

INTERNATIONAL BOREAL CONSERVATION SCIENCE PANEL

Keeping woodland caribou in the boreal forest: Big challenge, immense opportunity

A science and policy briefing note issued under the auspices of the International Boreal Conservation Science Panel and associates

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The International Boreal Conservation Science Panel is an interdisciplinary team of scientists from the United States and Canada. Its members have a wide range of expertise and experience gained from years of research, conservation and writing about science issues related to North America and many other parts of the world. The panel is jointly concerned with the future of North America's boreal forest and in ensuring that the scientific issues related to the conservation of the boreal forest are clearly articulated to the public and decision makers in government and industry. The panel enlists its member specialists and invited expert associates in producing science and policy briefing notes for issues of major relevance to the future of the boreal forest.

SUMMARY

Woodland caribou are year-round inhabitants of the boreal forest. While the challenges to conserving this threatened species are appreciable, woodland caribou are valued as an indicator of intact boreal forest. Indeed, **because of their need for large tracts of undisturbed forest, measures to protect them are certain to enhance the conservation of many other species.** Caribou are also important culturally, socially and spiritually to many aboriginal peoples who live in Canada's boreal forest.

Current scientific understanding underscores some key elements for conservation. To keep woodland caribou is to:

➔ ***Conserve habitat.***

The decline of woodland caribou stems primarily from loss of their boreal forest habitat.

➔ ***Develop long-term, broad-scale plans.***

Caribou need old forests, typically more than 50 years old, and they range over large areas, often thousands of square kilometres. Managing the boreal forest must occur at commensurate scales in time and space. Planning must consider the long term, in accordance with the long-term consequences of present-day human activities in the boreal forest.

➔ ***Limit disruptions to the boreal forest.***

The viability of a caribou population declines in the midst of disturbances to habitat, whether natural or human-caused. Such disturbances need to be considered cumulatively. Current understanding suggests that disturbed areas must not encompass more than about one-third of a population's range if the population is to persist.

➔ ***Buffer for uncertainty.***

Ensuring a future for woodland caribou populations must include a margin for error, in recognition of many uncertainties and the need to keep management options open. Protected areas provide insurance against unfavourable outcomes as well as a template for evaluating the effectiveness of management prescriptions beyond protected areas' boundaries.



In short, to conserve woodland caribou means dispensing with business as usual, which has demonstrably and repeatedly failed to meet caribou conservation needs. Society must broaden its perspective to match the scales of caribou biology and ecology. **The conventional piecemeal approach to resource development and the reliance on mitigation must be replaced with broad, proactive planning for caribou habitat, now and into the future.**

The conservation of biodiversity is often regarded as reactive. We think of the immense efforts, for example, to halt and reverse species' declines, to restore habitats and to respond to the growing global demand for resources. But occasionally, society is presented with a chance to act proactively and capitalize on a grand opportunity. Such

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is the case for much of Canada's boreal forest—one of the few vast tracts of wilderness left on the planet—and one of its signature inhabitants, the woodland caribou.

Capitalizing on this opportunity, however, means discarding the business-as-usual approach. The biology of woodland caribou poses considerable conservation challenges. This is a creature that reproduces slowly, is very sensitive to disturbances, moves readily across extensive areas, has low-density populations and makes its home in

intact, old forests.¹ Although such hurdles to conserving caribou are biological, others are conceptual. At its heart, keeping woodland caribou—an iconic northern species—demands a fundamentally new way of thinking about conservation. More than anything, woodland caribou present an invitation to realize a new path to resource development and a long-term vision for sustaining multiple values of the boreal forest.

THE CHALLENGE OF CARIBOU

Woodland caribou are in trouble. Once widespread—ranging as far south as the northern United States—forest-dwelling caribou have vanished from half of their historic range in North America, coincident with an expanding, continental front of human settlement and intensive resource exploitation.² Since the mid-19th century, the final glimpses of caribou in each region tell the tale of northward range collapse.



The sequential loss of caribou reads like a map of human expansion into North American woodlands. In Vermont, the last caribou was seen in 1840; in Wisconsin, 1850; the St. Lawrence Valley of Quebec, mid-1800s; Prince Edward Island, 1873; New Hampshire, 1881; Maine, 1910; mainland Nova Scotia, 1912; Cape Breton Island, Nova Scotia, 1925; Michigan, 1931; and Minnesota, 1942.³ **Today, caribou have disappeared**

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from roughly half of their original range in Alberta, Ontario and British Columbia.⁴ In Ontario, from 1880 to 1990, the extinction of caribou crept northward at a rate of 34 kilometres per decade.⁵ These events do not represent a cryptic northward migration by the species, but rather a cascade of local extinctions.

Another signal of the plight of caribou is numerical. Some populations, in northeastern Ontario and central Alberta, for instance, have been declining at 11 percent a year.⁶ This means their numbers have been cut in half roughly every six to seven years. For these reasons, **boreal forest caribou were listed as Threatened in Canada in 2000.**⁷

Significantly, the decline of woodland caribou is primarily the result of habitat loss. This species requires exceptionally large areas of relatively old and intact forest habitat, not only for the slow-growing lichens that serve as winter food, but also for the space to avoid predators.⁸ In spring, for example, adult females scatter across the boreal forest to give birth to their calves. Each female will, on average, select an area of about 16 square kilometres of a relatively undisturbed mix of coniferous forest, peatland or open water.⁹ What is crucial is not just food, but space—room for security and a margin

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of safety away from wolves and black bears, the major predators of woodland caribou.

While it is tempting to regard predators as the culprits in the decline and demise of woodland caribou, the ultimate cause is human activities.¹⁰ After the forest is disturbed, by logging for example, the flush of new vegetation invites increases in the numbers of moose and white-tailed deer. In turn, high numbers of these species lead to increases in the predators and parasites lethal to caribou. Roads



and trails associated with development also open up the forest to wolves and human hunters. In this mix, the security of the boreal forest for caribou fades away, and the caribou population shrinks and recedes progressively northward.

This ensuing impact may not always be immediate. It may take decades for these changes to unfold and for caribou to disappear¹¹: The slow-motion descent into extinction is no less final. Once burned or cleared, a forest will not return to suitable caribou habitat for some 50 years, even when left undisturbed. This underscores the need for long-term planning in resource use. **The consequences of today's actions, or inaction, will reverberate for at least a half-century.**¹²

Gains and losses in caribou populations are finely balanced¹³ and intimately linked to boreal forest conditions. The ability of a female to rear her calf diminishes in the midst of habitat disturbances, such as wildfire and industrial disruptions like logging, mining, oil and gas exploration and the roads to service these activities.¹⁴ The downward slide of a caribou population, once initiated, may continue inexorably without aggressive

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measures such as predator control. But such interventions strike at the symptoms of decline, not their cause. They are halfway responses. Without the protection or restoration of habitat, such costly and intrusive measures would have to become permanent and should be avoided for a host of other reasons.

Unfortunately, some biological attributes of caribou invite delay. Woodland caribou are rarely encountered, and their declines are hard to detect. Because of the delay between

habitat loss and local extinction, a population may persist for decades following habitat degradation.

And the future? A 2008 report by Environment Canada estimated that **only 17 of 57 boreal forest caribou populations had a greater than 50 percent probability of being self-sustaining.** Only two populations, encompassing less than 10 percent of the boreal woodland caribou range, had at least 80 percent probability of being self-sustaining.¹⁵



THE OPPORTUNITY OF CARIBOU

Scale is central to understanding and conserving caribou, both in time and space. Their requirement for old forests (on the scale of many decades) is coupled with their wide-ranging habits (on the scale of whole landscapes). For instance, a female woodland caribou's home range, the area she frequents during her lifetime, typically covers hundreds, even thousands, of square kilometres.¹⁶ A woodland caribou would readily traverse the expanse of Long Island or Prince Edward Island, for instance.

To ensure the survival of these caribou, their populations must be kept viable.

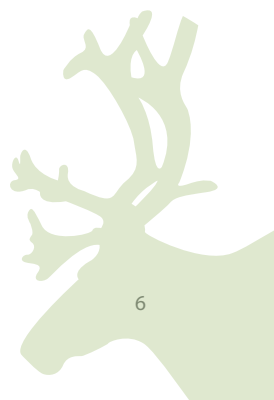
Thus, we need to plan for caribou and the condition of their habitat at the scale of the population range.

Because scale also underlies societal needs and anticipations, caribou represent an opportunity. More than a decade ago, the Canadian Senate Committee on Agriculture and Forestry's Subcommittee on the Boreal Forest emphasized the competing realities about the boreal forest: resource conservation, maintenance of community lifestyles

Keeping caribou may enhance sustainability and community resilience in the long term.

and values, and extraction of economic wealth—a wide range of functions failing to be met. Such competing views can be also traced to mismatches of scale. Indeed, the oft-cited choice between economy and environment is a false one, predicated on a single, narrow scale. The true alternatives are short-term gain versus continued, long-term prosperity.¹⁷ While woodland caribou may be viewed as an impediment to short-term economic exploitation, keeping caribou may enhance sustainability

and community resilience in the long term. **This species is recognized as an indicator of boreal forest intactness** and connectivity and an “umbrella species,” whose conservation enhances the survival of other species. Nevertheless, conserving caribou means tempering societal expectations, particularly in the short term.



THE CONSERVATION OF CARIBOU: KEEPING BIG SPACES, MATURE CONIFEROUS FORESTS

Although the challenge of conserving caribou may look daunting, science indicates that both caribou conservation and resource exploitation are possible—if society

makes room for caribou in the boreal forest in its plans and desires for the future.

When human disturbances begin to accumulate, options dwindle.

For millennia, caribou have lived with disturbances. Fire is a natural feature of the boreal forest. In an otherwise undisturbed forest, provided that the extent and frequency of fires are not too great, caribou will continue to find large tracts of mature, coniferous forest in which to

thrive. When human disturbances begin to accumulate, however, options dwindle for this space-demanding species to manoeuvre. Even the extent of natural fires can turn into a threat. A recent study shows that woodland caribou are able to cope with some disruption of the forest—up to about one-third of their range.¹⁸ But we must keep two crucial points in mind.

- ➔ **The first point is that there is little evidence that caribou distinguish between types of human disturbances—whether logging, seismic lines, settlements, roads, trails, transmission lines, hydroelectric developments or mines.**

Caribou view any of these disruptions as risky and tend to avoid them. What's more, some industrial developments, such as roads, tend to invite others. The implications are clear. Keeping caribou means we must address the many forms of habitat change together, not consider them in isolation. We must assess the total, cumulative impact of industrial development and natural disturbance. The outdated approach of piecemeal planning and rapid exploitation of the boreal forest will not suffice.

- ➔ **The second point is that science is still uncertain on one major question: Will caribou reoccupy old, disturbed tracts of forest? There is no clear answer—yet.** At this point, there are no definitive cases of caribou reinhabiting and surviving in large areas previously disrupted by humans, even when caribou



have been deliberately reintroduced.¹⁹ One possibility is that we have not had enough time to witness disturbed forests age gracefully into good caribou habitat. But the other possibility is that disturbed landscapes will never be afforded the chance to rebound to satisfactory condition. Evidence from the past

Evidence from the past 150 years suggests that the loss of caribou is irreversible.

150 years suggests that the loss of caribou, therefore, is irreversible. Why? After logging, for instance, not all forest stands grow back to their original tree composition.²⁰ Roads, a feature of large-scale industrial development, also tend to become an enduring fixture on the landscape; disturbances tend to accumulate alongside one another.

These compounded uncertainties underscore the need for caution—to act with prudence at least until there is solid evidence that we can manage and restore caribou habitat. The critical knowledge may not be available for a decade or more. **Keeping caribou, therefore, means taking a go-slow approach.** To proceed headlong with industrial exploitation in caribou range in the face of known uncertainties is to risk foreclosing on options.

Buffering for uncertainty is essential. Protected areas can offer insurance against unfavourable outcomes, such as increases in the frequency and severity of fires due to climate change. The biology of caribou suggests that such areas need to be large, not simply to ensure a viable population now, but to withstand and absorb natural disturbances, like forest fires and insect defoliations.

Protected areas need to be large to ensure a viable population and to withstand natural disturbances.

Protected areas are also vital for science. They are the basis for comparison and evaluation of our management actions—a way to learn and improve.

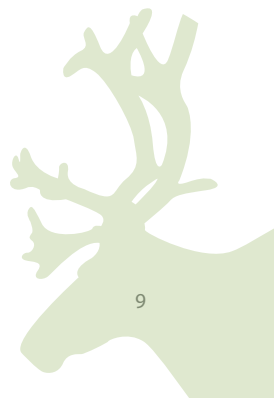
Science suggests that keeping caribou in the boreal forest is achievable. **Society will need a new way of thinking—based particularly on forethought and wisdom—to make it happen.**



GENERAL GUIDANCE

We offer the following caribou-centric recommendations for conservation of the boreal forest with the understanding that these measures be considered as part of comprehensive land-use planning:

- ➔ **Plan at an appropriate spatial scale for caribou that, at 10,000 to 15,000 square kilometres**, often exceeds the size of conventional management units. Where information on resident caribou is insufficient, management units should not be constrained by arbitrary boundaries.
- ➔ **Ensure that the cumulative disturbances of fire and development do not exceed risk levels, which requires that at least two-thirds of caribou population range exists as natural landscapes older than 50 years.** Insurance can be achieved in a variety of ways, including protected areas that regulate disturbances, minimization of habitat disruptions that tend to accumulate piecemeal, and the timely recovery of existing disturbances. Such a strategy must acknowledge and embrace the long-term, dynamic nature of the boreal forest.
- ➔ **As a rule, avoid the reliance on mitigation measures** such as minimizing sensory disturbances that are inadequate to maintain caribou populations. Stated bluntly, the lack of examples of woodland caribou persistence in the midst of industrial activity implies that best-management practices are inadequate.
- ➔ **Plan for uncertainty and buffer against the unexpected.** Avoid venturing to the absolute limits of habitat loss, relying on untested assumptions and failing to leave room for natural disturbances. Such approaches entail great risk and have contributed to past management failures.
- ➔ **Consolidate disturbances; leave large intact areas.** Narrow corridors in disturbed landscapes will not ensure caribou persistence. The absolute amount of suitable, available habitat is paramount and must be extensive.
- ➔ **Understand and anticipate cumulative effects;** forecast future scenarios and their implications for caribou.



- ➔ **Invest in monitoring and research**, both to track how caribou populations are faring in the face of habitat change and to understand how caribou respond under different conditions and management measures. Management must be nimble and responsive to new information.
- ➔ **Ensure that planning efforts are led by communities of the boreal forest**, building on their extensive knowledge of the area and offering creative solutions that will allow for sustainable animal populations and livelihood.

OPPORTUNITIES AND CHALLENGES FOR CARIBOU CONSERVATION

Across the boreal forest, there are many opportunities to apply the principles of caribou conservation. **There are a number of ongoing policy initiatives which, if implemented correctly, could help meet the habitat needs of woodland caribou.** In particular, we highlight:

- ➔ The nearly 29 million hectares within woodland caribou range that the Forest Products Association of Canada member companies have deferred from current logging operations under the recent **Canadian Boreal Forest Agreement (CBFA)**;
- ➔ **Ontario and Quebec**, where provincial governments have pledged to protect 50 percent of northern wilderness, coupled with the urgent need for aboriginal-led land-use planning;
- ➔ **Ontario**, where important lands include those bordering Wabakimi Provincial Park, the forests of the Northeast, and the Ogoki, Kenogami, Trout Lake and Lac Seul forests;
- ➔ **Quebec**, with the Lac-Saint-Jean Region and the large, intact forests identified by the Cree between James Bay/Eeyou Istchee and Lac Mistassini, including in the Broadback Valley, and the Montagnes Blanches region within the Innu territory;
- ➔ Proposed and interim protected areas in the **Northwest Territories** identified through the Northwest Territories Protected Areas Strategy in partnership with



aboriginal governments, following the lead of the Dehcho, where greater than 40 percent of their region is proposed for protected areas status;

- ➔ **British Columbia**, where large intact forest blocks are still occupied by woodland caribou;
- ➔ **Alberta**, where the Lower Athabasca Regional Plan and other land-use planning exercises could help create an overarching caribou protection plan, with special attention to the more intact ranges of the Bistcho, Caribou Mountains, Chinchaga, Red Earth, Steen River/Yates herds, West Side Athabasca River and East Side Athabasca River herds;
- ➔ **Labrador**, with areas beyond the recently established, significant, 10,000-square-kilometre Mealy Mountains National Park;
- ➔ **Manitoba**, with the proposed Pimachiowin Aki World Heritage site that would encompass much of the range of the Atikaki-Berens caribou herd, plus the lands bordering Atikaki Provincial Park and those parts of CBFA signatory company tenures;
- ➔ **Saskatchewan**, with the opportunity for the government to undertake comprehensive review of caribou conservation and challenges, with attention to CBFA signatory company tenures within the Suggi-Amisk-Kississing herd close to Nipawin Provincial Park.

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