



Caribou in Canada

With an Emphasis on
Ontario's Boreal Caribou

And

An Even More Refined Look at the
Lake Superior Caribou Range

All Caribou are the same species – Rangifer tarandus









All Caribou are the same species – Rangifer tarandus - **Maybe**



Caribou Taxonomy is a Mess

ZooKeys 1119: 117–151 (2022)
doi: 10.3897/zookeys.1119.80233
<https://zookeys.pensoft.net>

REVIEW ARTICLE



Available names for *Rangifer* (Mammalia, Artiodactyla, Cervidae) species and subspecies

Lee E. Harding¹

¹ 2339 Sumpter Drive, Coquitlam, BC, V3J 6Y3, Coquitlam, Canada

Corresponding author: Lee E. Harding (leeharding@shaw.ca)

Academic editor: Jesus Maldonado | Received 8 January 2022 | Accepted 19 July 2022 | Published 26 August 2022

<https://zoobank.org/55F12DC8-F012-49D2-8E1D-ED55DD9A277A>

Citation: Harding LE (2022) Available names for *Rangifer* (Mammalia, Artiodactyla, Cervidae) species and subspecies. ZooKeys 1119: 117–151. <https://doi.org/10.3897/zookeys.1119.80233>

ZooKeys 1119: 117–151. <https://doi.org/10.3897/zookeys.1119.80233>

Species

Conservation Units

Subspecies

Improved Conservation Units

**Migratory
Patterns**

Designatable Units

Ecotypes

Ranges

Herds

Meta-Herds

Populations

Subpopulations

Local Populations



Species

Subspecies

Designatable Units

Designatable Unit:
“Spatially, ecologically or genetically discrete and evolutionarily significant units that are irreplaceable components of biodiversity”

Conservation Units

Improved Conservation Units

Ecotypes

Herds

Meta-Herds

Populations

Subpopulations

Local Populations

Migratory Patterns

Ranges

Range: *“Geographic area occupied by a group of caribou that are subject to similar factors affecting their calving, rutting, and wintering”*



A Brief Detour – Species at Risk Definitions



Category	Example Species
Data Deficient – Not enough information to make a determination (62)	<ul style="list-style-type: none"> • Cougar • Arctic Gray Wolf
Not at Risk – A species that has been evaluated and found to be not at risk of extinction under the current circumstances (203)	<ul style="list-style-type: none"> • Black Bear • Eastern Bluebird
Special Concern – Species that may become threatened or endangered because of biological characteristics and identified threats (253)	<ul style="list-style-type: none"> • Polar Bear • Evening Grosbeak
Threatened – Species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction (196)	<ul style="list-style-type: none"> • Gray Fox • Beluga Whale
Endangered – A species facing imminent extirpation or extinction (371)	<ul style="list-style-type: none"> • Vancouver Island Marmot • Little Brown Myotis (Bat)
Extirpated – A species that no longer exists in wild in Canada, but exists elsewhere (21)	<ul style="list-style-type: none"> • Timber Rattlesnake • Blue Karner Butterfly
Extinct – A species that no longer exists (23)	<ul style="list-style-type: none"> • Passenger Pigeon • Atlantic Walrus

Species at Risk Definitions – Example Criteria



- Number of mature individuals and changes over recent generations
- Rate of population change
- Population size relative to fecundity
- Range size and decline, or fluctuation in range
- Number of locations in which the species occurs
- Distribution of numbers among subpopulations
- Existence of extreme fluctuations

Species

Subspecies

Designatable Units

Designatable Unit:
“Spatially, ecologically or genetically discrete and evolutionarily significant units that are irreplaceable components of biodiversity”

Conservation Units

Improved Conservation Units

Ecotypes

Herds

Meta-Herds

Populations

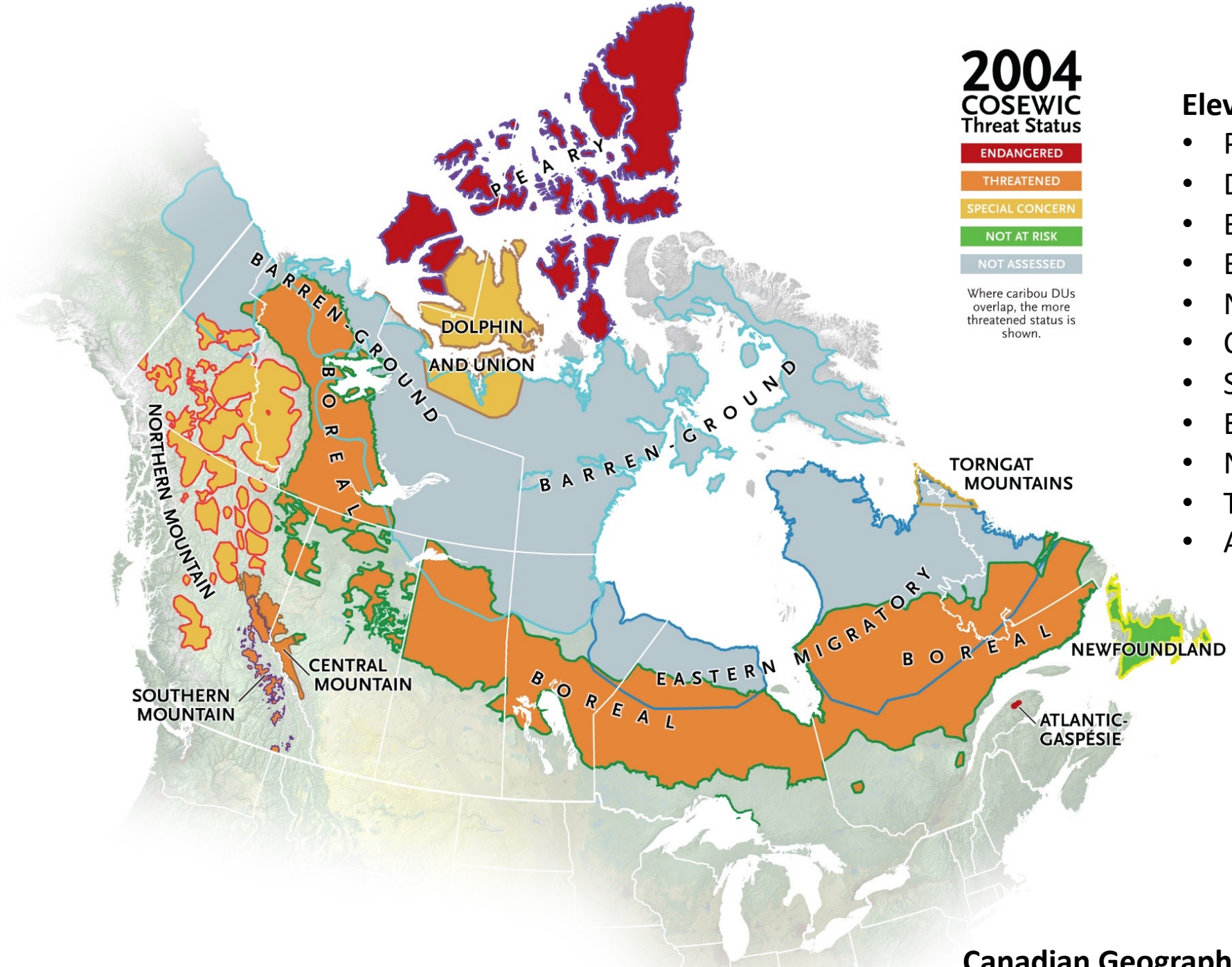
Subpopulations

Local Populations

Migratory Patterns

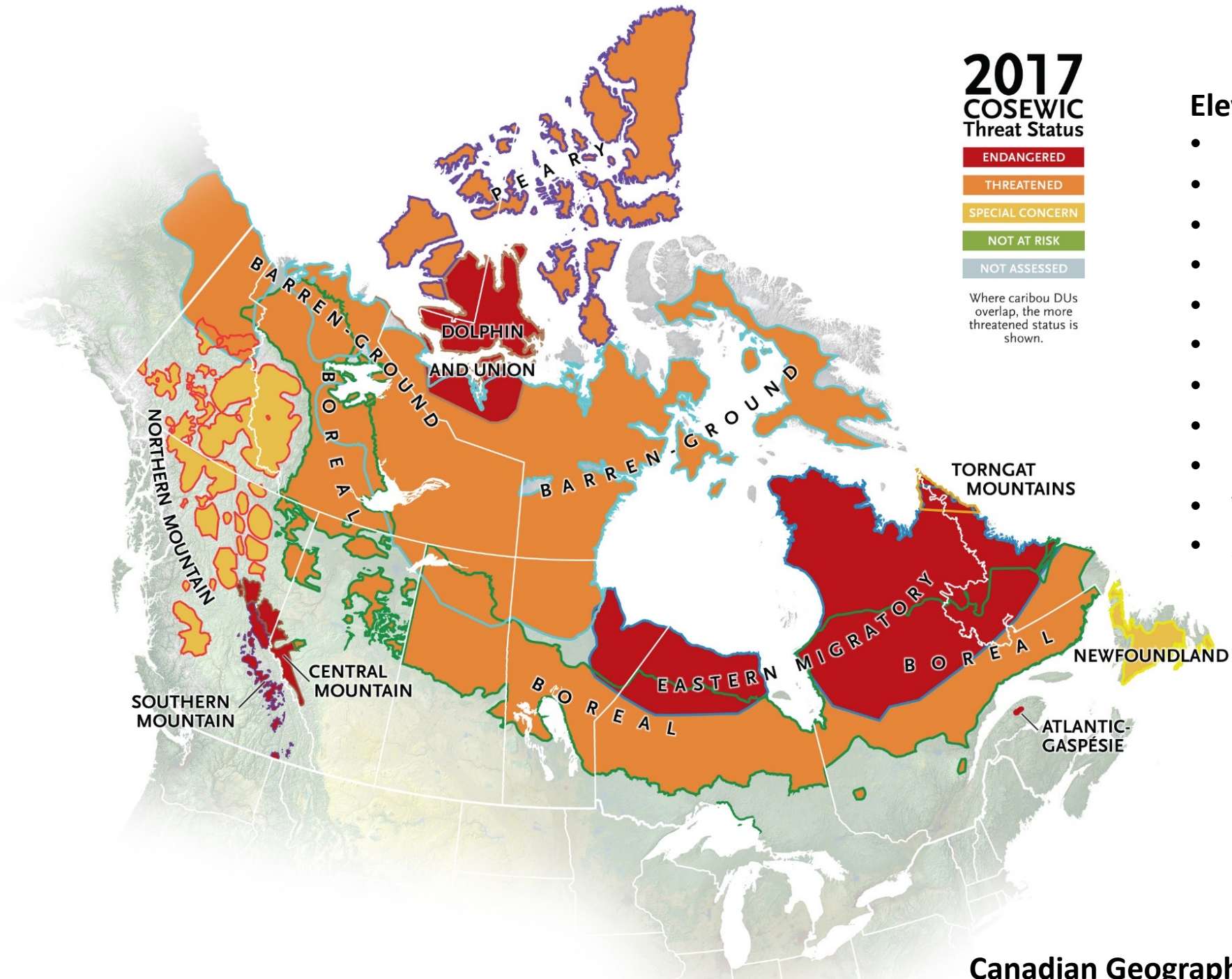
Ranges

Range: *“Geographic area occupied by a group of caribou that are subject to similar factors affecting their calving, rutting, and wintering”*



Eleven Designatable Units

- Peary
- Dolphin & Union
- Barren Ground
- Boreal
- Northern Mountain
- Central Mountain
- Southern Mountain
- Eastern Migratory
- Newfoundland
- Torngat Mountains
- Atlantic Gaspésie



2017 COSEWIC Threat Status

- ENDANGERED
- THREATENED
- SPECIAL CONCERN
- NOT AT RISK
- NOT ASSESSED

Where caribou DUs overlap, the more threatened status is shown.

Eleven Designatable Units

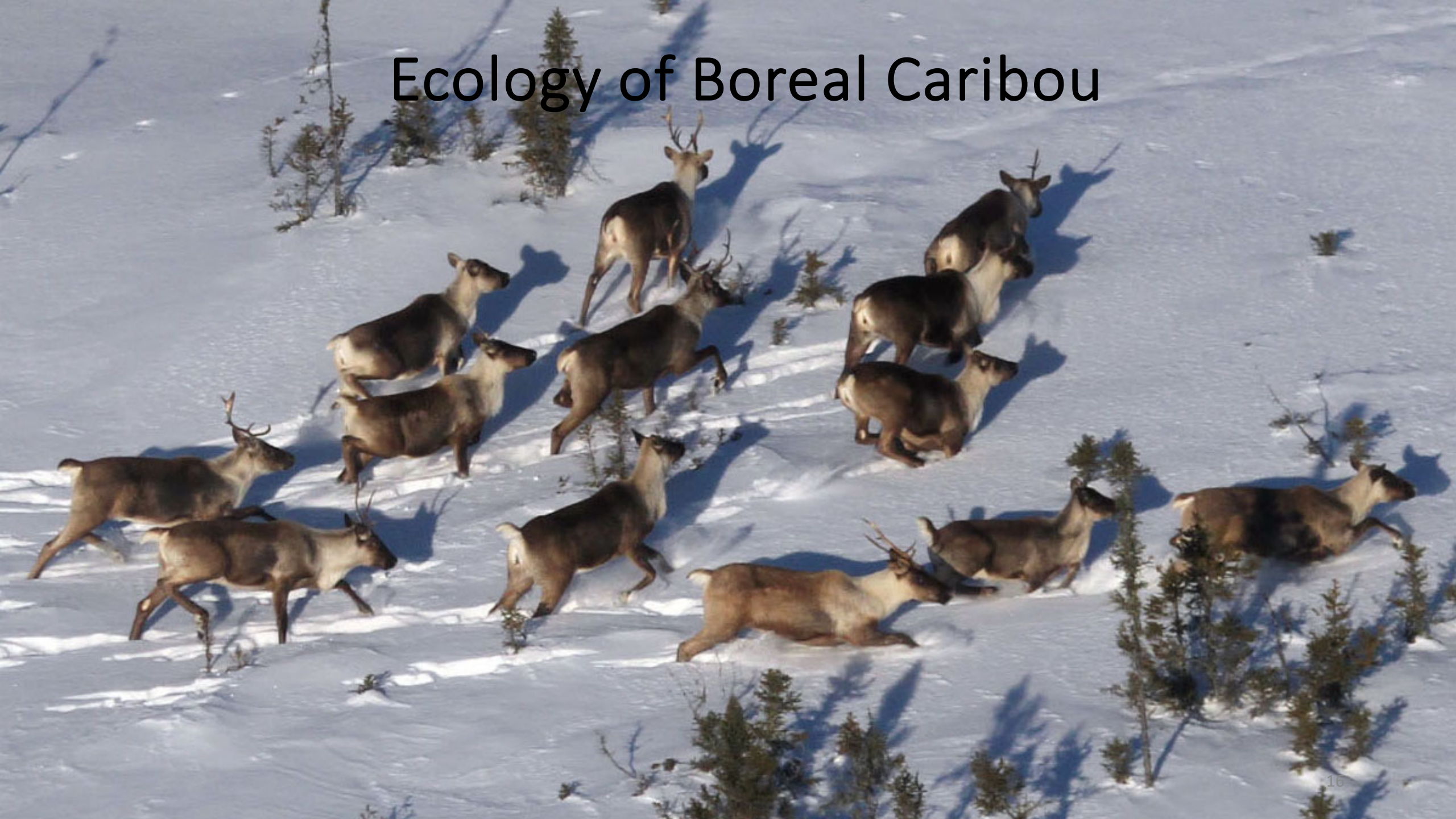
- Peary
- Dolphin & Union
- Barren Ground
- Boreal
- Northern Mountain
- Central Mountain
- Southern Mountain
- Eastern Migratory
- Newfoundland
- Torngat Mountains
- Atlantic Gaspésie

More than half the DUs are now Endangered


Designatable Unit	Assessment – period 1	Assessment – Period 2
Peary	Endangered (2004)	Threatened (2015)
Dolphin & Union	Special Concern (2004)	Endangered (2017)
Barrenground	Not assessed	Threatened (2016)
Eastern Migratory	Not assessed	Endangered (2017)
Newfoundland	Not at risk (2002)	Special Concern (2014)
Boreal	Threatened (2002)	Threatened (2014)
Northern Mountain*	Special Concern (2002)	Special Concern (2014)
Central Mountain*	Threatened (SM) (2002)	Endangered (2014)
Southern Mountain*	Threatened (SM) (2002)	Endangered (2014)
Torngat Mountains	Not assessed	Endangered (2017)
Atlantic-Gaspésie	Endangered (2002)	Endangered (2014)

*Mountain caribou DUs adjusted from 2 (2002) to 3 (2014)

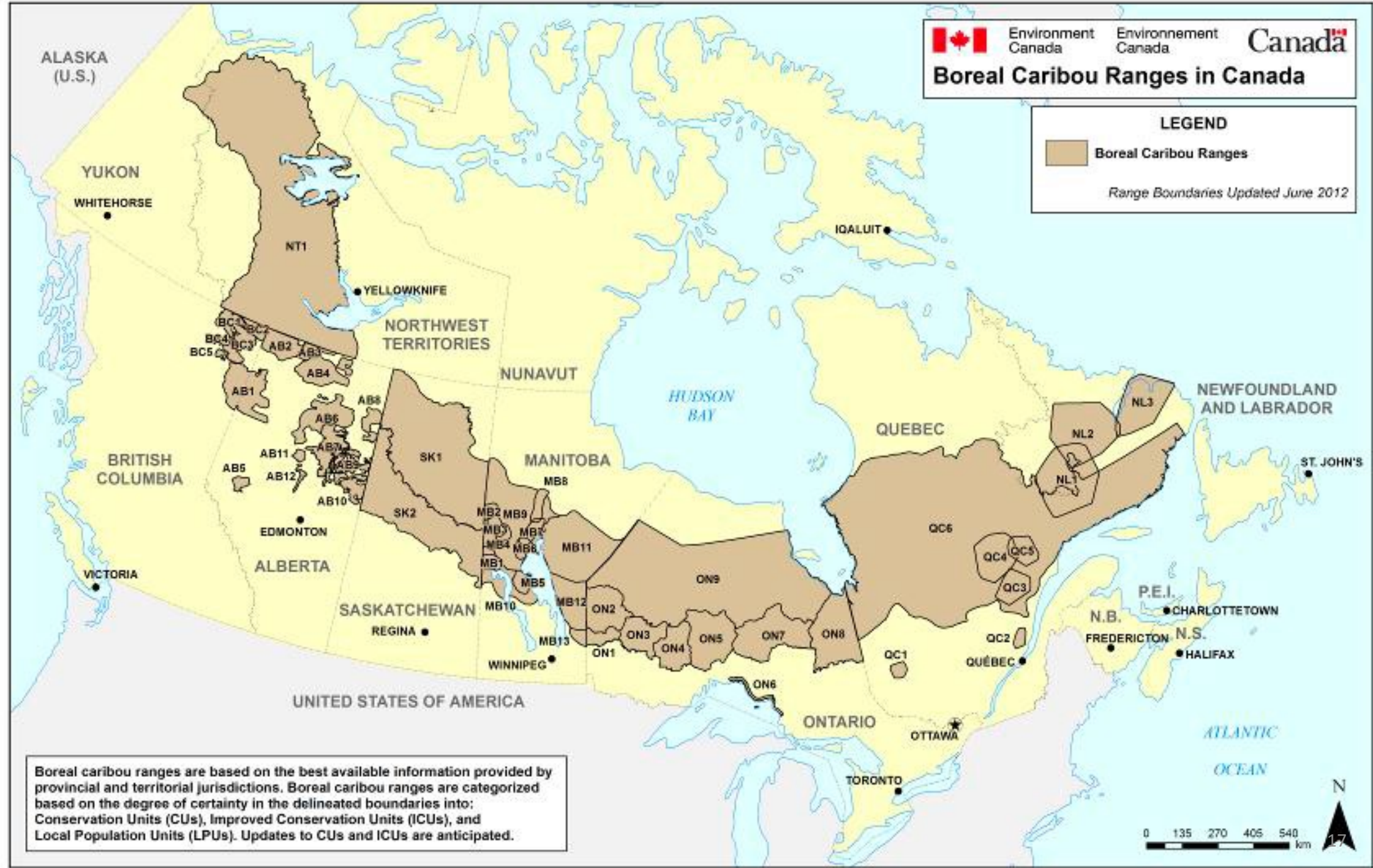
Ecology of Boreal Caribou



LEGEND

 Boreal Caribou Ranges

Range Boundaries Updated June 2012

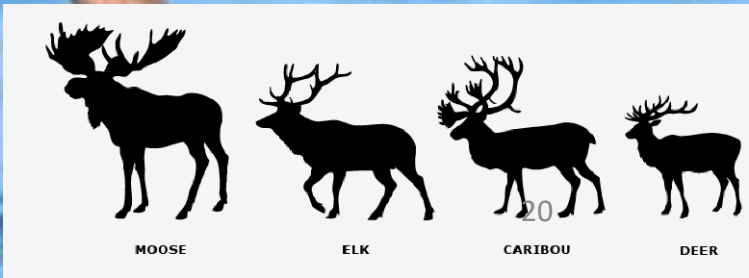


Boreal caribou ranges are based on the best available information provided by provincial and territorial jurisdictions. Boreal caribou ranges are categorized based on the degree of certainty in the delineated boundaries into: Conservation Units (CUs), Improved Conservation Units (ICUs), and Local Population Units (LPUs). Updates to CUs and ICUs are anticipated.

What do Boreal Caribou Need?

- Space - Continuous tracts of intact forest with limited access
- Refuge from predators
- Sufficient food





MOOSE

ELK

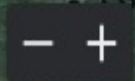
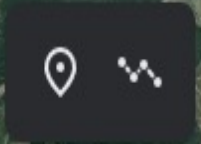
CARIBOU

DEER

Area of the Undertaking

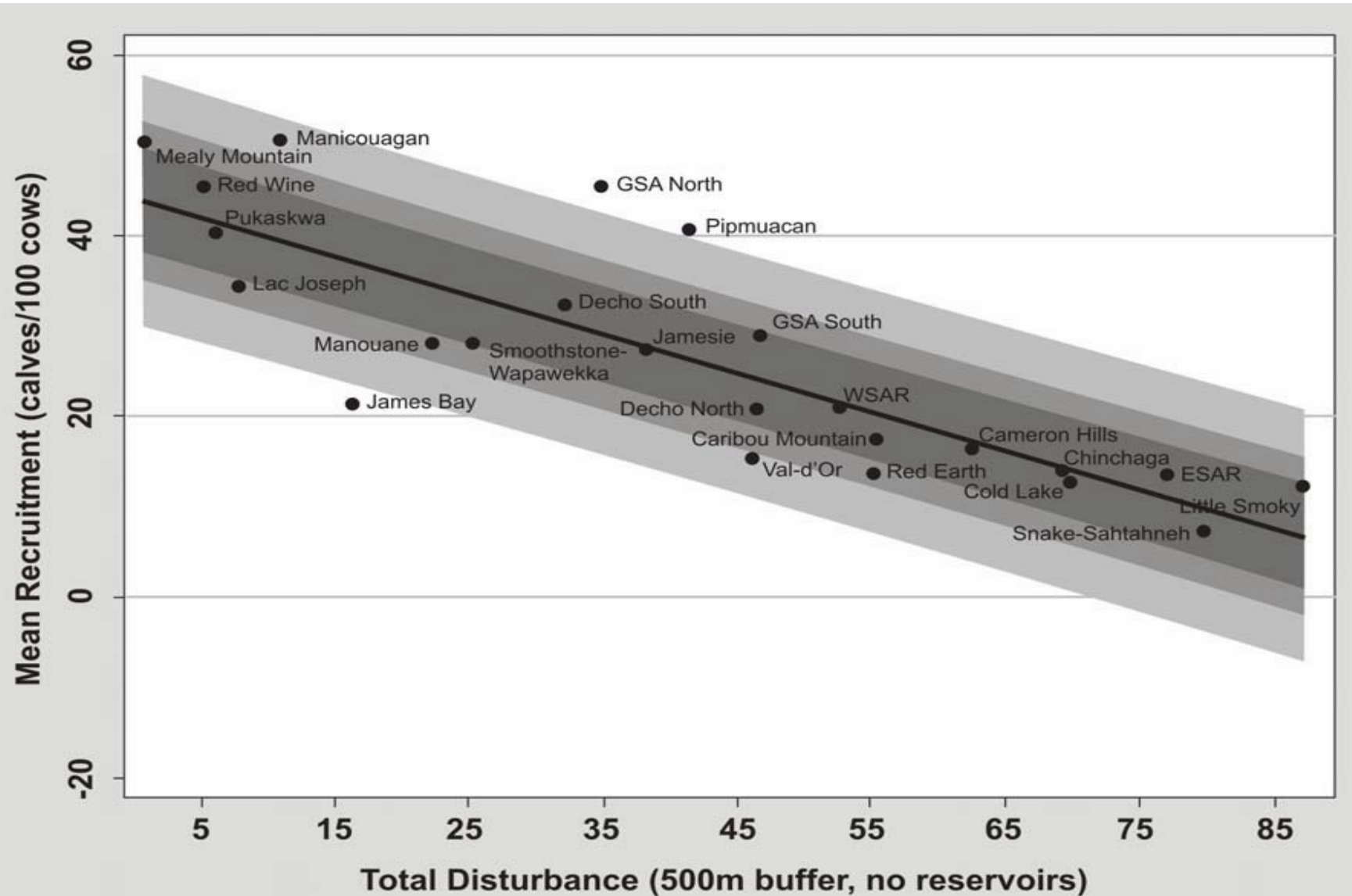






23

Sensitivity to Disturbance



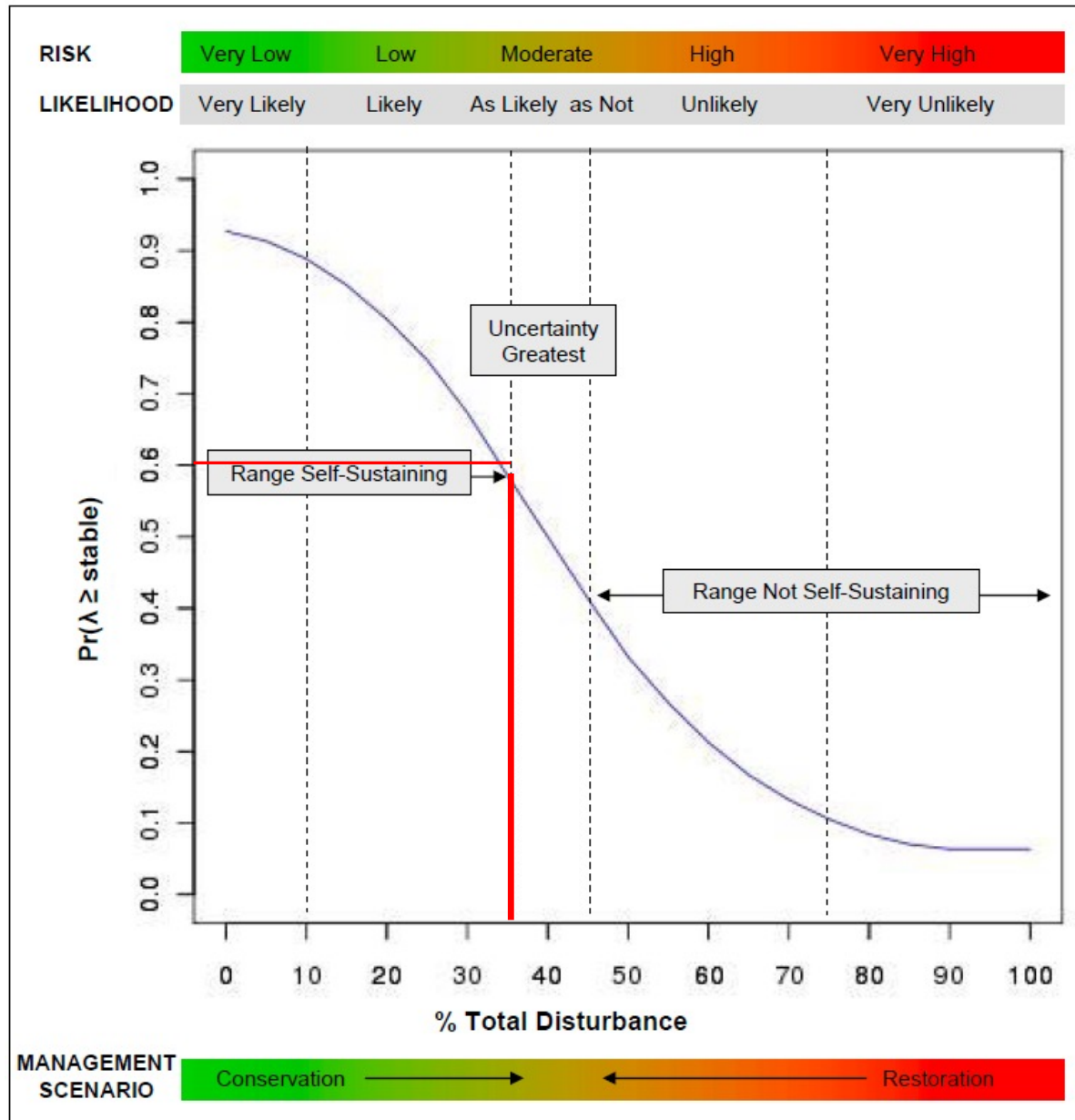
Environment Canada / Environnement Canada

**SCIENTIFIC ASSESSMENT
TO INFORM THE IDENTIFICATION
OF CRITICAL HABITAT
FOR WOODLAND CARIBOU
(*Rangifer tarandus caribou*),
BOREAL POPULATION, IN CANADA**

2011 UPDATE

24 Canada


Implications for Sustainability



Species at Risk Act
Recovery Strategy Series

Recovery Strategy for the Woodland Caribou
(*Rangifer tarandus caribou*), Boreal population,
in Canada

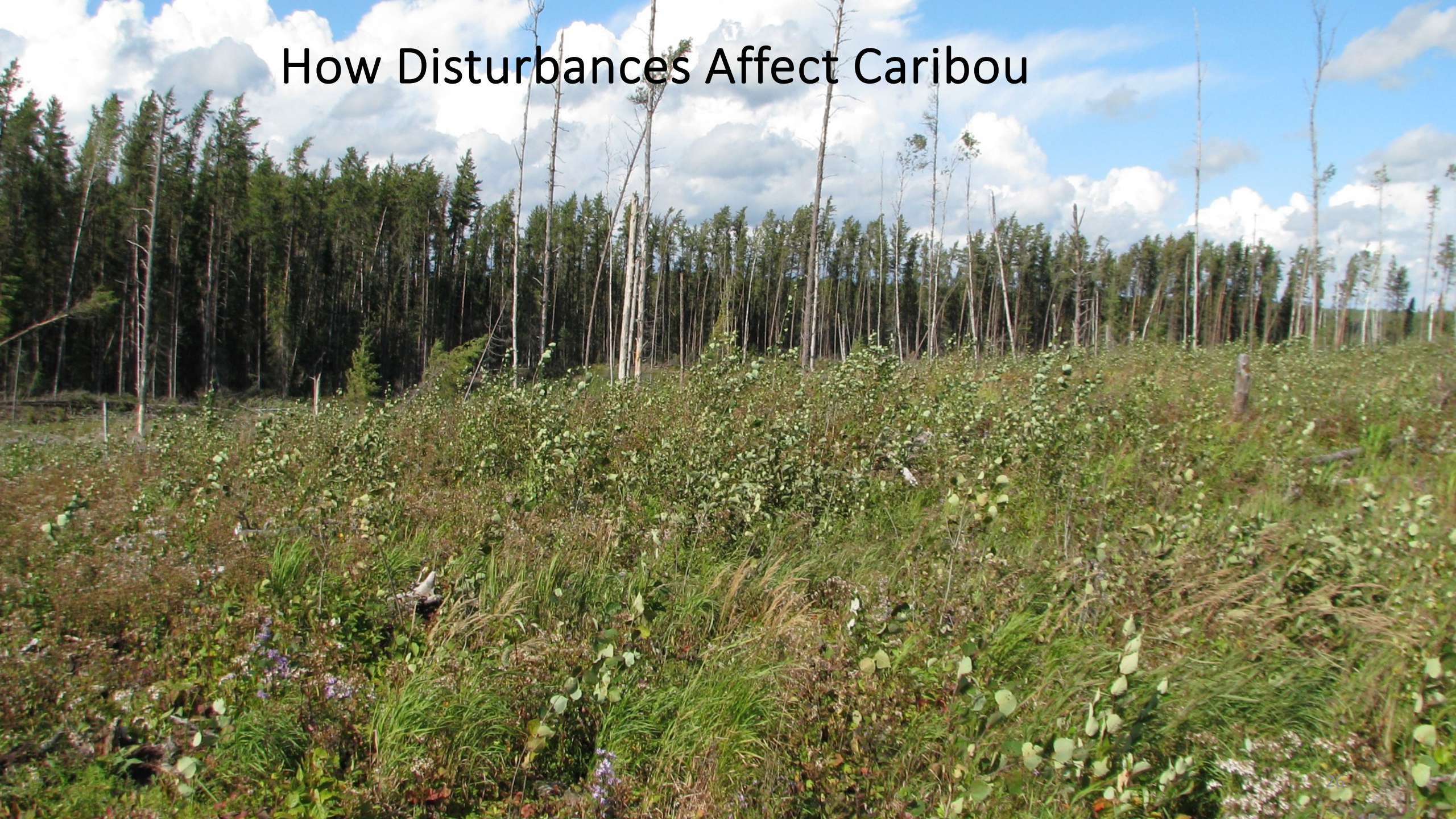
Woodland Caribou, Boreal population



2012

25 **Canada**

How Disturbances Affect Caribou



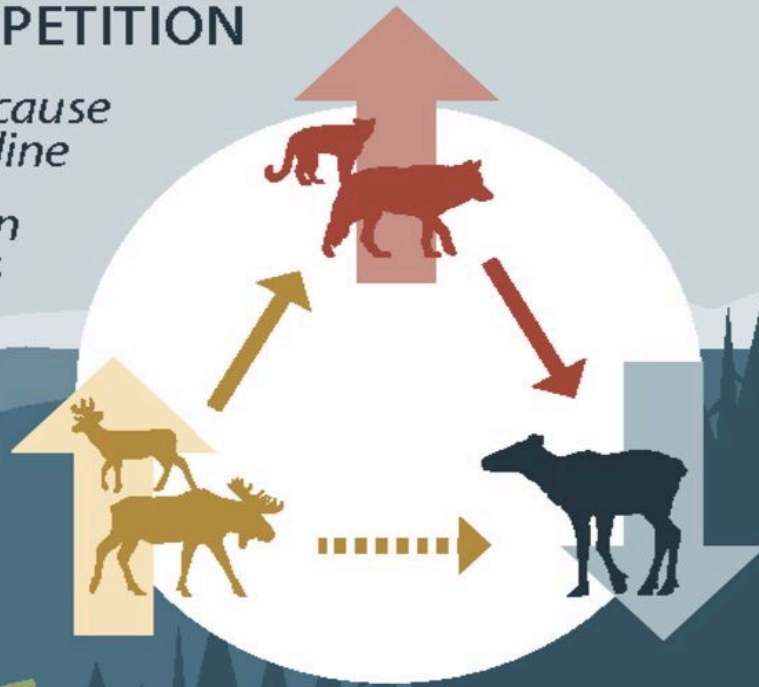




APPARENT COMPETITION

*Proximate cause
of decline*

*Interventions act on
short timescales*



HABITAT ALTERATION

Ultimate cause of decline

*Interventions act on
long timescales*



R. Serrouya et al. 2019. Saving endangered species using adaptive management. Proc. Nat. Acad. Sci. 116 (3) 6181-6186

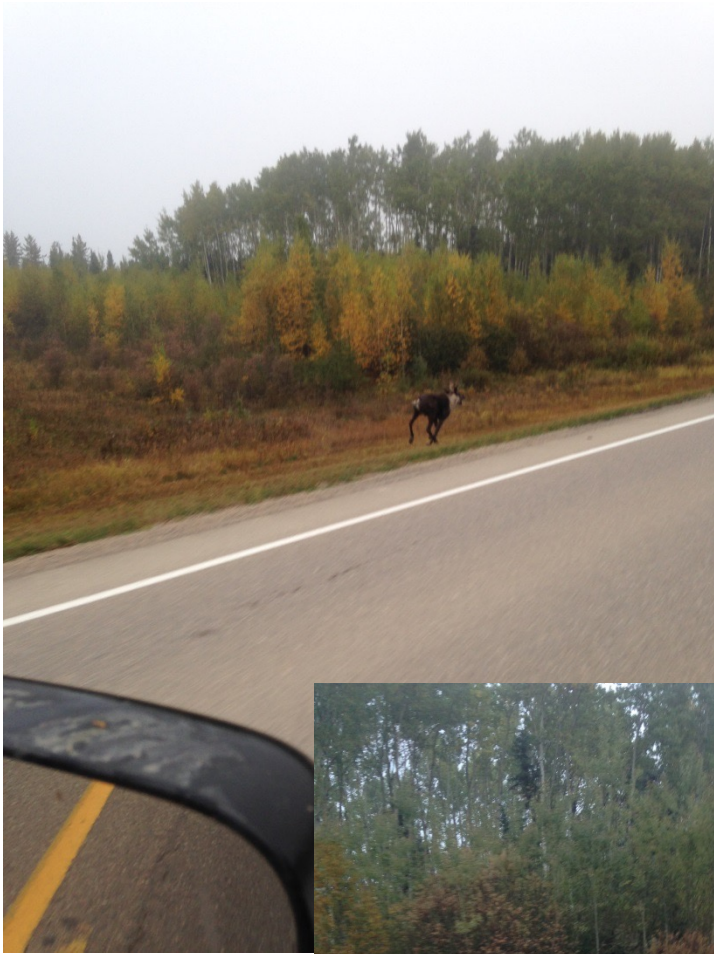




Photo by Ernest Ramsum, Al-Pac

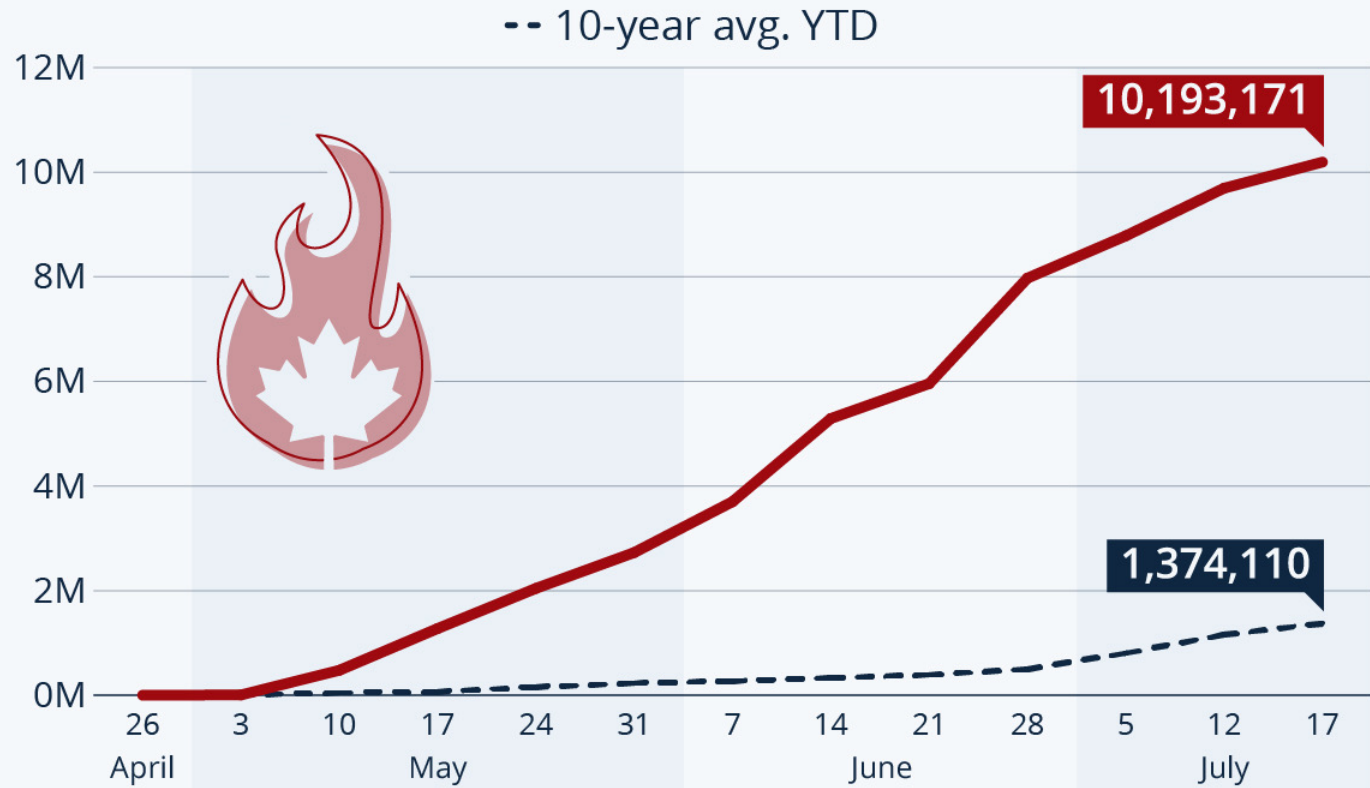




A Couple of points on Climate Change

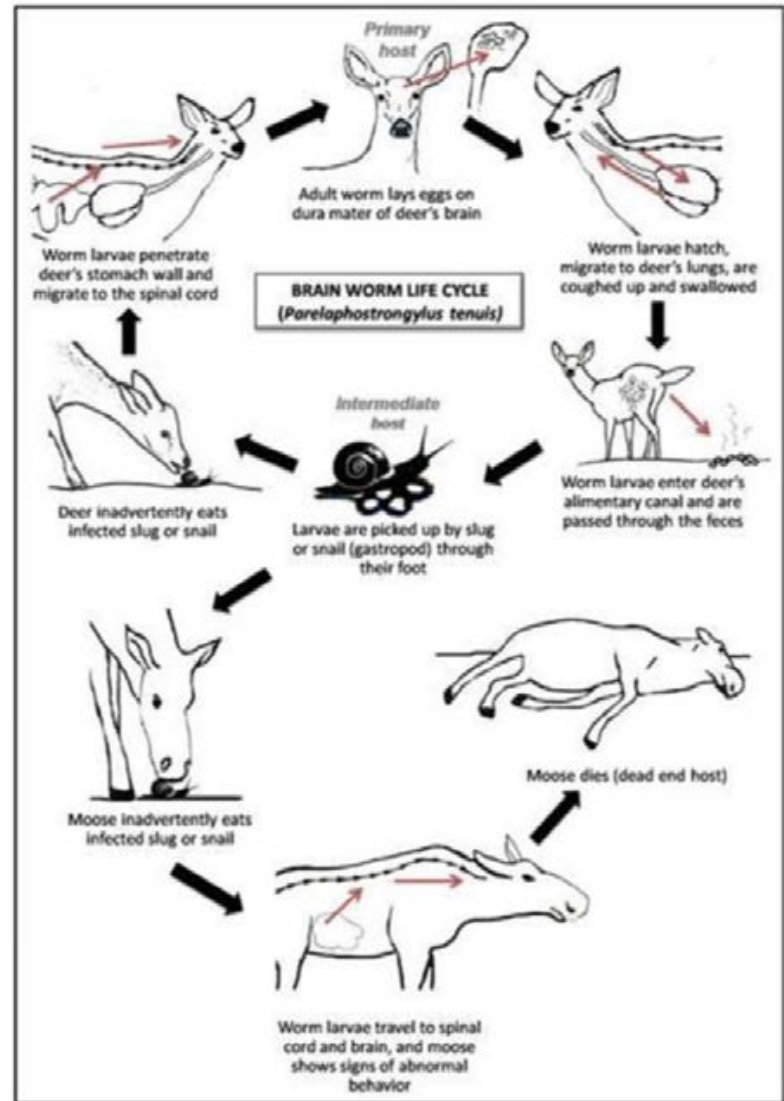
The Incredible Size of Canada's Wildfires

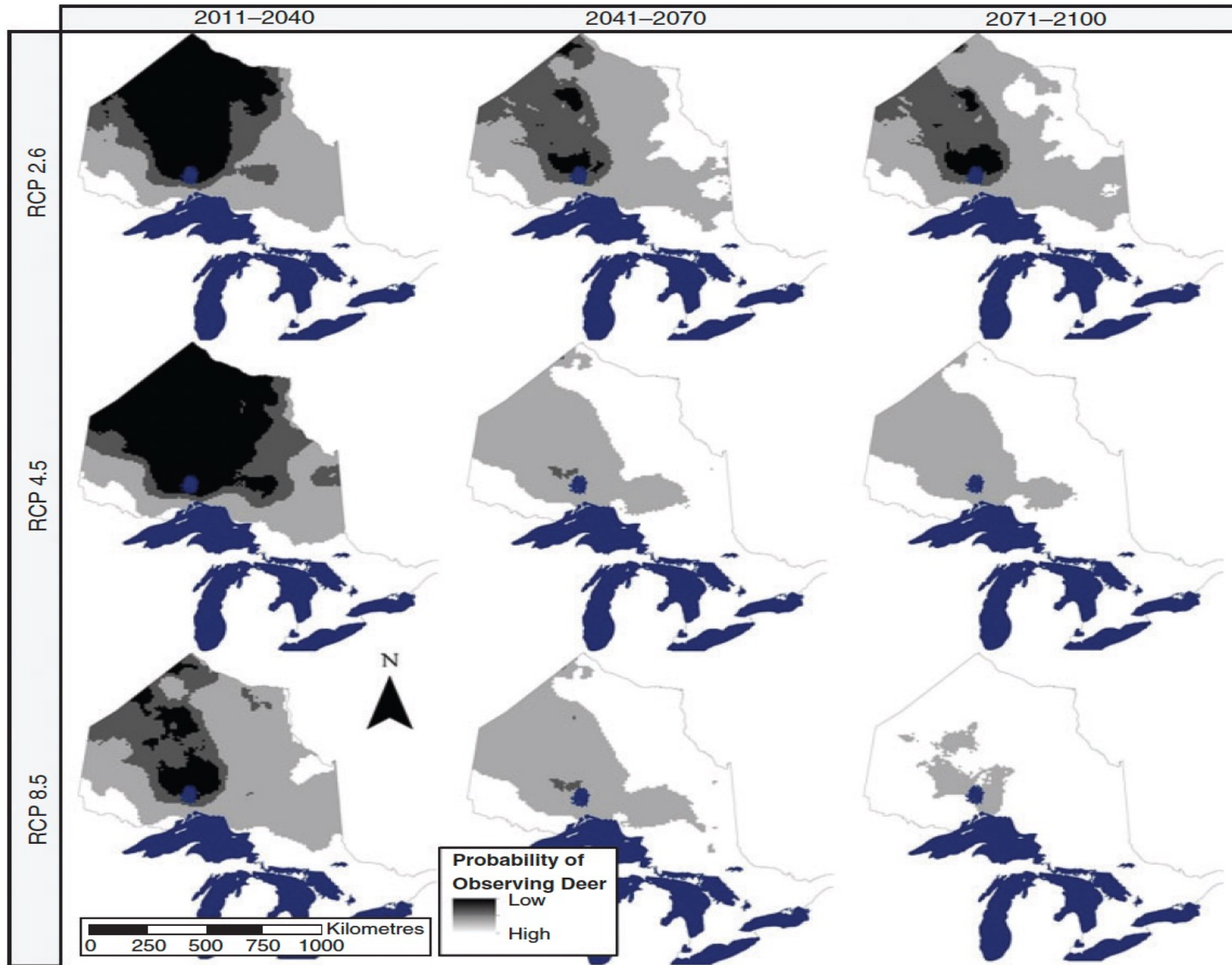
Cumulative area burned by wildfires in Canada in 2023 (in hectares)



Sources: Natural Resources Canada, Canadian Interagency Forest Fire Centre







Modeled probability of deer presence: 3 climate change scenarios

Independent variables: % conifer, temperature threshold, snow depth, winter severity

Kennedy-Slaney et al. 2018

[ABOUT US](#)

[LEADERSHIP](#)

[NEWS / JOBS](#)



[DEPARTMENTS](#)

[COMMUNITY](#)

[CONTACT](#)

BIIGTIGONG
NISHNAABEG

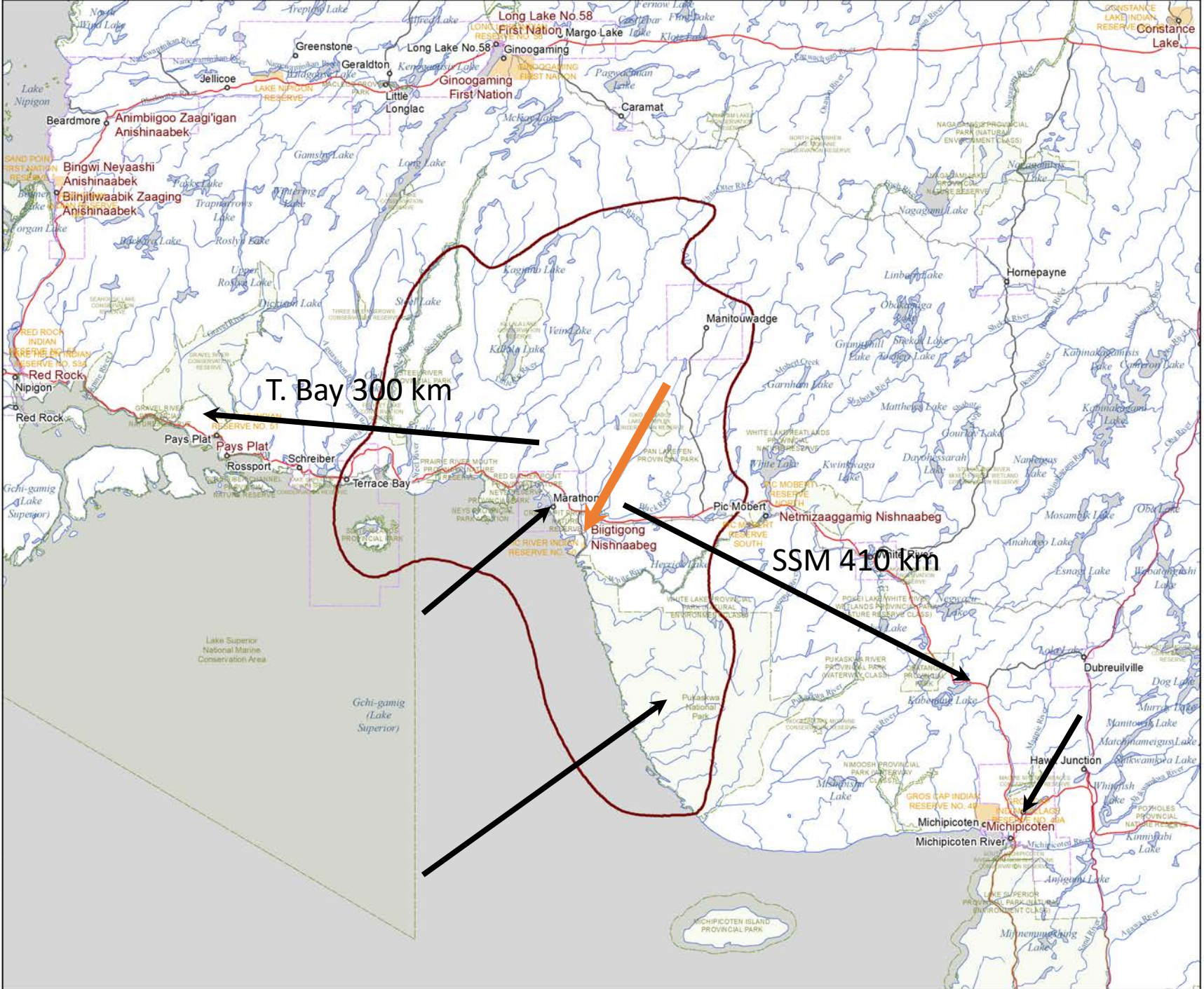
Welcome to

BIIGTIGONG NISHNAABEG

ABOUT OUR **Community**



We are a progressive First Nation with strategic visioning, growth, prosperity and culture that find balance in the modern era of Anishnaabe life with the traditional value of their ancestors.



Caribou Stewardship Plan

Version 1
Sept. 20, 2022



BIIGTIGONG
NISHNAABEG

Caribou


Adik = caribou (singular)

Adikwag = caribou (plural)

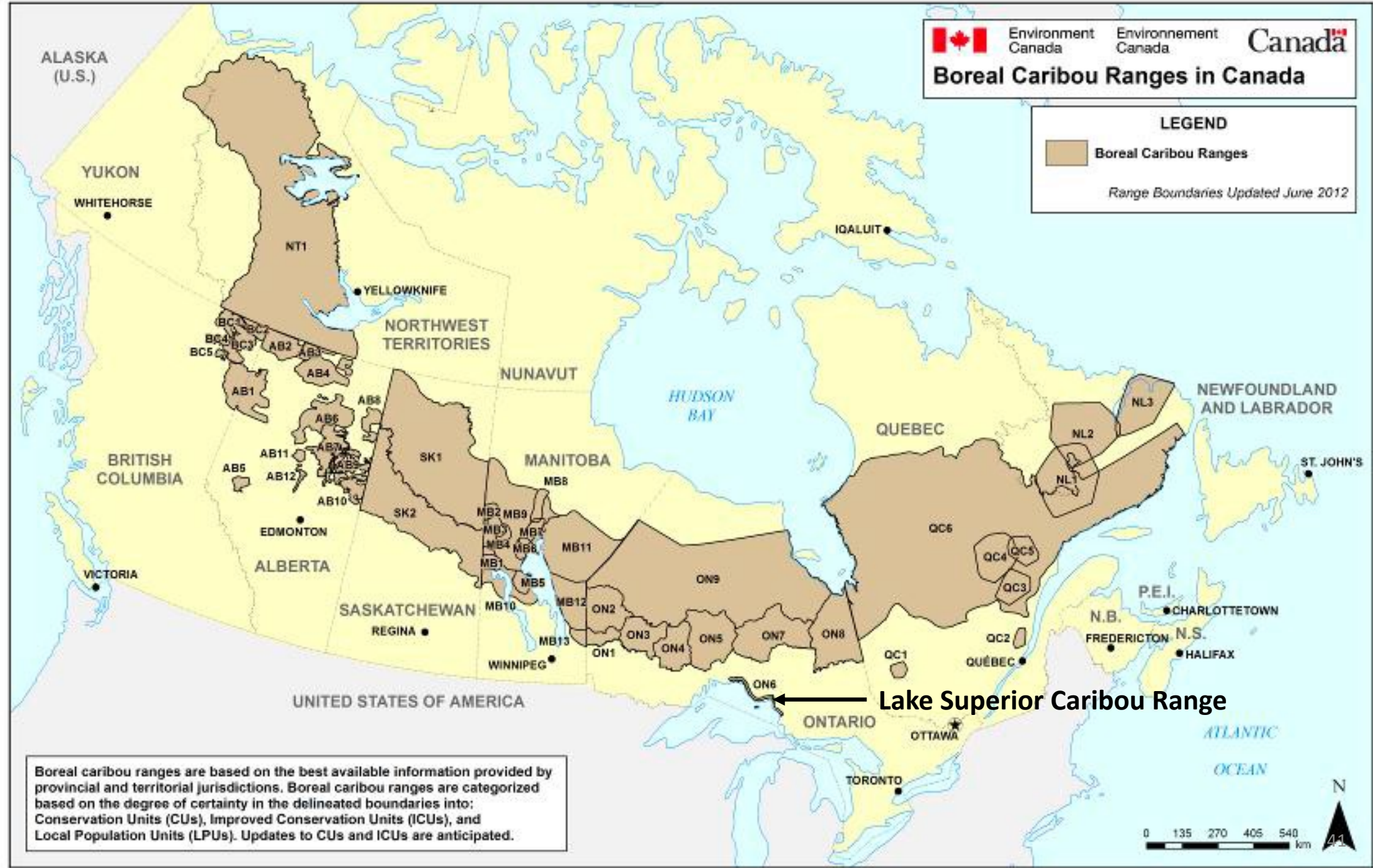
Diĭkkaag = there are many caribou



LEGEND

 Boreal Caribou Ranges

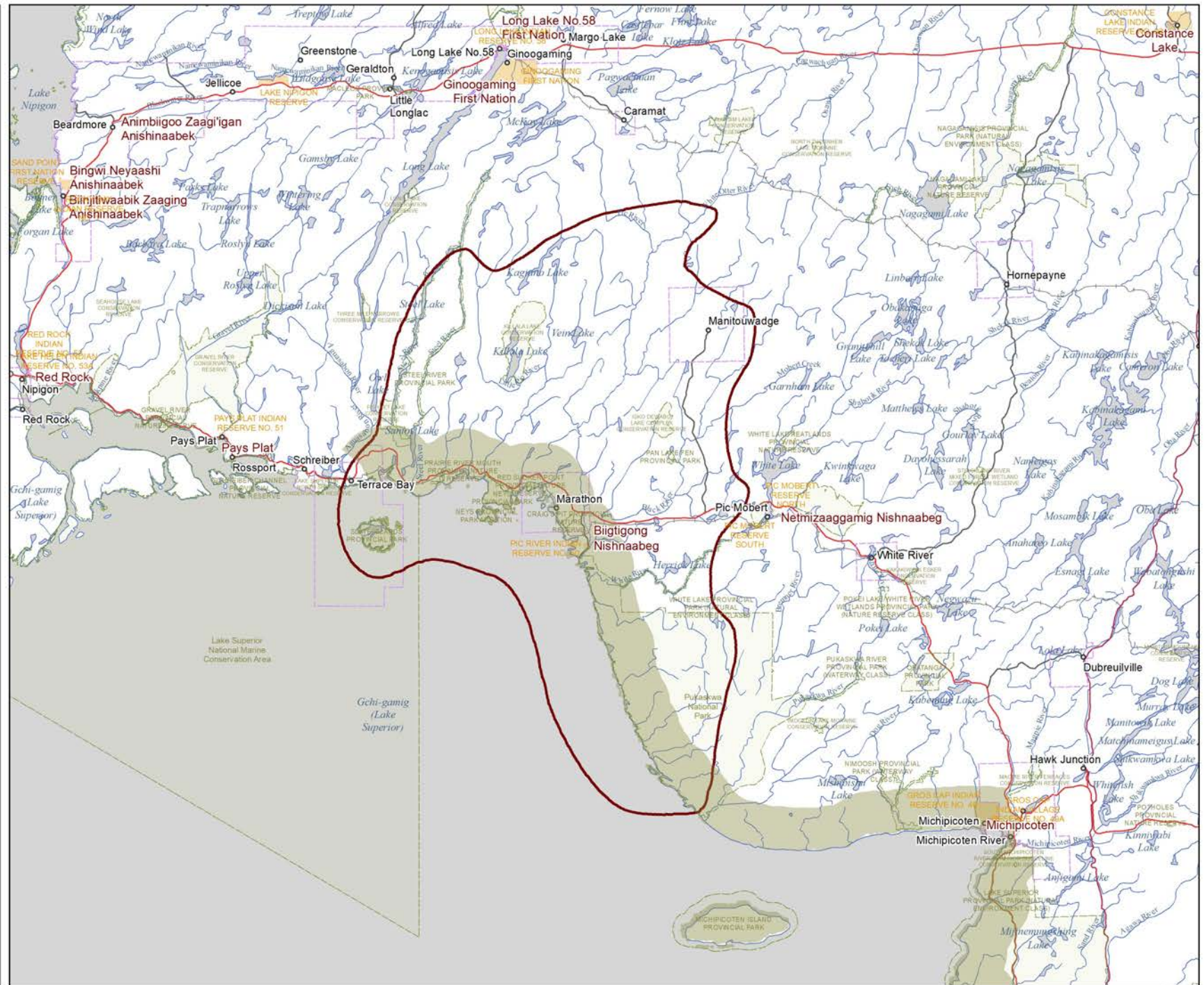
Range Boundaries Updated June 2012



Boreal caribou ranges are based on the best available information provided by provincial and territorial jurisdictions. Boreal caribou ranges are categorized based on the degree of certainty in the delineated boundaries into: Conservation Units (CUs), Improved Conservation Units (ICUs), and Local Population Units (LPUs). Updates to CUs and ICUs are anticipated.

Biigtigong Nishnaabeg First Nation Aboriginal Title Area

- Biigtigong Nishnaabeg Aboriginal Title Area
- Ontario Caribou Ranges
- Lake Superior Coastal Range



Confidential - not for circulation. Areas mapped are for discussion purposes only. Without prejudice to Aboriginal Rights and Title, including Title case and negotiations with the Crown. Areas mapped are not representative of all priority areas.



Map Creation Date: October 28, 2022
 For more information, contact:
 Juanita Starr, Director
 Biigtigong Nishnaabeg
 Ojibways of the Pic River First Nation
 Heron Bay, Ontario P0T 1R0
 P: (807) 229-8900 Ext 2



Map layout by David Carruthers
 Framework: Atlas of Canada 1M
 Projection: UTM Zone 16N, NAD83

1:1,000,000

Biigtigong Nishnaabeg First Nation Aboriginal Title Area

-  Biigtigong Nishnaabeg Aboriginal Title Area
-  Ontario Caribou Ranges
-  Lake Superior Coastal Range
-  Northern Continuous Ranges

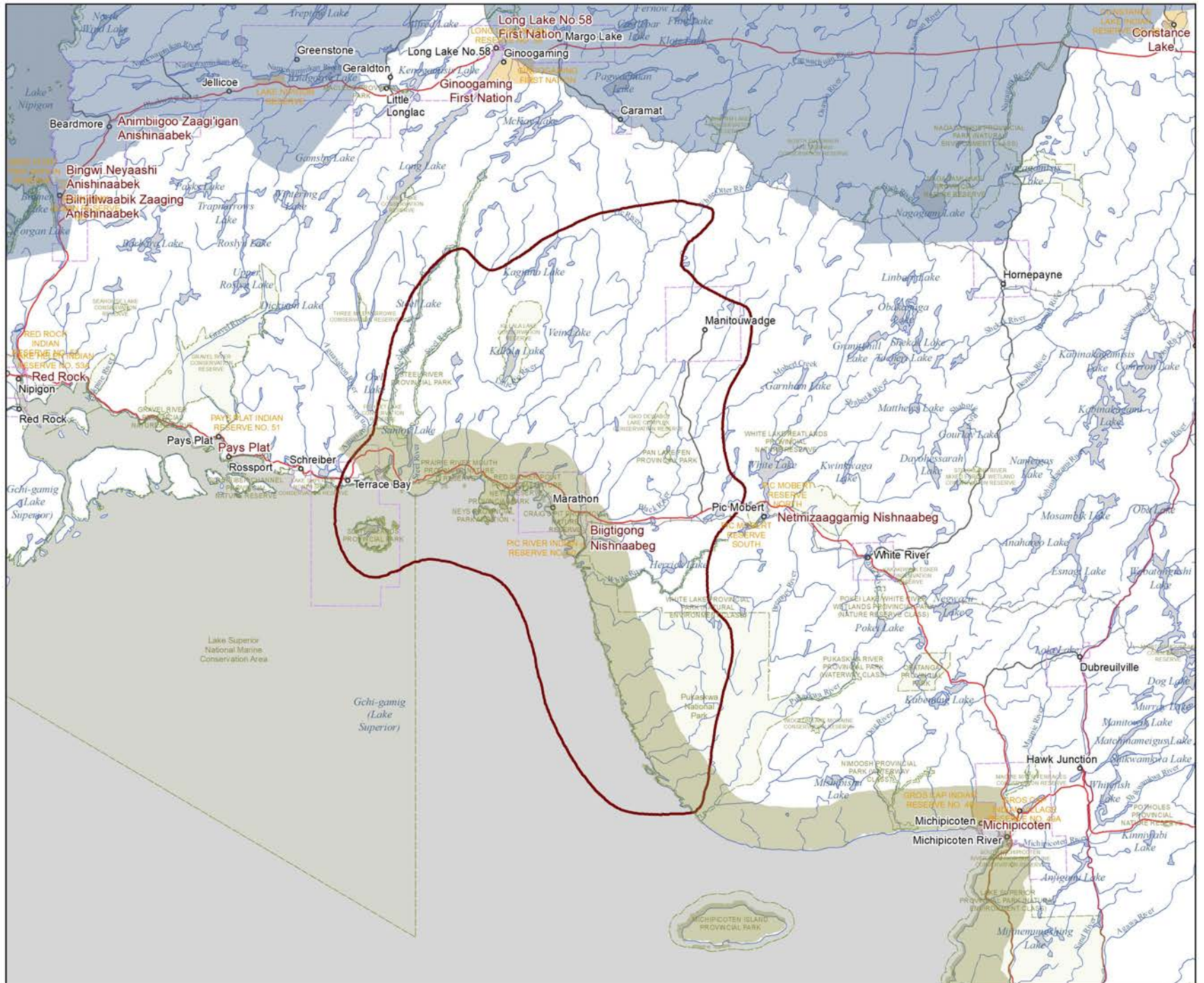
Confidential - not for circulation. Areas mapped are for discussion purposes only. Without prejudice to Aboriginal Rights and Title, including Title case and negotiations with the Crown. Areas mapped are not representative of all priority areas.



Map Creation Date: October 28, 2022
 For more information, contact:
 Juanita Starr, Director
 Biigtigong Nishnaabeg
 Ojibways of the Pic River First Nation
 Heron Bay, Ontario P0T 1R0
 P. (807) 229-8900 Ext 2






Map layout by David Carruthers
 Framework: Atlas of Canada 1M
 Projection: UTM Zone 16N, NAD83



Document Name: BN Title Area and Caribou Coastal Continuous Range - October 28, 2022

Biigtigong Nishnaabeg First Nation Aboriginal Title Area

-  Biigtigong Nishnaabeg Aboriginal Title Area
-  Ontario Caribou Ranges
-  Lake Superior Coastal Range
-  Northern Continuous Ranges
-  Discontinuous Range

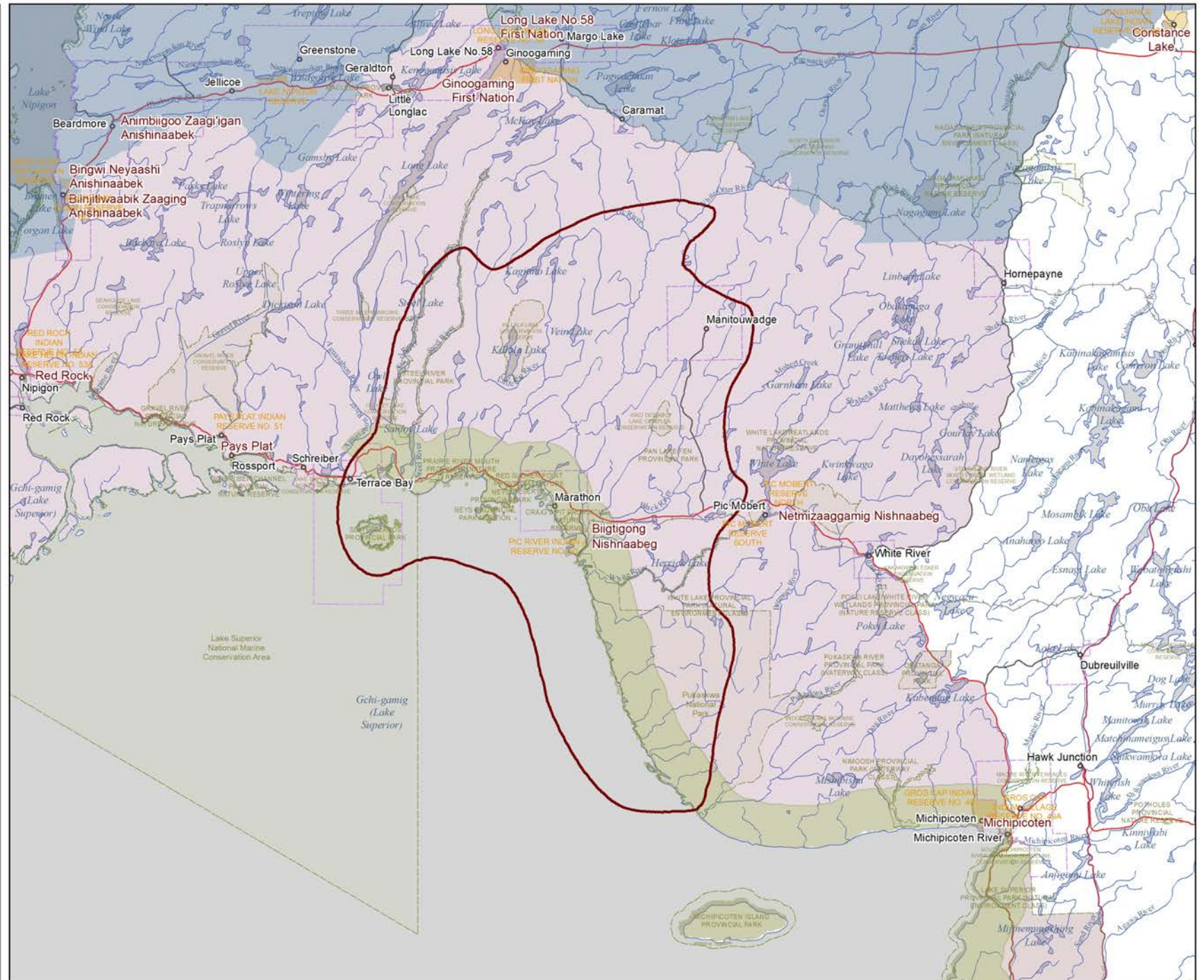
Confidential - not for circulation. Areas mapped are for discussion purposes only. Without prejudice to Aboriginal Rights and Title, including Title case and negotiations with the Crown. Areas mapped are not representative of all priority areas.



Map Creation Date: October 28, 2022
 For more information, contact:
 Juanita Starr, Director
 Biigtigong Nishnaabeg
 Ojibways of the Pic River First Nation
 Heron Bay, Ontario P0T 1R0
 P. (807) 229-8900 Ext 2



Map layout by David Carruthers
 Framework: Atlas of Canada 1M
 Projection: UTM Zone 16N, NAD83



Document Name: BN Title Area and Caribou Coastal Continuous Discontinuous Range - October 28, 2022

Biigtigong Nishnaabeg First Nation Aboriginal Title Area

- Biigtigong Nishnaabeg Aboriginal Title Area
- Ontario Caribou Ranges
- Lake Superior Coastal Range
- Northern Continuous Ranges
- Discontinuous Range

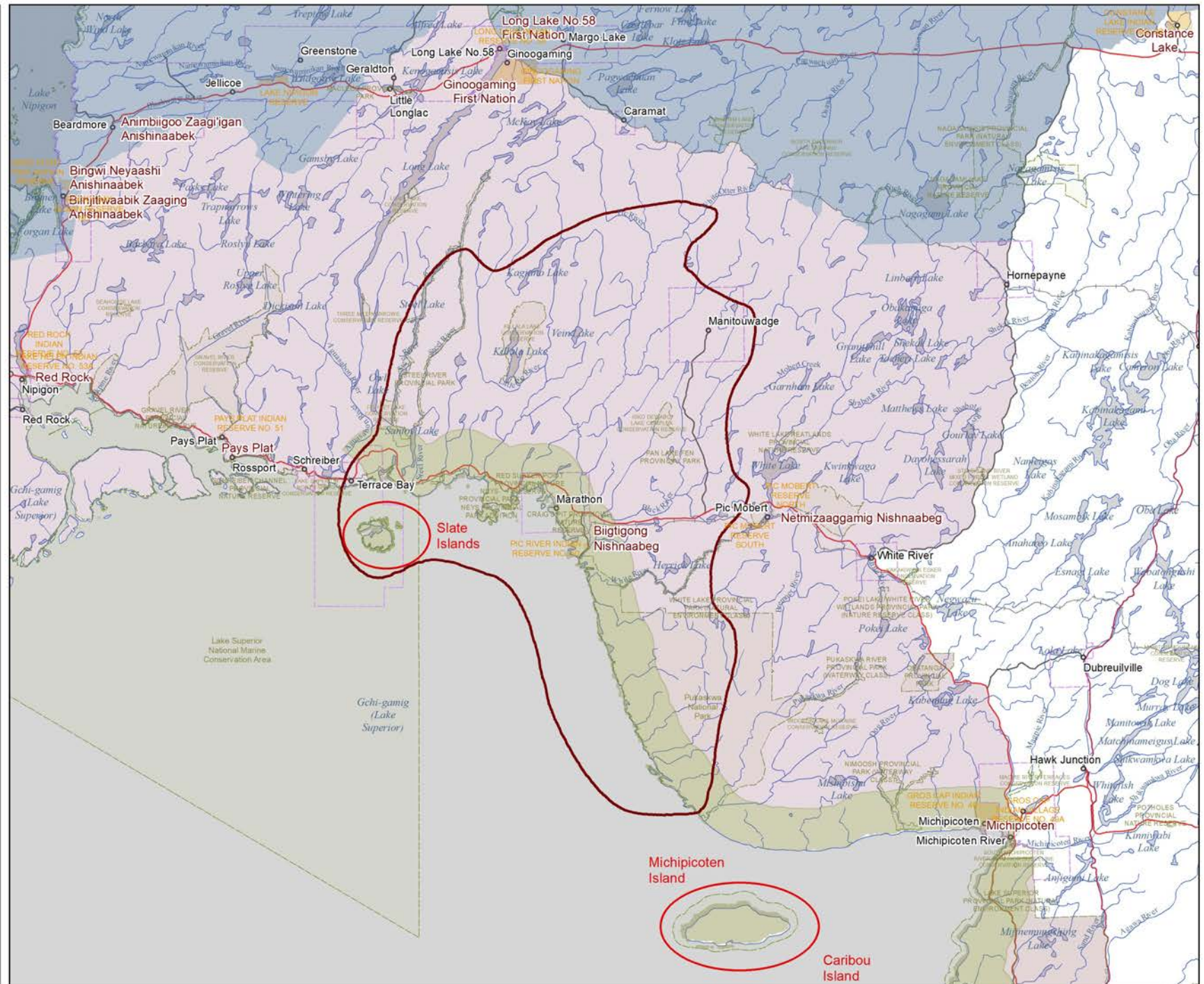
Confidential - not for circulation. Areas mapped are for discussion purposes only. Without prejudice to Aboriginal Rights and Title, including Title case and negotiations with the Crown. Areas mapped are not representative of all priority areas.



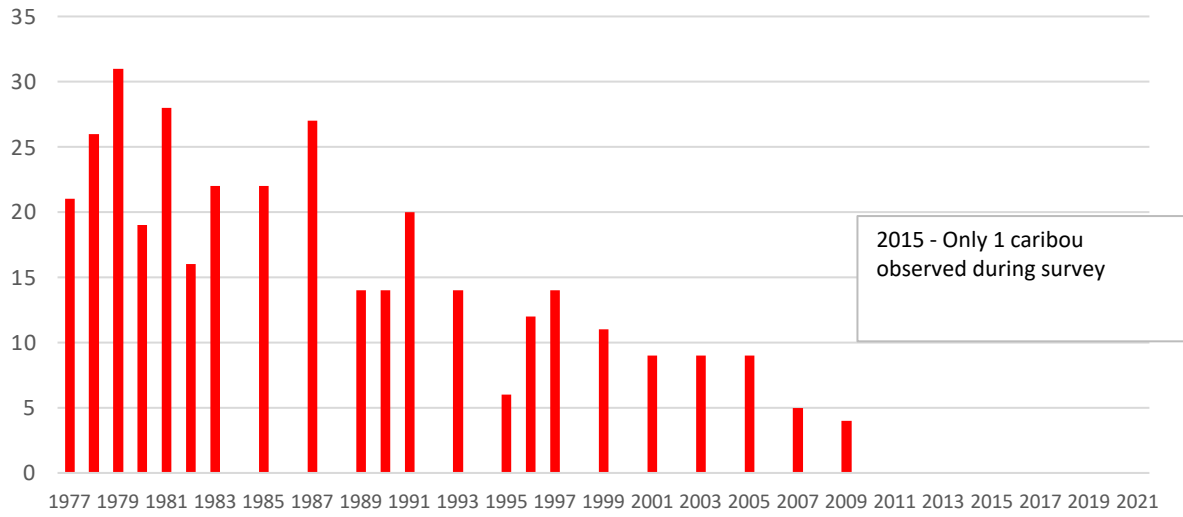
Map Creation Date: October 28, 2022
 For more information, contact:
 Juanita Starr, Director
 Biigtigong Nishnaabeg
 Ojibways of the Pic River First Nation
 Heron Bay, Ontario P0T 1R0
 P: (807) 229-8900 Ext 2



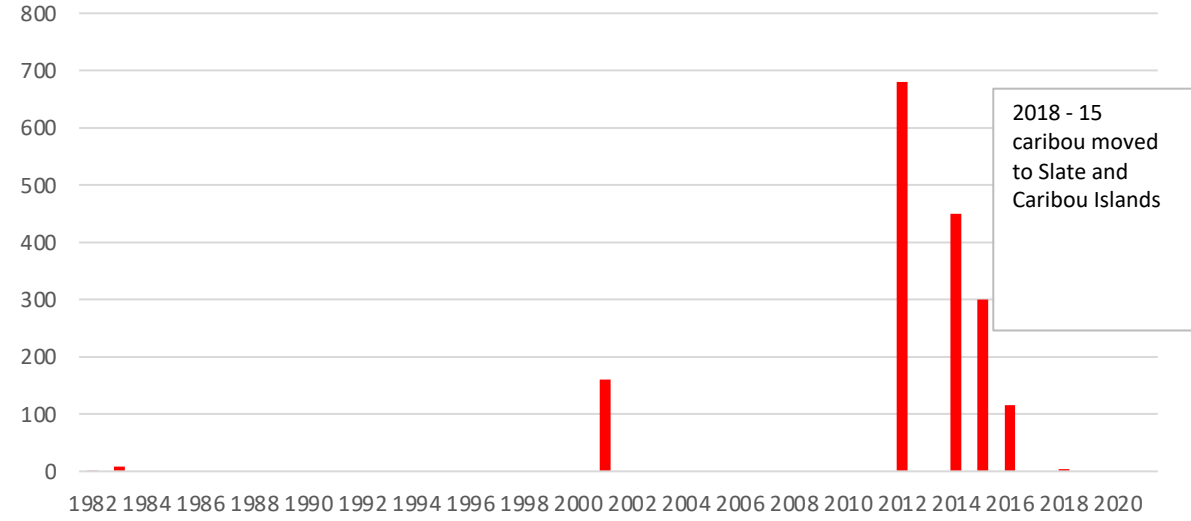
Map layout by David Carruthers
 Framework: Atlas of Canada 1M
 Projection: UTM Zone 16N, NAD83



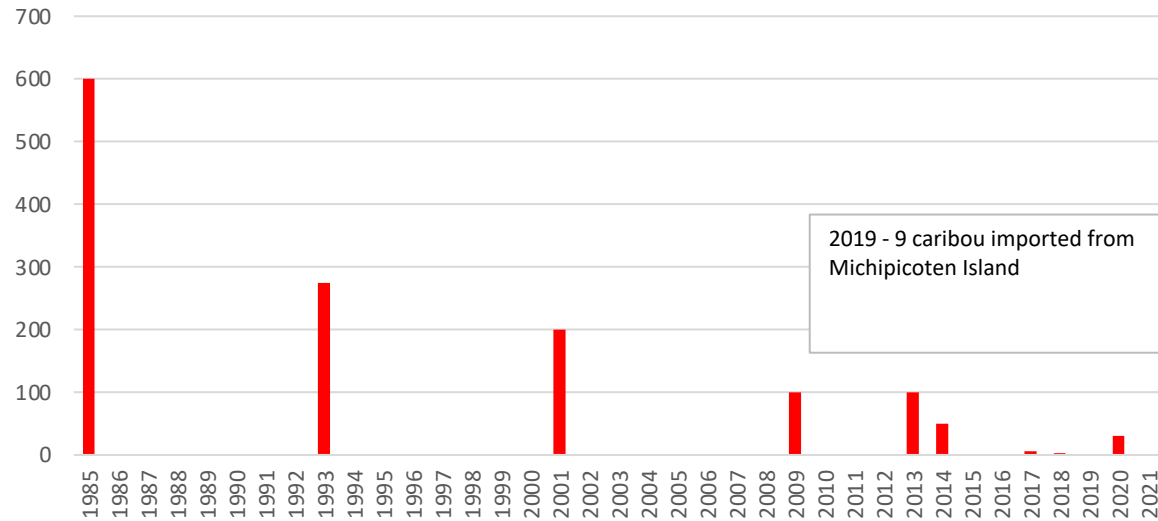
Pukaskwa Park Survey Results



Michipicoten Island Caribou Population Estimates

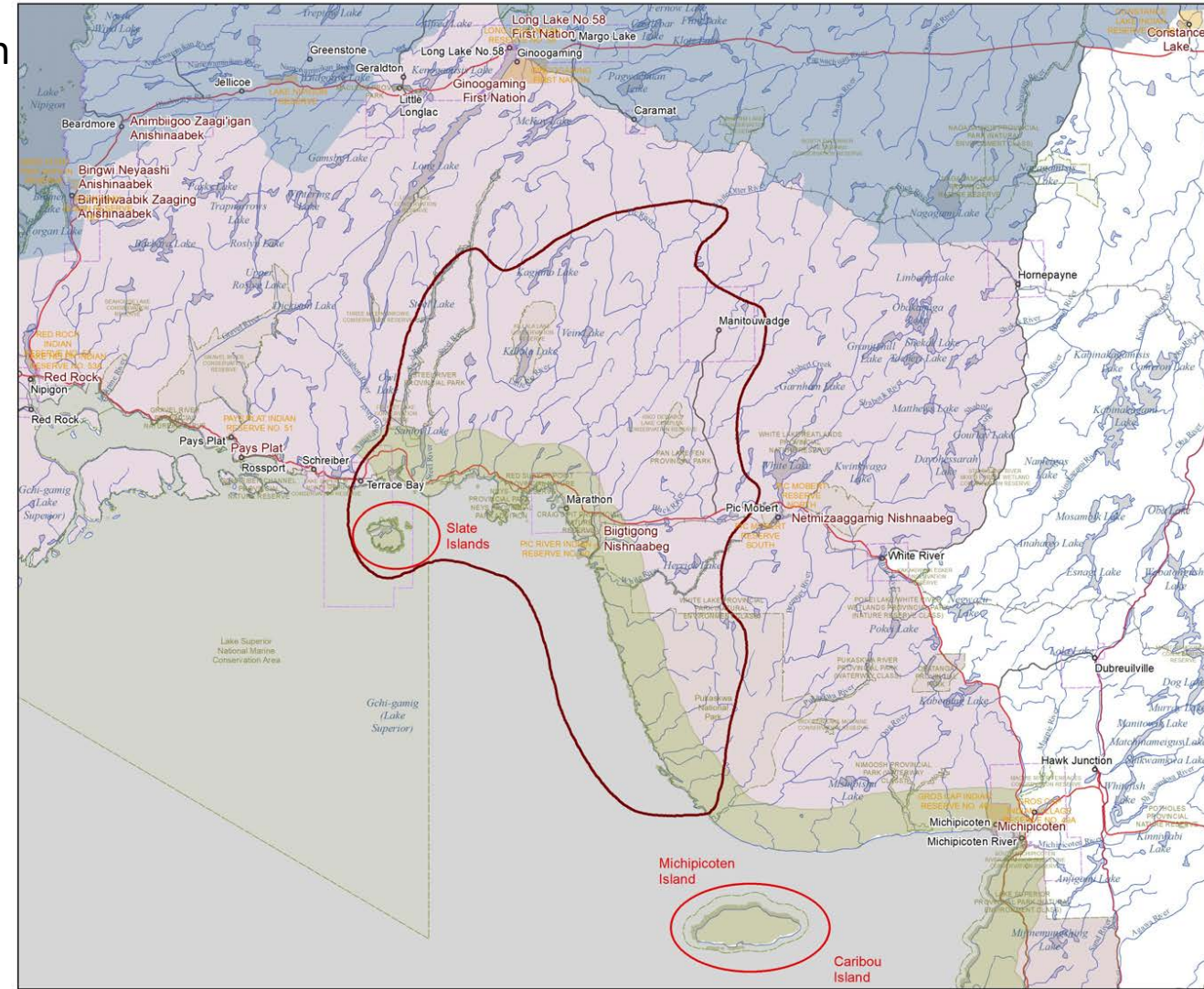


Slate Islands Caribou Population Estimates



Key Recent Caribou History Events

- **Mainland:**
 - 1970's-2000's: Caribou reduced to remnant population outside of Pukaskwa
 - 1970's – 2012 – Caribou population decline in Pukaskwa driven by predation and landscape changes
 - ~ 2015 – Caribou gone from Pukaskwa
- **Slate Islands:**
 - 1970's and 80's: Caribou reach tremendous density
 - 2014 : Wolves cross to Slates on ice
 - 2014-2018 – Caribou decimated; some migrated to mainland; wolves abandon Slates
 - 2018 – 2 caribou remaining
 - 2018 – 9 caribou moved to Slates from Michipicoten
 - Present popn' ~ 40-50 caribou
- **Michipicoten Island**
 - Early 1980's: caribou re-introduced to Michipicoten
 - 2012 – hundreds of caribou on Michipicoten
 - 2014 – Wolves cross on ice
 - 2018 < 20 caribou remaining
 - 2018 – 9 moved to Slates & 6 to Caribou Island
 - Present – no caribou & no wolves
- **Caribou Island**
 - Present popn' ~ 25-30 – near carrying capacity



One Goal:

Self-Sustaining Population


Establish a secure and self-sustaining population of caribou in the area centred on the northeast portion of Lake Superior, with particular emphasis on the area encompassed by the Biigtigong Nishnaabeg exclusive title lands.



One Goal:

Self-Sustaining Population

Four Objectives

1. Offshore Islands: **Contribute to the security of the Lake Superior Caribou population by establishing protected and carefully-managed sub-populations on the key offshore islands.**
 2. Mainland Population: **Manage caribou populations consistent with the long-term target of re-establishing viable populations on the mainland, focusing on the area encompassed by the LSCR and Biigtigong Nishnaabeg's Exclusive Title Area.**
 3. Collaboration: **Within the broader framework of Biigtigong's Land Claim, collaborate with other parties and agencies, including the Governments of Ontario and Canada, and other First Nations, in securing the caribou population in the LSCR and Biigtigong's Exclusive Title Area.**
 4. Cultural Awareness: **Increase the cultural awareness of caribou and their role in the ecosystem among the Biigtigong Nishnaabeg and other residents along the north coast of Lake Superior.**
- 
- A caribou with large, velvet-covered antlers is standing in shallow water near a forested shoreline. The caribou is facing left, and its reflection is visible in the water. The background shows a dense forest of evergreen trees under a cloudy sky.

Eleven Strategies



Indigenous Involvement

1. Leadership / co-management
2. Integration of Traditional & Community Ecological Knowledge
3. Increase Indigenous Capacity
4. Youth Involvement



Adaptive Management

Indigenous Involvement

Secure Island Populations

Address Institutional Barriers

Maintain Island Populations



Monitoring

Work in Collaboration

Increase Awareness

Re-establish Mainland Population

Protect Caribou Habitat

Protect Caribou

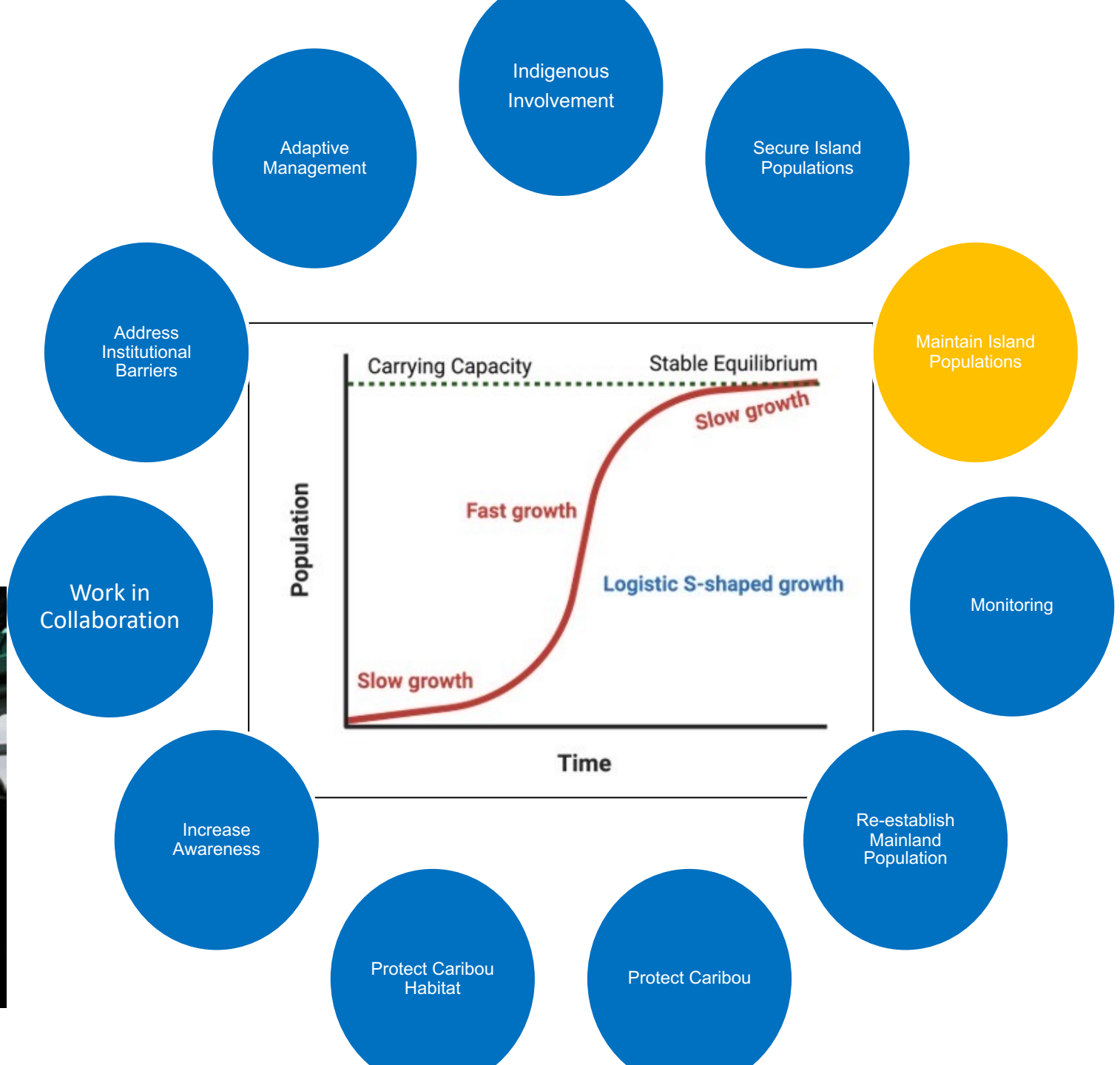
Secure Island Populations

1. Ensure Michipicoten is Predator Free
2. Transfer Caribou to Michipicoten
3. Monitor Caribou on All Islands
4. Predator Control if Necessary



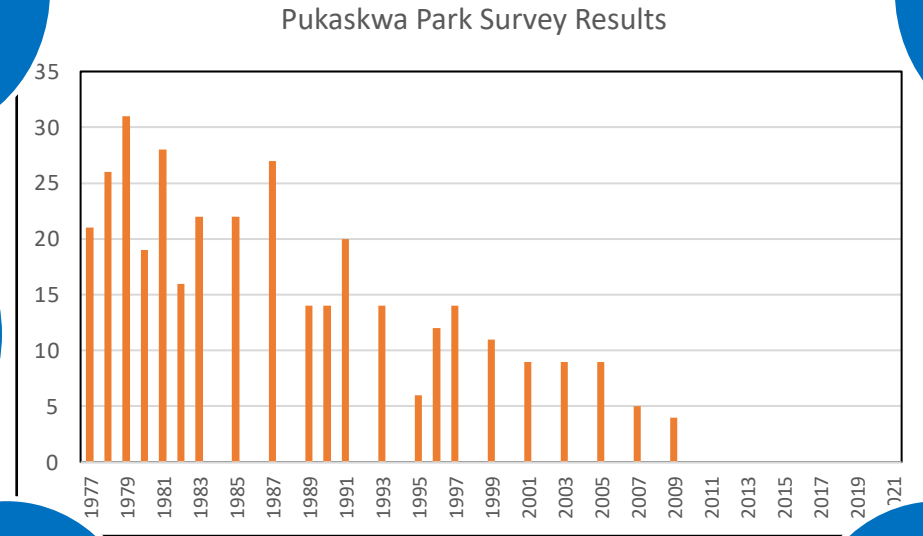
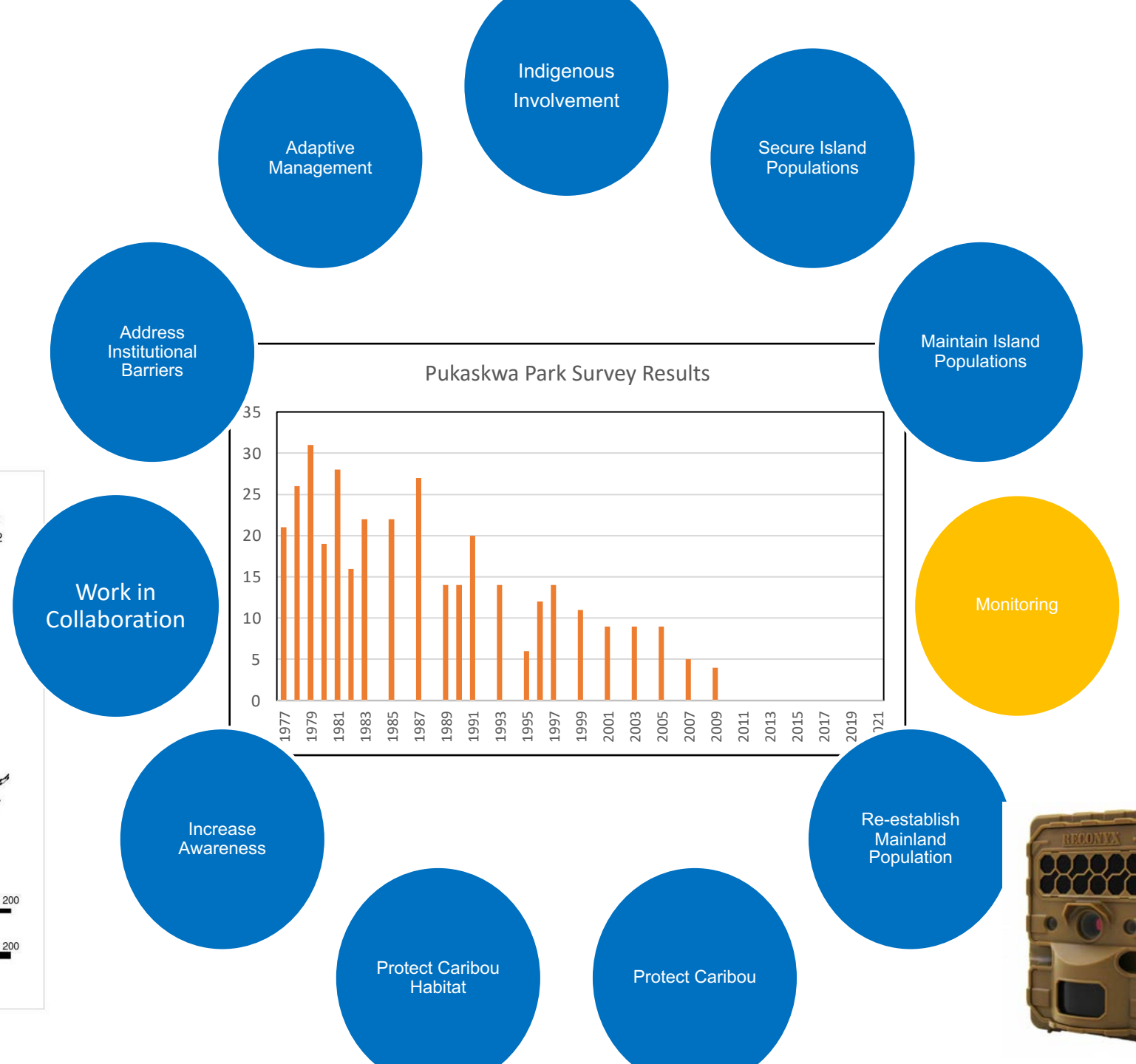
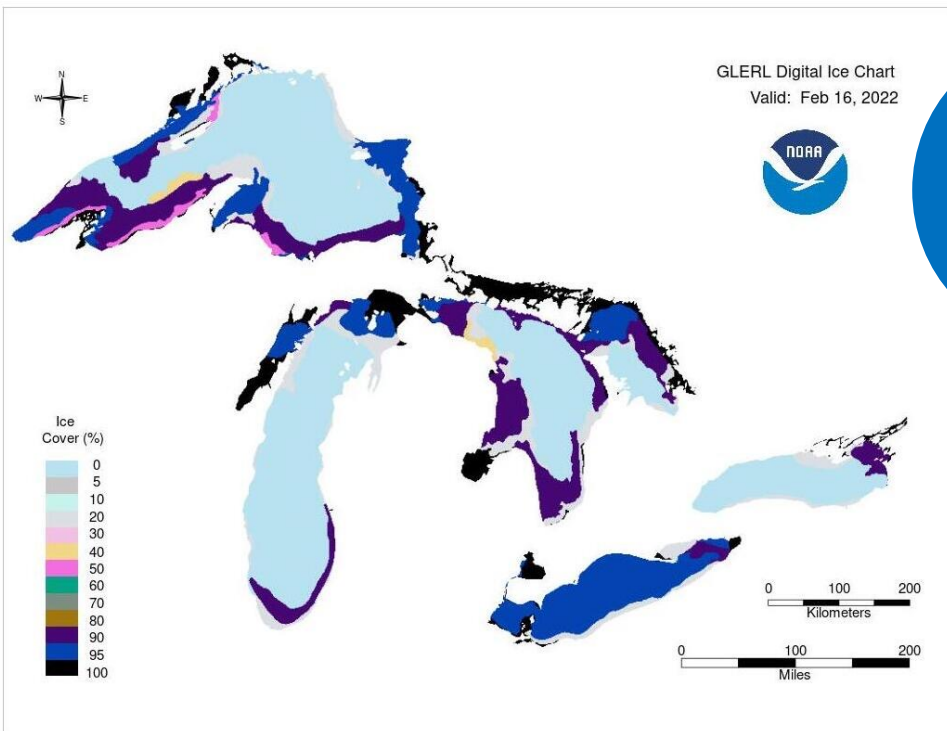
Maintain Island Popn's at Appropriate Levels

1. Establish Carrying Capacities for Islands
2. Manage Populations by:
 - Regular Monitoring
 - Transfer to Mainland
3. Protect Caribou (Strategy 7)



Monitoring

1. Ice
2. Predators
3. Caribou
4. Habitat Conditions



Re-establish Mainland Population

1. Identify Receiving Sites
2. Transfer Caribou
3. Monitor Mainland Population
4. On-going Transfer as Possible/Required

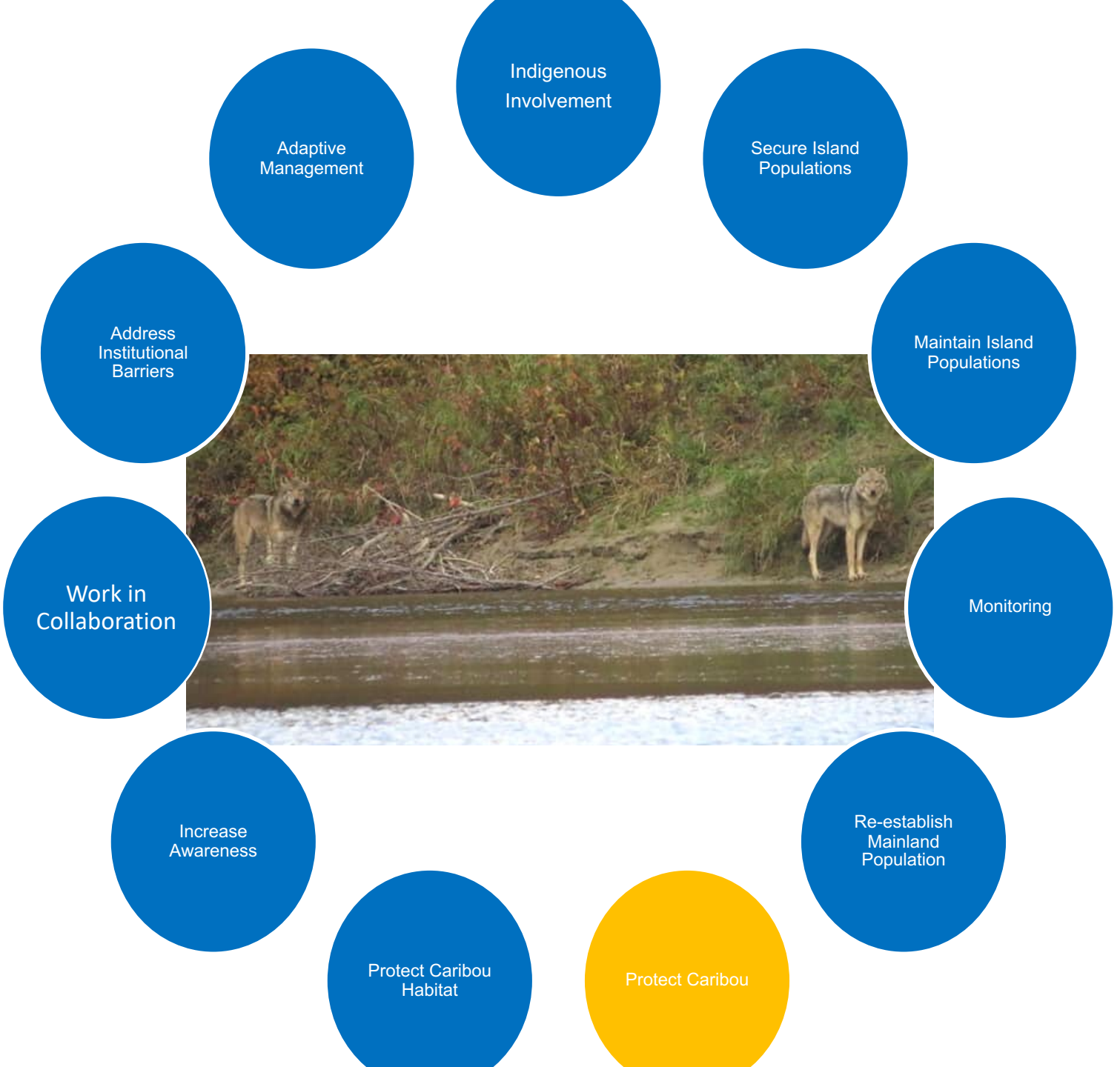
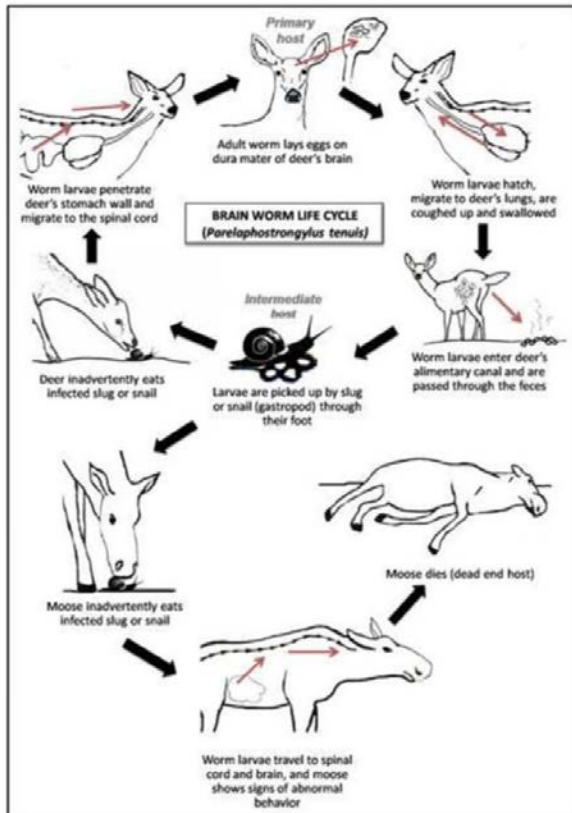


Photo Christian Schroeder



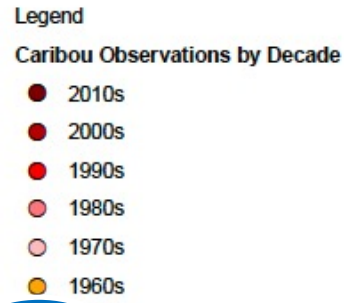
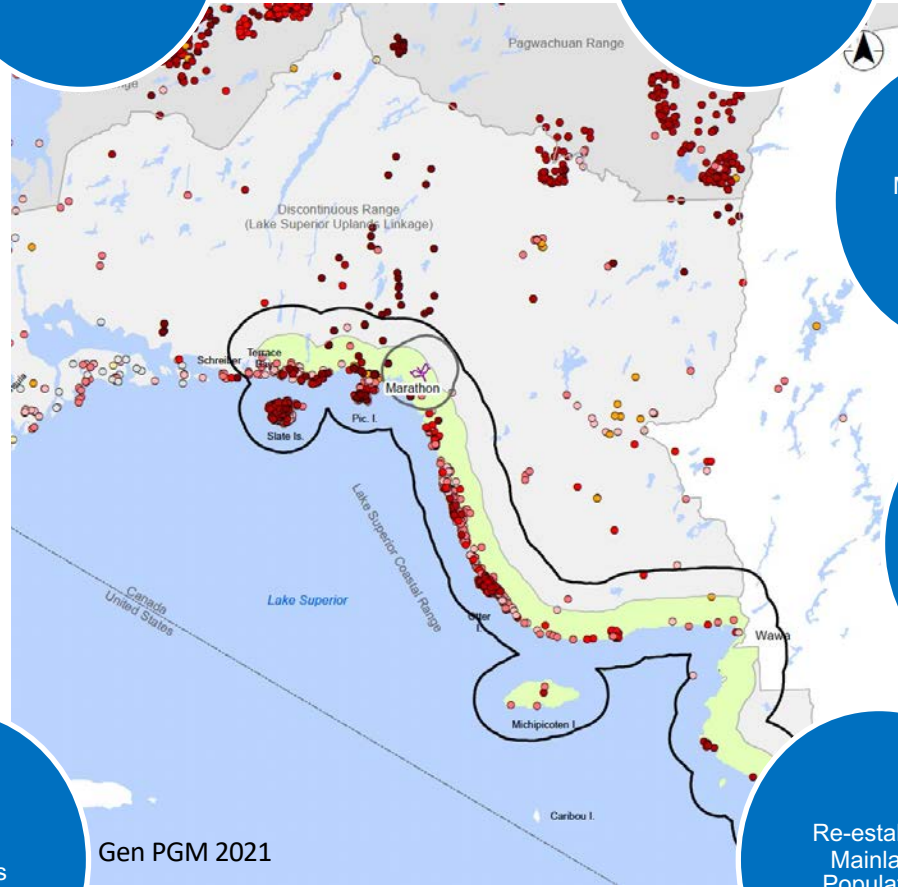
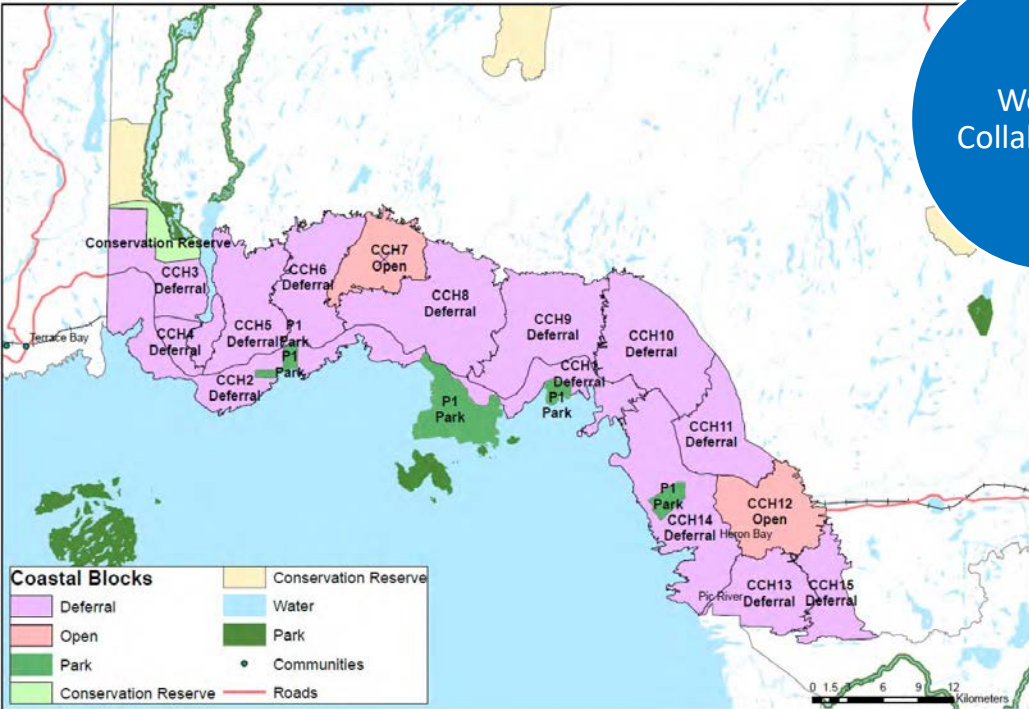
Protect Caribou

1. Predator Control if Necessary
2. White-tailed Deer Control
3. Increase Moose Harvest if Necessary
4. Increase Public Awareness



Protect Caribou Habitat

1. Cease Industrial Forestry in LSCR
2. Establish Buffer
3. Control & Re-habilitate Linear Disturbances
4. Re-consider Discontinuous Distribution
5. Work in Collaboration



Adaptive Management

Indigenous Involvement

Secure Island Populations

Address Institutional Barriers

Maintain Island Populations

Work in Collaboration

Monitoring

Increase Awareness

Re-establish Mainland Population

Protect Caribou Habitat

Protect Caribou

Increase Awareness

1. Within Indigenous Communities
2. Within L. Superior Coast Communities
3. Within Ontario's Communities



Work in Collaboration

Increase Awareness

Adaptive Management

Indigenous Involvement

Secure Island Populations

Maintain Island Populations

Monitoring

Re-establish Mainland Population

Protect Caribou

Protect Caribou Habitat

Work in Collaboration

1. With and Between Governments
2. With Indigenous Communities
3. With Resource Industries



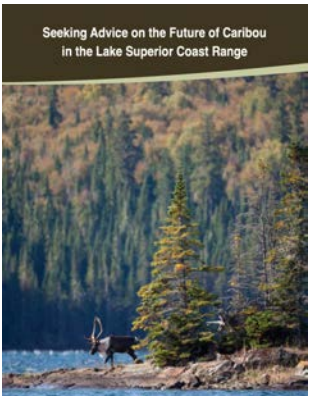
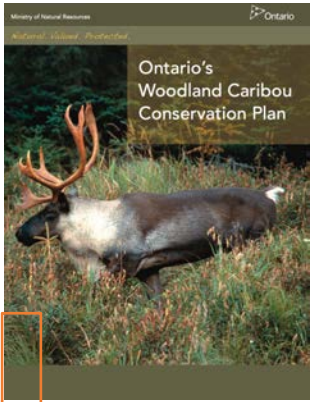
Address Institutional Barriers

1. Identify and Assess Barriers
2. Work in Collaboration to Remove Barriers

Failure of Province to address commitments:

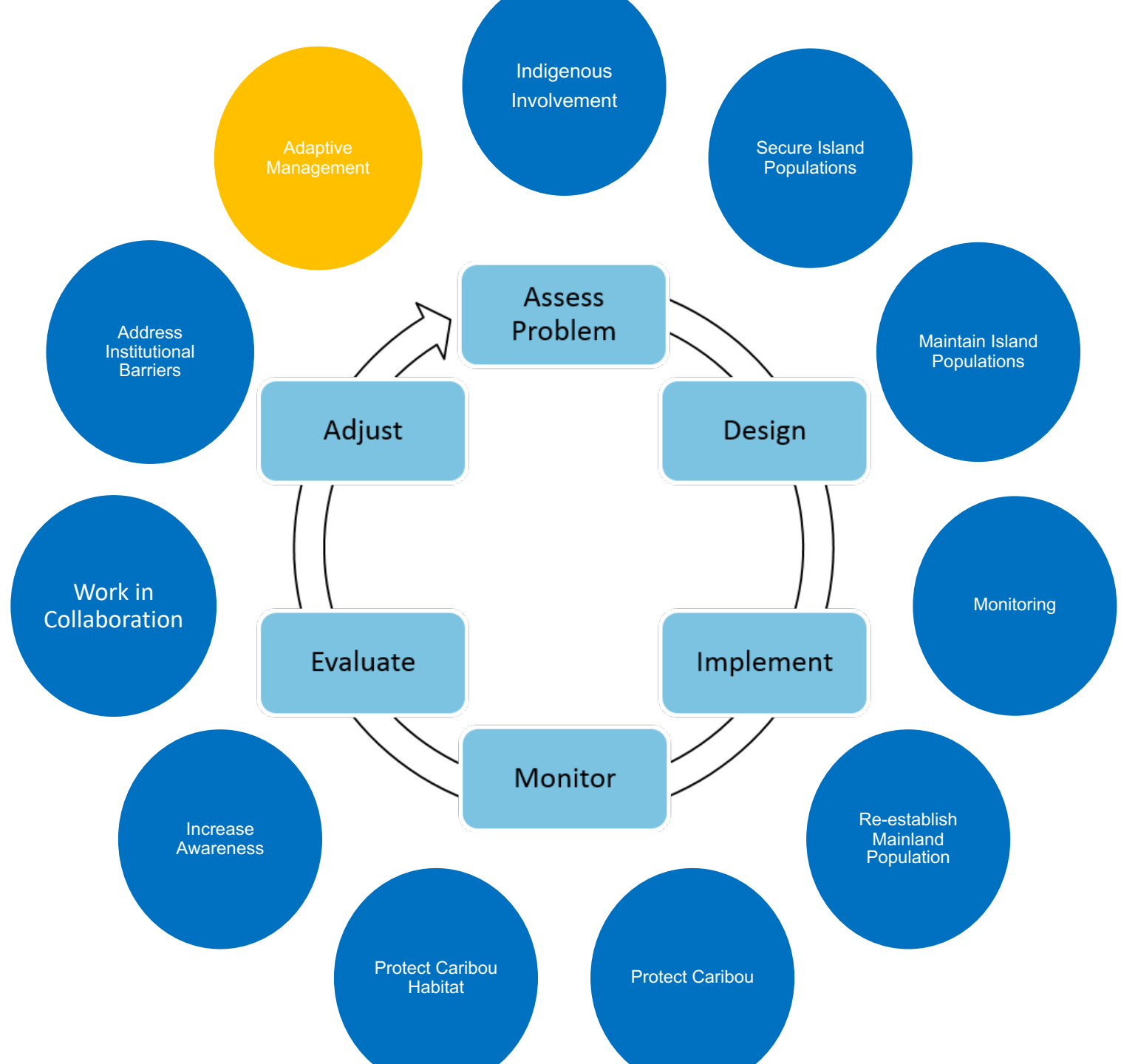
“The LSC population will be managed for population security”

Released March 2018 – No information or products yet released.



Adaptive Management

1. Program Design
2. Monitoring
3. Assessment of Successes and Failures
4. Incorporate Traditional Knowledge
5. Revise Management



Almost Final Slide!

Is It Hopeless?

No, but it will be hard.

Past Conservation Success Stories

Swift Fox, Bison, Whooping Crane, California Condor
Bald Eagle, Peregrine Falcon

Biggest Challenges

Climate Change
Provincial Government Ambivalence/Failure to Act
Industrial Half-Measures
Population Growth



Questions?



