REVELSTOKE MOUNTAIN CARIBOU RECOVERY:

AN INDEPENDENT REVIEW OF PREDATOR-PREY-HABITAT INTERACTIONS

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BACKGROUND

- In May 2002, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) designated woodland caribou (including the mountain ecotype) within the Southern Mountains National Ecological Area as "threatened".

- Under the federal Species at Risk Act, the Government of BC must prepare a Recovery Plan that would provide direction to ultimately "de-list" mountain caribou as a threatened species, if feasible.

- The North Kootenay Caribou Recovery Action Group received the mandate from the Ministry of Water, Land and Air Protection to develop a "regional" recovery plan that includes the Revelstoke-Central Rockies area. The City of Revelstoke has also established a Revelstoke Caribou Recovery Committee to communicate and coordinate activities locally.

- An expanded research program is being implemented in the Revelstoke-Central Rockies area with the objective to better understand factors underlying the decline in mountain caribou herds.

- The Revelstoke Caribou Recovery Committee invited a panel of scientific experts to review the pertinent literature, receive input from biologists, regulators, and interested parties, and formulate recommendations on research and management with regard to predator-prey-habitat interactions.

- This report of the Panel is not intended to be prescriptive. Rather, the objective is to offer guidance to the Revelstoke Caribou Recovery Committee while providing input to the recovery action plan for the Revelstoke and Central Rockies area.

- Herein, the panel presents recommendations on the following populations: Columbia South, Columbia North, Central Rockies, and Frisby/Boulder.

MANDATE OF THE PANEL

- To improve collective understanding of the complex predator-prey-habitat interactions that affect mortality of mountain caribou herds within the Revelstoke and Central Rockies area.
- To provide advice regarding prioritized research activities that should be initiated to conserve mountain caribou herds within a context of adaptive management.
- To propose mitigation actions that could be implemented in order to foster recovery of caribou populations in the Revelstoke area.

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NATIONAL AND HISTORICAL CONTEXT

Decline in woodland caribou populations has been observed from Labrador to BC. A common denominator in these declines is the enrichment of ungulate populations within previously mature forest landscapes where historically caribou were the primary ungulate species. This build-up of alternate ungulates and their associated predators increases the risk of predation on caribou.

In BC, caribou historically inhabited the interior plateau and mountainous portions of the province, except where deer were abundant in the lower southeastern areas. When moose colonized the plateaus in the early 1900s, caribou disappeared from these areas, but continued to exist in the mountains where their anti-predator strategies were effective in creating an ecological separation of caribou from other ungulate species (and their associated predators). In recent years, caribou declines continued to occur across the province, within and outside of protected areas.

Mountain caribou survival has always been precarious. The hazardous terrain and predation have always limited populations. Additional stresses are now tipping the balance so that populations are declining.

WHY HAVE CARIBOU DECLINED ACROSS CANADA?

Two paradigms can be proposed to explain the general northern shift of woodland caribou distribution in Canada:

A. Historic climatic changes - shorter winter seasons, warmer temperatures, fluctuating snowpacks.

- Ecological trigger: increase in other ungulates and associated predators

B. Human-induced changes to landscape and disturbances.

- Ecological trigger: increase in other ungulates and associated predators in habitats used by caribou
- Ecological trigger: increase in habitat suitable for bears, leading to greater bear populations and bear predation on caribou (particularly relevant in BC mountains). In this case, build up of other ungulates may not be relevant.

Note: From a Conservation Biology perspective, the loss of a species due to natural conditions should not be the subject of special “rescue” efforts - we should let nature follows its course.

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Note: Human activities can speed up natural changes, but natural changes may be "sufficient" to explain the loss of a species.

HUMAN-INDUCED CHANGES in BC IMPACTING MOUNTAIN CARIBOU

Highest concern: Changes in forest age structure that increase the amount of habitat for other ungulates

- Increase in early seral forests (0-40 years) from 5% to 25% of landscapes, and extending up the sidehills in harvested areas, whereas in the past moose-deer habitats were located principally in the valley bottoms.

Note: The focus on early seral forests is based on the Panel's view that caribou population declines are NOT the result of a reduction in lichen food supply. Rather, the fundamental ecological change leading to caribou decline is enrichment of alternate ungulate prey at the landscape level.

Moderate concern: snowmobiling and access of predators to high elevations

- High intensity snowmobiling may eliminate caribou use of open parkland ranges.
- Increased access of wolves to high elevation, mid-winter habitats along snowmobile trails.

Lowest concern: Hunting, skiing, collisions, connectivity barriers (TCH, railway, reservoirs)

RECOMMENDATIONS

POPULATION DELINEATION

The Panel recommends that the refined population delineation described by Wittmer (2004) be implemented in recovery action plans, research and management actions.

RESEARCH AND MONITORING

1. Population monitoring of caribou

A) Continue radio-collaring program on adult caribou

- frequent flights in summer, particularly, to monitor survival and cause of mortality

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- detailed habitat and movement information is a lower priority

B) New study on calf survival

- pregnancy rates (blood sample)
- early calf survival (count in early July based on collared cows)
- fall calf/cow ratio (collared cows and associated animals)
- late winter calf/cow ratio (collared cows and associated animals)

C) Census every 3 years (snow and weather permitting)

- a survey every three years is a target
- given the unpredictability in snow conditions, the Panel suggests that a survey be planned every other year, to achieve a 3-year cycle

2. Predators

A) Wolves

- 3-4 years of telemetry-based research to document territory sizes, pack sizes, total population, and elevational space use/overlap with caribou.
- after 4 years, monitoring of wolf abundance based on indices using local knowledge, tracks, scat indices, etc.

B) Cougars

- low deer populations: local knowledge monitoring of cougar abundance.
- high deer populations: radio collaring study to secure precise movement data, especially seasonal shifts in movement as a function of elevations and overlap with caribou.

No recommendations for bears or wolverine predation because:

- these species have historically co-existed with mountain caribou, so baseline levels of predation can be expected.
- for bears, rate of population increase is very slow and is unlikely to explain the rate of caribou declines (ecological data are expensive to obtain).
- for wolverine, past research indicates the population is declining.

3. Alternate ungulates

A) Moose

- survey every 3 years, to quantify abundance and calf productivity.
- space use (elevational shift in distribution) by moose during summer based on telemetry (10 collars/2 flights/month).

B) Deer

- local knowledge monitoring regarding deer abundance.
- index of deer abundance based on numbers of deer harvested.

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4. Others

- test silviculture practices to discourage shrubs that are food sources for alternate ungulates and bears on areas where seasonal use by caribou overlaps with use by alternate ungulate species.

ADAPTIVE MANAGEMENT

The Panel strongly advocates adaptive management as a scientific approach, but recommends this be conducted at scales much larger than the immediate Revelstoke area. The appropriate experimental unit would be the herd, but given the conservation issues related to mountain caribou, it would not be appropriate to apply management actions to specific populations within the Revelstoke area. However, it may be possible to link with ongoing caribou studies in other parts of BC.

MITIGATION

The following recommendations are made to promote conditions that better reflect the historical natural system, in order to facilitate the recovery of caribou populations. The following table describes the inter-relationship of the key factors in the habitat/prey/predator system in the area. The Panel recognizes that an analysis is needed to document historical forest age distribution and historic abundance of associated ungulate species.

Key factor	Current condition	Historically
Amount of early seral forests	More than historically	Fewer than currently
Moose population	1,600 animals	Fewer (400?)
Wolf population	Moderate to high	Rare
Caribou population	Declining	Stable, low to moderate densities

The following approaches are recommended, to be implemented as a multi-facetted mitigation framework. The Panel wishes to stress that mitigations at the habitat level are most important in the long term, but such mitigations will not be sufficient for the next few decades, due to the time-lag of responses to a new forest age structure. In other words, even if forest harvesting were to be stopped completely, the amount and distribution of young forests in the region are currently sufficient to support moose and wolves well above historical levels. This situation will likely be the case for many years to come. In the current context, it is most important that immediate mitigations target forest landscapes, moose populations, and possibly wolves.

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1. Forest management

- Continue to maintain adequate old growth forests to provide caribou forage such as arboreal lichens.

- Decrease the amount of early seral habitat that is suitable for alternate ungulate prey species in areas where seasonal use by caribou overlaps with use by these species. Such reductions could be realized through silvicultural approaches or reduction in the rate of cut.

- A preference should be given to preserve old growth forest stands in spatial arrangements that would facilitate migration of caribou from high to low elevations, while reducing contact with alternate ungulate species.

2. Alternate prey

- Reduce moose population to 800-1,000 animals (Rationale: Panel suggests that under natural conditions, moose populations would be much lower; however the recommended level should reduce the wolf population, and accommodate existing hunting use).

- Retain extremely low white-tailed deer populations through liberalized hunting focused on females.

- Maintain existing low mule deer populations through hunting regulations. (Rationale: The Panel observes that under natural conditions, mule deer populations were at low levels, and white-tailed deer were absent. The currently increasing deer numbers may be the result of human alteration of the forest landscape.)

3. Predators

- Reduce wolf populations through trapping and hunting regulations. For example the bag limit for wolves should be increased from 2 to 5 animals, and guide-outfitters should be encouraged to be more active in hunting wolves.

- Liberalize cougar hunting regulations (especially when deer populations are increasing).

Note: The panel does not recommend long-term wolf reduction without clear evidence that wolf predation is a primary cause of caribou population decline. Further, the Panel is not advocating a reduction of grizzly bear numbers because their numbers are either comparable or lower than long-term historical levels. This is not to say that grizzly bears are not an important source of mortality for mountain caribou. The Panel acknowledges

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that the relationship between increased early seral forests and bear numbers is poorly documented at this time.

In the Panel's view, implementation of a caribou maternity penning project is not warranted at this time because there is no reason to suspect that calf mortality occurs predominantly right after birth. As well, it would be intrusive, costly and high risk.

4. Recreation

- Projected increase in snowmobiling activity should be through increased intensity of use of existing areas, not expanded areas.

- Heli-skiing use should avoid high quality winter habitats for caribou.

CONCLUSIONS

In the Panel's view, if management actions are not changed, caribou populations will continue to decline and the rate of decline likely will increase in future years. The Panel agrees with the findings of Wittmer (2004) that, without mitigations, there is a high probability of extirpation of the local populations of mountain caribou in the next few decades. In short, caribou cannot support ever increasing risks of mortality due to higher alternate ungulates (and their associated predators), potentially higher bear numbers, and human-induced disturbances.

In the last few decades, the focus of mountain caribou conservation has been to preserve old growth forests to provide forage. This approach has had limited results, simply because caribou are NOT resilient to changes in the forest landscape that increase early seral stages. In other words, even under the most "stringent" mitigation measures to protect old growth forests (i.e., level of protection that would be socially and politically acceptable), species like moose and deer do increase in numbers due to the creation of young forests in response to logging. The end result is that the crucial spatial separation between mountain caribou and other major ungulates and their predators cannot be maintained, hence caribou populations gradually decline through time.

Facing this dilemma, the Panel encourages a shift in thinking about conservation of mountain caribou. In addition to maintaining old growth forests to provide forage, the focus should be to decrease early seral conditions, making the landscape less suitable to species such as moose, deer, and grizzly bears. Further, the Panel is of the opinion that the population growth of alternate ungulates (especially moose) must be suppressed through active management such as liberalized hunting. Finally, the Panel encourages a more liberalized hunting and trapping of wolves and cougars, carnivores which tend to be associated with early seral ungulates. Based on current scientific information, the Panel does not recommend active predator control programs.

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The panel stresses that given current human activities in the Revelstoke area, caribou conservation will require aggressive, ongoing conservation efforts to be successful. Continued research associated with the broad and complete range of mitigation recommendations is needed. Mitigation recommendations must be implemented following a multi-facetted approach to achieve population recovery. Implementing recommendations on protection of old growth forest alone, or on managing early seral stands alone, or on reducing moose numbers alone, or on reducing predator numbers alone, is doomed to fail.

The recommendations presented above should be re-evaluated every five years, taking into consideration new monitoring and research results. Should caribou numbers drop drastically, much more aggressive predator and alternate prey reduction would be necessary.

ACKNOWLEDGEMENTS

We thank all presenters who gave us the benefit of their advice with regard to conservation of woodland caribou in the Revelstoke and Central Rockies area. The Panel was impressed by the quality of written and oral presentations during public sessions. The remarkable participation and interest of the general public to the recovery of woodland caribou remains the best hope of success for this long-term conservation effort.

The Panel acknowledges the particular input of Dr. Dale Seip, biologist with the Ministry of Forests, during our discussion on the recovery of woodland caribou. His broader knowledge of caribou conservation in BC was helpful in drafting recommendations that are sound considering the ecology of caribou inhabiting mountainous environments. Finally, we express sincere thanks to Cindy Pearse and Jackie Morris (Columbian Mountains Institute of Applied Ecology) for organizing this workshop and facilitating our work.

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PRESENTATIONS MADE TO THE PANEL

Caribou biology and research

- Bruce McLellan
- Rob Serrouya
- Heiko Wittmer

Land use plans

- Jeff Morgan, Okanagan-Shuswap Land and Resource Management Plan
- Ken Gibson, Kootenay-Boundary Land Use Plan and Revelstoke Minister's Advisory Committee Land Use Plan
- Randy Harris, Kamloops Land and Resource Management Plan
- John Woods, Parks Canada

Local land uses:

- Guy Woods, Ministry of Water, Land and Air Protection (hunting regulation and harvest)
- Brian Glaicar and Phil Des Mazes, Guide-outfitters
- Colin McRae, Revelstoke Rod and Gun Club
- Bob Clarke and Del Williams, Revelstoke Community Forest Corporation
- Dieter Offerman, Downie Timber Ltd. and Wood River Forest Inc.
- Nora Manners, North Columbia Environmental Society
- Penny Pasnak, Selkirk-Tangiers Heli-skiing
- Tom Dickson, Revelstoke Snowmobile Club/Society

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