

Seeking Advice on the Future of Caribou in the Lake Superior Coast Range



Cover Photo: Hidehiro Otake



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Figure 1. Boreal Caribou (*Rangifer tarandus caribou*) walking along the shoreline of Lake Superior.

Photo credit: Hidehiro Otake



We Want to Hear From You

The purpose of this document is to get your input to inform development of a management approach for caribou in the Lake Superior Coast Range and Discontinuous Distribution.

Introduction

Boreal caribou, listed as threatened under *Ontario's Endangered Species Act, 2007*, are an important part of healthy boreal forest ecosystems.

Currently, boreal caribou are found across most of northern Ontario, where distribution of the species is generally continuous across broad landscapes. Thirteen caribou ranges have been delineated in this region (Figure 1).

Farther south, along the northeast shore of Lake Superior, the **Lake Superior Coast Range (LSCR)** supports isolated populations of caribou. This represents the most southerly population of boreal caribou in Canada. The coastal range is unique in its small size, shoreline location, and inclusion of small nearshore and large off-shore islands, the Slate Islands and Michipicoten Island, both of which are provincial parks. The LSCR is separated from the ranges to the north by an area called the **Discontinuous Distribution (DD)**. Caribou formally occupied this area; however there are now only sporadic sighting reports of caribou and it is not believed to support a resident population. *Ontario's Woodland Caribou Conservation Plan* (2009) recognized the unique characteristics of this area and recommended the development of management approaches specific to the LSCR and DD.

Through this Discussion Paper, Ontario is seeking your input to inform the development of a management approach for the LSCR and DD which will identify and describe Ontario's approaches for boreal caribou conservation and recovery in this area.

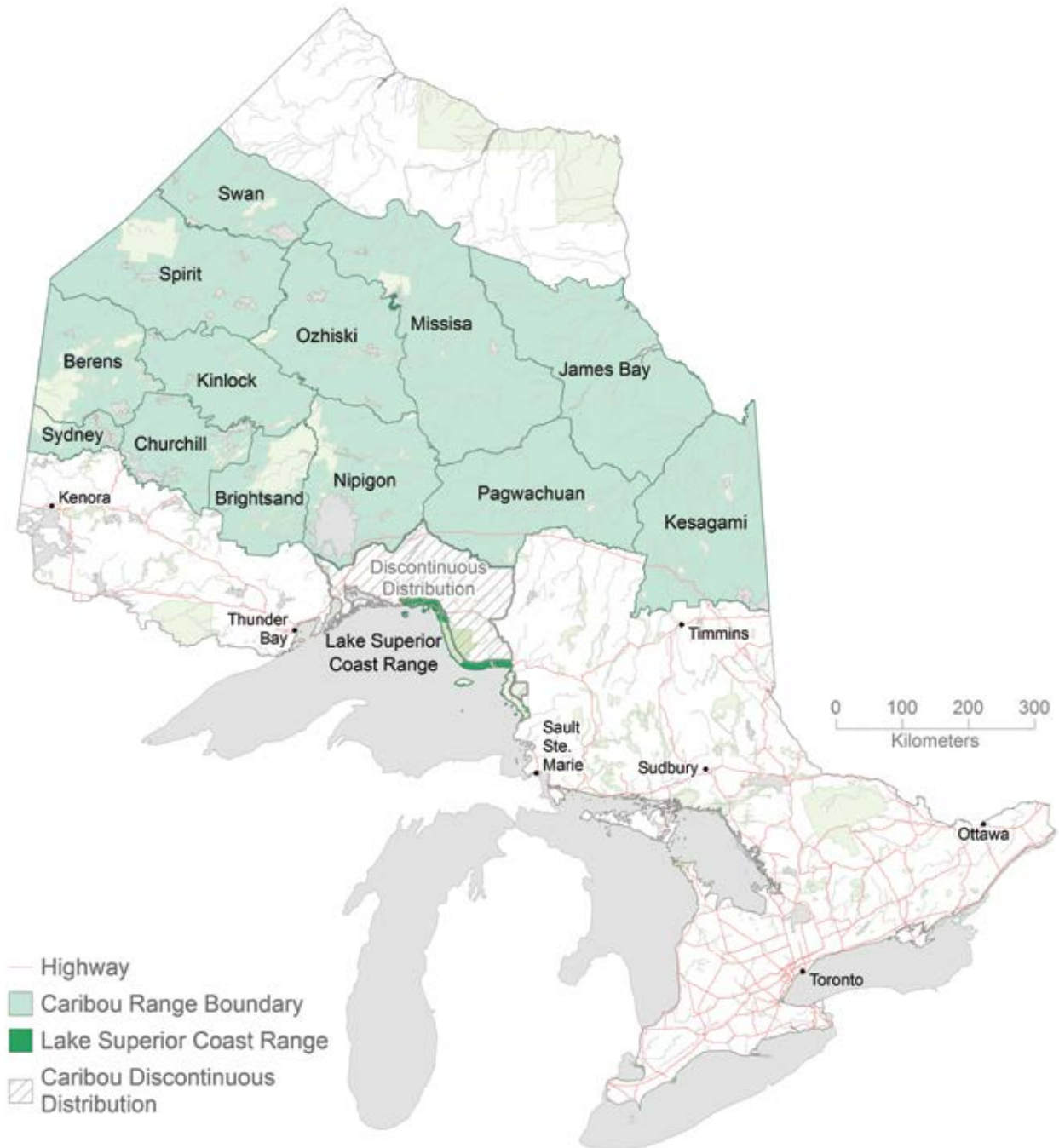
The deadline for submitting your input is May 3rd, 2018

To enhance the discussion, the Ministry of Natural Resources and Forestry is engaging with interested Indigenous communities and stakeholders. Ontario is committed to meeting

its obligations to Indigenous peoples under section 35 of the *Constitution Act, 1982*, including obligations to consult.

Figure 2. Ontario caribou ranges

Source: MNRF



The Policy Context

Ontario's Cervid Ecological Framework (2009)¹ provides broad policy guidance for the management of Ontario's four cervid species, moose, white-tailed deer, boreal caribou, and American elk. It recognizes that, as in the case of the LSCR and DD, sometimes these species occur together across a broad landscape. The policy provides guidance on managing cervid species within the context of the ecosystems they share, and establishes a system of broad-scale Cervid Ecological Zones for this purpose. The LSCR and DD are part of Cervid Ecological Zone B, which is a mixture of caribou habitat and core moose range.

Ontario's Endangered Species Act (2007) (ESA) protects species at risk and their habitats. The killing, harming, or harassing (s.9) of a species at risk, or the damage or destruction of their habitat (s.10), is prohibited under the ESA. As a threatened species, boreal caribou receive both species and habitat protection.

Ontario's Woodland Caribou Conservation Plan Goal

To maintain self-sustaining, genetically-connected local populations of woodland caribou (forest-dwelling boreal population) where they currently exist, improve security and connections among isolated mainland local populations, and facilitate the return of caribou to strategic areas near their current extent of occurrence



Figure 3. Monitoring and research are important components of the adaptive management approach.

Photo credit: N. Asselin/Parks Canada



In 2009, the Ontario government released *Ontario's Woodland Caribou Conservation Plan*² (MNR, 2009), which outlines the actions the Government of Ontario intends to take to protect and recover boreal caribou. Ontario's Caribou Conservation Plan is based on an adaptive management approach where the outcomes of management actions are evaluated through research and monitoring which in turn inform the adjustment of future management actions.

¹ Ontario Ministry of Natural Resources. 2009. Cervid Ecological Framework. Ontario Ministry of Natural Resources, Toronto. Available online at <https://dr6j45jk9xcmk.cloudfront.net/documents/3086/263997.pdf>.

² Ontario Ministry of Natural Resources. 2009. Ontario's Woodland Caribou Conservation Plan. October 13, 2009. Ontario Ministry of Natural Resources, Toronto. Available online at <http://files.ontario.ca/environment-and-energy/species-at-risk/277783.pdf>.

▶ Ontario's Caribou Conservation Plan contains the following statements specific to the LSCR and DD:



Figure 4. The rugged shoreline and mixed wood conditions typical of the Discontinuous Distribution.
Photo credit: Ontario Parks

Section 2.7: Ontario will develop a management strategy for discontinuous range management to enhance connectivity between the northern continuous range and the southern coastal Lake Superior populations. This connectivity will improve the prospects for persistence of the coastal population. Discontinuous range will not be managed broadly for caribou habitat to support self-sustaining populations. Instead it will be managed with a focus on specific landscapes that may support temporary caribou occupancy or movement between the continuous range and Lake Superior.

Section 4.1.3: Where caribou distribution is discontinuous, Ontario will look for opportunities through forest management planning and other land use planning to improve future connectivity between local caribou populations and isolated populations.

Section 4.1.4: The Lake Superior coastal population will be managed for population security and persistence. The focus will be to protect and manage habitat and encourage connectivity to caribou populations to the north.

Indigenous Peoples and Caribou in the Lake Superior Coast Range

For a number of Indigenous peoples in Ontario, caribou have long held and continue to maintain religious, cultural, social and subsistence significance. Several First Nations and Métis communities are present within the LSCR and

DD. Ontario is committed to providing opportunities for incorporating Traditional Ecological Knowledge into caribou recovery and meeting any constitutional obligations that may exist with respect to Aboriginal and Treaty rights.



Caribou in the Lake Superior Coast Range and Discontinuous Distribution

Historical Status

The LSCR and DD were continuously populated with caribou until the late 1800s. Over time, factors such as unregulated hunting and changes in land cover and forest composition as a result of human development and activities led to the extirpation (local extinction) of caribou in the DD and decline of caribou numbers in the LSCR. By the beginning of the 20th Century, caribou had entirely disappeared from Michipicoten Island but remained in fluctuating numbers in other areas within the LSCR. Results from long-term monitoring work carried out in Pukaskwa National Park from 1972 to 2009 suggest that the caribou population along this portion of the Lake Superior shore gradually retracted to a few areas, like Otter Island and One Lake Island (Figure 2, Map A), that have historically been associated with high caribou abundance³. No comparable long-term datasets on caribou distribution and abundance exist outside Pukaskwa National Park, but it is possible that a similar process has occurred on other portions of the shoreline. For example, Pic Island, in Neys Provincial Park, is an area of high historic caribou abundance where small numbers of caribou continue to be sighted⁴. Figure 2 shows a large-scale map of the LSCR and DD and these locations.



Figure 5. The cumulative effects of natural disturbance (e.g., fire, storm damage, etc.) and human development activities (e.g., roads, harvest, etc.) over time have fragmented habitat causing the extirpation of caribou within the DD.

Photo credit: Christine Rosche

Moose and Caribou: Evolving Together in the Boreal Forest

While ecosystems supporting higher moose densities will in turn support higher densities of their predators, resulting in increased caribou predation, moose naturally occur across almost the entire distribution of caribou. The Cervid Ecological Framework provides the policy guidance for managing healthy moose populations and indirectly, caribou populations. Consistent with this direction, moose population objectives for wildlife management units in this landscape have been set at natural densities (between ~ 18 and 28 moose per 100 km²), which recognizes the need to minimize impacts to and maintain caribou populations as outlined in the *Caribou Conservation Plan*.

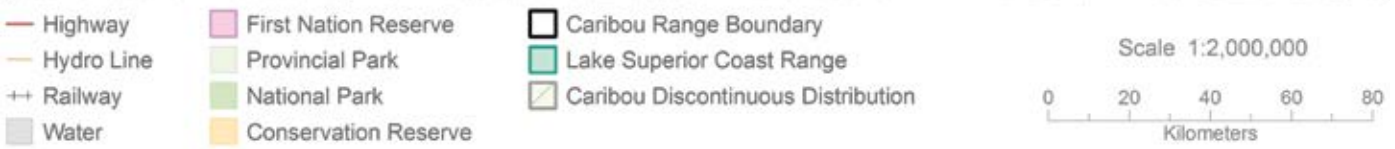
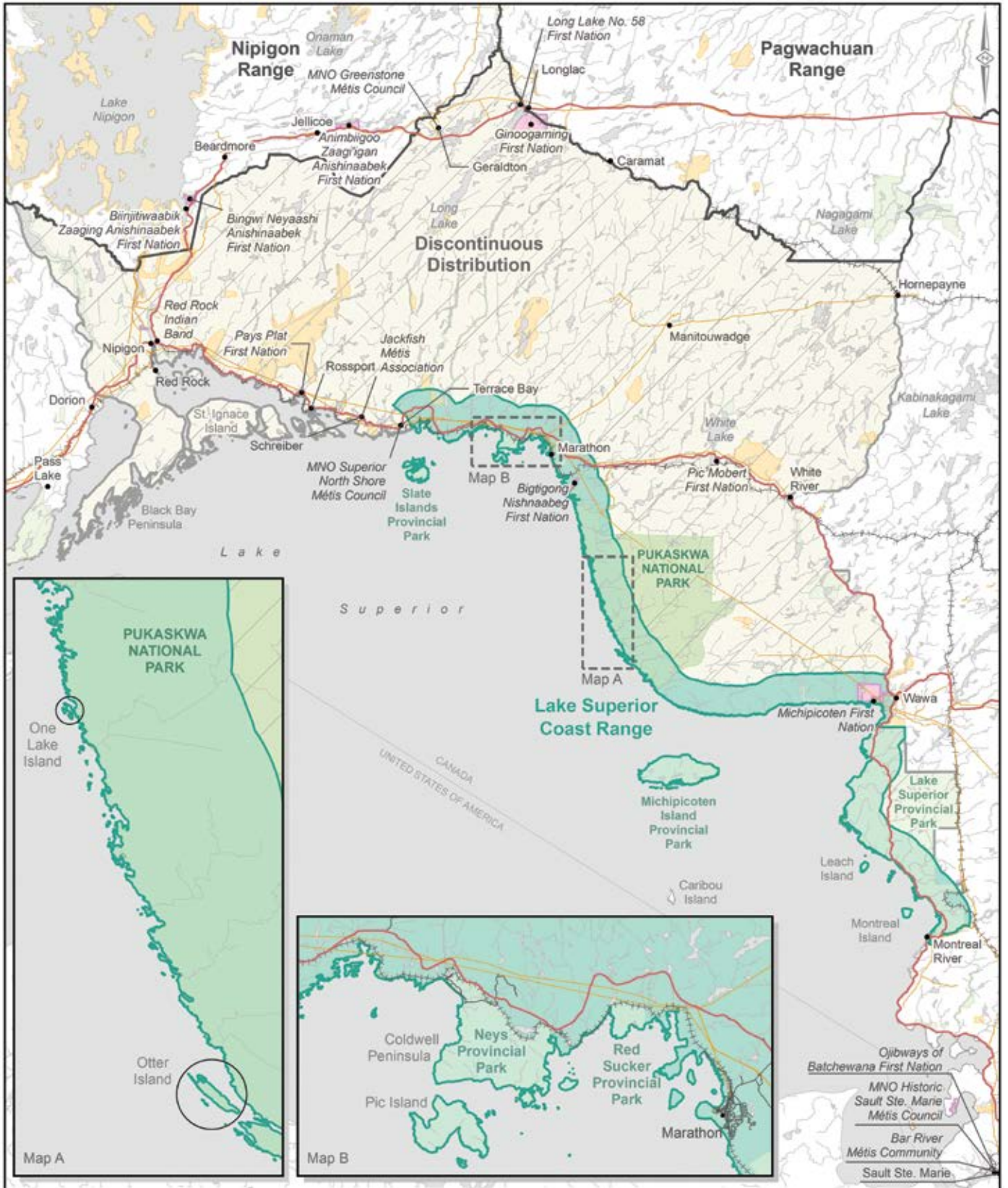
Achieving this target includes managing for both moose and caribou habitat using the *Forest Management Guide for Boreal Landscapes*. This guide provides direction to resource managers that forest conditions such as tree species composition, age and pattern be managed within the range of natural variation. Practically speaking, this means managing for forest conditions which natural disturbance such as fire or insect damage would have historically created based on the ecological capability of the landscape. In the LSCR and DD, this range of conditions over time includes large areas of mature conifer forest suitable for caribou and some smaller patches of earlier successional forest preferred by moose.

³ Bergerud, A.T., W.J. Dalton, H. Butler, L. Camps and R.Ferguson. 2007. Woodland caribou persistence and extirpation in relic populations on Lake Superior. *Rangifer*. 27(4): 57-78

⁴ Ferguson, S.H., Bergerud, A.T. and Ferguson, R., 1988. Predation risk and habitat selection in the persistence of a remnant caribou population. *Oecologia*, 76(2), pp.236-245.

Figure 6. The Lake Superior Coast Range and Discontinuous Distribution.

Source: MNRF





Presently, the mainland portion of the LSCR supports moose and white-tailed deer and their predators (i.e. wolves and bears), but caribou also persist, albeit at very low numbers. Researchers believe that caribou make use of the rugged shoreline topography and nearshore islands to avoid predation and exploit the terrestrial and arboreal lichens that grow there⁵. Caribou are excellent swimmers so nearshore islands can provide good habitat, especially for calving.

◀ **Figure 7.** Lake Superior's rugged shoreline and the many small islands near the shore are thought to provide refuge to caribou. Photo credit: Joel Cooper

Michipicoten Island and the Slate Islands Provincial Parks in particular provide important caribou habitat in the LSCR. These are larger islands located farther from the shore, which have supported successful reproduction and rearing, and growth in caribou numbers. The distance of these large off shore islands usually makes them less accessible to most other prey and their predators, so the presence of dense coniferous forest is less important for predator avoidance by caribou. Occasionally, cold temperatures support the formation of ice bridges enabling free movement of both predators and caribou between the mainland and islands. When that happens, the caribou become vulnerable to predation.



Figure 8. Translocation of caribou.

Photo credit: MNR/CNFER

Effort has gone into restoring caribou in the LSCR, primarily through the translocation of animals, and these actions have been met with varied success. Attempted translocations to Montreal Island, Leach Island and the Gargantua area, all of which are part of Lake Superior Provincial Park, occurred throughout the 1980s. In some of these cases, translocation initially appeared to be successful, with evidence of population establishment and growth over a period of 10 to 20 years. With time, however, the translocated caribou populations began to decline and eventually disappeared. In the early 1980s, caribou were translocated from the Slate Islands and successfully reintroduced to Michipicoten Island, where the population grew from nine animals to an estimated 680 animals in 2010. During this time period the island was predator free.

Caribou have occupied the Slate Islands from 1940 to the present. For most of this time period the Slate Islands have been free of predators; however, in both 1993/94 and 2003/04, a pair of wolves accessed the islands on each occasion. During both 'wolf arrival' events, the pair remained on the islands for two years. No fresh wolf evidence was observed after 2005 (Bergerud and Camps 2016). In both of these cases, population estimates calculated just prior to wolf arrival indicate that there were approximately 250-300 caribou on the islands (Bergerud et al. 2007). In 2009, the estimated caribou population on Slate islands was 100 animals (Carr et al. 2012).

⁵ Bergerud, A.T., W.J. Dalton, H. Butler, L. Camps and R. Ferguson. 2007. Woodland caribou persistence and extirpation in relic populations on Lake Superior. *Rangifer*. 27(4): 57-78

The Current State

Caribou are spatially separated across the LSCR into relatively isolated sub-populations: the mainland and nearshore islands, and the large off-shore islands, Michipicoten Island and the Slates Islands. These spatially separated populations interact as individual members move from one population to another. There is limited but occasional natural (e.g. ice bridges) and human assisted movements between these three subpopulations.

The Mainland and Nearshore Islands

A 2016 survey of the LSCR mainland and nearshore islands estimated that approximately 50 animals may remain in this area, although when the uncertainty associated with this estimate is taken into account, actual caribou numbers could be as low as 13 or as high as 227⁶. Results of population modelling efforts for boreal caribou suggest that even when average adult and calf survival rates are relatively high, a population size of at least 300 caribou is needed if they are to have a high probability of persistence⁷. This means that the much smaller and declining group of caribou that currently inhabits the mainland and nearshore island portion of the LSCR is vulnerable to extirpation.

The Large Off-Shore Islands

In recent years, Michipicoten and the Slate Islands have supported the majority of the LSCR caribou. However, islands can also be subject to population “boom and bust” cycles (see text box) related to predator-prey dynamics and/or the growth and depletion of forage.



In the winter of 2014, four wolves crossed to Michipicoten Island via an ice bridge and established a den. The wolf population grew due to the availability of prey (i.e. caribou, as well as a large beaver population). As wolf numbers increased, the caribou population began to decline precipitously, from an estimate of 450 animals in the fall of 2014 to 116 animals in the fall of 2016, and is now once again in danger of extirpation from Michipicoten Island.

Wolves also arrived on the Slate Islands over the same time period, but there is no evidence of wolf reproduction or population growth there. Evidence suggests that the caribou population declined substantially during the course of this most recent ‘wolf arrival’ event.

Figure 9. A primary predator to caribou, wolves are a part of the natural ecosystem that caribou have evolved within.

Photo credit: MNRF

⁶ Shuter, J., N. C. Asselin and A. Rodgers. 2016. Results of the 2016 Lake Superior Coast Range (LSCR) caribou (*Rangifer tarandus caribou*) aerial survey. Ontario Ministry of Natural Resources and Forestry Centre for Northern Forest Ecosystem Research, Thunder Bay, Ontario, and Parks Canada, Pukaskwa National Park, Heron Bay, Ontario.

⁷ Environment Canada. 2008. Scientific Review for the Identification of Critical Habitat for Woodland Caribou (*Rangifer tarandus caribou*), Boreal Population, in Canada. August 2008. Ottawa: Environment Canada. 72pp. plus 80 pp Appendices.



Figure 10. One of 9 caribou moved from Michipicoten Island to the Slate Islands in January 2018. Photo credit: MNRF

Translocating Caribou: Lessons Learned

The history of translocations in the LSCR provides valuable lessons for best practice in caribou population management. It suggests that caribou conservation and restoration efforts should focus on providing caribou with sufficient suitable habitat and opportunities to avoid predators, while controlling the factors that could increase predator numbers in caribou ranges.

In early 2018, Ontario, along with a broad range of partners including Michipicoten First Nation and supportive foundations, conducted emergency translocations of caribou to address the impacts of wolf predation on the Michipicoten caribou and the potential extirpation of both the Slate Islands and Michipicoten Island populations. Eight cows and one bull were successfully translocated from Michipicoten Island to the Slate Islands which are currently believed to be free of predators and have supported a large self-sustaining caribou population in the past. These translocated caribou join a minimum of two bulls recently observed on the Slate Islands. Based on past experience with the translocation of caribou to Michipicoten Island in the early 1980s, this number of caribou is expected to be sufficient to enable the Slate Islands population to grow over time. As an additional measure to secure the persistence of caribou in the LSCR, an additional six caribou, four cows and two bulls, were successfully translocated from Michipicoten Island to Caribou Island which has supported caribou in the past. We are continuing to monitor the situation to assess whether any further management action is warranted in the near term.



Figure 11. Resource extraction within the Discontinuous Distribution. Photo credit: Tom Harris

The Discontinuous Distribution (DD)

Caribou formally occupied the Discontinuous Distribution, or the area north of the LSCR up to the Continuous Distribution (see Figure 1); however there are now only sporadic sighting reports of caribou and it is not believed to support a resident population. The DD is fragmented by infrastructure (e.g., roads, railway lines, transmission lines, human settlement), and resource extraction activities (e.g., forest harvesting, mining, aggregates), as well as natural disturbance (e.g. fire), all of which impair the function of this area for caribou occupancy or movement between the LSCR and Continuous Distribution to the north.

Key Threats and Challenges to the LSCR Population

Climate Change

Climate change creates many uncertainties for caribou conservation. While the general trend is towards warmer temperatures, climate change is also bringing more severe winters, which increase the probability of ice bridges being formed between the mainland and islands.

Climate change is also anticipated to affect vegetation in a variety of ways. Warmer and drier forests and more frequent severe weather may mean an increase in wind storms and forest fires, which can reduce the availability of the mature conifer forests caribou prefer. The boreal forest itself is likely to shift northwards, being replaced by more southern species of vegetation.



Figure 12 Moose naturally occur at varying densities across almost the entire distribution of caribou. Photo credit: JB Dawson

These changes, combined with a trend towards decreased snow depth and shorter, warmer winters, are also likely to allow for the continued northward expansion of white-tailed deer and moose ranges. Larger deer and moose populations can support higher populations of wolves and other predators, increasing the potential for predation on caribou populations. White-tailed deer also carry a parasitic nematode worm which, while harmless to them, can be very harmful to moose and caribou. Exposure to this parasite could therefore contribute to increased caribou mortality. White-tailed deer now routinely inhabit the southern edge of the caribou range including the LSCR.

Island Biogeography

Fluctuations in the relative abundance of predator and prey species are common in natural systems, but those cycles can be exaggerated on islands. Unlike mainland circumstances where caribou are dispersed across the landscape and occur in low densities, caribou on islands are especially vulnerable to predators that may access the island over the ice. When this happens, the island's relatively small size and geographic isolation limits escape opportunities, particularly in ice-free periods, making caribou vulnerable to predation-related declines. Caribou populations on islands may decline even in the absence of predators if the population becomes too dense, forage is depleted and the animals begin to starve.

Island Biogeography: Boom and Bust

Many scientists, including Charles Darwin, have observed that species diversity on islands seems to follow different patterns than in mainland ecosystems. A formal theory of island biogeography was first proposed by Robert MacArthur and E. O. Wilson in 1963, and remains important in ecological thinking today. The theory holds that the larger the island and the closer it is to the mainland, the more potential species will arrive and be able to persist. On small islands, there will be less available habitat and therefore smaller populations and species are less likely to persist.

Island species are also more susceptible to disease, starvation and predation, because of limited habitat and resources and lower likelihood of immigration from neighbouring islands. Especially on smaller islands, these factors can contribute to a “boom and bust” cycle. Several good years in a row, followed by a bad year, can result in dramatic population fluctuations that make populations more vulnerable to extinction. Each “crash” also removes animals from the population and reduces its genetic diversity and therefore its ability to adapt to adverse conditions.

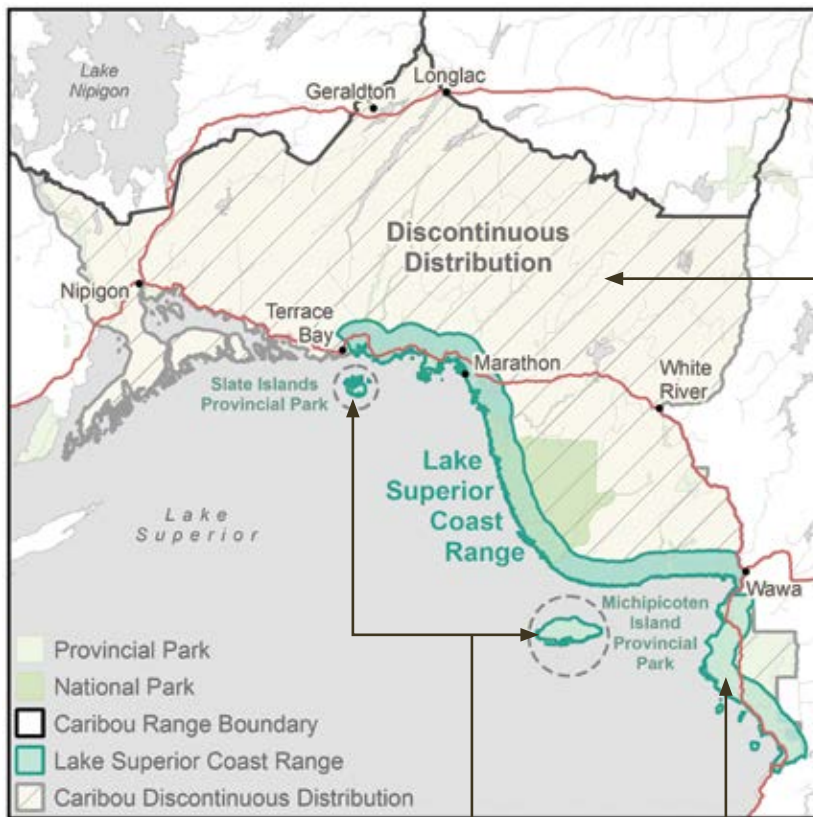
Possible Management Approaches

There are a variety of management actions that could be taken in support of caribou conservation and recovery in this area (Figure 3). These actions can be categorized into habitat and population based management actions.

Habitat management actions are directed at improving the function of an area for caribou either through limiting or

restricting activities, undertaking actions to restore or enhance habitat suitability, or to preserve suitable habitat.

Population management actions are intended to result in enhanced caribou numbers and likelihood of persistence. Both direct and indirect actions may be undertaken to address predators, alternate prey or caribou.



Potential actions for the DD include;

- Habitat management actions such as restrictions on land use or specific activities; habitat rehabilitation; and amendment or enhancement of Crown land use policy for select land use designations (e.g. protected areas, enhanced management areas).
- Population management actions such as indirect control of predators, for instance by managing habitat and/or harvest of other prey species.

Potential actions for the LSCR mainland, include:

- Habitat management actions such as restrictions on land use or specific activities; habitat rehabilitation; and amendment or enhancement of Crown land use policy for select land use designations (e.g. protected areas, enhanced management areas)
- Population management actions such as indirect control of predators, for instance by managing habitat and/or harvest of other prey species.

Potential actions for the larger, offshore islands (Michipicoten and the States) include:

- Population management actions such as direct control of predators through translocation, sterilization, or lethal removal; translocation of caribou; and temporary penning of female caribou and calves.

Figure 13. Possible caribou management actions for the LSCR mainland, DD, and large offshore islands.

We Want to Know What You Think

As discussed, there are a range of possible approaches for caribou conservation in the Lake Superior Coast Range and Discontinuous Distribution. Various management actions each carry different levels of commitment and cost.

The Ministry of Natural Resources and Forestry is seeking your thoughts, perspectives and recommendations concerning caribou conservation in the Lake Superior Coast Range and Discontinuous Distribution.

All input acquired through this discussion will be considered along with the best available science and social

and economic information to develop a draft management approach for caribou in the Lake Superior Coast Range and Discontinuous Distribution.

We anticipate that we will begin stakeholder and Indigenous consultation on a draft management approach in the fall of 2018. The draft management approach will be posted for public comment on Ontario's Environmental Registry.

Details on how to submit your questionnaire can be found at the end of this paper.



Figure 14. Boreal caribou within the Lake Superior Coast Range.

Photo credit: Hidehiro Otake

1. What should be the goal of caribou conservation in the Lake Superior Coast Range and/or Discontinuous Distribution?

Please rank the following goals in order from most to least important (with 1 being the most important and 5 being the least important goal).

- Achieve long-term occupancy of caribou in the LSCR and establish connectivity through the DD to the northern continuous distribution.**
This goal would aim to keep caribou in the LSCR, with some connectivity through the DD to the northern continuous distribution. The intended outcome would be continued presence of caribou in the LSCR mainland and islands.
- Achieve long-term occupancy of caribou in the LSCR.**
This goal would aim to keep caribou in the LSCR, but would not focus on increasing the connectivity to the Continuous Distribution through the management actions in the DD. The intended outcome would be continued presence of caribou in the LSCR mainland and islands.
- Maintain caribou on the large offshore islands (i.e. Michipicoten and/or the Slate Islands) only.**
This goal would aim to keep caribou on Michipicoten Island and/or the Slate Islands and not specifically focus on proactive efforts to conserve caribou along the LSCR mainland coast.
- Do Nothing (i.e. no proactive actions to conserve caribou).**
This goal would mean no human intervention to manage predator-prey interactions or island boom or bust cycles and would not involve proactive efforts to conserve caribou in the LSCR (e.g. habitat restoration).
- Other (please specify).**

Comments:



Rehabilitate disturbed habitat (e.g. old roads)

Strongly Oppose Oppose No Preference Support Strongly Support

Comments:



Restrict the type, location or timing of activities (e.g. recreational trail development/use)

Strongly Oppose Oppose No Preference Support Strongly Support

Comments:



Enhance forest management direction to support caribou habitat needs

(e.g. creation and maintenance of large areas of conifer forest)

- Strongly Oppose Oppose No Preference Support Strongly Support

Comments:



Photo credit: Gerry Racey

Amend/enhance Crown land use policy for select land use designations
(e.g. protected areas, enhanced management areas)

Strongly Oppose Oppose No Preference Support Strongly Support

Comments:



Photo credit: Carol Dersh

Population Management Actions



Direct control of predators on the islands through translocation elsewhere.

Strongly Oppose Oppose No Preference Support Strongly Support


Comments:



Direct control of predators on the islands by sterilizing them.

Strongly Oppose Oppose No Preference Support Strongly Support

Comments:

 **Direct control of predators on the islands by lethal removal.**


Strongly Oppose Oppose No Preference Support Strongly Support

Comments:

 **Indirect control of predators on the mainland, for instance by managing habitat and/or harvest of other prey species**


Strongly Oppose Oppose No Preference Support Strongly Support

Comments:

 **Translocation (moving) of LSCR caribou** to locations with fewer predators, better opportunities for refuge, and/or better forage.

Strongly Oppose **Oppose** **No Preference** **Support** **Strongly Support**

Comments:

 **Temporary penning of female caribou and calves** to protect them from predation during a vulnerable life stage.

Strongly Oppose **Oppose** **No Preference** **Support** **Strongly Support**

Comments:

We Appreciate Your Input- Thanks for Participating!

Please submit your feedback by May 3rd, 2018.

You can send us your thoughts in four ways:

- Submit your comments through the Environmental Registry at [Environmental Registry](#)
- Submit your ideas through SurveyMonkey at [Survey Questions - Management approach for LSCR](#)
- Send an email to MNRF-SpeciesConservationPolicyBranch@ontario.ca
- Write us a letter at:

Landscape Species Recovery Section,
Species Conservation Policy Branch,
Ministry of Natural Resources and Forestry,
Suite 114 - 435 James Street South,
Thunder Bay, ON, P7E 6T1

