

Natural. Valued. Protected.

Ontario's Woodland Caribou Conservation Plan



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Minister's Message

I am proud to present *Ontario's Woodland Caribou Conservation Plan*, which lays out a comprehensive, science-based and responsive long-term strategy for recovering Ontario's Woodland Caribou. This plan builds on our province's strong track record of species protection and our commitment to sustainability as a priority in all our planning.

I would like to acknowledge the Ontario Woodland Caribou Recovery Team and the Woodland Caribou Science Review Panel for providing very helpful advice and support for the development of this plan. Many members of the public also participated in our public consultations. I thank everyone for their time and their considered input.

Through the implementation of this plan we will be initiating a number of recovery actions that will involve Aboriginal peoples, the scientific community, resource industries, other stakeholders, the general public and ministry staff.

A healthy caribou population is a good indicator of a healthy boreal forest. Ontario will continue to be a leader in caribou recovery and conservation in North America. I look forward to your continued involvement and support as we move forward.

Hon. Donna Cansfield
Minister of Natural Resources



Caribou crossing a creek in Northern Ontario.

Photo: Tim Timmermann



Photo: Lee Gerrish

Ontario's Woodland Caribou Conservation Vision:

Self-sustaining caribou populations in a healthy boreal forest.

Ontario's Woodland Caribou Conservation 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.

Introduction

Woodland Caribou are native to Ontario's northern forests. They are an important indicator of the healthy boreal forest ecosystem on which they rely. As one of several jurisdictions responsible for managing the northern boreal forest, Ontario has an important role in Woodland Caribou stewardship.

The purpose of *Ontario's Woodland Caribou Conservation Plan* (*Caribou Conservation Plan* for this document) is to:

- provide broad policy direction regarding Woodland Caribou conservation and recovery;
- summarize the actions the Government of Ontario intends to take in response to recommendations in the Ontario Woodland Caribou Recovery Strategy and the government's priorities in taking those actions (Government Response Statement)¹; and
- outline initiatives to support Woodland Caribou recovery.

Guiding Principles

The *Caribou Conservation Plan* is guided by these principles:

- Adaptive management which combines science and the use of new information to continuously improve management over time.
- Ecosystem-based management that considers all the natural factors that affect and sustain caribou.
- A healthy boreal forest that supports self-sustaining caribou populations.
- The precautionary principle, which means that incomplete information should not be used as a reason for delaying conservation action.
- A focus on the long-term sustainability of caribou ranges including the consideration of cumulative impacts.
- Consideration of caribou population health and habitat condition in resource development decisions.
- A science-based approach to caribou recovery that recognizes existing knowledge and its limitations.
- A commitment to incorporating Aboriginal Traditional Knowledge in decision-making where available.
- Consideration of social, economic and environmental concerns in the context of long-term caribou survival.

1. As per s. 11(8) of the *Endangered Species Act*, 2007, S.O. 2007, c.6

Scope and Scale of the Plan

Ontario's Woodland Caribou Conservation Plan provides policy direction for the management and recovery of Woodland Caribou (forest-dwelling boreal population), and will apply to the areas of continuous and discontinuous distribution shown in green in Figure 1. Woodland Caribou (forest-dwelling boreal population) are designated as **Threatened** in Ontario under the *Endangered Species Act, 2007*.

Aboriginal Peoples and Woodland Caribou

Ontario is committed to Aboriginal participation and involvement in caribou recovery. Aboriginal peoples will continue to play a unique role in Woodland Caribou conservation and recovery because of their close relationship with the land, and their knowledge of and interactions with caribou and other animals. Implementation of the *Caribou Conservation Plan* will be most effective in

collaboration with Aboriginal peoples. Ultimately, the participation and involvement of Aboriginal peoples will enhance prospects for successful conservation and recovery of Woodland Caribou in Ontario.

For thousands of years, Woodland Caribou have been the dominant member of the deer family in much of northern Ontario. Caribou have long held cultural, spiritual, social and subsistence significance for many Aboriginal communities. Ontario is committed to providing opportunities for incorporating Aboriginal Traditional Knowledge (ATK) into caribou recovery and meeting any constitutional obligations that may exist with respect to Aboriginal and Treaty rights.

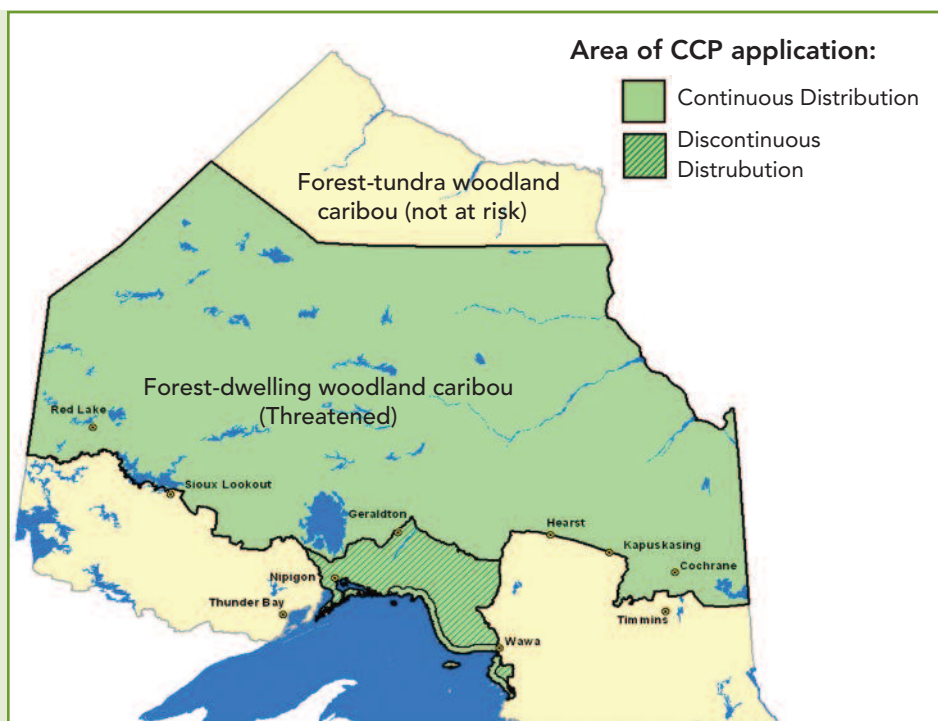


Figure 1. Area of application for the Caribou Conservation Plan shown in green. Note that there is some imprecision regarding the boundary between the forest-dwelling and forest-tundra ecotypes; the boundary as displayed is based upon the southern boundary of Wildlife Management Units 1A and 1B and closely approximates an ecological boundary.

Background

Woodland Caribou live in the boreal forest and taiga (subarctic evergreen forest) across northern Canada. They range across much of northern Ontario, with isolated populations as far south as Lake Superior. Caribou were once widespread across most of Ontario north of Lakes Huron and Superior. Expanding human settlement and development have resulted in significant habitat changes. These changes have had a long-term negative impact on caribou by fragmenting landscapes, changing forests, and creating ecological conditions that benefit other wildlife at the expense of caribou. As much as 40-50 per cent of the area of historic caribou distribution has been lost in Ontario since the late 1800s.

All caribou in Ontario are considered Woodland Caribou, but there are two different types based on the way they use their habitat. *Forest-dwelling Woodland Caribou* live year-round in the boreal forest, typically migrate less than 100 km annually and are designated as Threatened. The more northern *forest-tundra Woodland Caribou*, which are currently considered Not at Risk, travel in larger herds, winter in the boreal forest, and migrate longer distances to the open tundra of the Hudson Bay Lowlands for the spring and summer calving time. Forest-dwelling Woodland Caribou are the same as the Boreal Population of Woodland Caribou listed as Threatened under the federal *Species at Risk Act*. In this plan the terms *Woodland Caribou* and *caribou* both refer to the forest-dwelling type.

Caribou Ecology

Caribou habitat in the boreal forest is constantly changing. Much of the forest is naturally in an unsuitable condition for caribou at any one time, but caribou need and use the entire landscape over time as habitat changes. Caribou habitat is a shifting configuration of large patches of mature forest, occupied by evergreen trees such as Black Spruce and Jack Pine. Disturbances from fires, blowdown, and insects can quickly change the amount and distribution of habitat (Figure 2). There is also great ecological variation in caribou habitat across the province ranging from upland fire-dependent forests in the northwest to extensive lowland forests in the northeast where fire is much less frequent.

Caribou have very large individual annual home ranges of approximately 200-4,000 sq. km.

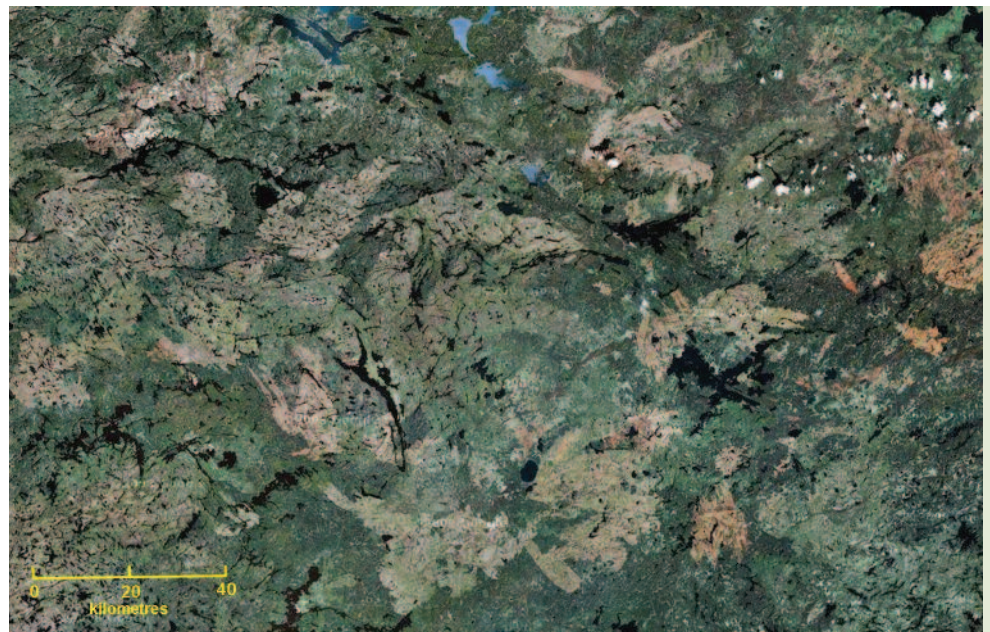


Figure 2. An example of the natural pattern of large forest habitat patches generated by the wild fire typical of upland boreal forests in northwestern Ontario. Forest fires burn and renew the boreal forest in very large patches of similar age, creating a dynamic configuration of caribou habitat that shifts over time. Caribou avoid the younger patches (lighter green), using the mature and older pure conifer forests (darker green). © 2009 Google – Map data © Tele Atlas

Caribou habitat needs must be considered from the broad landscape to very specific local sites where caribou find winter food (Figure 3). Caribou have very large individual annual home ranges of approximately 200-4,000 sq. km. This compares with Moose home ranges of less than 40 sq. km and even smaller White-tailed Deer home ranges.

Members of the deer family differ considerably in their ability to withstand and recover from various challenges and stresses. Woodland Caribou are considered the least resilient North American deer species and do not respond well to human disturbance. Caribou generally take the longest to recover from population stresses as they first breed at a later age, have only one young per year, and are very vulnerable to predators.

Forest-dwelling Woodland Caribou generally travel in small groups during the winter and are more solitary at other times of the year. To caribou, habitat is more than just trees and lichen. It also includes refuge habitat, for the avoidance of predators such as Gray Wolves and Black Bears. Biologists believe that caribou choose mature and older conifer-dominated forests to minimize contact with predators. To avoid predators, caribou disperse across the landscape in low numbers and select refuge (security) habitat which has large areas of mature and older coniferous forest or peatlands with low diversity. These areas have very little food for Moose and White-tailed Deer, and thus support lower numbers of predators. One of the main winter foods of caribou across Ontario is ground lichen, a food on which few other animals can survive.

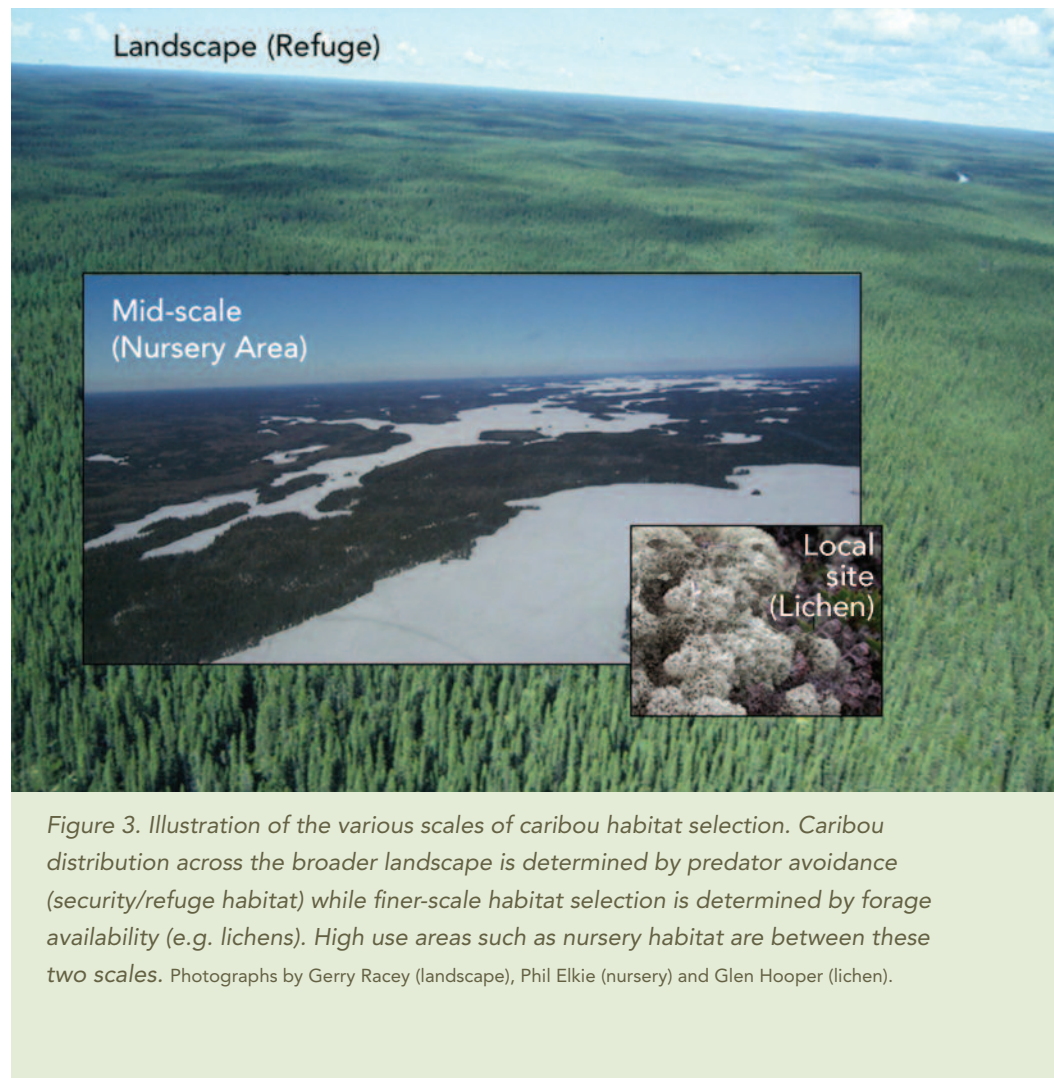


Figure 3. Illustration of the various scales of caribou habitat selection. Caribou distribution across the broader landscape is determined by predator avoidance (security/refuge habitat) while finer-scale habitat selection is determined by forage availability (e.g. lichens). High use areas such as nursery habitat are between these two scales. Photographs by Gerry Racey (landscape), Phil Elkie (nursery) and Glen Hooper (lichen).

Moose and White-tailed Deer thrive in younger forests after disturbance by fire or logging. When the numbers of Moose and White-tailed Deer increase, so do the abundance of associated predators and parasites. This can subsequently lead to the decline or disappearance of Woodland Caribou.

Effective Woodland Caribou conservation and recovery requires maintenance of a landscape suitable for caribou. The provincial distribution of Woodland Caribou can be divided into a number of smaller areas, or “local population ranges”, which can be more efficient for management and better reflect local ecology, caribou movements and habitat use. In most cases local population ranges overlap, resulting in continuous provincial caribou distribution across most of the northern boreal forest.

Habitat Management

Effective caribou habitat management requires that all resource management activities consider implications to the provision of caribou habitat, with appropriate strategies to avoid or mitigate impacts. Management decisions must consider the dynamic nature of the caribou landscape, which varies naturally over time and across large areas (Figure 2). Because ecological conditions vary considerably across northern Ontario, different management approaches are needed in the northeast and northwest. Caribou habitat needs have been considered in many forest management plans in Ontario since the early 1990s. But there is still much to learn about how caribou respond to the habitat conditions resulting from forest harvesting.

The boreal forest is a fire-dependent ecosystem. While Woodland Caribou have adapted to this fire-driven landscape, they also require the availability of large areas of mature, coniferous forest. Whether forests are affected by forest fire, insects, blowdown, forestry or some other disturbance, it is essential that these disturbed forests once again become suitable for caribou. Effective silviculture in active forestry areas is essential to sustaining caribou and to providing future caribou habitat. Especially important is the successful regeneration of large patches of pure Jack Pine and Black Spruce forests that make up the natural configuration of caribou habitat. There are some uncertainties about the effectiveness of silviculture to replicate habitat conditions after natural wildfire.

Forest management practices are updated and refined as our understanding of the boreal forest improves. However, there are still a number of knowledge gaps and uncertainties. Forest management has made significant progress in emulating the pattern and composition of forests resulting from fire, although forestry cannot fully emulate all aspects of wildfire. Commercial forestry is relatively recent in the current caribou distribution area, and there are few areas where caribou reoccupancy of logged habitats can be fully documented, as this can take 40-60 years after disturbance. Ongoing research will improve the effectiveness of renewing habitat after logging so that it more closely reflects natural regeneration.

The implications of forest management are long-term, often decades or longer. Ontario must, therefore, incorporate a margin of error in current strategies to ensure that options for future decisions are not lost. For example, there has not yet been full demonstration that caribou will successfully re-inhabit areas impacted by modern logging, and there are uncertainties regarding the impact of environmental changes such as forest fires and climate change. Management actions today must always focus on the long-term benefit to caribou even if some uncertainty exists. Adjustments to forest management practices in northwestern Ontario since the early 1990s appear to have had some initial success at retaining caribou and caribou habitat near the southern edge of range. Whether this is forestalling range recession is unproven due to the level of population monitoring, but is suspected based on our observations. Although the evidence is not conclusive, short-term caribou well-being and management options for the future are probably greater due to the deferral of large tracts of mature forest at the southern edge of range.

Managing forest fire response can also help maintain and renew caribou habitat. A range of fire response options from full suppression to monitoring can be applied to support habitat preservation and renewal. Prescribed burning is an effective tool for renewing forest stands, particularly after logging and in degraded forests. There is substantial research on historical fire regimes, which has found that there is a great deal of variation in fire severity and long term impacts. Habitat changes can and do occur suddenly, especially due to large wildfires. The scale of such disturbance is likely to increase in coming decades with climate change. Management practices must accordingly be conservative and responsive, recognizing that large-scale forest fires may still affect the overall quality and availability of current and future caribou habitat. For individual ranges, the total area disturbed reflects the area burned by wildfire, as well as that affected by logging and other development.

Incorporating caribou conservation and recovery in land use planning requires consideration of caribou at the landscape scale, and an understanding of the point at which human disturbance has a significant impact on caribou ("thresholds of human disturbance").

Most Woodland Caribou in Ontario are distributed north of areas on which commercial forestry and large-scale agriculture occurs. This provides an opportunity to integrate caribou conservation with emerging Far North planning and policy direction. Protected areas also play an important role in the provision and retention of caribou habitat.

Caribou Conservation through Adaptive Management – Actions to Achieve Protection and Recovery

The goal of the *Caribou Conservation Plan* is to maintain self-sustaining, genetically-connected local populations of Woodland Caribou (forest-dwelling boreal population) where they currently exist, strengthen security and connections among isolated mainland local populations, and facilitate the return of caribou to strategic areas near their current extent of occurrence. To do this, Ontario intends to implement integrated recovery strategies and actions within an adaptive management framework.

Adaptive management is the best way to achieve sustainability and caribou conservation. It is a dual process – science and knowledge inform us of the best management practices, and the implementation of those practices becomes the object of scientific study. It is an ongoing cycle of research, implementation, new research and revised implementation. As we learn more, uncertainties are reduced, and the prospects for caribou conservation and sustainable resource use are improved. Management and science go hand-in-hand. The key strategies in the *Caribou Conservation Plan*, linked and integrated through the adaptive management cycle, are illustrated in Figure 4.

Outlined below are the actions that the Government of Ontario intends to take with respect to the protection and recovery of forest-dwelling Woodland Caribou. These actions are considered important toward achieving the recovery goal and objectives for the species.

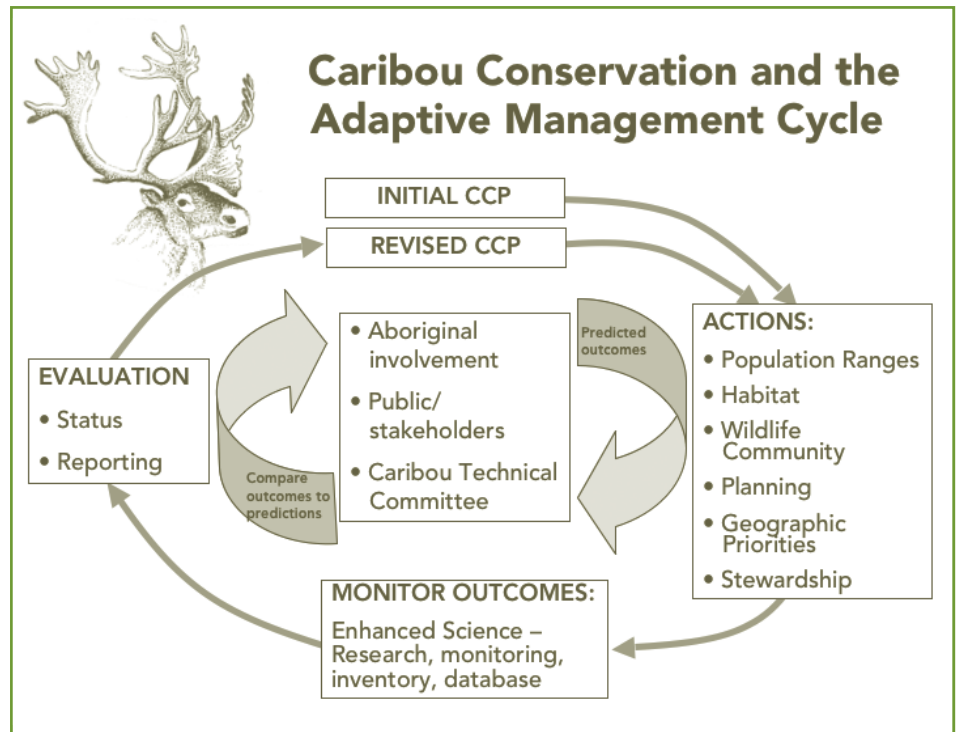


Figure 4. Application of the Adaptive Management Cycle to the Caribou Conservation Plan.

1.0 Enhance Caribou Science

1.1

Ontario is starting a collaborative provincial caribou research program to increase understanding of the response of caribou populations to human-caused disturbance, natural disturbance, and other influences such as predation, habitat quality and quantity. Research will also support implementation of range management (Section 2.0), provide benchmarks for range occupancy, population viability, population dynamics and habitat quality and quantity. It will also inform habitat suitability and population viability models.

1.2

The re-occupancy of previously logged areas by caribou will be studied as part of the broad caribou research program through several initiatives including:

- a broad assessment of caribou re-occupancy of formerly logged habitats, highlighting new science information, lessons learned and recommended adjustments to management;
- research on silvicultural efforts to renew future caribou habitat, including the use of herbicides and silviculture to renew ground lichen after logging; and
- case studies of known caribou reoccupancy of formerly logged areas.

1.3

Research on the establishment and use of thresholds of human disturbance and cumulative impact assessment will be a priority to support land-use planning decisions.

1.4

Ontario will expand current monitoring efforts by establishing a standard provincial caribou monitoring program to provide baseline data on populations, range occupancy, southern edge of continuous distribution, and population health data (e.g. birth and death rates) for Woodland Caribou across the province. This will include the development of standards and protocols for caribou monitoring surveys.

1.5

Ontario will initiate an ongoing population range monitoring program at the local population range level to support range management (Section 2.0). It is anticipated that 1-2 ranges will be monitored annually.

1.6

Ontario will create and maintain a provincial caribou database to store, manage and integrate caribou inventory and monitoring data from all past, current and future sources in support of caribou recovery (within the Natural Resource Values Information System – NRVIS).

1.7

Ontario will establish a Provincial Woodland Caribou Technical Committee to support the implementation of the *Caribou Conservation Plan*. It will provide provincial-level advice on the implementation of Ontario's Woodland Caribou recovery program to the provincial government. Potential members will have professional or technical expertise in areas such as caribou ecology, forest ecology, conservation biology, forest management and Aboriginal Traditional Knowledge.

2.0

Adopt a Range Management Approach

2.1

Ontario will adopt a range management approach to Woodland Caribou recovery. Caribou ranges will be the basis for evaluating habitat conditions and identifying caribou habitat, assessing population trends, and assessing and addressing cumulative impacts. Range management will be the primary approach that sets the spatial and ecological context for planning and management decisions within an adaptive management framework. Management actions will be refined and adapted as new information becomes available. Planning decisions will consider all factors influencing the well-being of caribou within the range including direct and indirect human impacts. MNR policy will be developed to guide implementation.

2.2

Ontario will identify local caribou population ranges, as units of analysis, within the provincial distribution of caribou. Preliminary ranges across the area of southern caribou distribution (within and immediately adjacent to areas licensed for forest management) have been identified for the *Caribou Conservation Plan* (Figure 5), based upon the following criteria (in priority order):

1. Animal survey data – movements, distribution, and evidence of shared geography;
2. Habitat functions and behavioural responses; and
3. Predominant risk factors.

Boundaries will be refined on a criteria-based approach as new scientific and management information and Aboriginal Traditional Knowledge become available, as part of the adaptive management process. Initial efforts will focus on development of a technical support document to further describe implementation of the range management approach, including refinement of the criteria for range delineation and the process for reviewing and modifying range boundaries as required. Local population ranges for more northern areas will be identified by 2012, in consideration of the Far North planning process as additional information becomes available.

2.3

As part of its commitment to range management, Ontario will establish range-specific population-based objectives (e.g. population health measures). Successful achievement of these objectives will require that all management decisions reflect and stay within known thresholds of range-level disturbance (human and natural).

2.4

Ontario will conduct and report on preliminary range assessments for the proposed preliminary ranges (see Figure 5) within the first six months of implementation of the *Caribou Conservation Plan*. Preliminary range assessments will provide the contextual direction for all resource management and land use management planning. These assessments will be based upon the methodology used in the federal Critical Habitat Science Review process tailored to Ontario's situation.²

2.5

Aboriginal Traditional Knowledge will be incorporated where available to support the delineation and refining of caribou ranges.

2.6

Ontario will work with other jurisdictions, in particular – Manitoba, Quebec, Parks Canada and Environment Canada to ensure the effective and co-ordinated management and conservation of local caribou populations and ranges that cross jurisdictional boundaries.

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.

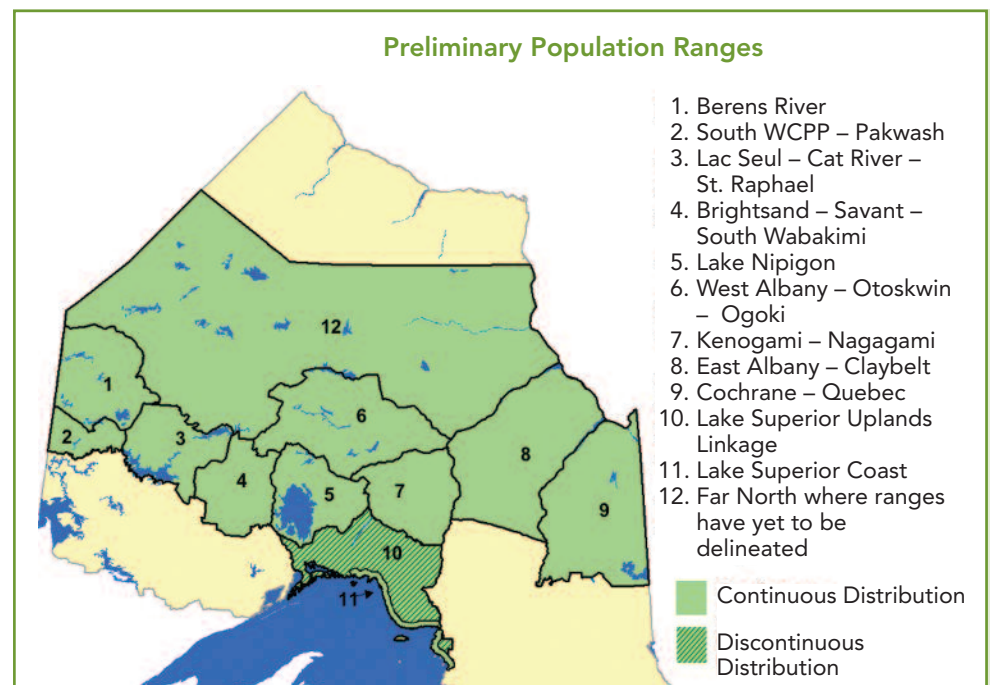


Figure 5. Preliminary delineation of local Woodland Caribou population ranges along the southern edge of the provincial extent of occurrence.

2. Environment Canada. 2009. Scientific review for the identification of critical habitat for woodland caribou (*Rangifer tarandus caribou*), boreal population, in Canada. August 2008. Ottawa: Environment Canada. 72 pp. plus 180 pp. appendices.

3.0 Improve Planning

3.1

Caribou populations and habitat will be important considerations in both the designation of conservation lands in the Far North Planning Area, as well as in the management of the rest of the northern landscape. The Ontario Government has committed to protecting at least 225,000 km² of the Far North Boreal region – this northernmost region represents 43 per cent of Ontario's land mass. Conservation of ecological features and functions, including caribou habitat and populations, will also be integrated into policy and planning tools developed for the Far North Land Use Strategy. Over time, Community Land Use Plans will be prepared in partnership with local First Nation communities to establish land use designations, including areas for protection, in the Far North.

3.2

Refinements will be made to existing land use and resource management planning processes to better incorporate caribou considerations:

3.2.1

The Crown Land Use Policy Atlas will be amended within areas of continuous current caribou distribution to reflect caribou presence and the need for additional consideration of caribou. Policies will include a commitment to consider caribou habitat values in all land use decisions. Land use policies for these areas will be updated as appropriate to incorporate new caribou policy.

3.2.2

Ontario will review Fish and Wildlife Enhanced Management Areas (EMAs) within the area of current caribou distribution to assess their effectiveness for caribou conservation and consider the potential establishment of additional caribou-related EMAs.

3.3

Parks, protected areas and conservation lands will be managed as important components of a broad landscape approach to caribou conservation through the following considerations:

- Caribou values will be considered within existing processes for the creation of new protected areas within areas licensed for forest management;
- Caribou habitat objectives and strategies will be integrated across the boundaries that separate dedicated protected areas from areas licensed for forest management or other development activities; and
- Caribou conservation and recovery will be incorporated into management planning for protected areas within the current distribution of caribou.

3.4

A Habitat Regulation under the *Endangered Species Act, 2007* is being planned to provide sufficient amount and arrangement of Woodland Caribou habitat to support self-sustaining local caribou populations. A landscape approach to habitat conservation would be used under the Habitat Regulation and broader policy and legislative tools to advance caribou conservation and recovery.

3.5

Ontario will provide for and renew caribou habitat during forest management planning by requiring the development of a “dynamic caribou habitat schedule” for each forest management plan. These schedules will be developed for and integrated across all forest management plans within continuous caribou distribution.

3.6

Decision-making will be integrated through processes that support the achievement of caribou habitat requirements. These will be achieved through forestry and other resource management planning processes, and will be consistent with the range management approach.

3.6.1

As part of the broader cumulative impact assessment approach to assessing the impacts of all resource management activities upon caribou (see 3.7), Ontario will implement an “insurance policy” to guide forest management decisions. This policy will link access to future forest tracts for harvesting to current habitat quality and availability, future habitat provision and population status at the population range level (Figure 6). The purpose of this approach is to ensure that there will always be a sufficient level of Woodland Caribou habitat, relative to natural variation, in areas where forest harvesting occurs.

Caribou Insurance Policy

The caribou habitat management approach is being strengthened to provide greater certainty for the provision of future caribou habitat in areas licensed for forest management within areas of continuous population distribution. Because caribou rely on mature and old forests, habitat management must be long-term. Deferrals (forest areas set aside from logging) will not be available for harvest until the following criteria are met:

1. Habitat:

- There must be sufficient amount and arrangement of currently suitable habitat and future habitat
- Based on silvicultural monitoring, logged areas must also be moving toward a suitable future habitat condition

2. Caribou Population Health:

- The local Woodland Caribou population must be viable, based on an assessment, at the local population range level, of caribou presence, population size and trends.

These range-level assessments will be based on the best available information and conducted prior to forest management plan renewal (or changes to long-term management direction). If these criteria are not met, the deferrals will be prolonged until it can be demonstrated that there is sufficient habitat, successful habitat renewal, and a persistent caribou population. Ontario will develop guidelines to address implementation of the caribou insurance policy.

Deferrals:

- Normally constitute 70-80 per cent of the forest landbase – varies by forest management unit;
- Apply to areas licensed for forest management; and
- Current deferral areas typically are not available for harvest for 20 or more years.

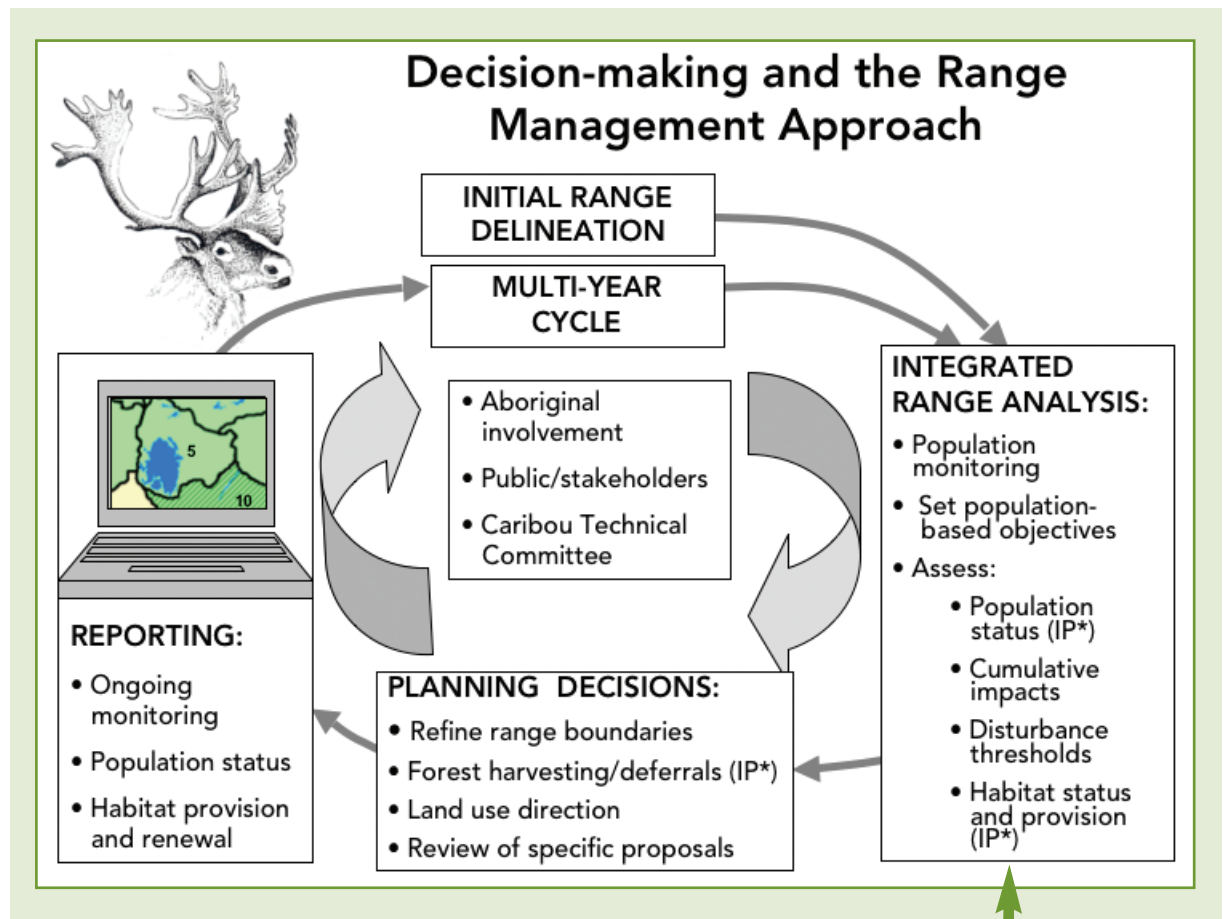
Figure 6. Overview of the caribou insurance policy to support decision making in forest management.

3.6.2

The range management approach will be the key decision-making framework for caribou conservation in broader resource use and management planning decisions through the assessment of cumulative effects (Figure 7). Cumulative impact assessments will occur at both the population range level and an area of assessment centred on the proposed disturbance – Figure 7 illustrates how the cumulative effects approach is implemented through range management planning. This framework will integrate many of the key components of the *Caribou*

Conservation Plan and provide the range assessments (population health status and contributing factors to any negative population trends) necessary to inform resource management decisions including the caribou "insurance policy" (3.6). The status of caribou habitat and populations at the population range level will guide decisions on resource management proposals, potential mitigation, and the need for recovery measures. If a range assessment suggests the need for additional long-term deferrals, they will be considered in the stressed range with potential opportunities to offset any

associated wood supply impacts from adjacent healthier ranges that range assessments have shown can sustain additional harvest.



Integrated Range Analysis:

A Range Management Approach will evaluate range quality in terms of thresholds, probability of persistence and habitat composition and structure.

Evaluations will consider implications to caribou populations and future caribou habitat provision.

Green

- Range status meets or exceeds requirements for caribou population presence; and
- Development and forestry approvals follow established process with consideration of future implications to caribou populations.

Yellow

- Uncertain if range status sufficient to sustain caribou; and
- Development and forestry approvals may have special conditions to address future implications to caribou populations – e.g. best management practices, mitigative measures, etc.

Red

- Range status insufficient to sustain caribou;
- Development and forestry approvals must be geared towards improvements of conditions for caribou;
- Development may not be approved; and
- Land use direction may be reviewed.

Figure 7. Demonstration of the decision-making approach to resource management applied through range management planning.*

* IP – indicates that the feature has a direct link to the insurance policy (3.6.1, Figure 6)

3.6.3

Policy will be developed to guide interpretation and implementation of strategies 3.6.1 and 3.6.2.

Ontario will consider the following in developing supporting policy:

- A regular cycle will be established to conduct population monitoring and cumulative impact assessments for each population range; this will be on a different cycle from the development of Forest Management Plans;
- As population ranges may encompass several forest management units, the habitat and silvicultural criteria of the caribou insurance policy will be applied through the forest management planning process based on information for the specific forest management unit being reviewed;
- The caribou population health criteria in the caribou "insurance policy" will use the best "range level" information available at the time of FMP renewal or amendment; this assessment of population health will also consider factors other than forestry that may be affecting population health; and
- Policy to support implementation of strategy 3.6.1 will require ongoing dialogue between the ministry and forest industry on caribou habitat renewal status, identification of clear and fair science-based standards for performance, minimization of additional "red tape", reporting requirements and industry needs for investment certainty.

3.7

Ontario will develop caribou policy and planning tools to assess the implications of various resource development proposals, both individually and collectively, and assist in the evaluation of potential impacts to caribou population health and persistence.

3.7.1

Until strategic policy direction is available, major land use and development proposals within the area of caribou distribution will be assessed through a screening process. A screening tool will be developed to assess all significant development proposals within the provincial distribution of caribou, by evaluating the implications of the proposed development for caribou and identifying options for avoiding or limiting impacts on caribou.

3.7.2

Cumulative impact assessment will be central to evaluation of the status of caribou population ranges, understanding implications to caribou population health, refining the thresholds of landscape disturbance above which caribou may not survive and making informed decisions on appropriate types and levels of resource uses.

3.7.3

Ontario will develop policy to manage densities (thresholds) of roads and other linear features to support caribou persistence (e.g. maximum km of roads per 100 km²).

3.7.4

Thresholds of human and natural disturbance will be considered in land-use planning decisions. Until research results on thresholds are established, the best available scientific information will be used.

3.8

A range assessment will be conducted and recovery actions subsequently developed for individual population ranges, using the best available science. This integrated analysis will consider trends in population health, cumulative impacts, current habitat availability, prospects for habitat renewal, disturbance and fragmentation. It will also consider current land use and resource management decisions and identify any additional required mitigation measures to provide for the long-term persistence of caribou. This could potentially include additional land use designations and decisions on areas available for harvest or development. Such decisions would include public consultation. This range assessment will ultimately provide the context for implementing the actions outlined in sections 3.5 and 3.6 and 3.7.

3.9

Ontario will work with resource sectors (e.g. forestry, mineral exploration and mining, renewable energy, tourism) and communities (e.g. with respect to major access roads) to increase awareness of the presence of caribou and related planning requirements, and the need to include appropriate caribou mitigation measures in resource development plans.

4.0 Enhance Caribou Habitat

4.1

In areas licensed for forest management within the continuous extent of caribou occurrence, Ontario will ensure that forest management practices fully consider both current and future Woodland Caribou habitat needs, reflecting natural forest conditions and dynamics.

4.1.1

Ontario will manage the quality, quantity and location of caribou habitat in the area of continuous extent of caribou occurrence. Forest management planning will use a variety of tools to provide for caribou habitat, including silviculture, scheduling of harvesting and deferrals, science-based modeling, precautionary planning in the face of natural uncertainty such as wildfire, and a requirement for caribou habitat provision objectives and a dynamic caribou habitat schedule. Direction on minimum and maximum limits for the amount and distribution of habitat will provide for an adequate supply of habitat to be available over time, based upon science-based models of the range of habitat conditions provided through natural disturbances (as being developed for the draft Forest Management Guide for Boreal Landscapes). Forest management plans will demonstrate how planning decisions provide for an uninterrupted supply of year-round caribou habitat within

the limits of natural forest variability, recognizing the influence of both forest harvesting and wildfire.

4.1.2

Ontario will require the effective renewal of caribou habitat through a number of silvicultural initiatives, including:

- A caribou-based objective for silviculture to be included in all forest management plans within the geographic distribution of caribou;
- Use of the Silvicultural Effectiveness Monitoring and Independent Forest Audit programs to assess the effectiveness of forest renewal for caribou, provide recommendations for improvements, and monitor how successfully logged areas are tracking toward a suitable future habitat condition, before any long-term deferrals are made available for harvest; and
- New technical guidance for caribou habitat renewal in forest management guides.

4.1.3

Where caribou distribution is discontinuous (Figure 5), 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.

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.

4.2

Ontario will develop caribou habitat policy so that all resource development and management activities within the geographic distribution of caribou with the potential to affect provision of caribou habitat consider the implications for Woodland Caribou and include appropriate conservation and mitigation measures.

4.2.1

Ontario will develop policy for future primary resource access roads. This will include clear direction and standards for the decommissioning and removal of resource access roads in caribou range where necessary and feasible.

4.2.2

Caribou conservation values will be considered and incorporated where feasible into fire management strategies, planning priorities and processes to address:

- Important elements of habitat that require protection;
- The management of fire to provide future caribou habitat where feasible; and
- The role of prescribed burns in renewing future caribou habitat.

5.0 Manage the Wildlife Community

5.1

White-tailed Deer hunting seasons are being expanded across northern Ontario to help slow deer range expansion within the area of provincial caribou distribution. Deer populations and associated parasites will be monitored to assess trends and their potential impact on caribou populations.

5.2

Ontario will document all known human-caused mortality of caribou, including road kills, poaching, rail kills, and subsistence harvest. This will help to increase knowledge about the extent and significance of all caribou mortality factors in relation to population viability.

5.3

Ontario will review the feasibility of caribou translocations (i.e. the trapping and transferring of animals within Ontario) as a caribou recovery tool for very specific situations, including an assessment of risks and the development of criteria and guidelines, if appropriate. This review will examine lessons learned from past experience in Ontario and elsewhere as well as disease transmission and regulatory considerations. Translocations have been shown to be successful at establishing caribou populations in very specific situations, such as predator-free islands.



Aerial view of a group of caribou in Northern Ontario

5.4

Ontario will assess the relationship between Moose and caribou numbers in order to develop recommended objectives for maximum Moose numbers in Wildlife Management Units within continuous caribou distribution. This process will be implemented through the Moose management program by the establishment of Moose population objectives and harvest management strategies.

5.5

Within the geographic distribution of caribou, populations of predators will be managed primarily by managing habitat and the associated roads to reflect natural forest conditions. This will include the management of land and resource uses to maintain naturally-occurring low densities of prey (e.g. Moose, White-tailed Deer) and predators. Ontario will assess the feasibility and effectiveness of directly and indirectly influencing predator densities in very specific situations, and develop criteria and guidelines for managing the prey-predator balance as required.

6.0 Focus on Geographic Priority Areas

6.1

Ontario will initiate immediate recovery efforts to address the most at-risk local population ranges in the province across the southern edge of continuous caribou distribution (Figure 5) through a range of pilot recovery projects and actions. Pilot projects will include population range delineation and refinement, assessment of population health and landscape disturbance, research studies, inventorying areas requiring road decommissioning and silvicultural improvements, development of cumulative impact assessment tools, and a review of potential recovery actions such as improving landscape connectivity and the potential for caribou transfers. Criteria will be developed to prioritize recovery efforts and ensure that actions focus on the most urgent needs.

7.0 Improve Outreach and Stewardship

7.1

Ontario will provide effective ongoing communications, outreach and engagement in support of caribou conservation and recovery in Ontario.

7.2

Ontario will develop a series of publications on “*Best Management Practices in Caribou Country*” to increase awareness of caribou ecology and conservation practices, and to help mitigate some of the impacts of resource development. Topics will include:

- An explanation of how caribou habitat management is implemented within forest management plans (CCP Implementation);
- Managing cumulative effects among resource sectors in caribou country (an overview);
- Mining in caribou country;
- Renewable energy in caribou country;
- Roads and access planning in caribou country;
- Tourism and outdoor recreation in caribou country (e.g. shore lunches, campsites and boating, sustainable wildlife viewing);
- Caribou screening and decision support tools for resource users in caribou country; and
- Caribou habitat considerations in the area of discontinuous distribution.

7.3

Ontario intends to develop a “*State of the Woodland Caribou Resource Report*” by 2014 to support the review of progress towards recovery, including progress on:

- assessment of caribou populations and habitat conditions for all preliminary ranges;
- what has been learned regarding caribou reoccupancy of formerly logged habitats, including recommendations for improved management; and
- progress made towards recovery actions and commitments made in *Caribou Conservation Plan*.

7.4

Caribou recovery will be based on the best available scientific information. As caribou recovery proceeds, new information from research and monitoring and new recovery tools will become available. This information will be openly shared with the public, user groups and industry partners on an ongoing basis to foster and support caribou recovery through stewardship.

7.5

Individuals and groups involved in caribou stewardship activities will continue to be supported by government through capacity building and funding initiatives.

7.6

Ontario intends to reach out to Aboriginal communities, stakeholders and members of the public to seek additional information on caribou populations and habitat in support of caribou recovery.

7.7

Ontario will ensure ongoing communication with other ministries to better consider and incorporate caribou conservation needs in other resource development initiatives within the geographic distribution of caribou.

8.0

Integrate Aboriginal Traditional Knowledge

8.1

Ontario intends to continue to work in partnership with Aboriginal peoples to increase mutual knowledge and awareness of caribou, and to support caribou conservation through the implementation of the *Caribou Conservation Plan*. Aboriginal Traditional Knowledge will be incorporated in caribou management and research where available.

8.2

Ontario will work with Aboriginal peoples to identify and develop partnership opportunities for caribou research and recovery actions.



Source: John B. Ridley Research Library, Quetico Provincial Park

Pictograph of a caribou in Quetico Provincial Park

Moving Forward ... Implementation

The *Caribou Conservation Plan* is a comprehensive multi-year plan that will apply across the provincial distribution of Woodland Caribou. Woodland Caribou recovery poses a significant conservation challenge – the boreal forest provides many important social and economic benefits, while at the same time, Woodland Caribou persistence is at risk from many of these same human uses and activities. Our decisions about boreal ecosystem management must balance the demand for northern resources, boreal forest health and the needs of Woodland Caribou.

Successful implementation of this plan requires a long-term commitment to an adaptive management approach. Adaptive management involves the ongoing scientific review and evaluation of progress on management actions, and the use of new science and management information to continually review and improve management. Ontario will apply an adaptive management approach to all elements of the *Caribou Conservation Plan* (Figure 4). Range management is the central element of the *Caribou Conservation Plan* that provides the geographical context for the adaptive management approach. It provides a context within which to develop a clear vision of a co-ordinated set of management actions that can achieve a desirable outcome for caribou. Management of local caribou populations and ranges and provincial populations will be refined as research and management activities provide new information, reflecting the adaptive management approach in action.

Climate change has long-term ecological implications for the boreal forest, including caribou persistence. A number of *Caribou Conservation Plan* recovery measures will help Ontario anticipate and respond to some potential future effects of climate change. These include:

- Implementation of integrated management strategies for all members of the deer family that occur in the same area (e.g. 5.1, 5.4). Ontario will respond to changes in cervid populations as caribou are affected by changes in climate;
- Managing the forest landscape within the range of natural variation to emulate natural habitat conditions into the future (4.1.1); and
- Proactive management of forest fires and forest fuels to help maintain older forest habitat and address anticipated more extreme and more frequent storm events (4.2.2).

Due to the comprehensive nature of the *Caribou Conservation Plan*, not all recovery actions will be funded and implemented simultaneously. Implementation will initially focus on the highest priority actions and areas for recovery, building upon these actions in subsequent years. Several initiatives will focus on preliminary local population ranges along the southern edge of continuous distribution (Figure 5) where the tools and techniques will be developed, refined, tested and demonstrated for broader application. A number of other aspects of the *Caribou Conservation Plan* (e.g. research, habitat management, population management, planning, and outreach and communication initiatives) will be implemented over time and on a broader scale. Ontario will develop an implementation plan to help guide priorities for various recovery actions.

This plan will include tools, policies and management approaches that will require further development prior to implementation.

Ontario will work closely with the forest industry to direct the immediate review of all forest management plans (current and in preparation) including the identification of a schedule for revisions and amendments. This will address the adjustments needed to ensure these plans meet commitments for silviculture, dynamic caribou habitat schedule, habitat and road management consistent with direction in the *Caribou Conservation Plan*, as well as the identification and development of key training messages for forest management planning teams. This will result in a Forest Management Plan adjustment schedule.

Ontario intends to continue to work in partnership with Aboriginal peoples, resource industries and other stakeholders to support implementation of the *Caribou Conservation Plan* over time. This will be a long-term commitment. Implementation of some actions may also require further consultation, such as the posting of specific regulation and policy proposals on the Environmental Registry.

Some of the key progress benchmarks for implementation of this plan are identified in Table 1. Specific times and sequencing may be adjusted as a more comprehensive implementation plan is completed, depending upon the availability of resources, staff and expertise.

Table 1. Preliminary Priorities for Implementing the *Caribou Conservation Plan* in the First Five Years

Timing	Key Benchmarks
6 months	■ Initial cumulative effects assessment for all preliminary population ranges. ■ The MNR will work closely with the forest industry to direct the immediate review of all forest management plans (current and in preparation) including the identification of a schedule for revisions and amendments. This will address the adjustments needed to ensure these plans meet commitments for silviculture, dynamic caribou habitat schedule, habitat and road management consistent with direction in the <i>Caribou Conservation Plan</i>, as well as the identification and development of key training messages for forest management planning teams. This will result in a Forest Management Plan adjustment schedule. ■ Documentation of preliminary population ranges and delineation criteria. ■ Finalize <i>Caribou Conservation Plan</i> implementation plan. ■ Development of preliminary screening tool to assess resource development proposals. ■ Establishment and implementation of Provincial Caribou Technical Committee.
1 year	■ Development and distribution of Best Management Practices related to: i) managing cumulative impacts among resource management sectors, and ii) caribou-management requirements within forest management plans. ■ Draft range management policy. ■ Incorporation and implementation of caribou habitat management direction in the Forest Management Guide for Boreal Landscapes. ■ Development of initial dynamic caribou habitat schedules for all forest management units in continuous caribou distribution, and comparisons with existing management direction. ■ Policy and technical guidance on disturbance thresholds analysis for Ontario. ■ Provincial caribou monitoring plan, including protocols and standards. ■ Technical document to provide rationale and support for range management implementation. ■ Full operationalization of the provincial Woodland Caribou database. ■ Interim policy interpretation and decision-making criteria associated with: ■ implementation of caribou “insurance policy”; ■ habitat renewal; ■ road densities; ■ road decommissioning; and ■ caribou screening tool.

Timing	Key Benchmarks
3 years	■ Revised caribou habitat management direction for forest management planning. ■ Amendment of Crown Land Use Policy Atlas to reflect caribou presence and considerations. ■ Dynamic caribou habitat schedules developed, integrated and implemented across all of continuous caribou distribution. ■ Preliminary evaluation of coastal population linkage options to connect discontinuous and continuous range. ■ Identification of preliminary population ranges for all Far North ranges. ■ Plan in place for monitoring, assessment and reporting of human-caused mortality of caribou.
5 years	■ “<i>State of the Woodland Caribou Resource Report</i>” to support the review of progress towards recovery, including progress on: ■ population assessment for all preliminary ranges; ■ what has been learned regarding caribou reoccupancy of formerly logged habitats, including recommendations for improved management; and ■ progress made towards recovery actions and commitments made in <i>Caribou Conservation Plan</i>. ■ Preliminary population assessment complete for all preliminary ranges at southern extent of continuous caribou distribution (e.g. range occupancy, population viability). ■ Formal review of preliminary population ranges (southern distribution). ■ Policy direction on the amount and arrangement of caribou habitat reviewed and amended if necessary.

For More Information

The Recovery Strategy for the Woodland Caribou (*Rangifer tarandus caribou*) (Forest-dwelling, Boreal Population) in Ontario (2008).

<http://www.mnr.gov.on.ca/251755.pdf>

The Report of the Ontario Woodland Caribou Science Review Panel: The Path Forward (2008).

<http://www.mnr.gov.on.ca/251753.pdf>

The Caribou Discussion Paper Keeping Caribou in Ontario (2008).

<http://www.mnr.gov.on.ca/251715.pdf>

Report on the Status of Woodland Caribou in Ontario (1999). Available through the MNR Species at Risk Manager, and Northwest and Northeast MNR offices -

http://www.mnr.gov.on.ca/en/ContactUs/2ColumnSubPage/STEL02_179002.html

COSEWIC Assessment and Update Status Report on the Woodland Caribou *Rangifer tarandus caribou* in Canada (2002).

http://www.sararegistry.gc.ca/virtual_sara/files/cosewic/sr_woodland_caribou_e.pdf



Photo: Tim Timmermann

Female caribou nursing calf

Glossary of Terms

Adaptive Management – Monitoring the implementation of policy, practices and procedures through the use of scientific methods of investigation in order to assess policy effectiveness and adjust management approaches³.

Cervid – a member of the deer family Cervidae; in Ontario native species consist of American Elk, Moose, White-tailed Deer and Woodland Caribou.

Connectivity – A qualitative term describing the degree to which mature and late successional ecosystems are linked to one another to form an interconnected network. The degree of interconnectedness and the characteristics of the linkages vary in natural landscapes based on topography and natural disturbance regime and influence the ability of caribou to move across the landscape for the purpose of breeding or habitat selection. Separation of these linkages results in forest fragmentation and reduced connectivity.⁴

Continuous Distribution – Area of Ontario occupied by Woodland Caribou, where individuals and local populations freely intermingle and mix, and where there are no geographic or human-caused barriers preventing the genetic interchange of populations.

Cumulative Effects – The additive influence of individual habitat disturbances that, when combined together, cause significant change to landscape-level ecological functions for caribou habitat, and/or to the probability of caribou living or persisting in a particular geographic area.

Deferral – Forest areas that form part of the managed landbase in licensed forest management units that are set aside from logging, typically for 20 years or more, as part of a dynamic caribou habitat schedule that plans and provides for an adequate amount of arrangement of habitat.

Decommissioning (Roads) – For roads or road networks where the management intent is to not maintain the road for public use, the physical work that will be undertaken to render the road impassable to vehicular traffic, enhance public safety and reduce potential environmental damage (e.g., removal of water crossings. The roadway will degenerate over time. Active preparation and planting or seeding of the roadbed may also be required for caribou conservation purposes.⁵

Discontinuous Distribution – Area of Ontario occupied by Woodland Caribou, where caribou exist in isolated populations, where individuals and local populations do not freely intermingle and mix, and where there are geographic or human-caused barriers preventing the genetic interchange of populations.

Distribution – see Extent of Occurrence.

Dynamic Caribou Habitat Plan Schedule – A long-term plan for the provision of sustainable year-round caribou habitat in very large interconnected habitat tracts, that is implemented through long-term strategies and operational plans for roads, forest harvesting and forest renewal within acceptable limits of habitat supply and population persistence.

Endangered Species – A species that lives in the wild in Ontario but is facing imminent extinction or extirpation.⁶

Extent of Occurrence – For Ontario, the defined area that encompasses the geographic distribution of all known populations of caribou, based on provincial and territorial distribution maps developed from observation and telemetry data, local knowledge and biophysical analyses.⁷ This includes areas of both continuous and discontinuous distribution.

3. Adapted from Landscape Ecology and Adaptive Management. J.A. Baker. IN Ecology of a Managed Terrestrial Landscape: Patterns and Processes. A.H.Perera, D.L. Euler and I.D. Thompson Editors. UBC Press, Vancouver and Toronto

4. Adapted from B.C. Forest Practices Code Biodiversity Handbook 1995 - <http://www.for.gov.bc.ca/tasb/legsregs/fpc/fpcguide/biodiv/biotoc.htm>.

5. Adapted from Ontario Ministry of Natural Resources *Forest Manual Planning Manual*, 2009

6. *Endangered Species Act*, 2007

Forest-dwelling Woodland Caribou –

An ecological type of Woodland Caribou based upon habitat use and seasonal migratory behaviour. They live year-round in the boreal forest, typically migrate less than 100 km annually between winter and summer ranges (although there is significant variation), and have their calves singly in isolated locations. Designated as “Threatened” in Ontario.

Forest-tundra Woodland Caribou –

An ecological type of Woodland Caribou based upon habitat use and seasonal migratory behaviour. They live in the far north of the province, travel in larger herds, spend the winters in the northern boreal forest and taiga and migrate long distances out to the tundra of the Hudson Bay Lowlands to have their calves, forming large groups of cows and calves. Designated as “Not at Risk” in Ontario.

Government Response Statement (GRS)/Response to a Recovery Strategy –

A statement published by the Minister that summarizes the actions the Ontario government intends to take in response to the recommendations in a recovery strategy and their priorities. This needs to be done within nine months after a recovery strategy has been published.

Habitat – The suite of resources (food, shelter) and environmental conditions (abiotic variables such as temperature, and biotic variables such as competitors and predators) that determine the presence, survival, and reproduction of a population.⁷

Habitat Tracts – Patterns of landforms, vegetation composition, forest age class, and associated caribou use information which are mapped at scales meaningful to the way caribou use the landscape, and reflecting land forms, soils and disturbance regime patterns.

Home Range – The area traveled by an individual animal throughout its annual life cycle, as defined by seasonal movements and occupancy (e.g. summer home range, winter habitat, calving habitat).

Linear Feature – Any long, narrow area that has been cleared of vegetation or otherwise modified by people. Examples such as a road, trail, seismic line or right of way are modifications to the landscape that are typically placed to provide access of one form or another. Features can range in length and width, but all are considered a corridor of some sort.⁴

Local Population – A group of boreal caribou occupying a defined range, defined based upon some knowledge of movements, landscape ecology and physiography. This is the basic unit of conservation and management for Woodland Caribou recovery planning.⁸

Local Population Range – A broad geographical area used and/or required for a self-sustaining local population of Woodland Caribou that provides both present and future habitat needs.⁸

Migration – Seasonal movements of animals between winter and non-winter habitats.

Mitigation – A means of reducing the significance of adverse effects mitigation is “the elimination, reduction or control of the adverse environmental effects of the project, and includes restitution for any damage to the environment caused by such effects through replacement, restoration, compensation or any other means”.⁹

Not at Risk – A species whose status has been assessed and determined to not be at risk.

7. Adapted from Scientific Review for the Identification of Critical Habitat for Woodland Caribou (*Rangifer tarandus caribou*), Boreal Population, in Canada (2009) - http://www.sararegistry.gc.ca/document/default_e.cfm?documentID=1761

8. Recovery Strategy for the Woodland Caribou (*Rangifer tarandus caribou*) (Forest-dwelling, Boreal Population) in Ontario (2008) - <http://www.mnr.gov.on.ca/251755.pdf>

9. Cumulative Effects Assessment Practitioners’ Guide Appendix A Glossary, Canadian Environmental Assessment Agency - http://www.ceaa.gc.ca/013/0001/0004/a_e.htm



Photo: Ted Armstrong

Caribou feeding near shoreline

Persistence – The survival of a population expressed as a given probability or likelihood over a specified time frame. The likelihood of not achieving specified persistence levels is a measure of extinction risk.⁷

Precautionary Principle – A philosophy or planning approach based on the premise that “where there is a threat of significant reduction or loss of biological diversity, lack of full scientific certainty should not be used as a reason for postponing measures to avoid or minimize such a threat.”⁶

Range Management – Recovery actions taken within a local population range to maintain and/or enhance the persistence of a local population of caribou.

Recovery – “The restoration of a species to self-sustaining population level, able to withstand random events and other environmental variables. Thus implies that human activities can be managed and/or habitat restored to allow a species to exist with no or little direct management.”¹⁰

Recovery Strategy – a recovery strategy is a document prepared by species experts that outlines the long-term goals and short-term objectives for recovering a threatened, endangered or extirpated species, based on the best available scientific information. Recovery strategies must be prepared within one year of listing for endangered species and within two years of listing for threatened species. In Ontario, recovery strategies are considered advice to government.

Self-sustaining – A wildlife population that is able to sustain itself naturally in a healthy condition without external intervention or support.

Silviculture – The scientific, creative, and practical use of silvics at the site level to control vegetative species establishment, composition, growth, and stand structure.¹¹

Stewardship – An ethic by which citizens care for our air, land and water as parts of a natural life-support system and collectively act to sustain and enhance it for generations to come.¹²

Threatened Species – A species that lives in the wild in Ontario, is not endangered, but is likely to become endangered if steps are not taken to address factors leading to its extinction or extirpation.⁶

10. Public Discussion Draft Action Plan Boreal Woodland Caribou Conservation in the Northwest Territories 2009-2014 - http://www.nwtwildlife.com/pdf/Caribou%20Action%20Plan_public%20discussion%20draft.pdf

11. Adapted from The Practice of Silviculture: Applied Forest Ecology. D.M. Smith, B.C. Larson, M.J. Kelty and P.M.S. Aston, 1997. John Wiley and Sons Inc., New York

12. Stewardship Strategy for Ontario – Collaboration of Organizations (2007) - http://www.stewardshipcentre.on.ca/index.php/about_sno_0e2ea

