

An Analysis of Government Actions for the Protection and Recovery of Forest-dwelling Woodland Caribou (*Rangifer tarandus caribou*) in Ontario, Canada

Christopher J. A. Wilkinson

Office of the Environmental Commissioner of Ontario, Toronto, Canada (chris.wilkinson@eco.on.ca).

Abstract: The Government of Ontario has legal responsibilities to protect and recover the province's population of forest-dwelling woodland caribou, which is classified as a threatened species. Loss and fragmentation of habitat caused by commercial timber harvesting, land clearing, and linear disturbances such as road building have resulted in range recession. Ontario's Woodland Caribou Conservation Plan (2009) serves as the provincial government's response to a recovery strategy. This paper contends that the likelihood of success for this conservation plan is low as it focuses on mitigating rather than eliminating threats, relies on the unproven and circumspect hypothesis that woodland caribou will re-occupy logged habitat, and lacks clarity and details on implementation. Sound government action focused on protection and recovery is needed to prevent the imperilment and extirpation of this species at risk.

Key words: woodland caribou, species at risk, recovery planning, government policy, environmental law, monitoring, habitat.

Rangifer, 30 (1): 67 - 77

Introduction

In October 2009, the Ministry of Natural Resources (2009) (MNR) released its finalized Ontario's Woodland Caribou Conservation Plan. The forest-dwelling boreal population of woodland caribou is classified as a "threatened species" under the province's *Endangered Species Act, 2007*. This conservation plan outlines the measures the Government of Ontario intends to take to protect and recover this species at risk and its habitat. This population also is listed as a threatened species by the Government of Canada under the federal *Species at Risk Act*. Declines of woodland caribou populations are

widespread in the circumpolar North and are not restricted to this region of Canada (Hummel & Ray, 2008; Vors & Boyce, 2009).

It is estimated that 20 000 woodland caribou remain in Ontario, of which approximately one quarter inhabit the boreal forest and are described as the "forest-dwelling" population (Ontario Woodland Caribou Recovery Team, 2006:18). Approximately 3000 forest-dwelling woodland caribou remain in the area set aside for commercial forestry, south of roughly 51°N. However, available estimates of the numbers of woodland caribou in Ontario are

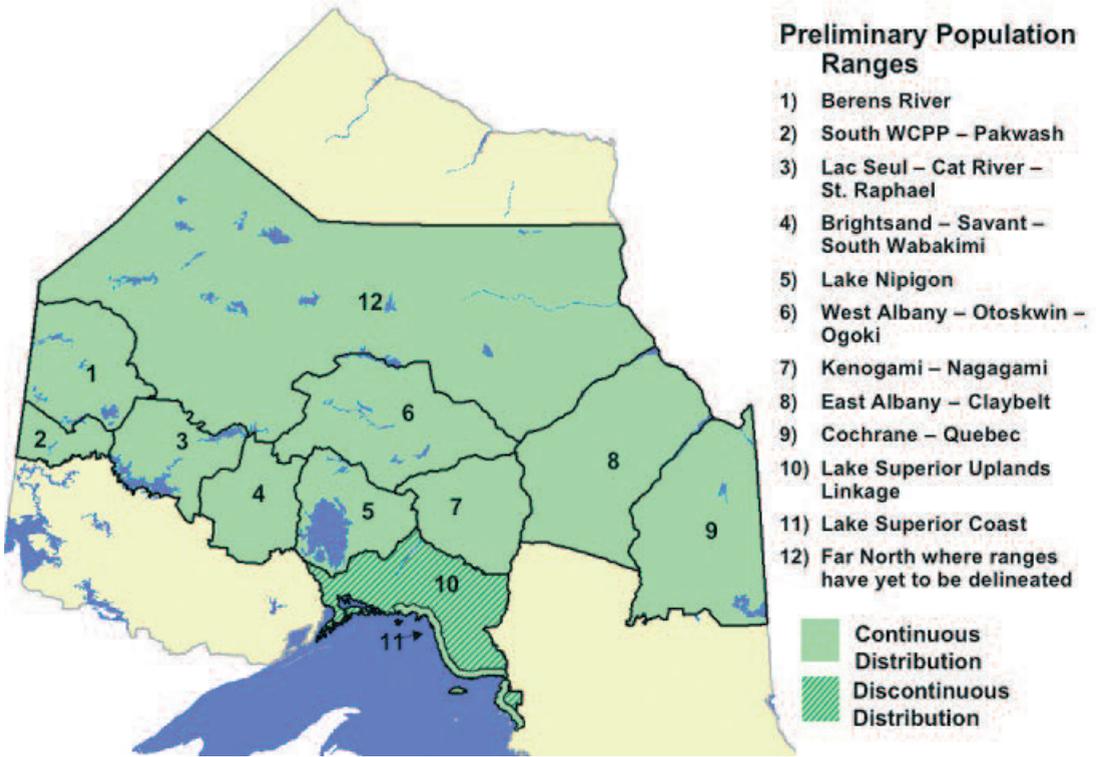


Fig. 1. Preliminary population ranges of the forest-dwelling population of woodland caribou outlined in the Ministry of Natural Resources' NR's (2009) Ontario's Caribou Conservation Plan. The conservation plan applies to the continuous (shaded area) and discontinuous (hatched area) range of the forest-dwelling population of woodland caribou. It does not include the range of the forest-tundra population of woodland caribou in the northernmost part of Ontario.

essentially guesses due to the lack of monitoring (Thomas & Gray, 2002:42). The majority of Ontario's woodland caribou are part of the "forest-tundra" population; this population is currently under assessment by the Committee on the Status of Species at Risk in Ontario (2009:19) to determine if it too should be identified as at-risk.

The forest-dwelling boreal population of woodland caribou has lost approximately half its range in the province since the end of the 19th century and is now found mainly north of Hearst and Dryden above 49° latitude north (Darby *et al.*, 1989; Ontario Woodland Caribou Recovery Team, 2008). This massive range contraction has resulted in the loss of

approximately 35 000 km² of habitat per decade in Ontario over the last century, equating to a northward range recession of roughly 34 km per decade (Schaefer, 2003). A driving cause of this range recession is the loss, fragmentation, and alteration of forested habitat caused by commercial forestry, land clearing, and linear disturbances such as road building (Bowman *et al.*, 2010, Ontario Woodland Caribou Recovery Team, 2008; Hesselenk *et al.*, 2008). Other threats include the effects of climate change, the alteration of natural forest fire cycles, changes to predator-prey dynamics, and disease transmission from other ungulates (Bowman *et al.*, 2010).

Policy Context

Ontario's Woodland Caribou Conservation Plan (2009) serves as the provincial government's response to the recovery strategy that was finalized in July 2008 (see Ontario Woodland Caribou Recovery Team, 2008). The recovery strategy was initiated in 2001 and prepared by the Ontario Woodland Caribou Recovery Team, which was largely composed of MNR staff. The recovery strategy took seven years to complete, setting back the timing of this conservation plan which was originally to be released in 2007 (see Environmental Commissioner of Ontario, 2009:24).

The *Endangered Species Act, 2007* intends that recovery strategies are to be drafted by impartial experts and serve as advice to government on how to best protect a species at risk (see Environmental Commissioner of Ontario, 2009:22). MNR is then legally required to prepare a finalized government response within nine months. It is only at this step that social and economic factors may be considered.

The Environmental Commissioner of Ontario (2007:75-81) raised multiple concerns with the draft woodland caribou recovery strategy. A critical flaw was the recovery strategy's failure to identify habitat that needed to be protected. The Environmental Commissioner of Ontario (2007:80) described the recovery strategy's approach as the maintenance of the *status quo* and a further delay in taking tangible recovery action. The Environmental Commissioner of Ontario (2007:80) also was critical that MNR's (2006:27) primary measure to "protect" this species at risk was a set of forestry guidelines on how to progressively log its habitat.

In early 2008, the Minister of Natural Resources struck an arms-length Woodland Caribou Science Review Panel to review the scientific basis for the recovery strategy's recommendations. This panel's report was released in May 2008, concluding that the

recovery strategy is "reasonably sound" and "consistent with current scientific understanding of caribou biology" (Suffling *et al.*, 2008:5). However, the panel also commented that the recovery strategy's "objectives and approaches are largely fitted into the existing policy and management framework. Thus, the overall approach is piecemeal and will ultimately fail" (Suffling *et al.*, 2008:6). The panel also noted that it "fails to confront the central land use planning issues crucial to the success of a recovery strategy" (Suffling *et al.*, 2008:4). Moreover, the panel noted that the recovery strategy "demonstrates over-confidence in the capacity of habitat management to effectively protect caribou, given that it relies on the untested hypothesis that caribou will eventually return to use industrially logged areas" (Suffling *et al.*, 2008:6).

Components of the Conservation Plan

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, improve security and connections among isolated mainland local populations, and facilitate the return of caribou to strategic areas near their current extent of occurrence" (MNR, 2009:2). While laudable, the conservation plan does not contain the necessary measures to give confidence that this goal will be achieved.

Enhance Caribou Science

The conservation plan focuses its caribou research program not on how to protect caribou or safeguard their habitat *per se*, but, rather, on trying to validate the untested hypothesis that woodland caribou will re-occupy habitat that has been commercially logged. The research program will include:

- a broad assessment of caribou re-occupancy of formerly logged habitats;
- research on silvicultural efforts and the use of herbicides to renew future caribou habitat;
- case studies of known caribou re-occupancy of formerly logged habitat; and,
- research on the establishment and use of thresholds of human disturbance and cumulative impact assessment.

MNR also will conduct a broader monitoring program to establish baseline data. This program will collect data on population sizes and health, range occupancy, and southern edge of continuous distribution. The conservation plan is vague as to who is responsible for the various monitoring programs, leaving it unclear as to what roles the ministry and the forest industry hold. In contrast to the proposed use of five recovery implementation groups as recommended in the recovery strategy, a single Provincial Woodland Caribou Technical Committee will be created to support implementation of the conservation plan.

Adopt a Range Management Approach

MNR will use a “range management approach” in which discreet areas will serve as the ecological context for planning and management decisions (see Fig. 1). These areas will be used “for evaluating habitat conditions and identifying caribou habitat, assessing population trends, and assessing and addressing cumulative impacts” (MNR, 2009:8). The conservation plan identifies 12 preliminary population ranges, although existing boundaries may later be refined. The ministry will identify local population ranges for the Far North by 2012, as well as a management strategy for discontinuous range by an unspecified date. These discreet ranges will be used by the ministry to establish range-specific population objectives. The conservation plan acknowledges that the

success of range-specific management will require that management decisions “stay within known thresholds of range-level disturbance (human and natural)” (MNR, 2009:9).

Improve Planning

The conservation plan does not provide any hard commitments or timelines to permanently set-aside and protect the habitat of the forest-dwelling population of woodland caribou (see Schaefer & Mahoney, 2003; Vors, 2006). Instead, the conservation plan focuses on actively managing habitat by mitigating the impacts of development on a case-specific and range-specific basis. In contrast, Boutin *et al.* (2006:3) note that even “[l]ow levels of industrial development within a woodland caribou range may threaten the viability of the herd” and effects are likely permanent.

A central purpose of the conservation plan, as envisaged by the *Endangered Species Act, 2007*, should be to address the area of habitat that the Minister of Natural Resources intends to regulate, in order to protect it from damage or destruction. However, the conservation plan deflects this issue, noting that a regulation is being planned “to provide a sufficient amount and arrangement” of habitat (MNR, 2009:10). This lack of direction for the regulation of woodland caribou habitat is problematic given that it is the law’s intent that a chief purpose of any such plan is to address it.

The conservation plan makes many vague allusions about what MNR’s actual actions might be for woodland caribou. For example, the conservation plan states that a “landscape approach to habitat conservation” will be used in a forthcoming habitat regulation (MNR, 2009:10). It also states that habitat will be provided for and renewed during the forest management planning process by requiring a new “dynamic caribou habitat schedule” (MNR, 2009:10). It can only be guessed whether these statements are references to the Forest Man-

agement Guide for Boreal Landscapes, which MNR targeted for release in 2007, but now will not release until 2012 (see Environmental Commissioner of Ontario, 2009:24).

The conservation plan refers to the Premier of Ontario's (2008) commitment to protect at least 225 000 km² of the Far North. This commitment is dependent on the Ontario legislature passing and proclaiming Bill 191 (*Far North Planning and Protection Act, 2009*). If passed, this legislation should have an enormous impact on woodland caribou. It will likely have both benefits for this species at risk by creating some manner of new protected areas, but it will also set the stage for increased commercial forestry and other industrial operations in this part of Ontario. However, the conservation plan contains little discussion of how these new protected areas would align with woodland caribou conservation given the large spatial requirements of the species. This omission cannot be overstated in its gravity as, "Based on current knowledge, it is likely necessary to protect entire herd ranges from industrial activity to sustain caribou populations" (Boutin *et al.*, 2006:4).

The conservation plan assumes development will proceed in woodland caribou ranges, although special conditions may be applied on a case-by-case basis. First, this approach is reliant on MNR, and presumably other relevant ministries, developing a broad array of policies. Second, it also requires MNR to first obtain baseline data, such as population and habitat status, for each of the 12 preliminary ranges, and then assess acceptable levels of disturbance. Third, this approach would require effective interim actions that would address threats and safeguard habitat until baseline data is obtained and policies are finalized, which the conservation plan lacks. Therefore, given MNR's checkered history in developing policies for woodland caribou or monitoring their status, it is disconcerting that so many

key details have been off-loaded to the future (Wilkinson, 2008).

Crown land use planning is referred to in the conservation plan in vague and non-committal terms. The conservation plan states that "caribou habitat values" in the areas of continuous distribution will be "considered" in all land use decisions (MNR, 2009:10). It also states that "caribou values" will be "considered" within the existing processes for the creation of new protected areas within the area currently licensed for commercial forestry (MNR, 2009:10). This weak language, coupled with a lack of definitions, leaves no choice except to guess about the possible land use planning implications for woodland caribou.

The concept of a "caribou insurance policy" is introduced in the conservation plan to guide forest management decisions (MNR, 2009:11). The conservation plan states that "deferrals" – areas not yet logged – will not be available for harvesting until these criteria are met:

- 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; and,
- 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.

The conservation plan provides no explanation of key terms in this new policy direction, such as what constitutes a "sufficient amount" or what an "arrangement of currently suitable habitat" might be. While the conservation plan indicates that guidelines will be developed at a later date to clarify the implementation of the "caribou insurance policy," this delay adds yet more confusion to the unanswered question of how commercial forestry under the *Crown*

Forest Sustainability Act, 1994 is ecologically compatible with the protection of woodland caribou habitat under the *Endangered Species Act, 2007*.

Cumulative impact assessment, at both the population range level and the area of the proposed disturbance, will be the framework for “resource use and management planning decisions” (MNR, 2009:11) In addition, integrated range analysis will be used for population monitoring, determining population objectives and status, assessing cumulative impacts and disturbance thresholds, and determining habitat status. Until “strategic policy direction is available,” the conservation plan outlines one of three scenarios that would occur under this screening process for development and forestry approvals. These scenarios range from ‘green’ (development proceeds) to ‘yellow’ (development may require special approvals) to ‘red’ (development may not be approved or it should geared towards improvements for caribou).

The conservation plan is ambiguous with regard to how cumulative impact assessment will be implemented and how planning decisions will be made. First, it does not provide any examples of the types of activities that this assessment would apply to. Logically, to be of any value, such assessment would apply to all activities that potentially generate disturbance(s) such as mineral staking and development, road and rail-line construction, hydroelectric corridors and other infrastructure.

Range recession has occurred in Ontario as a result of the northward push of industrial development (Darby *et al.*, 1989; Environmental Commissioner of Ontario, 2007; Schaefer, 2003; Vors *et al.*, 2007; Wilkinson, 2008). However, the conservation plan assumes that development can be made compatible through mechanisms such as “special conditions” in the approvals process. This process seemingly makes it very difficult to reach a “no” and deny

a development proposal that would negatively impact woodland caribou and their habitat.

Second, it is unclear how this assessment will actually be applied by the various ministries of the Government of Ontario. Given that the conservation plan is intended by law to contain the actions that the Government of Ontario government will take – not just MNR – it must be assumed that amendments to the various approvals processes of other ministries will occur in order for this cumulative impact assessment to have any practical and legal effect. Moreover, the conservation plan is unclear how this decision-making framework will be applied when no approvals processes exist *per se*, such as mineral staking under the *Mining Act* that is overseen by the Ministry of Northern Development, Mines, and Forestry (MNDMF).

Another element the conservation plan attempts to address is roads and other linear disturbances, which presumably includes features such as hydroelectric power lines and rail-lines. Although the conservation plan does not specify by whom and when, it states that a policy will be developed to manage densities of linear disturbances. While the density of linear disturbances is an important consideration, it is important to note that their distribution or pattern is equally important. Even when taking this overall approach of mitigating development, rather than eliminating key threats, the conservation plan does not appear to acknowledge that the proximity to threats is a key variable (see Hesselink *et al.*, 2008; Hesselink, 2009). For example, the overall density of roads within a given caribou range is moot if a single linear corridor transects the middle of occupied habitat or an important ecological feature such as a calving ground. Research suggests that buffers from human disturbances should be more than an order of magnitude higher than what is directed by past MNR policy, as woodland caribou require at least 13 km

of intact forest separating them from activities such as logging (Vors *et al.*, 2007).

Enhance Caribou Habitat

This section of the conservation plan focuses on woodland caribou habitat in areas that already are licensed for commercial forestry. Similar to other sections of the conservation plan, it largely focuses on mitigating the impacts of forestry as the means to “enhance” habitat. The conservation plan states that silviculture, scheduling of harvesting and deferrals, and modeling will be used in forest management planning. Additionally, a requirement for caribou habitat provision objectives and a dynamic caribou habitat schedule will be included in forest management plans.

Forest management plans will include “minimum and maximum limits for the amount and distribution of habitat” to provide for “an adequate supply of habitat” (MNR, 2009:14). The very concept of “maximum limits” for woodland caribou habitat is inconsistent with the stated goal of the conservation plan, as well as the basic intent of the *Endangered Species Act, 2007*. Instead of treating it as a species at risk of extirpation whose habitat should be protected, this approach treats woodland caribou as an ordinary forestry “value” that has to be planned around during the forest management planning process under the *Crown Forest Sustainability Act, 1994*.

The conservation plan refers to the unreleased Forest Management Guide for Boreal Landscapes, but provides little information as to its exact application. While it sometimes may be reasonable to refer to policy that has yet to be developed, MNR has a long history of referring to policies that do not yet formally exist to allay public concerns of what actions it is taking to conserve woodland caribou (Environmental Commissioner of Ontario, 2009; Wilkinson, 2008). The conservation plan separately refers to the development of “new tech-

nical guidance for caribou habitat renewal in forest management guides” (MNR, 2009:14). Again, it is unclear exactly what the conservation plan is referring to, be it the aforementioned forest management guide or something completely different.

This section also refers to developing a roads policy, at an unspecified time in the future, that will “include clear direction and standards for the decommissioning and removal of resource access roads in caribou range where necessary and feasible” (MNR, 2009:14). This type of policy, if developed and implemented in a timely manner, would be a positive step forward.

The conservation plan states that it will “look for opportunities” through forest management planning and other land use planning to improve connectivity in discontinuous woodland caribou range (MNR, 2009:14). While this statement is laudable, there is no further information to explain how or when this action would be achieved.

Manage the Wildlife Community

The northward range expansion of moose and deer, caused in part by MNR’s own forest management guidelines, has a variety of negative effects on woodland caribou (Environmental Commissioner of Ontario, 2007; Wilkinson, 2008; Bowman *et al.*, 2010). These effects include the facilitation of the transmission of a parasite that causes mortality in caribou, as well as the alteration of pre-existing predator-prey dynamics. The conservation plan states that white-tailed deer seasons are “being expanded across northern Ontario to help slow deer range expansion” within woodland caribou range (MNR, 2009:15). It also states that MNR (2009:15) will “assess the relationship between moose and caribou numbers” to develop objectives for maximum moose numbers in areas of continuous woodland caribou range. The conservation plan provides no ad-

ditional detail on how or when these actions will be undertaken. The Environmental Commissioner of Ontario (2007:78) previously commented on this very issue, stating, “MNR should aim to achieve pre-anthropogenic disturbance population levels of moose when setting quotas within occupied woodland caribou range and where re-colonization of woodland caribou is feasible.”

The conservation plan also opens the door to the culling of grey wolf (*Canis lupus*) populations and other predators. It states, “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” (MNR, 2009:15). Such an approach would be ecologically indefensible and the historical mismanagement of woodland caribou cannot be remedied in the future by killing off grey wolves (Wilkinson, 2008).

Improve Outreach and Stewardship

A series of best management practice guides will be published to increase awareness of woodland caribou ecology, as well as “to help mitigate some of the impacts of resource development” (MNR, 2009:16). The conservation plan states that topics will include habitat management in forest management planning, managing cumulative impacts among different resource sectors, mining, renewable energy, road and access planning, tourism, screening and decision support tools for resource users, and habitat considerations in the area of discontinuous distribution. The conservation plan does not specify whether they will be posted on the Environmental Registry for the purposes of public notification and comment.

The discussion of outreach and stewardship reflects the confused nature of the conservation plan. It states, “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” (MNR, 2009:17). This language implies that only MNR has direct responsibilities to protect and recover this species at risk. In contrast, the *Endangered Species Act, 2007* states that this conservation plan is required to summarize the actions that “the Government of Ontario intends to take in response to the recovery strategy and the Government’s priorities with respect to taking those actions.” Instead, the specific role of other relevant ministries – such as the Ministry of Northern Development, Mines and Forestry (MNDMF); the Ministry of the Environment (MOE); and, the Ministry of Energy and Infrastructure (MEI) – is vague at the very best. The conservation plan should have clearly outlined the responsibilities of all applicable ministries of the Government of Ontario.

Conclusion

The Government of Ontario has struggled for decades with how to deal with woodland caribou. It has avoided making the tough policy choices that would provide a basis for coherent actions and practical steps to protect and recover this threatened species and its habitat. Ontario’s Woodland Caribou Conservation Plan focuses almost exclusively on mitigating rather than eliminating threats to this species at risk. It provides little reassurance that woodland caribou will not be extirpated from Ontario by the end of the 21st century (see Environmental Commissioner of 2007, Schaefer, 2003, Wilkinson, 2008). It fails to take a precautionary approach, all but ignoring why the forest-dwelling population of woodland caribou became at-risk. Ignoring history is the antithesis of caution.

MNR (2009:1) touts this conservation plan as “science-based.” The central pervading assumptions of the conservation plan are that

development can be tweaked to mitigate disturbances and, at some point in the future, woodland caribou will re-occupy habitat that has been impacted by development. In effect, this approach is the very *status quo* that has caused the northward range recession of woodland caribou. Boutin *et al.*, (2006:3-4) note that “there is no evidence of a woodland caribou herd successfully recolonizing an area after industrial activity has occurred” and that “practices that minimize the footprint caused by industrial activity are unlikely to protect woodland caribou populations.”

The conservation plan’s emphasis on testing whether woodland caribou will re-occupy logged habitat is of great concern. While the science panel did generally support research that would test this hypothesis, it cautioned that “resource extraction should never be justified under the guise of research” (Suffling *et al.*, 2008:10). Testing this hypothesis in the parts of the area of undertaking for commercial forestry (see Rodgers *et al.*, 2007) that have already been logged – essentially the middle third of the Province of Ontario – is starkly different from how MNR should approach the management of intact forest. If commercial forestry is to be approved north of the current cut-line for the northern-third of Ontario, as envisioned by Bill 191 (*Far North Act*, 2009), MNR’s approach contains an inordinate amount of risk and gambles with woodland caribou habitat. This risk is underscored by the approximate 20-year time lag between forest harvesting and range recession (Ontario Woodland Caribou Recovery Team, 2006; Vors *et al.*, 2007).

It is inexcusable that MNR has failed to develop and implement a monitoring program to-date for woodland caribou. Without such monitoring, it is impossible to detect failure and whether a program is achieving its objectives. In this case, failure is the continued loss of woodland caribou and their habitat. The

Environmental Commissioner of Ontario (2002:53) first called for a monitoring program in 2001/2002 Annual Report, calling the ministry’s approach to forestry a “grand experiment” and that properly understanding the “impacts of forestry operations on the boreal population of woodland caribou is dependent on effective monitoring.” The lack of monitoring data has also raised in multiple independent forest audits that are required by *Crown Forest Sustainability Act, 1994* (Arbex Forest Resource Consultants Ltd., 2006; KBM Forestry Consultants Inc., 2006a; 2006b; Callaghan and Associates Inc., 2001; 2002; BioForest Technologies Inc., 2003).

Little or no direction is provided in the conservation plan about if, when or how woodland caribou habitat will actually be set-aside and protected. The Government of Ontario had committed to passing a species-specific habitat regulation under the *Endangered Species Act, 2007* for the forest-dwelling population of woodland caribou by June 2009. This commitment was not fulfilled. Indeed, the conservation plan appears to place little value or urgency on permanently protecting habitat for this threatened species. Given the conservation plan’s overriding assumption that development can proceed under most conditions, the forthcoming habitat regulation will likely be of limited conservation value for protecting woodland caribou habitat.

The conservation plan causes arguably even greater uncertainty for all concerned stakeholders and, more importantly, for the survival of woodland caribou. It frequently uses ambiguous and vague language, without any supporting explanation of key terms. Moreover, the conservation plan off-loads many key policy decisions to the future, making it more like a faith-based approach rather than a “science-based” approach (MNR, 2009:1). As a result, stakeholders can only hope that key details will be worked out. It also reduces many important

concepts to the level of jargon, such as the precautionary principle and ecosystem-based management.

The conservation plan states that its success – the protection and recovery of woodland caribou – will require “a long-term commitment to an adaptive management approach” (MNR, 2009:18). However, it also states that “not all recovery actions will be funded and implemented simultaneously” (MNR, 2009:18). While it is reasonable to initially focus on high priority actions, such as addressing local population ranges along the southern edge of continuous distribution, it is critical that the Government of Ontario provide the necessary resources to support all aspects of protecting and recovering this species at risk in the long-term. The science panel cautioned that “monitoring is extremely vulnerable to cuts in funding and the exigencies of new government priorities. Arbitrary changes in support can seriously impair, or ruin, the stream of management information” (Suffling *et al.*, 2008:13).

Many aspects of the conservation plan lack timelines. This problem is compounded by the historical failure of MNR to meet many, if not all, self-imposed timelines related to actions for woodland caribou (Environmental Commissioner of Ontario, 2009:24). Reference is made to the finalization of an “implementation plan” by April 2010, which might fill in some details that are lacking in the conservation plan. However, as of that date, the ministry had not released an implementation plan. The repeated pattern of putting off key decisions to future dates is not reassuring. The Auditor General of Ontario (2007:145-146) noted that such delays by MNR to implement recovery actions for woodland caribou may result “in a more serious classification on the list of species at risk in Ontario, such as endangered or extirpated.”

It is troubling that the Minister of Natural Resources failed to complete Ontario’s Woodland Caribou Conservation Plan in the legally required time. Although the finalized caribou conservation plan was required by *Endangered Species Act, 2007* to have been released by April 2009, it was not released until October 2009. Given that this was the first species to go through the recovery planning process since the *Endangered Species Act, 2007* was proclaimed, it is a troubling precedent for the recovery planning of other species at risk that the law was breached in this manner.

Acknowledgements

This paper was originally written in a different form for presentation to the Legislative Assembly of Ontario in the 2009/2010 Annual Report of the Environmental Commissioner of Ontario. The author wishes to express his gratitude to Gord Miller, Tyler Schulz, and several anonymous reviewers for their helpful comments during the preparation of this paper.

References

- Arbex Forest Resource Consultants Ltd. 2006. *Cochrane Moose River Management Unit, Independent Forest Audit, 2000-2005*. Queen’s Printer, Toronto, Ontario. 191pp.
- Auditor General of Ontario. 2007. *2007 Annual Report of the Office of the Auditor General of Ontario*. Queen’s Printer, Toronto, Ontario. 494pp.
- BioForest Technologies Inc. 2003. *An Independent Audit of Forest Management on the Nagagami Forest for the Period 1997 to 2002*. Queen’s Printer, Toronto, Ontario. 145pp.
- Boutin, S., C. Carlson, S. Elgie, J. Ouellet, K. Parker, J. Ray, J. Schaefer, F. Schmiegelow, & J. Weaver. 2006. Canadian Boreal Institute/Wildlife Conservation Society Woodland Caribou Expert Workshop Summary. Unpubl. 5pp.
- Bowman, J., J.C. Ray, A.J. Magoun, D.S. Johnson, & F.N. Dawson. 2010. Roads, logging, and the large-mammal community of an eastern Canadian boreal forest. – *Canadian Journal of Zoology* 88: 454-467.
- Callaghan and Associates Inc. 2001. *Caribou Forest, Independent Forest Audit (April 1, 1999 – March 31, 2004)*. Queen’s Printer, Toronto, Ontario. 92pp.
- Callaghan and Associates Inc. 2002. *An Independent Audit of Forest Management on the Lake Nipigon and Auden Forests for the Period 1996 to 2001*. Queen’s Printer, Toronto, Ontario. 137pp.

- Committee on the Status of Species at Risk in Ontario. 2009. *2009 Annual Report from the Committee on the Status of Species at Risk in Ontario (COSSARO) to the Minister of Natural Resources*. Queen's Printer, Toronto, Ontario. 20pp.
- Darby, W.R., Timmermann, H.R., Snider, J.B., Abraham, K.F., Stefanski, R.A., & C. A. Johnson. 1989. *Woodland caribou in Ontario. Background to a policy*. Queen's Printer, Toronto, Ontario.
- Environment Canada. 2008. *Scientific Review for the Identification of Critical Habitat for Woodland Caribou (Rangifer tarandus caribou), Boreal Population, in Canada. August 2008*. Environment Canada, Ottawa, Ontario. 72pp.
- Environmental Commissioner of Ontario. 2002. *Developing Sustainability. Environmental Commissioner of Ontario 2001-2002 Annual Report*. Queen's Printer, Toronto, Ontario. 191pp.
- Environmental Commissioner of Ontario. 2007. *Reconciling Our Priorities. Environmental Commissioner of Ontario 2006-2007 Annual Report*. Queen's Printer, Toronto, Ontario. 228pp.
- Environmental Commissioner of Ontario. 2009. *The Last Line of Defence. A Review of Ontario's New Protections for Species at Risk. A Special Report to the Legislative Assembly of Ontario*. Queen's Printer, Toronto, Ontario. 68pp.
- Hesselink, T., D. Pearce, L. Vors & J. Snider. 2008. *Caribou: Holding the Line in Northeastern Ontario*. CPAWS Wildlands League. 58pp.
- Hesselink, T. 2009. *A Snapshot of Caribou Range Condition in Ontario*. CPAWS Wildlands League.
- Hummel, M. & Ray, J.C. 2008. *Caribou and the North: A Shared Future*. Dundum Press, Toronto, Ontario. 288pp.
- KBM Forestry Consultants Inc. 2006a. *Kenogami Forest, Independent Forest Audit, 2000-2005*. Queen's Printer, Toronto, Ontario. 132pp.
- KBM Forestry Consultants Inc. 2006b. *Smooth Rock Falls Forest, Independent Forest Audit, 2000-2005*. Queen's Printer, Toronto, Ontario. 138pp.
- Minister of Natural Resources. 2007. iIn: *Hansard of the Legislative Assembly of Ontario for Wednesday, May 16, 2007*. Queen's Printer, Toronto, Ontario.
- Ministry of Natural Resources. 2009. *Ontario's Woodland Caribou Conservation Plan*. Queen's Printer, Toronto, Ontario. 24pp.
- Ontario Woodland Caribou Recovery Team. 2006. *Draft Woodland Caribou (Rangifer tarandus caribou) (Forest-dwelling, Boreal Population) in Ontario*. Prepared for the Ontario Ministry of Natural Resources, Peterborough, Ontario. 70pp.
- Ontario Woodland Caribou Recovery Team. 2008. *Woodland Caribou (Rangifer tarandus caribou) (Forest-dwelling, Boreal Population) in Ontario*. Prepared for the Ontario Ministry of Natural Resources, Peterborough, Ontario. 93pp.
- Premier of Ontario. 2008. *Protecting Ontario's Northern Boreal Forest*. Media Release on July 14, 2008 from the Office of the Premier of Ontario. 1pg.
- Rodgers, A.R., B.A. Allison, K.D. Wade, & E.P. Iwachewski. 2007. *Forest-Dwelling Woodland Caribou in Ontario: Research Workshop Report. Information Paper CNFER IP-001*. Ontario Ministry of Natural Resources, Centre for Northern Forest Ecosystem Research, Thunder Bay, Ontario, Canada. 27pp.
- Schaefer, J. 2003. Long-term range recession and the persistence of caribou in the taiga. – *Conservation Biology* 17(5): 1435-1439.
- Schaefer, J.A. & S.P. Mahoney. 2003. Spatial and temporal scaling of population density and animal movement: a power law approach. – *Ecoscience* 10: 496-501.
- Suffling, R., V. Crichton, J.C. Ray, J.A. Schaefer, & I. D.Thompson. 2008. *Report of the Ontario Woodland Caribou Science Review Panel: The Path Forward. Report to Hon. D. Cansfield, Ontario Minister of Natural Resources*. Waterloo, Ontario, Canada. 19pp.
- Thomas, D.C. & D.R. Gray. 2002. Update COSEWIC status report on the woodland caribou (*Rangifer tarandus caribou*) in Canada. – In: *COSEWIC assessment and update status report on the woodland caribou (Rangifer tarandus caribou) in Canada*. Committee on the Status of Endangered Wildlife in Canada, Ottawa, Ontario. 98pp.
- Vors, L.S. 2006. *Woodland Caribou Extirpation and Anthropogenic Landscape Disturbance in Ontario*. Master of Science dissertation. Watershed Ecosystems Graduate Program Trent University, Peterborough, Ontario, Canada. 146pp.
- Vors, L.S., J.A. Schaefer, B.A. Pond, A.R. Rodgers, & B.R. Patterson. 2007. Woodland caribou extirpation and anthropogenic landscape disturbance in Ontario. – *Journal of Wildlife Management* 71: 1249-1256.
- Vors, L.S. & M.S. Boyce. 2009. Global declines of caribou and reindeer. – *Global Change Biology* 15: 2626-2633.
- Wilkinson, C.J.A. 2008. An Examination of Recovery Planning for Forest-dwelling Woodland Caribou (*Rangifer tarandus caribou*) in Ontario, Canada. – *Rangifer* 28(2): 13-32.

*Manuscript received 5 May, 2010
revision accepted 21 June, 2010*

