

Using Simulation Models to Assess Impacts to Species at Risk and of Importance in Northern Ontario

A presentation to the working group for the Regional Assessment in the Ring of Fire Area

Matt Carlson, Integral Ecology Group

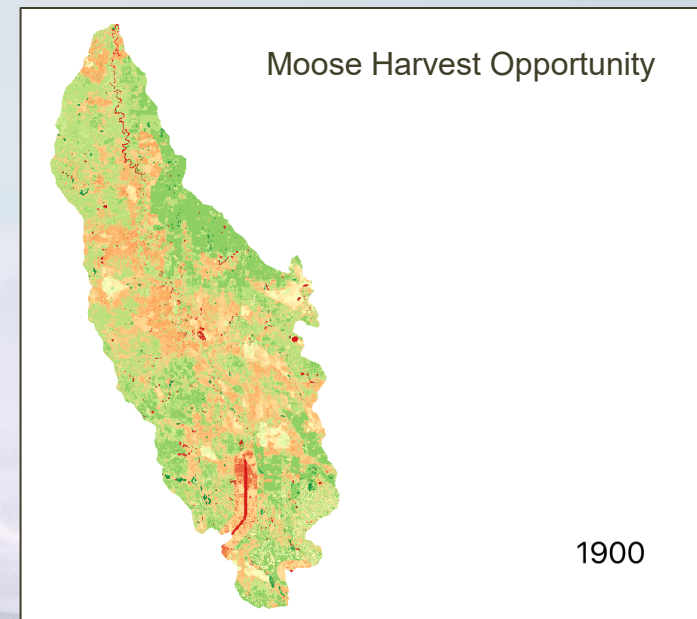
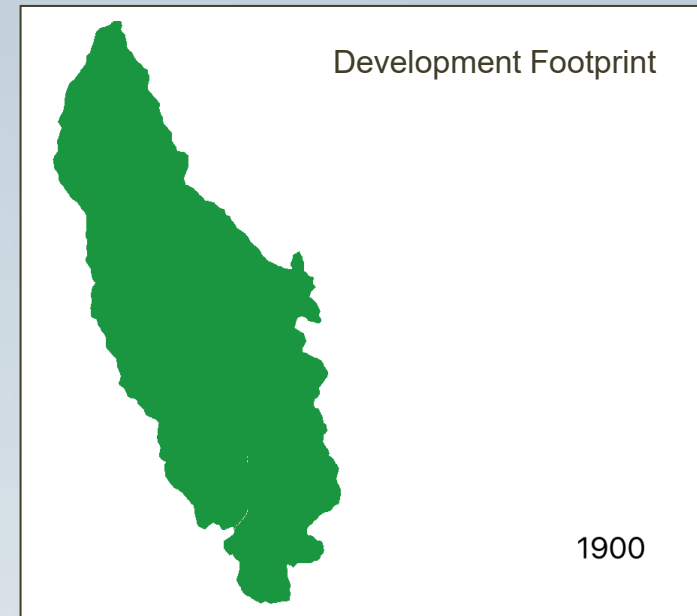
Background

- IEG – support the maintenance and restoration of ecological and cultural integrity
- Cumulative effects assessment approach – Indigenous Knowledge and modeling
- Used by Nations in multiple Canadian jurisdictions including Ontario



The ALCES Simulation Platform

- Maps cumulative impacts to wildlife and Indigenous land use
- Simulates impacts over long time periods and large regions
- Builds capacity through custom tools that can be used by other organizations



Use of ALCES in Northern Ontario Moose Cree First Nation

Scenario Name: Scenario Status:

Basic Settings | Forest Settings

Date: 2050-01-01

Study Region: CE Analysis Domain

Use study region as domain:

Development Footprints:

Wildfires:

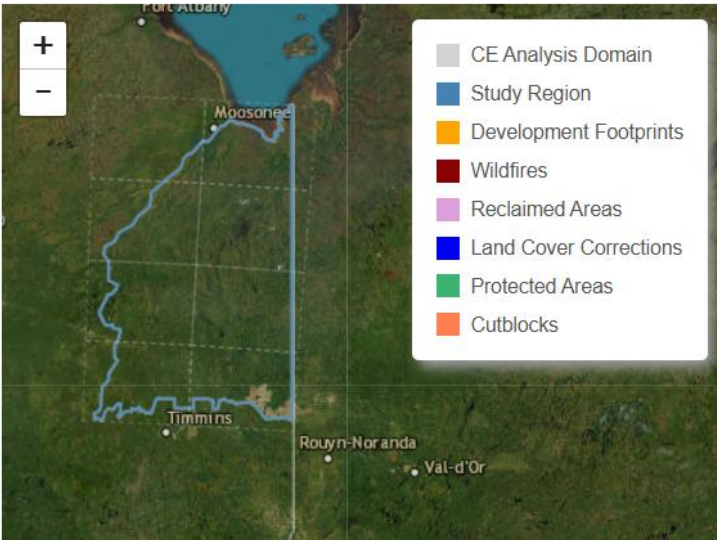
Reclaimed Areas:

Land Cover Corrections:

Protected Areas:

Cutblocks:

Basic | Timber Harvest | Wildfire



Legend:

- CE Analysis Domain
- Study Region
- Development Footprints
- Wildfires
- Reclaimed Areas
- Land Cover Corrections
- Protected Areas
- Cutblocks

ipyleaflet | Tiles © Esri — Source: Esri, i-cubed, USDA, USGS, AEX, GeoEye, Getmapping, Aerogrid, IGN, IGP, UPR-EGP, and the GIS User Community

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Use of ALCES in Northern Ontario Government of Ontario

Scenario Name: Scenario Status:

Basic Settings | Forest Settings

Date: 2050-01-01

Study Region: Missisa

Use study region as domain:

Reclaimed Areas:

Protected Areas:

Cutblocks:

Land Cover Corrections:

Wildfires:

Development Footprints:

Berens

Brightsand

Churchill

FMUs that overlap the caribou range

James Bay

Kesagami

Kinloch

Missisa

Nipigon

Nipigon and Brightsand

Ozhiski

Pagwachuan

Spirit

Swan

Sydney

CE Analysis Domain

Run Scenario | **Delete Scenario**

Basic | Timber Harvest | Wildfire

Legend:

- CE Analysis Domain
- Study Region
- Reclaimed Areas
- Protected Areas
- Cutblocks
- Land Cover Corrections
- Wildfires
- Development Footprints

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Use of ALCES in Northern Ontario Wabauskang and Lac Seul First Nations

Scenario Name: Scenario Status:

Basic Settings | Forest Settings

Date: 2055-01-01

Study Region: CE Analysis Domain

Use study region as domain:

Development Footprints: Add Development Footprints...

Wildfires: Add Wildfires...

Reclaimed Areas: Add Reclaimed Areas...

Land Cover Corrections: Add Land Cover Corrections...

Protected Areas: Add Protected Areas...

Cutblocks: Add Cutblocks...

Basic | Timber Harvest | Wildfire

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Use of ALCES in Northern Ontario Natural Resources Canada



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An assessment of mitigation strategies for maintaining a balanced moose-wolf-caribou system in Ontario's ring of fire region

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Effective resource management is crucial for preserving global biodiversity. This paper employs scenario-based analysis of different mitigation strategies to assess their effectiveness and feasibility in addressing the cumulative impacts of resource development in Northern Ontario's Ring of Fire, a region that represents one of the largest remaining intact forest landscapes in North America, capable of supporting natural levels of biodiversity and traditional Indigenous land use practices. The scenario analysis was conducted to explore the consequences of resource development, fire, climate change, harvest, and proposed management strategies on the moose-wolf-caribou system in the Ring of Fire region. Specifically, the simulations assess the potential effectiveness of wolf control, maternal caribou penning, and moose harvest in maintaining a balanced predator-prey system. This modelling project was completed in the Missisla and Ozhiski caribou ranges, covering 108,000 km² of northern Ontario. Through the scenario analysis, we combined integrated landscape and population simulators to compare different management strategies aimed at conserving caribou and maintaining opportunities for moose harvest. The models and results presented here help identify the range of plausible outcomes and relative effort required for mitigation. The study concludes that to foster an effective wildlife management and maintain ecological balance among caribou, wolves and moose amid development pressures in the Ring of Fire region, a holistic, integrated science-based and community-led mitigation strategy is required.

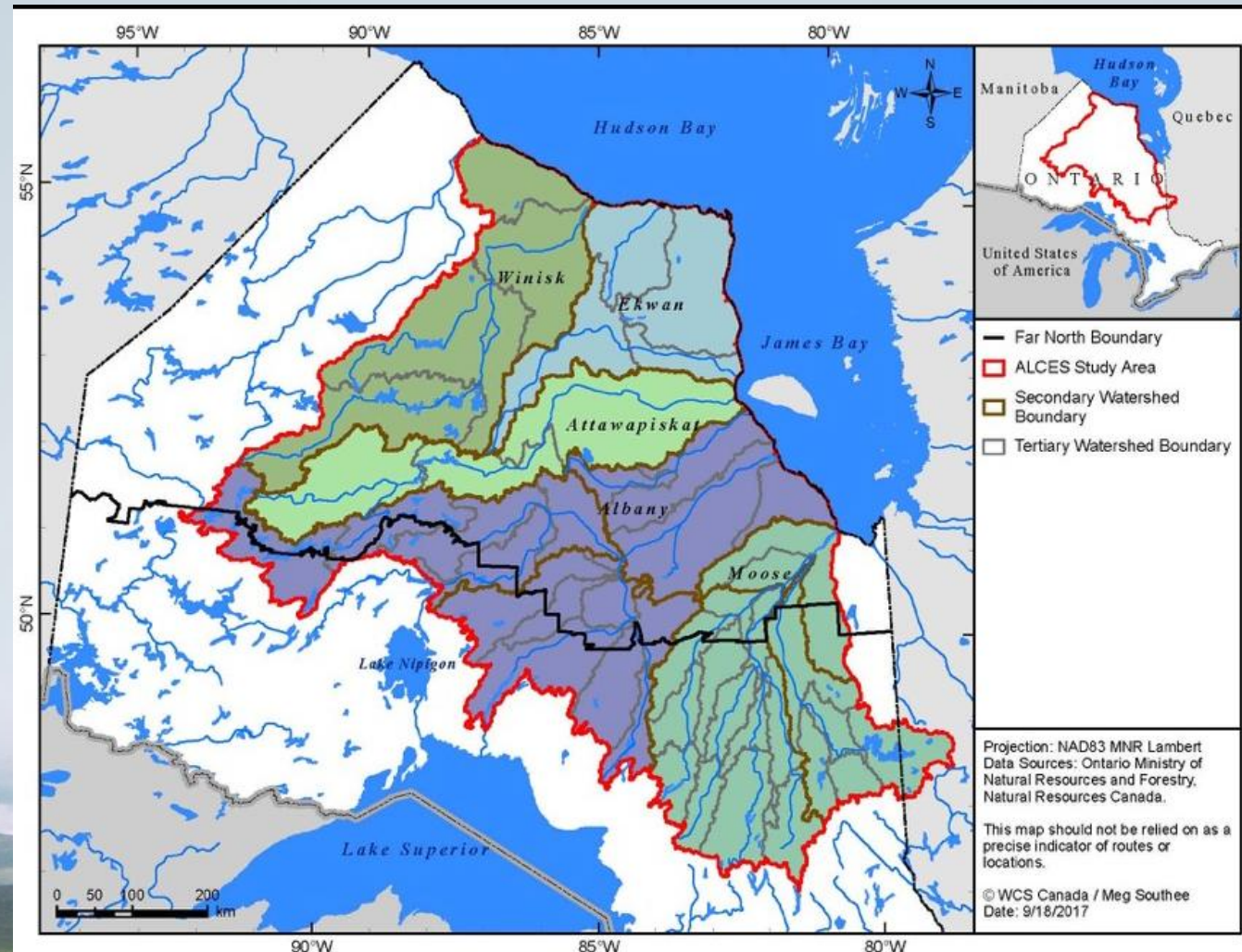
KEYWORDS

cumulative effect assessment, mitigation strategies, moose-wolf-caribou system,
resource development, ring of fire, scenario analysis

1 Introduction

Ontario's Far North represents one of the largest remaining intact forest landscapes in North America, capable of supporting natural levels of biodiversity and traditional Indigenous land use practices. Maintaining these functions in the face of climate change and potential future development requires balanced predator-prey populations such as the moose-wolf-caribou system. The region's Ring of Fire mineral deposit has been selected for regional assessment under the new Canadian Impact Assessment Act (Impact Assessment Agency of

Use of ALCES in Northern Ontario WCS Canada



Use of ALCES in Northern Ontario

Case Studies

- Moose Cree First Nation
- Government of Ontario
- Natural Resources Canada
- Wabauskang and Lac Seul First Nations
- WCS Canada

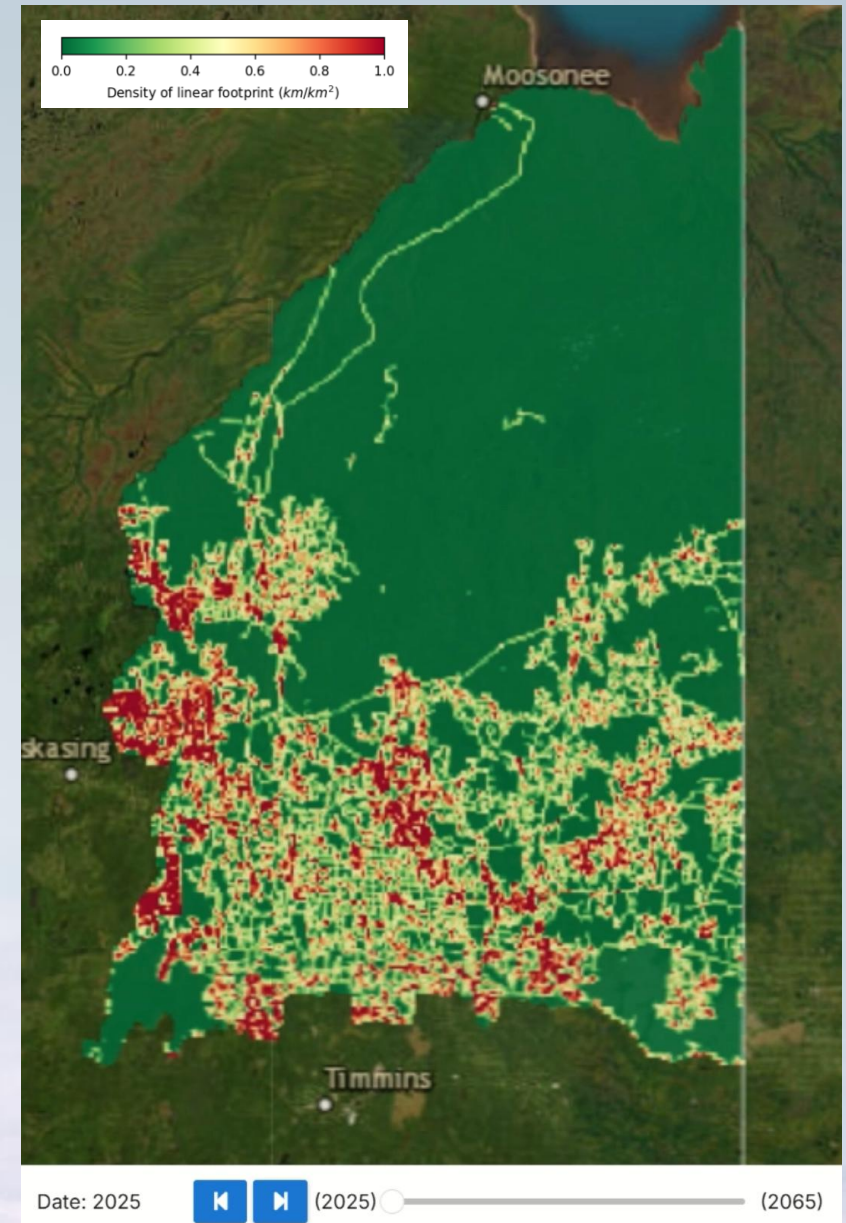


Impacts on wildlife

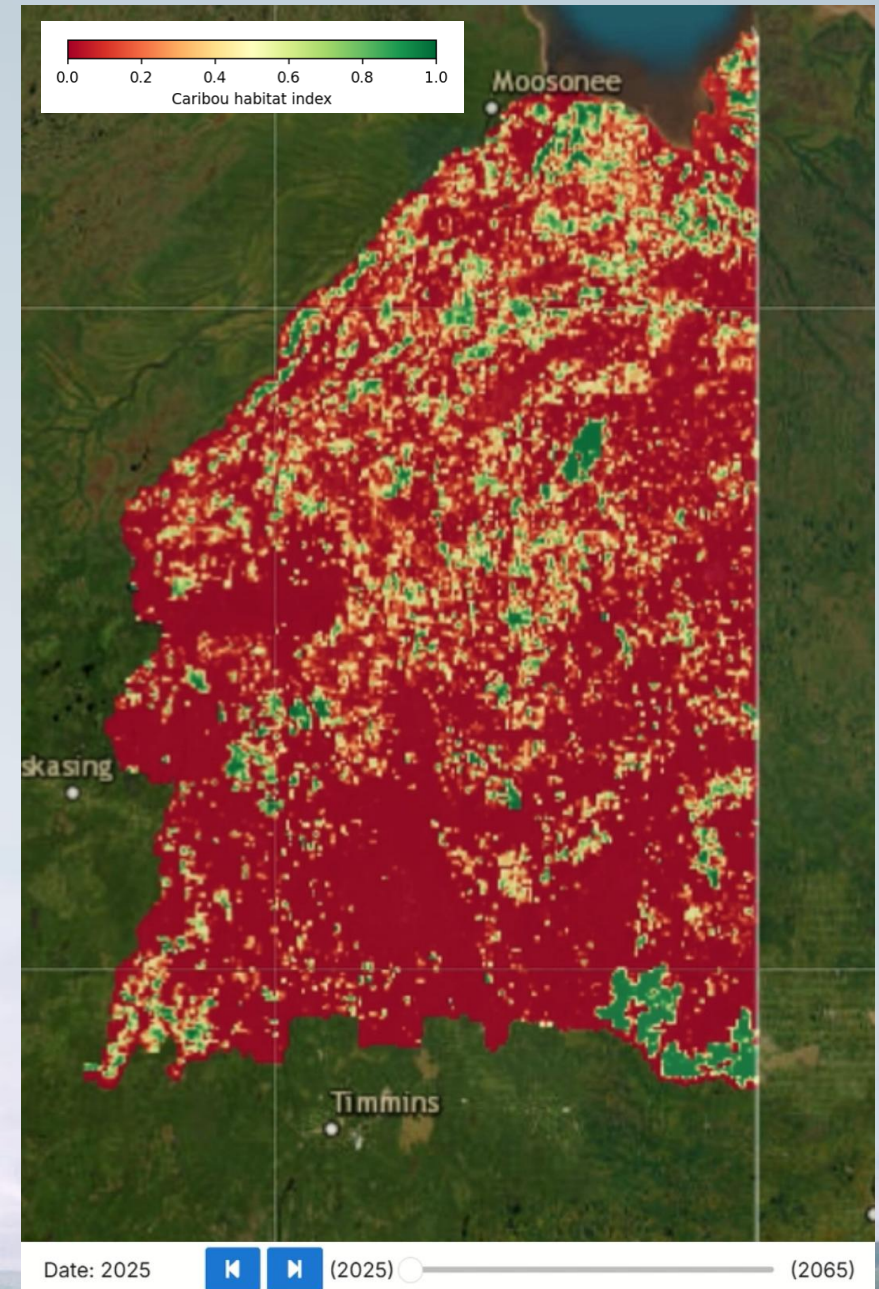
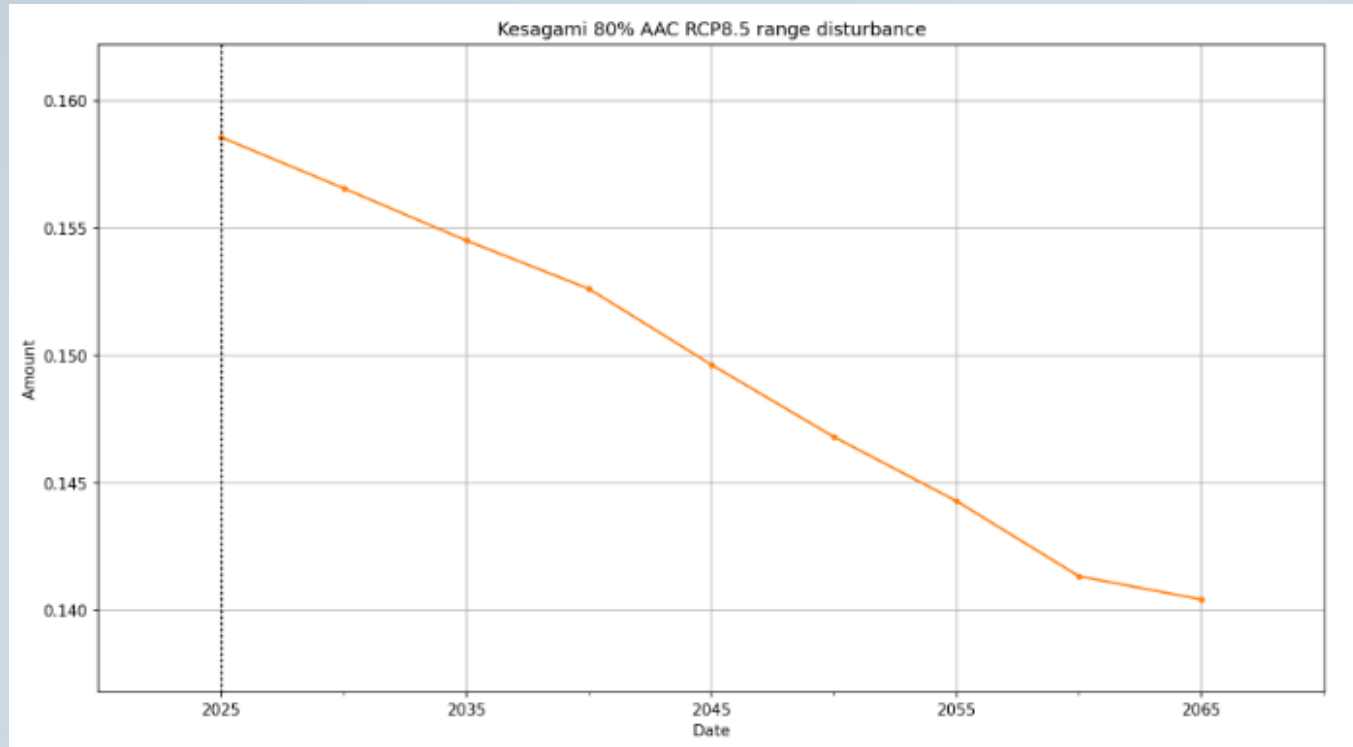
- Habitat fragmentation
- Climate change
- Migration
- Consequences to traditional ways of life

Impacts of Fragmentation and Climate Change

- Moose Cree First Nation with funding from the Caribou Conservation Stewardship Program
- Impacts and mitigation strategies
 - Kesagami caribou herd
 - Moose harvest



Impacts of Fragmentation Caribou Summer Habitat



Conservation Planning

- Apply ALCES to explore conservation scenarios
- Hypothetical example

Import Type: Protected Areas

New Import | Existing Import: North of Kapuskasing

Name: North of Kapuskasing

Upload File | File: [1881656381.geojson](#)

Simulate Implicitly

Description: For demo

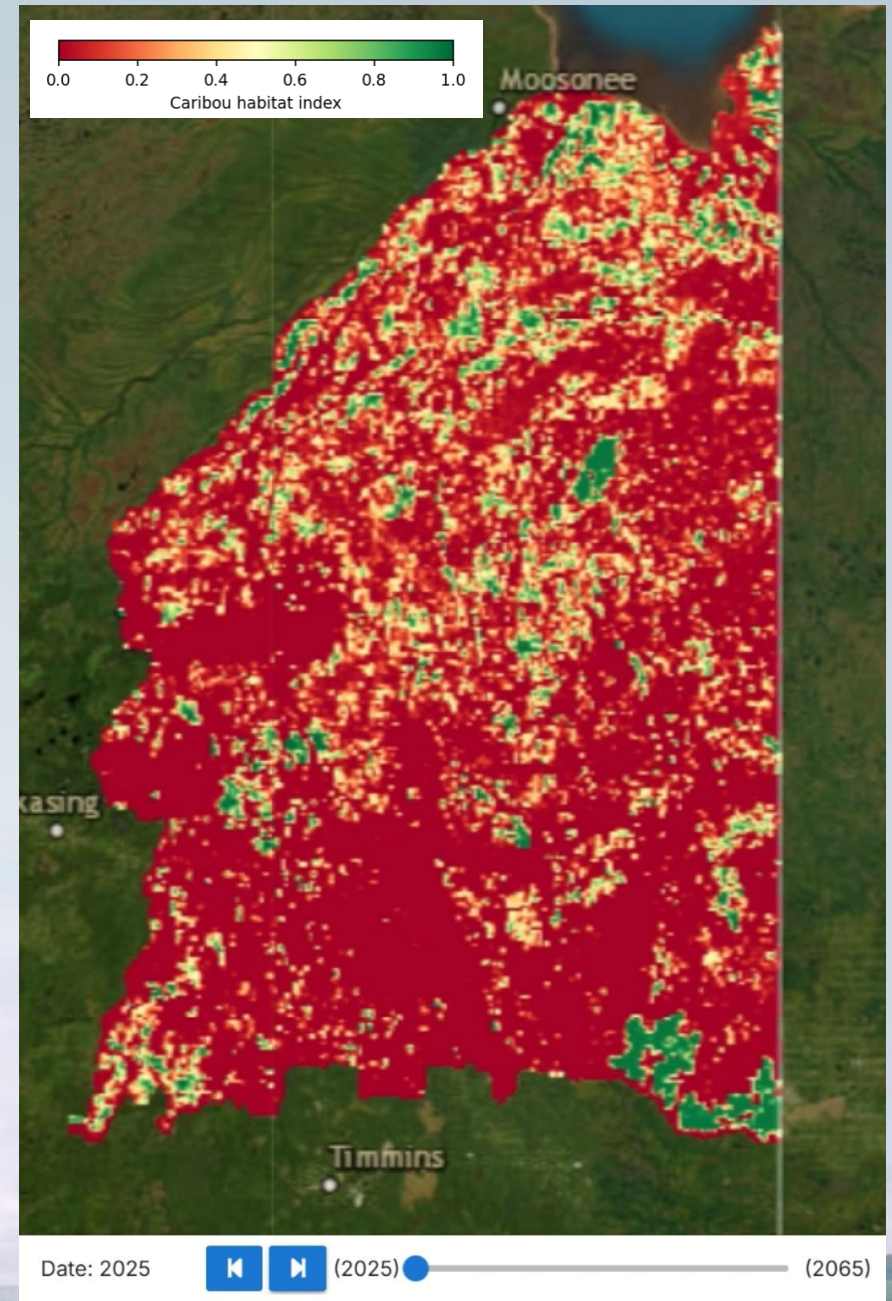
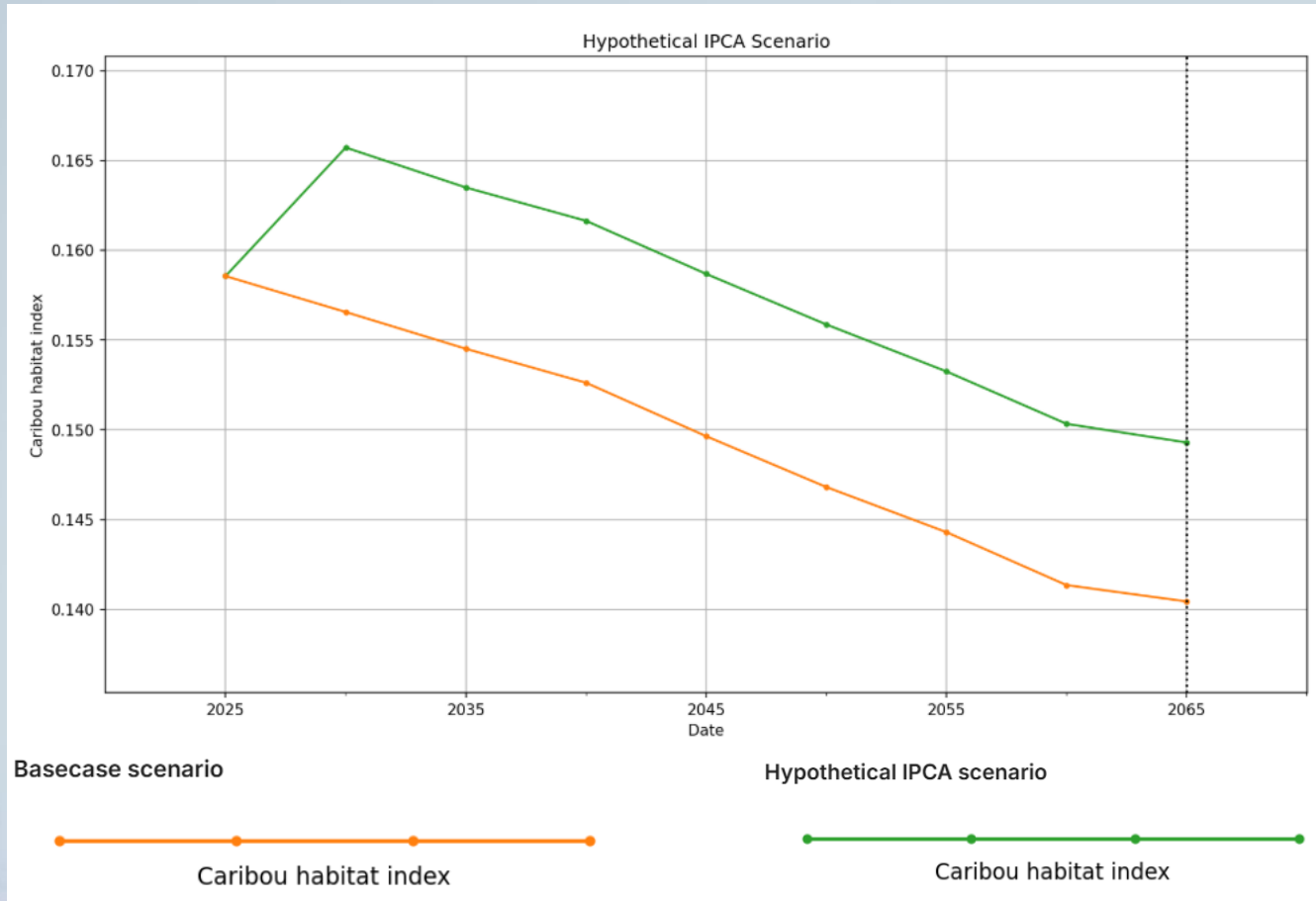
Date: 2026

Forestry Not Allowed

Development Not Allowed

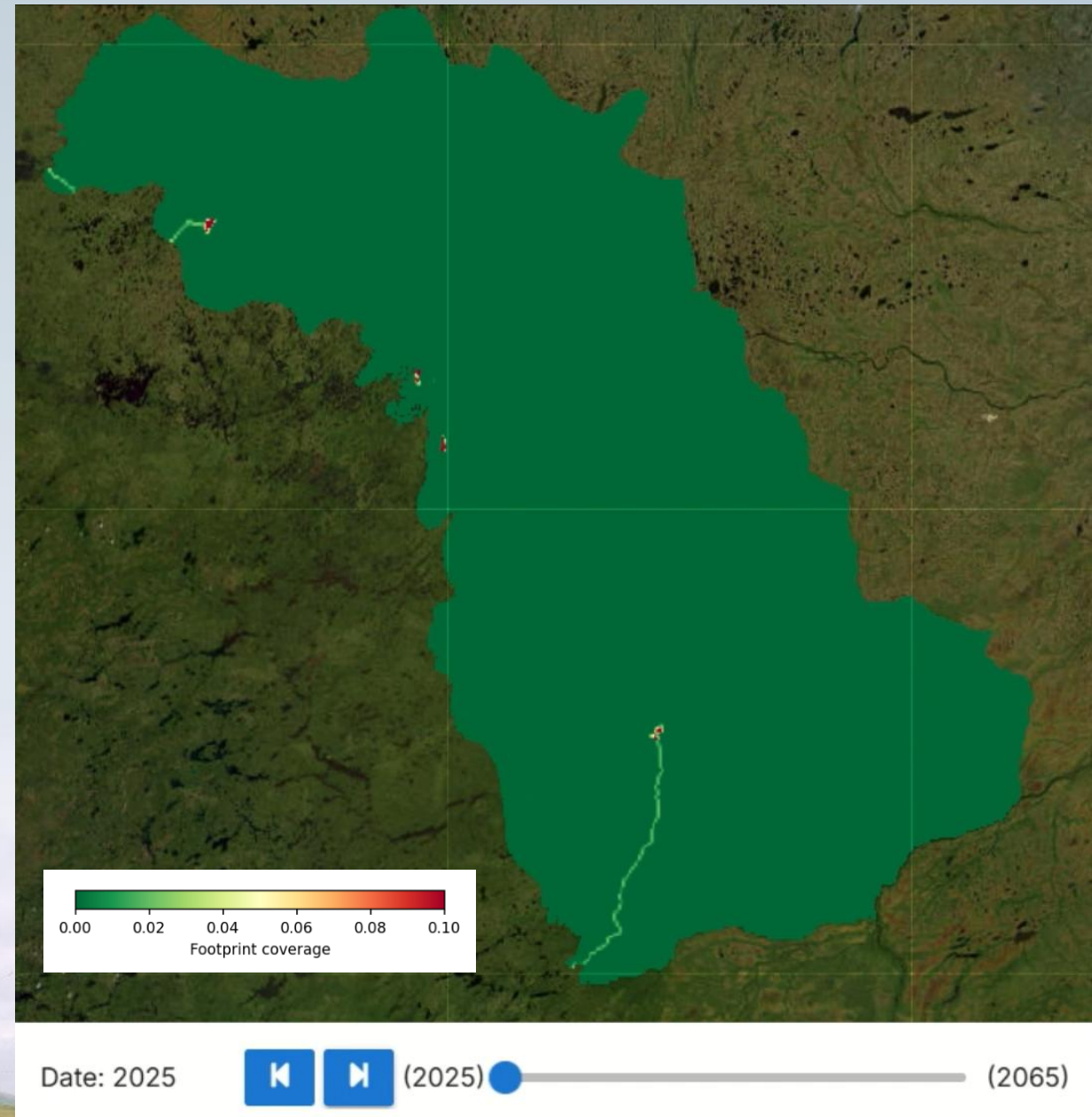
Map showing a satellite view of a region with a blue polygon highlighting a specific area. The map includes a toolbar with various icons for navigation and interaction.

Conservation Planning



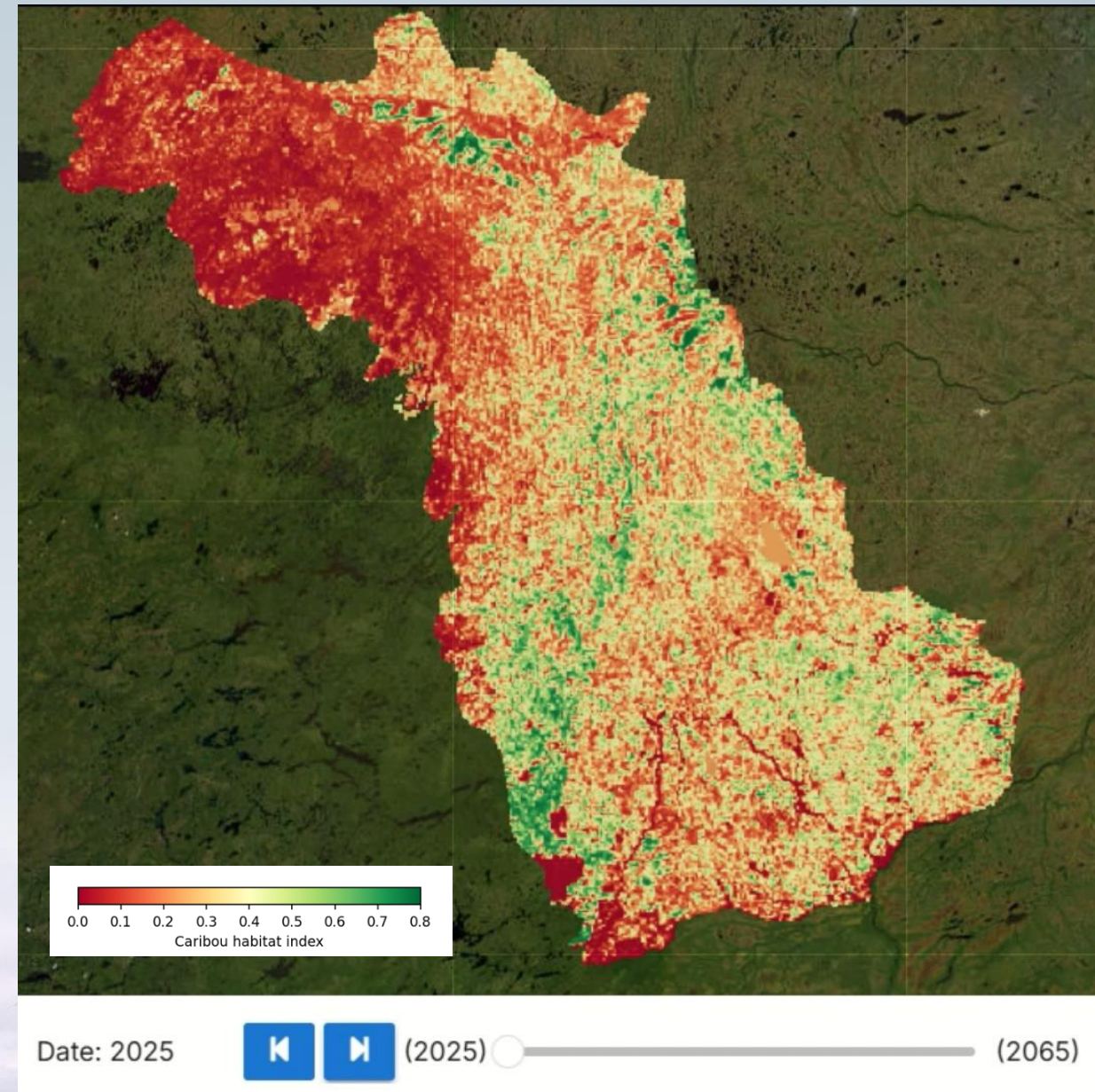
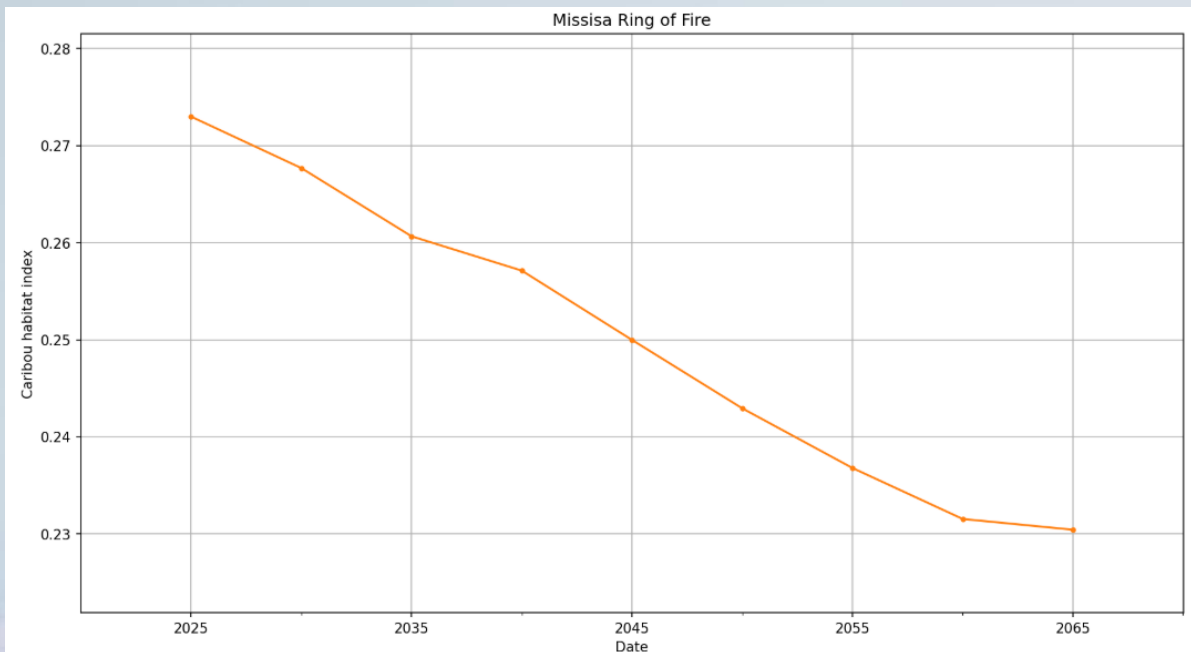
Impacts of Fragmentation and Climate Change

- Government of Ontario's Caribou Conservation Stewardship Program
- Parameterization of ALCES for all caribou ranges
- Ring of Fire – Missisa Range



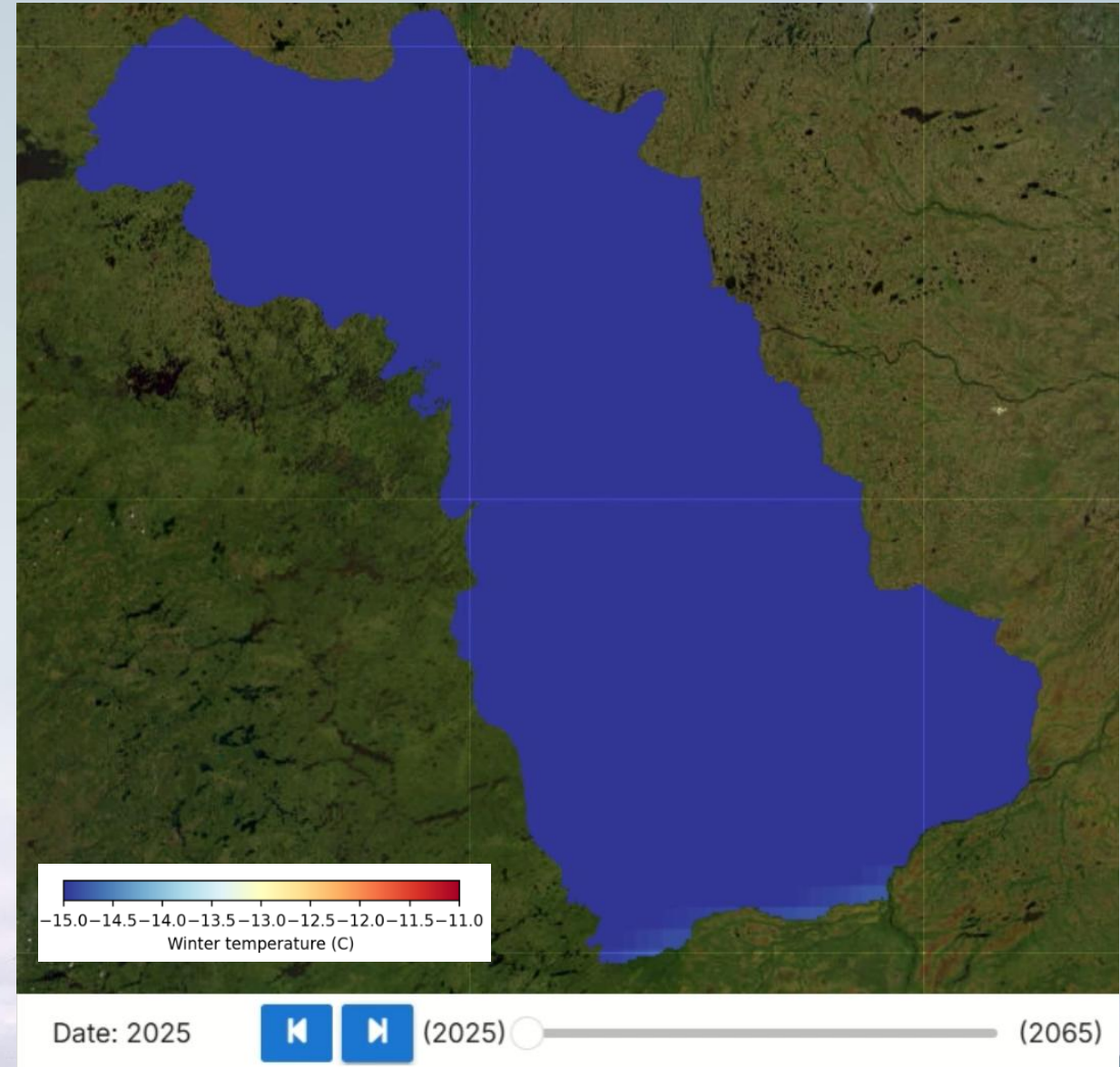
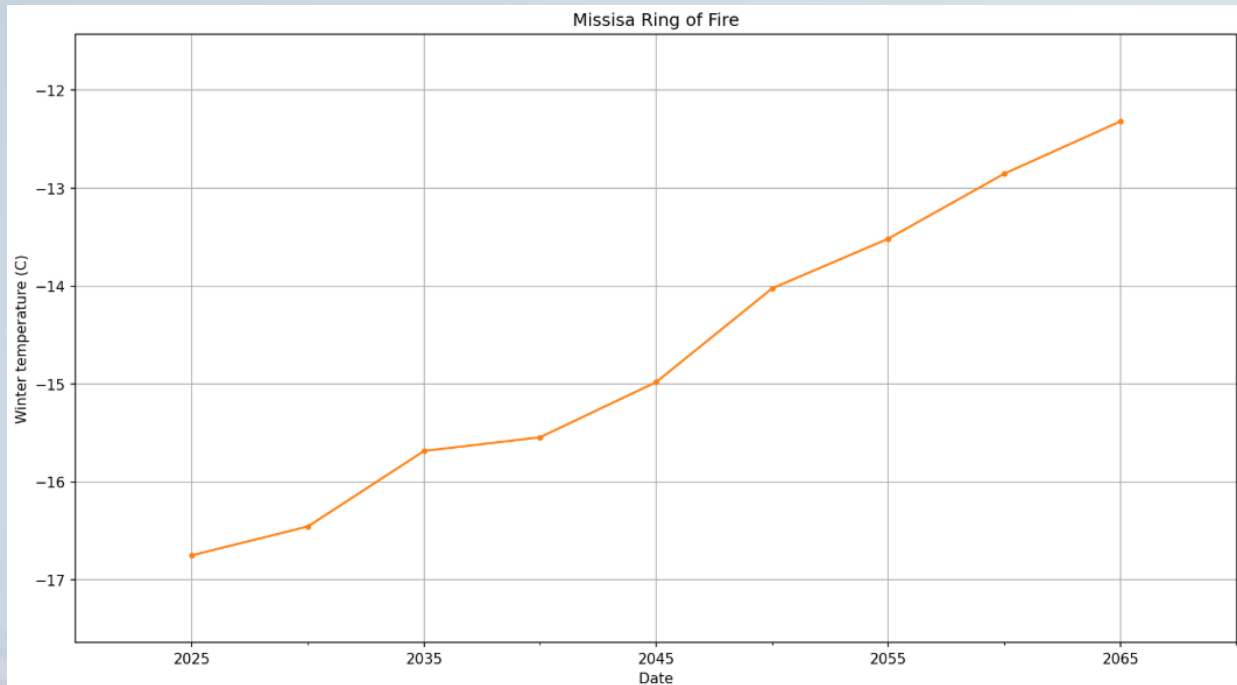
Impacts of Fragmentation and Climate Change

- Caribou habitat



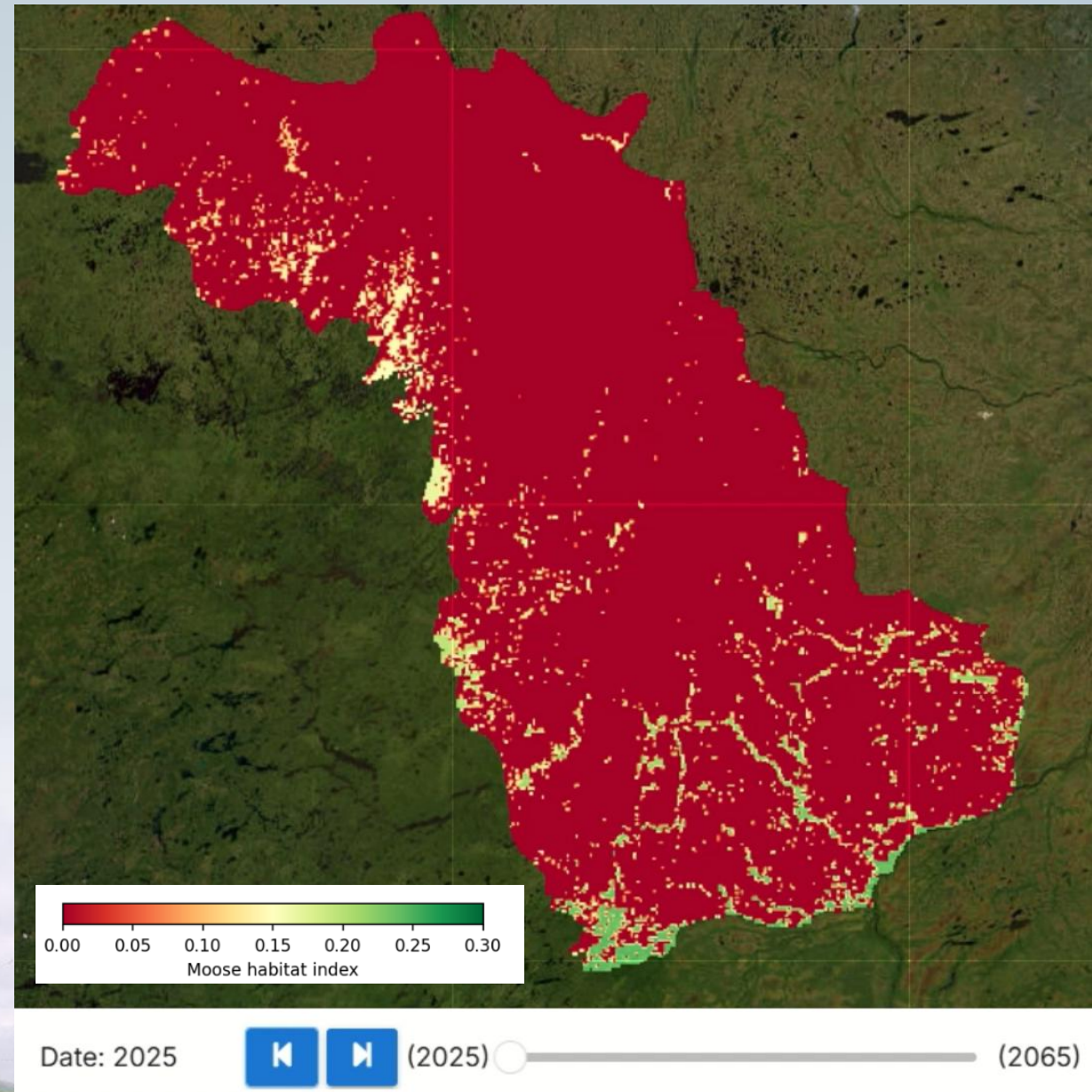
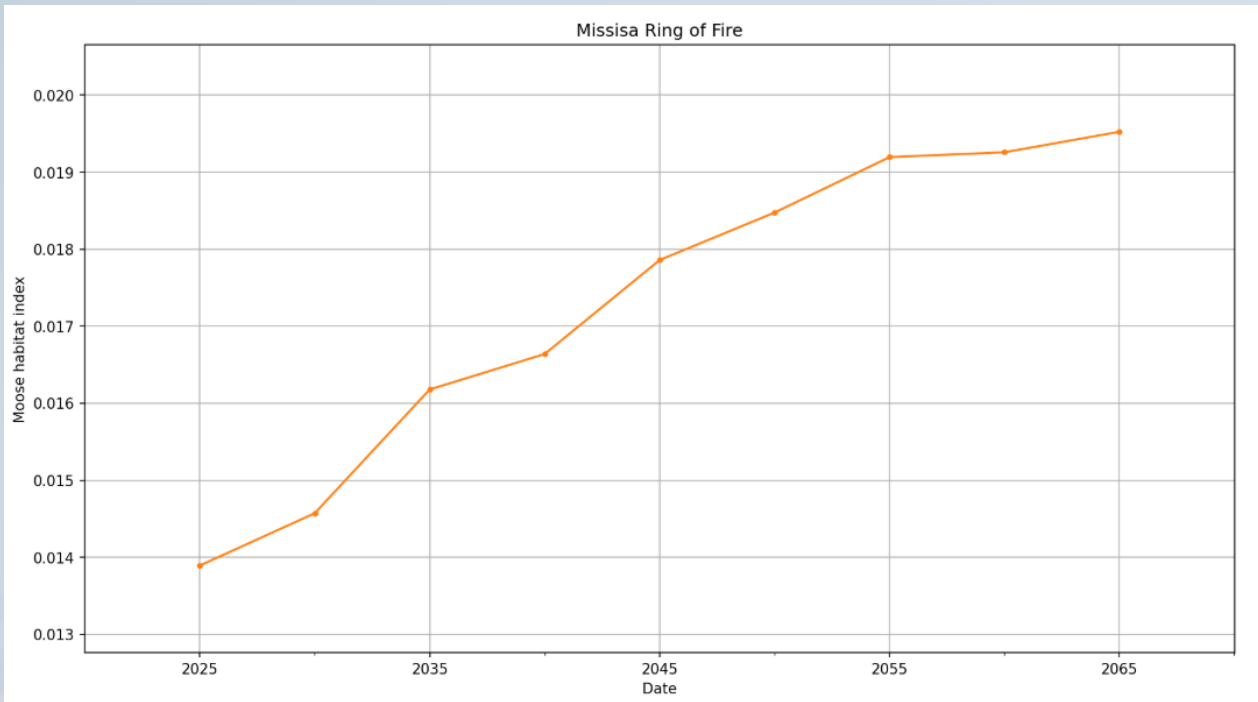
Impacts of Fragmentation and Climate Change

- Winter temperature



Impacts of Fragmentation and Climate Change

- Moose habitat

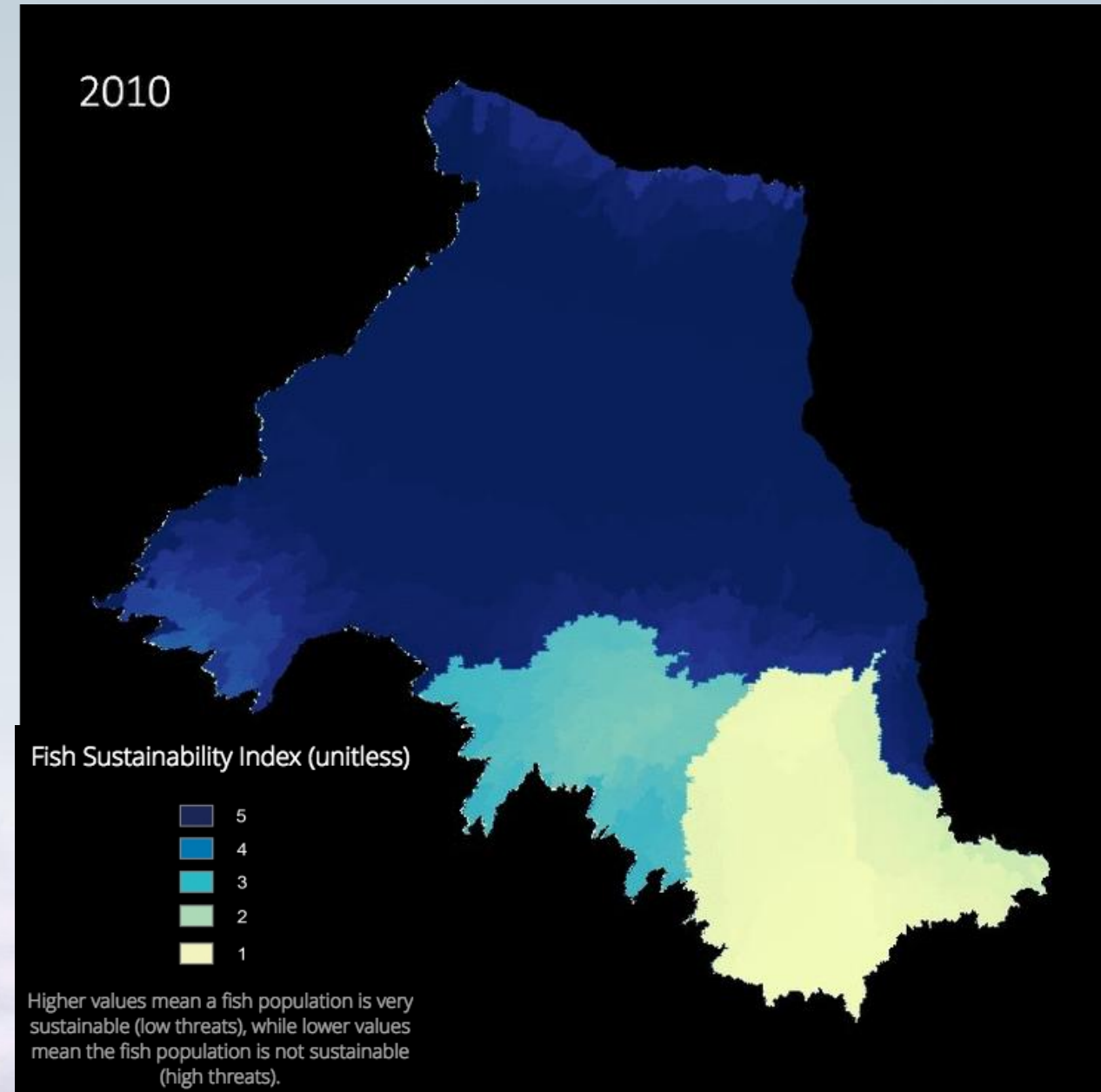


Impacts on Migration

- WCS Canada
- Dams as migration barriers

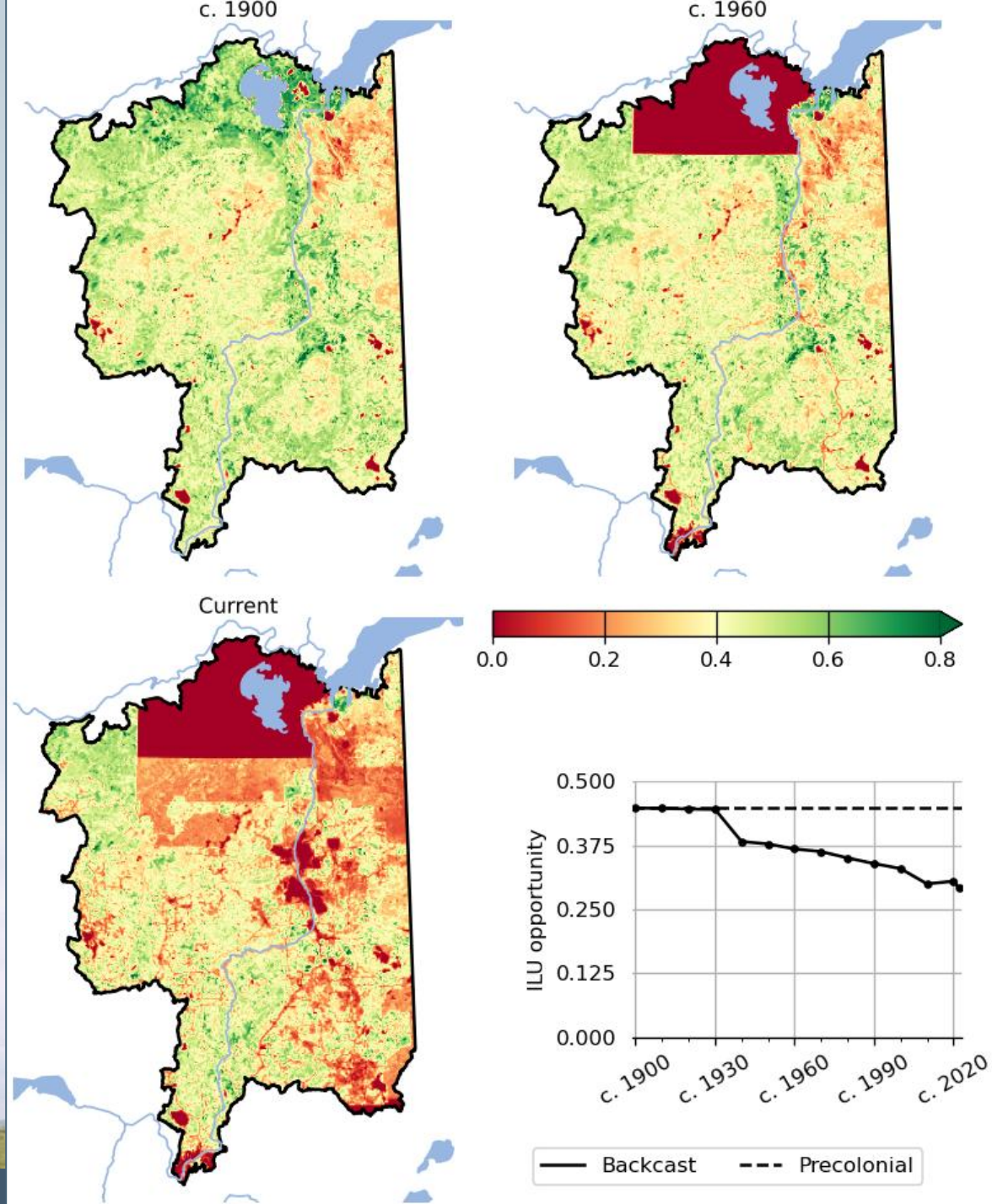


©Engbretson Underwater Photography



Impacts on wildlife important to traditional ways of life

- Fort McKay Métis Nation (Alberta) with funding from IAAC and ICCE
- Cumulative effect of habitat loss and degraded access to the land



Thank you

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