A Review of Manitoba's Conservation and Recovery Strategy for Boreal Woodland Caribou

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CPAWS
CANADIAN PARKS AND WILDERNESS SOCIETY
MANITOBA CHAPTER

Introduction

Across Canada, 386 species have been listed under the federal Species at Risk Act (SARA) as at risk of extinction. For forest-dwelling species at risk, the primary threat is loss of habitat.

Under SARA (Section 37), a recovery plan must be prepared for each species listed as endangered or threatened. The object of recovery plans is to restore species to healthy, self-sustaining, viable populations[i]. For 193 species listed as endangered, extirpated or threatened under SARA, recovery plans were to be completed and legally posted for comment by June 2007. To date these requirements have been met for only 71 species.

The Species at Risk Act mandates that the recovery strategy must include an identification of the species' critical habitat, to the extent possible.[ii] Habitat protection can occur only once habitat has been identified, and therefore the identification of critical habitat is the next essential step, after listing, towards species recovery. In the case of boreal woodland caribou, habitat is sufficiently well understood to proceed immediately with the establishment of some large protected areas.

Across Canada, the leading cause of forest habit alteration and decline in wildlife populations is forest habitat degradation resulting from industrial activities and resource-extraction. As legal means for protecting wild species are afforded only when the species has declined to the point at which it is considered at risk of extinction, species listed as at risk under SARA represent a threshold for change.

The Canadian Wildlife Service developed a draft manual for the development of recovery plans which mandates that recovery strategies under SARA include an identification of the threats to the survival of the species and strategies to mitigate these threats. It also states: 'knowledge–based, strategic thinking about what is needed for recovery of a species should not be influenced by socio-economic considerations; socio-economic considerations should come into play later, at the implementation/action plan stage.'[iii]

The Sierra Club of Canada and CPAWS are committed to the protection of healthy ecosystems for wildlife populations, and recognize that efforts to recover declining species populations may challenge the socio-economic traditions and operations that have led to the decline of wildlife populations and that have, in many places, become status quo. To foster effective recovery efforts, the Sierra Club of Canada has commissioned the evaluation of provincial recovery plans to assess the degree to which they fulfill the obligations of SARA, such as critical habitat identification and adequate identification of strategies for mitigating threats to habitat.

The evaluator was asked to respond to ten questions developed by the Sierra Club of Canada regarding Manitoba's Conservation and Recovery Strategy for Boreal Woodland Caribou. The evaluator's answers are provided below. The introduction, conclusion, and next steps are those of the Sierra Club of Canada and the Canadian Parks and Wilderness Society.

Manitoba Woodland Caribou: A Short Overview

The boreal population of the Woodland Caribou is listed as threatened under SARA. The distribution of caribou has receded in Manitoba. For example, caribou no longer occur in Whiteshell Provincial Park or elsewhere south of the Winnipeg River. The federal government lists the following as the main threats to the survival of Woodland Caribou: habitat destruction, hunting, disturbance by humans (including construction of roads and pipelines), and predation (by wolves, coyotes, and bears). Manitoba adopted a *Woodland Caribou Conservation Strategy for Manitoba* in 2000 and the current *Conservation and Recovery Strategy for Boreal Woodland Caribou* in 2005. The latter document is the subject of this review.

Evaluation by Dr. James Schaefer

1. Does the plan aim for full recovery or just survival of the species?
Populations are the unit of biological conservation, and the main focus of the *Strategy* (appropriately enough) is on woodland caribou populations in Manitoba, denoted as ten ranges across the province. The central goals of the plan are (1) for "self-sustaining boreal woodland caribou populations on all existing ranges" and (2) for the management of habitat on those ranges to support those populations (p.3). This second goal is important; habitat changes are the principal agent of decline and demise of woodland caribou in virtually every jurisdiction in Canada. More specifically, the objectives of the plan are the maintenance of existing populations, redress for declining populations, and recovery of populations that are not self-sustaining.

One of the central tenets of population ecology is that abundance and distribution are linked. As in many other regions in North America, woodland caribou in Manitoba have vanished from portions of their historic range. They no longer occur, for instance, south of the Winnipeg River. Restoration of caribou to former parts of their range is also noted as an objective, but only in cases "where feasible" (p.3), although these criteria are not specified. Presumably, restoration will not be attempted "where habitat changes are irreversible" (Crichton et al. 2004).

Where woodland caribou do occur, they are distributed more-or-less as a continuum, scattered across regions of favourable calving sites (Bergerud 1996). Just as the province's total woodland caribou abundance is likely underestimated (p.9), so too their distribution in Manitoba is likely greater than currently depicted (p.11). Presumably, then, as additional populations are delineated, they would come under the conservation umbrella of the plan.

2. Is critical habitat identified in the recovery plan?
To conserve forest-dwelling caribou is to conserve their habitat. As noted in the *Strategy*, all national and provincial status reports of woodland caribou have pointed to one, principal cause of decline: the loss, degradation, and fragmentation of habitat (p.7). According to the background document (Crichton et al. 2004, p.3), critical habitat "is the habitat currently occupied or the habitat that will be required in the future" – a statement

that, while accurate, is lacking somewhat in its description of essential habitat attributes and spatial scale.

No further elaboration is provided in the *Strategy*. The identification, delineation, and mapping of critical habitat are not outlined here but are relegated to the subsequent stage of recovery action plans for each range (p.14). Although the exact distribution of habitat will obviously be range-specific, the critical elements of woodland caribou habitat, in my view, are tolerably well understood to be defined, even tentatively, in a recovery strategy. Here it is: Critical habitat for woodland caribou, at its broadest scale, can be denoted as the extent of calving and post-calving range, the largely disturbance-free area of old (more than 50 years) forests and peatlands occupied by parturient females during late spring and summer. This focus on calving and post-calving is appropriate because this is the time when:
(1) the need for space is at its zenith, due to the "spacing out" strategy of reproductive adult females, the defining feature of woodland caribou (Bergerud 1996);
(2) the fate of each calf is determined, because most mortality occurs within the first 6 weeks of life (Mahoney et al. 1990);
(3) the mortality rate of the crucial adult female segment of the population is often highest; and
(4) the site fidelity of adult females is most pronounced (Schaefer et al. 2000).
In other words, for woodland caribou, it is the suitability of calving and post-calving range that likely determines occupancy, survival, and reproduction of a population, the central feature of "habitat" (Caughley and Gunn 1996). Around this distribution, one would conservatively add a strip of intact forest approximately 10 kilometres wide (Vors et al. 2007) as a buffer from landscape disturbances.

Defining critical habitat at such a broad spatial scale is consistent with both theory and evidence. Theoretically, habitat selection at the broadest scales is most relevant to governing population growth rate (Rettie and Messier 2000). Empirically, the definition is consistent with the persistence of the Owl-Flintstone population – a remarkable case of resilience of a woodland caribou herd despite extensive logging during the past several decades. Here, it appears that the slight disjunction between this population's ranges during winter (where most of the forest harvesting has occurred) and summer (just to the east) may be the reason for its stability. It is a noteworthy instance, especially given the known sensitivity of woodland caribou to logging and other landscape disturbances (Schaefer 2003, Schaefer and Mahoney 2007, Vors et al. 2007). The Owl-Flintstone circumstances, like some other facets of caribou conservation in Manitoba, is an important opportunity – a rare chance to improve our understanding and to conduct adaptive management, a principle espoused by this recovery plan.

3. If critical habitat is not identified, does the plan articulate immediate, interim measures to ensure survival of the species in the short term?
The document identifies the three populations in the province (Owl-Flintstone, Atikaki-Berens, Naosap) at highest risk. These ranges are identified as priorities for conservation (population and habitat monitoring, research, and communication) for which action plans will be completed within 4 years.

Such a timeline seems appropriate to complete habitat mapping and range assessments, but adhering to these deadlines is crucial. It is axiomatic in conservation biology that efforts are more likely to be successful when initiated earlier, rather than later. Indeed, for woodland caribou, because of a delay of approximately two decades between the habitat changes and population demise (Vors et al. 2007), there is urgency to detecting, diagnosing, and treating a decline. This time lag between habitat loss and caribou disappearance, known as the "extinction debt", implies that a declining population may continue to dwindle inexorably, even once the agent of habitat loss is removed.

4. Where critical habitat is not identified, but general habitat is, are activities that cause destruction/degradation of habitat clearly identified?

The *Strategy* lists the commonly cited causes of woodland caribou extirpation: industrial developments, increased predation, over hunting, sensory disturbances, and introduced parasites and disease (p.9). For the most part, these are the consequences of direct, human-caused changes to boreal forest habitat. For example, heightened predation by bears or wolves may appear as the proximate agent of caribou decline, but the ultimate reason for the loss of woodland caribou often may be traced to faunal changes (especially the greater abundance of alternate prey) following conversion of forests to younger successional stages, due to logging, for instance. Indeed, retrospective analyses (Schaefer 2003, Alberta Woodland Caribou Recovery Team 2004, Vors et al. 2007) underscore that human-caused landscape disturbances, like trails and cutovers, are good predictors of caribou persistence and extirpation. The precautionary principle, as embraced by the plan (p.13), is warranted.

5. Does the recovery plan address, with strategies to mitigate, the primary causes of species decline?

The plan makes a commitment "to reduce or mitigate direct threats that impact the survivorship of boreal caribou populations, where required" (p.13). It correctly identifies "large tracts of relatively undisturbed habitats" as critical to caribou occupancy (p.7), although this extent is not specified. One can surmise, nevertheless, based on a typical population density of 0.06 caribou per square kilometre and typical population size in Manitoba of 130 animals (p.12), that "large" entails hundreds, likely thousands, of square kilometres. "Landscape level management" (p.15), indeed, is appropriate, even necessary, for the persistence of woodland caribou.

The upshot, in my view, is that expectations for the boreal forest, in Manitoba as elsewhere, may be too high. From these northern forests, we desire it all: timber, hydroelectric power, roads, minerals, recreation – while, at the same time, conserving ecosystem services and woodland caribou. It is unlikely that these expectations will be wholly satisfied. For a viable caribou future, tempering our expectations would be a good place to start. At the same time, the persistence of woodland caribou is in the interest of resilient communities, because this animal is a clear signal that economic developments in the North are sustainable.

On the other hand, because "intensive population management" (such as translocation and captive breeding; p.15) does not address the chief causes of decline (which is, in the vast majority of instances, the loss of habitat), these procedures are unlikely to help in the

recovery of woodland caribou in Manitoba.

The plan also notes that Manitobans should "consider expanding and/or establishing new protected areas" (p.15). Indeed, I find the provincial map of protected areas in the province, overlaid with caribou ranges (Figure 3; Crichton et al. 2004), particularly telling. No protected area, at present, is likely to suffice for the conservation of woodland caribou. This is a major gap in a recovery strategy for woodland caribou, in my view, because protected areas serve two essential conservation functions:

(1) As buffers against errors. At present, the key to woodland caribou persistence on a managed landscape is not clear. At the same time, the consequences of our present decisions may not be apparent for decades (because of the extinction debt) and, at the same time any mistakes are likely to be serious – with negative outcomes that are longterm, perhaps even permanent (because caribou have never been successfully reintroduced once extirpated). Large protected areas represent an insurance policy for woodland caribou and options for future generations.

(2) As references to evaluate management actions. Indeed, *comparison* of an experimental area with a reference area (i.e., the managed landscape with a large protected area) is the crux of the scientific method and thus also of adaptive management. Adaptive management is presented as a central tenet of the plan.

Coupled with establishing protecting areas, and consistent with the principle of precaution, is a "go slow" approach to any resource exploitation within caribou ranges. Indeed, a key to successful forest management is not to foreclose on options. Because the outcome of any caribou conservation action (or inaction) may not be evident for many years (Vors et al. 2007), proceeding slowly and, in some cases, deferring developments, would enhance caribou persistence in future.

6. Does the recovery plan address, with strategies to mitigate, other significant threats to the species?

The plan assures us that "the cumulative effects of all factors affecting boreal caribou, their use of habitats and their survival must be addressed" (p.2). Direct, human-caused mortality (especially hunting) is another important threat to woodland caribou, and according to the plan, such agents will be assessed and closures to hunting implemented where needed. Appropriately, because wildlife management is based on common consent, such actions will be preceded by consultation with First Nations. In the case of vehicle collisions, these sources of mortality will be minimized by signage and using de-icing agents that do not attract caribou, although road closures are not mentioned as an option.

Wildfire is another pertinent habitat change that, if extensive enough, can be detrimental to caribou (Schaefer and Pruitt 1991). One can be assured, in the fire-prone ecosystems of Manitoba, that caribou ranges are going to burn. The likelihood of increased fire severity, extent, and frequency of fires stemming from the global climate change (p.9) underscores the need for ecosystem management (consideration and maintenance of natural processes) as part of caribou conservation.

7. Is the strategic plan influenced by socio-economic considerations?
There is an old dictum about wildlife management – that it is really people management. If we continue to insist on short-term exploitation of the boreal forest, then satisfying "the needs of both caribou and people" (p.2) is surely one of the greatest conservation challenges we face. Some of the hurdles to the implementation of this recovery strategy are listed (p.6), such as modifying the wood supply, but perhaps the greatest test involves tempering our economic expectations (#5, above).

Owing to their sensitivity and rigorous habitat needs, woodland caribou may often be viewed as an impediment to rapid resource development, but their value is far more profound: They serve as an indicator "reflecting the quality and health of the ecosystems they inhabit" (Crichton et al. 2004). Woodland caribou conservation, therefore, invites us to take a farsighted approach, with an emphasis on human well-being that is sustained in the long-term, and with important implications for how "human activities will continue to occur on caribou ranges" (p.2). In my view, articulating a frank philosophical vision of the interplay between caribou and humans would have been a valuable part of this document.

8. Does the recovery plan include indicators for monitoring the long-term viability of the species' recovery?
Even though the plan fails to define critical habitat, one of its positive aspect is that it adopts a long-term perspective to managing caribou range. In particular, the space needs of woodland caribou are not merely considered as currently occupied habitats but also "those required in the future, given the dynamic nature of the boreal ecosystem." This is crucial in the fire-prone forests of Manitoba. Forests remain unsuitable for caribou until approximately 50 years post-fire (Schaefer and Pruitt 1991); hence the *Strategy*'s longterm view is essential for caribou persistence on the landscape.

If adaptive management is truly to be espoused, then management actions need to be considered as *experiments* – that is, hypotheses to be tested. A positive aspect of the plan is that the monitoring of population and distribution trends is noted as an objective (p.15). Indeed, there appears to be a pile of uncollated information on caribou in the province. The document also correctly notes as a prime intention (p.3) that this *information* (in which we are awash) needs to be marshalled into *knowledge* (of which we are in need). This is accomplished only by careful analysis and interpretation.

There is a need, in particular, of greater understanding of the status and space-use patterns of the high-risk Owl-Flintstone population. Why has this herd persisted in the face of continued logging of its range? What is the population rate-of-growth or, at least, the rate of survival of adult females? What is the calving distribution vis-à-vis cutovers and other habitat disturbances? In addition, a population viability assessment (PVA) under different scenarios of fire frequency and forest harvesting is also needed (as noted, generally, on p.17). An important element of such a PVA would be wildfire – a foreseeable, yet stochastic, event, whose probability is likely to increase under global climate change. This is likely to be a growing threat to this population that requires quantification.

9. Would the recovery strategy, if implemented, negatively impact other species?
Management of predators and other prey is mentioned as an option, the criteria for which are to be developed at a later stage (p.16). What is left unstated is that such population reductions – of wolves or black bears, for instance – represent the application of "halfway technologies" (Frazer 1992), in this case, the treatment of the *symptoms*, rather than the *cause*, of caribou endangerment (i.e., human-caused landscape alterations). It makes little biological nor philosophical sense to take such aggressive actions without removing the agent ultimately responsible for the decline. Indeed, woodland caribou no longer serve as an indicator once we resort to directly manipulating the abundance of their predators. It is also inconsistent with ecosystem management as espoused in the *Strategy* – that the structure and function of the boreal forest must be maintained (p.2).

10. What are the main strengths and weaknesses of the plan?
Its strengths are:
– A focus on population-level indicators of success or failure of recovery. For example, one objective is to address population declines and to use population and range-use data (p.6) as indicators. Population rate-of-growth is the hallmark of a species in trouble. (On the other hand, the province-wide estimates of woodland caribou abundance are dubious because they suffer from imprecision, the inevitable consequence for a widely distributed, low density, shy and secretive animal. At the same time, as noted by C.H.D. Clarke: "It is to be hoped that there will never be so few caribou that it will be possible to count them.")
– A commitment to adaptive management and scientific research "to address major knowledge gaps" (p.13) and "to continually review and update this strategy" (p.1). The pressure for resource developments in Manitoba, like elsewhere in the boreal forest, is likely only to increase in the foreseeable future. It is essential that we learn from experience by treating management decisions for woodland caribou, whether *laissez-faire* or intensive interventions, as experiments. This is the basis of adaptive management.
– A commitment to consult and include a wide array of interested and affected parties, including First Nations, industry, other provinces, and the broader citizenry. Indeed, there appears to be already an established protocol of inclusiveness with respect to caribou conservation in Manitoba – a positive aspect that seems likely to continue.
– Adherence to the principles of ecosystem management (maintaining the structure and function of ecosystems), precaution (need to err on the side of caution), adaptive management (treating management measures as experiments), and sustainability (a long-term vision). These motherhood principles are necessary and clearly positive. At the same time, it is a potential weakness (see below) that all the positive prose of the *Strategy* may not translate into caribou persistence, especially without clear acknowledgement of their consequences for forest management and public expectations.

Its weaknesses are:
– A rather high-level framework, somewhat lacking in detail. Woodland caribou are, quite bluntly, the greatest conservation challenge in the boreal forest. While this *Strategy* embraces much of necessary philosophical grounds for conserving caribou,

its goals and objectives will be achieved only once “integrated management and recovery action plans” are developed. Caribou conservation is both a challenge and an invitation; the explicit recognition of this would have been valuable in a strategic document.

It is worth emphasizing that Manitoba has a rare chance to conserve its woodland caribou – an opportunity that has been lost, likely permanently, in many jurisdictions, such as the Maritime provinces and several US states, and one that is quickly vanishing in others, such as Alberta. Protected areas, for instance, serve as anchors for both biodiversity conservation and scientific understanding. Establishing such areas would be a practical sign that this opportunity will not be squandered. Unfortunately, some of the species’ attributes invite delay and delusion. Woodland caribou are rarely seen; their declines may be hard to detect; owing to the extinction debt, a population may persist for decades following habitat loss; and caribou conservation demands a vision that extends beyond individual careers and individual jurisdictions. I surmise that the next few years in Manitoba will serve as an important test – not only for woodland caribou but of the commitment of Manitobans to this species and their forest habitat.

Literature Cited

Alberta Woodland Caribou Recovery Team. 2004. Alberta woodland caribou plan 2004/05-2013/14. Alberta Sustainable Resource Development, Fish and Wildlife Division, Edmonton.

Bergerud, A. T. 1996. Evolving perspectives on caribou population dynamics, have we got it right yet? Rangifer, Special Issue 9:95-116

Caughley, G. and A. Gunn. 1996. Conservation Biology in Theory and Practice. Blackwell Science.

Crichton, V, K. Whaley, D. Cross, G. Collins, D. Hedman and K. Leavesley. 2004. A reference document for Manitoba’s boreal woodland caribou (*Rangifer tarandus caribou*) strategy. Manitoba Conservation, 46 pp.

Frazer, N. B. 1992. Sea turtle conservation and halfway technology. Conservation Biology 6:179-184.

Mahoney S.P., Abbott H., Russell L.H., and Porter B.R. 1990. Woodland caribou calf mortality in insular Newfoundland. International Congress of Game Biologists 19:592-599

Rettie, W. J. and F. Messier. 2000. Hierarchical habitat selection by woodland caribou: its relationship to limiting factors. Ecography 23:466-478.

Schaefer, J. A. 2003. Long-term range recession and the persistence of caribou in the taiga. Conservation Biology 17:1435-1439.

Schaefer, J. A. and S. P. Mahoney. 2007. Effects of progressive clearcut logging on Newfoundland caribou. Journal of Wildlife Management (in press).

Schaefer, J. A., C. M. Bergman, and S. N. Luttich. 2000. Site fidelity of female caribou at multiple spatial scales. Landscape Ecology 15: 731-739.

Schaefer, J. A., and W. O. Pruitt, Jr. 1991. Fire and woodland caribou in southeastern Manitoba. Wildlife Monographs 116:1-39.

Vors, L. S., J. A. Schaefer, B. A. Pond, A. R. Rodgers, and B. R. Patterson. 2007. Woodland caribou extirpation and anthropogenic landscape disturbance in Ontario. Journal of Wildlife Management 71:1249-1246.

Conclusion

The Manitoba recovery strategy laudably aims to establish "self sustaining boreal Woodland Caribou populations on all existing ranges" and for the management of those ranges to support those populations. However, the strategy has three fundamental deficiencies: critical habitat is not identified, there is no plan to aggressively protect habitat by establishing new parks and protected areas, and perhaps most importantly, recovery action in Manitoba does not reflect the urgency of the situation faced by this species.

Urgency

Manitoba's boreal woodland caribou are an example of the extinction debt phenomenon: there is likely to be a delay of approximately two decades between habitat changes and caribou disappearance. This means that the effect of implementing conservation strategies may not be known for 20 years. Thus it is critical to act immediately, and to exercise precaution. Delays in conservation efforts are the caribou's worst enemy.

In fact, this recovery strategy appears to be a step backwards from the 2000 Woodland Caribou Conservation Strategy for Manitoba, which emphasizes protecting critical habitat rather than primarily relying on managing the landscape through unproven methods such as logging prescriptions and predator management.

Habitat

The Species at Risk Act (SARA) requires that critical habitat be identified "to the extent possible" and explicitly mandates that the precautionary approach be applied in recovery planning. The Manitoba recovery strategy defines critical habitat as "habitat currently occupied or the habitat that will be required in the future". This definition lacks description of essential habitat attributes and spatial scale.

Further, critical habitat mapping and identification is mandated by SARA to be included in provincial recovery strategies, but this action has been deferred to the action planning stage, while no concrete intermediate steps are being taken to protect habitat.

Protected Areas

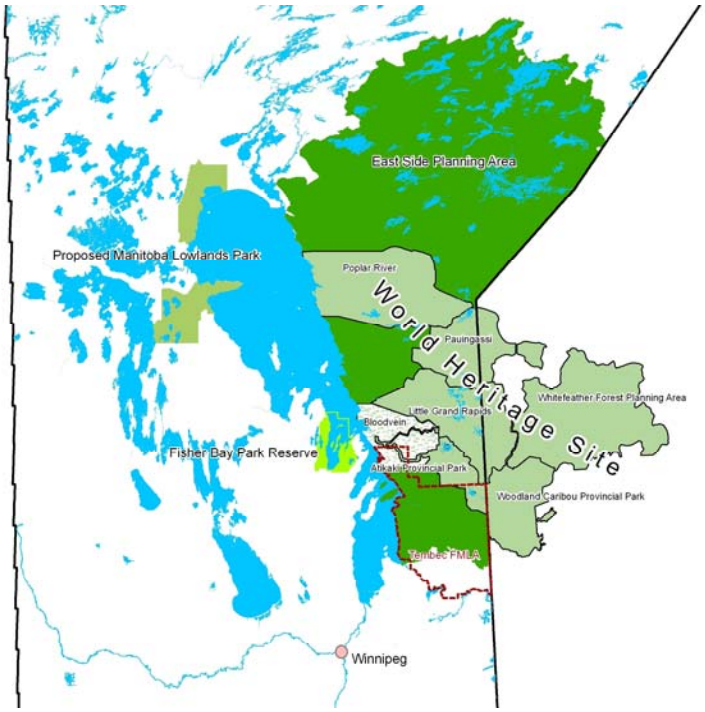
The recovery strategy lists industrial development, increased predation, over-hunting, sensory disturbances and introduced parasites and disease, which are all consequences of direct human caused changes to boreal forests. However, the recovery strategy fails to address these threats. Areas currently protected from these disturbances will not suffice for the conservation of Caribou, and establishment of new protected areas should be a cornerstone of the recovery strategy.

Manitoba has the unique opportunity to establish protected areas before habitat is disrupted, unlike some other provinces. To lose this opportunity by delaying action would be a grave loss. Fortunately some suitable areas in caribou range are already the subject of political support for

protection.

One such area is the east side of Lake Winnipeg. This region is First Nation traditional territory and its potential for conservation of healthy boreal forest and for sustainable local economies is tremendous.

The Manitoba government has designed a planning process to develop a Broad Area Plan for 8.2 million hectares on the east side of Lake Winnipeg – an area larger than New Brunswick. There is currently a request by local First Nations, which is supported by the Manitoba government, for 4.3 million hectare World Heritage Site within the intact boreal forests straddling the Manitoba-Ontario border.



On the Manitoba side of the proposed World heritage Site, the First Nations land protection requests are identified below:

Area	Region	Size	Form of Protection Sought
Poplar/Nanowin Rivers park reserve	East Side Lake Wpg.	800,000 ha	Permanent
Pauingassi traditional resource area	East Side Lake Wpg.	450,000 ha	Interim
Little Grand traditional resource area	East Side Lake Wpg.	670,000 ha	Interim

Other examples of well-studied suitable locations for new protected areas include the Manitoba Lowlands region, in the Interlake area, and north-western Manitoba around The Pas.

Next Steps

The *Conservation and Recovery Strategy for Boreal Woodland Caribou* as currently constituted fails to ensure a high probability of recovery of the species. Overcoming the shortcomings of the current strategy will require that the Manitoba government:

- Identify (describe and map) the critical habitat of woodland caribou in Manitoba.
- Address the principal causes of loss of woodland caribou habitat in Manitoba: logging, mining, hydroelectric development.
- Act in the short term to create new protected areas in woodland caribou range, including the First Nations land protection requests on the east side of lake Winnipeg.
- Live up to its commitment in the Woodland Caribou Conservation Strategy for Manitoba (2000) that "Habitat considered critical for the continued viability of a woodland caribou range will be protected by legal designation. No development will occur within these protected areas."

About Dr. James Schaefer

Jim Schaefer is Associate Professor of Biology at Trent University. He has interests in the demography and conservation of large northern mammals, with a focus on their spatial ecology. He has intensively studied the behaviour and habitat selection of muskoxen, and the movements and population dynamics of woodland caribou.

More Information

For more information please refer to www.sierraclub.ca and www.cpawsmb.org

Cover photo: CPAWS Manitoba

Endnotes

[i] RENEW Recovery Handbook (ROMAN), April, 2004. p.2.

[ii] SARA, section 41.

[iii] RENEW Recovery Handbook (ROMAN), April, 2004. p.33.