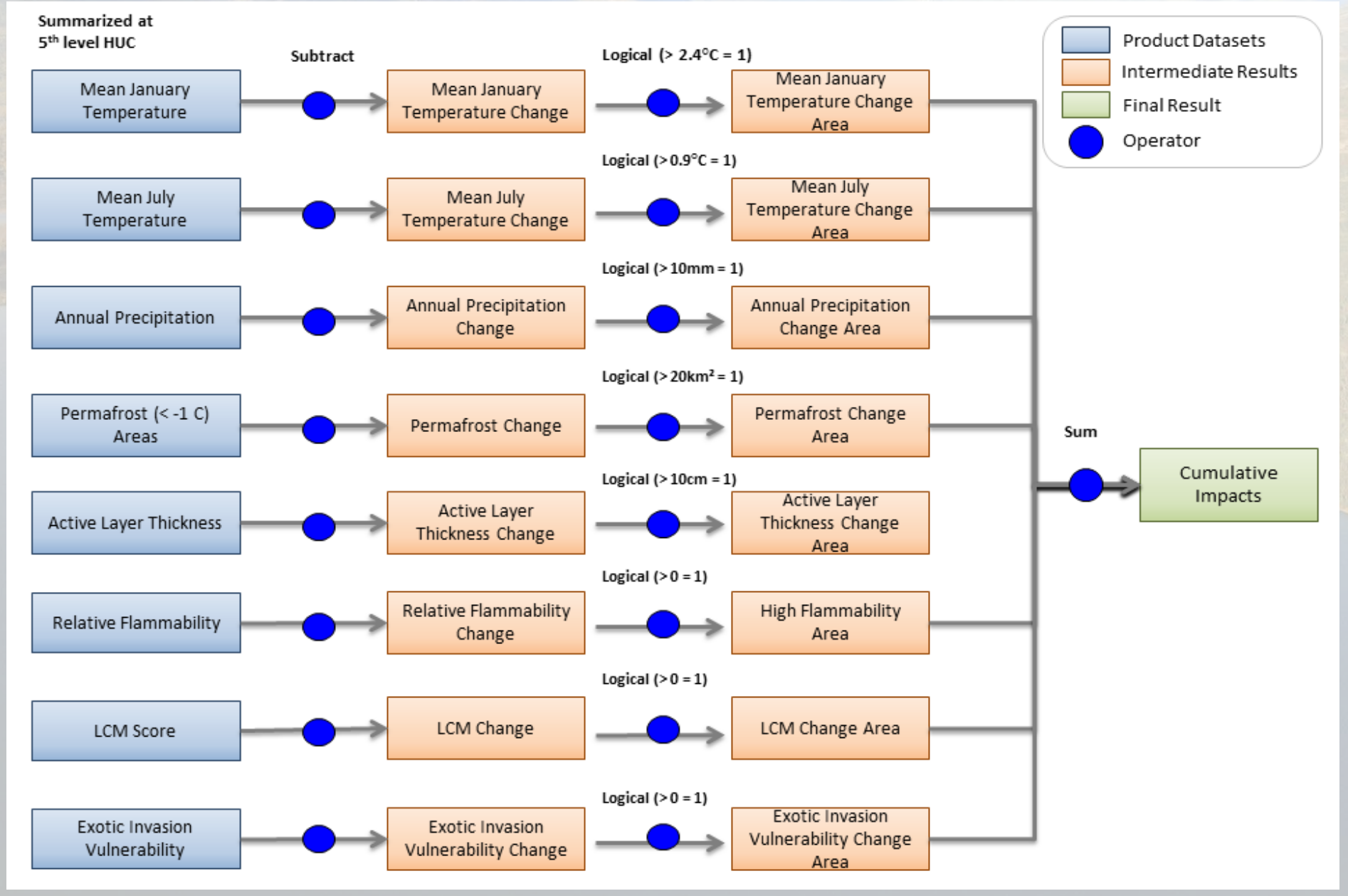
Temperature

American Beaver

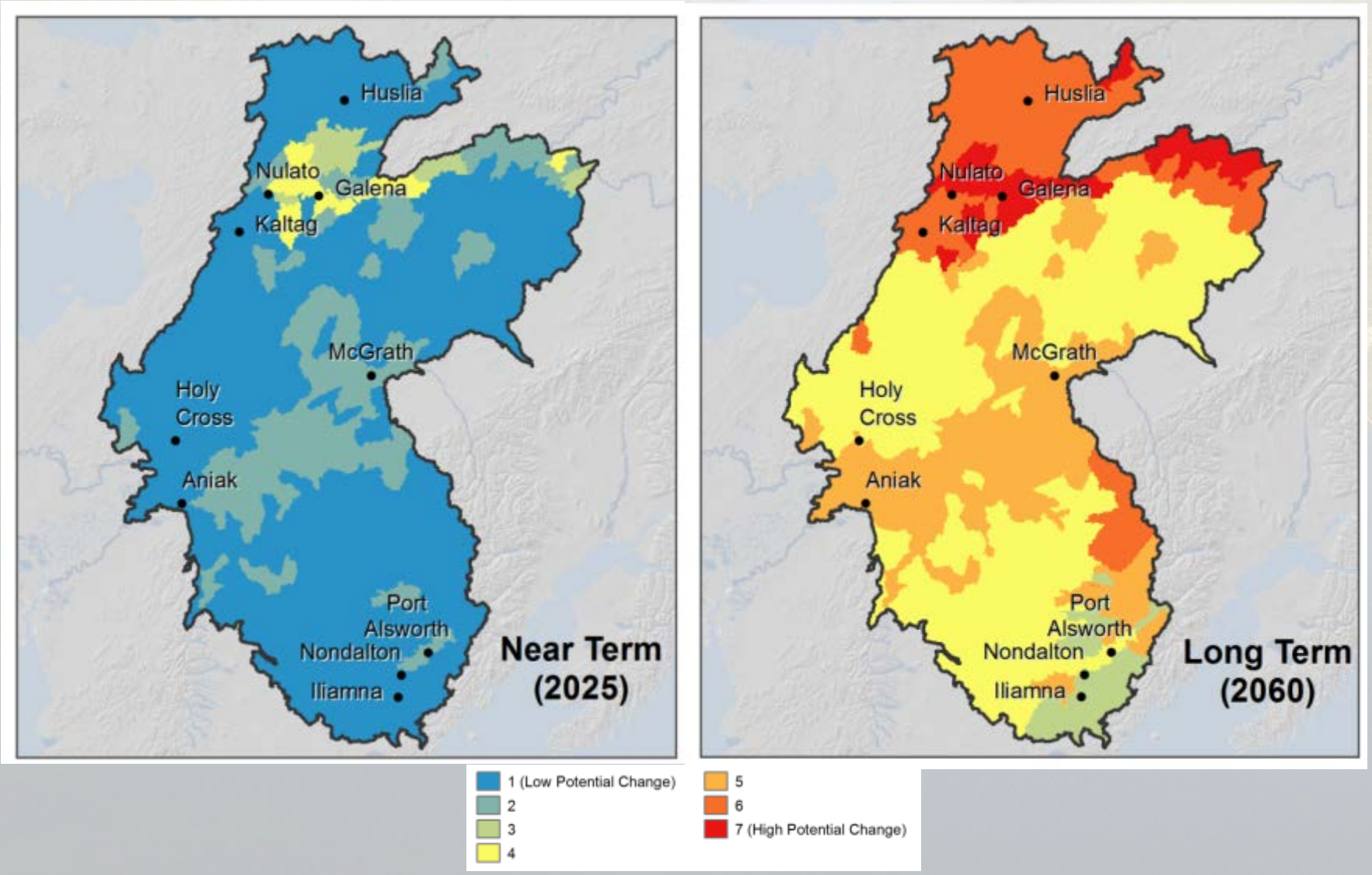
- Beaver densities are temperature dependent, with greater densities above > 14.8°C (optimal temperature threshold)
- Increasing ambient temperatures in the YKL will could result in higher beaver densities
- This effect will be most pronounced in the northern half of the REA, from McGrath northward



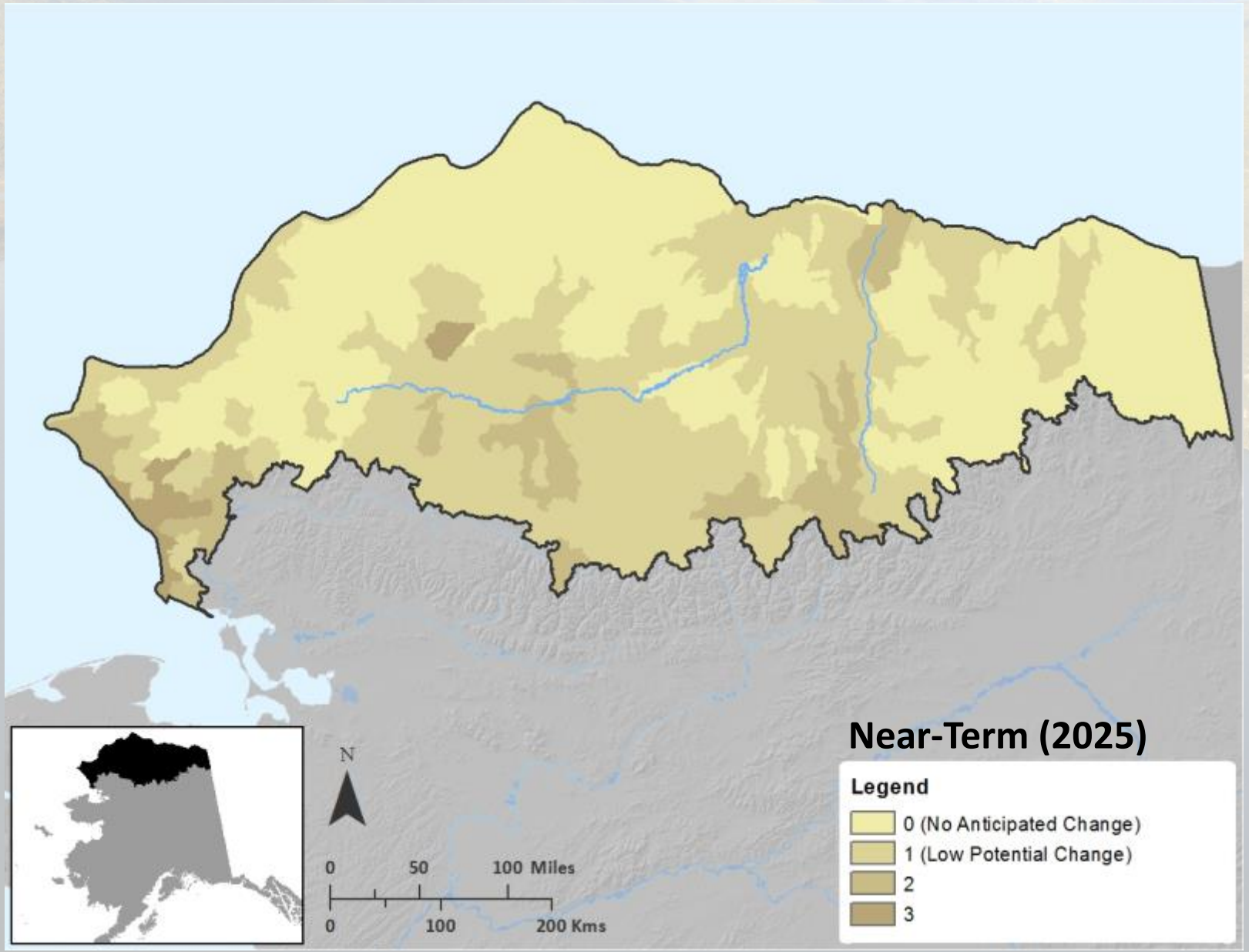
Cumulative Impacts



Cumulative Impacts



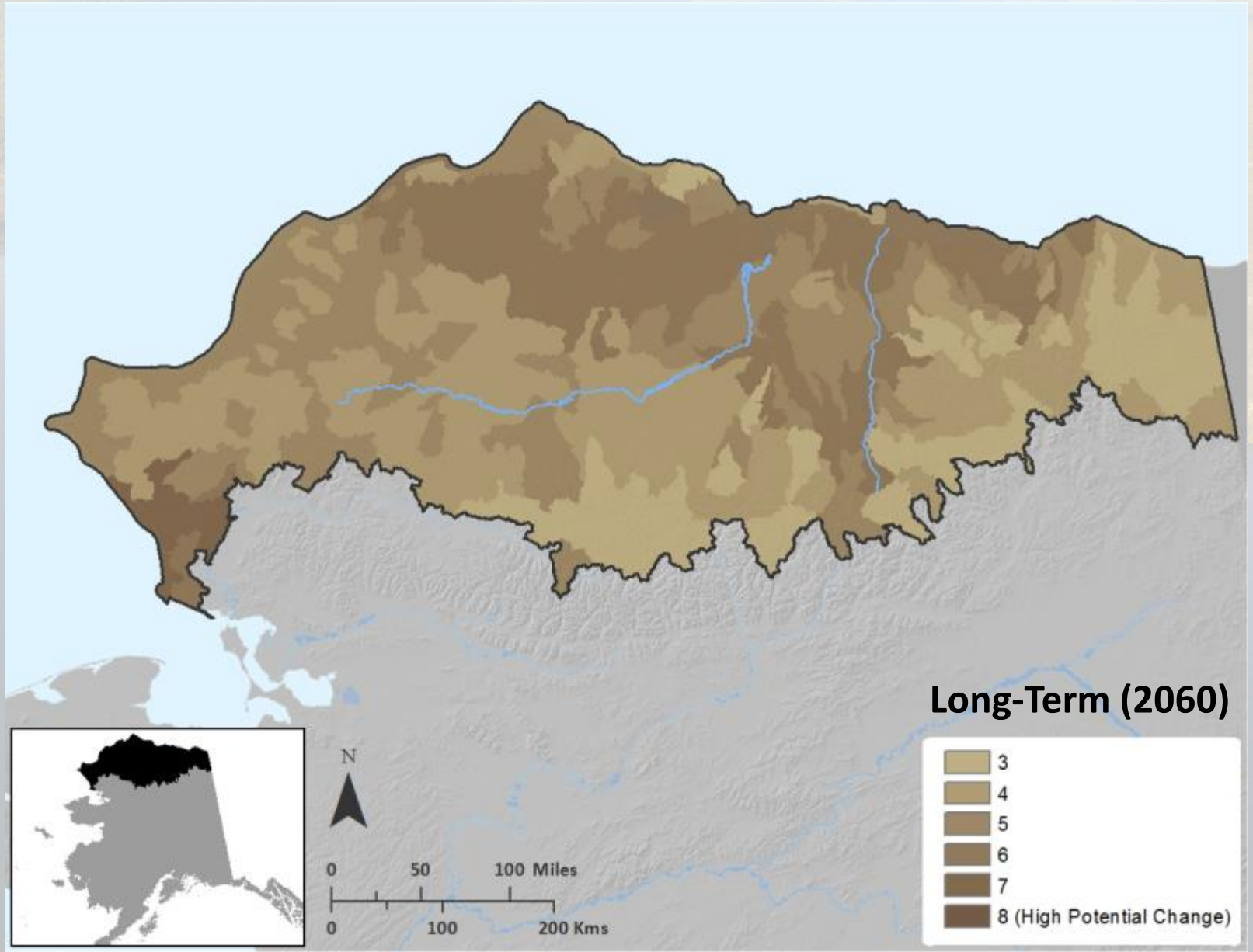
Cumulative Impacts



BLM

Rapid Ecoregional Assessment

Cumulative Impacts



BLM

Rapid Ecoregional Assessment

What is a Rapid Ecoregional Assessment?

Rapid Ecoregional Assessments

YKL REA

- YKL Study Area
- YKL Management Questions
- YKL Ecoregional Conceptual Model
- YKL Conservation Elements
- YKL Change Agents
- YKL Maps
- YKL Products

North Slope REA

- North Slope Study Area
- North Slope Management Questions
- North Slope Ecoregional Conceptual Model
- North Slope Conservation Elements
- North Slope Change Agents
- North Slope Maps
- North Slope Products
- North Slope Rolling Review Maps

Central Yukon REA

- Central Yukon Study Area
- Central Yukon Management Questions
- Central Yukon Ecoregional Conceptual Model
- Central Yukon Conservation Elements
- Central Yukon Change Agents
- Central Yukon Maps
- Central Yukon Products

Home »

Conservation Planning

Rapid Ecoregional Assessments

The Alaska Natural Heritage Program (AKNHP) in cooperation with the Bureau of Land Management (BLM), the Institute for Social and Economic Research (ISER), and the Scenarios Network for Alaska Planning (SNAP) is currently developing two **Rapid Ecoregional Assessments** (REAs). REAs are intended to target and answer important management questions identified by land managers, collect and in some cases develop new distribution maps for key resource values, document potential impact from environmental change agents, identify science gaps, and provide baseline data for future management decisions. REAs for the Yukon River Lowlands – Kuskokwim Mountains – Lime Hills (YKL) ecoregions and the North Slope ecoregions are currently in progress.

Click the study areas highlighted on the map below for more information on each REA:

http://aknhp.uaa.alaska.edu/landscape-ecology/

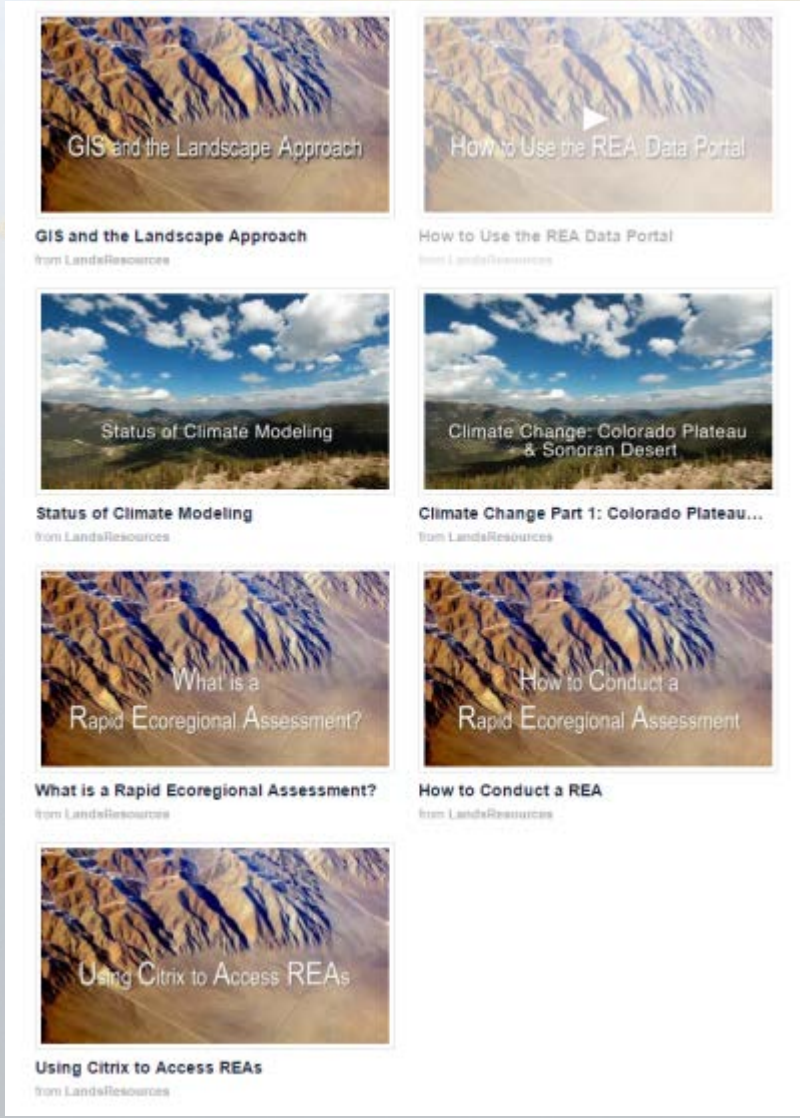
REA Resources

- REA Home Page
  - http://www.blm.gov/wo/st/en/prog/more/Landscape_Approach.html
- REA Q&A
  - http://www.blm.gov/wo/st/en/prog/more/Landscape_Approach/reas/assessmentsqa.html
- REA Data Portal
  - http://www.landscape.blm.gov/geoportal/

REA Resources

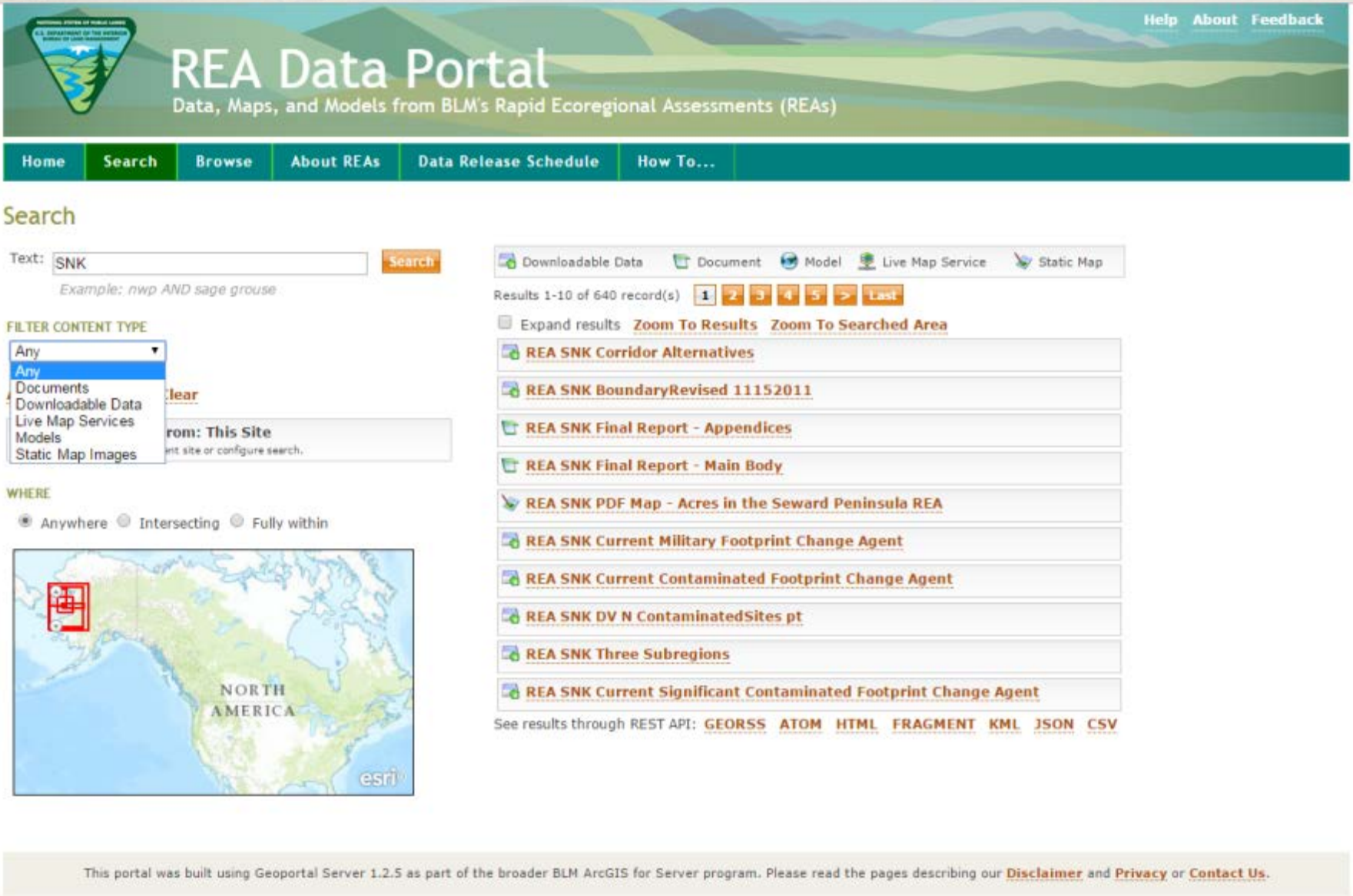
Rapid Ecoregional Assessments Vimeo Channel

http://vimeo.com/channels/ecoregional



REA Data Portal

http://www.blm.gov/wo/st/en/prog/more/Landscape_Approach/reas/dataportal.html



THANK YOU

QUESTIONS??

COMMENTS??

ejtrammell@uaa.alaska.edu
http://www.uaa.alaska.edu/ges/faculty/trammell.cfm