
Strategic Planning Tools for Mountain Caribou Conservation

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Mountain Caribou and Old-Growth Forests

Mountain caribou are woodland caribou that are native to the mountainous region of cedar-hemlock and spruce-subalpine fir forests in southeastern and east central British Columbia and adjacent parts of Montana, Idaho, and Washington. This globally unique area is often called the Interior Wet Belt or the Inland Rainforest. Mountain caribou are distinguished from other types of caribou by their dependence for late-winter food on hair lichens ('old-man's beard') that grow on old trees at high elevations. Mountain caribou require this food because the 3-m snowpacks that are typical of this region rapidly bury ground-based foods. During spring and early winter, caribou often descend from spruce-subalpine fir forests to cedar-hemlock stands on valley bottoms. **Regardless of season, mountain caribou are virtually always in landscapes dominated by old-growth forest.**



Photo: Milo Burcham

Losing Ground

Over many centuries, the moist climate and infrequent fires of the Interior Wet Belt allowed large tracts of old forest to develop, which supported healthy populations of mountain caribou. In fact, the distribution and ecological requirements of mountain caribou almost perfectly matched the location and conditions of this wet inland ecosystem. Impacts to mountain caribou began almost 150 years ago. Early on, overhunting, large fires, and the building of railroads, towns, highways, and reservoirs reduced populations and fragmented forests. The progression of industrial forestry is now causing long-term losses of old-growth habitat. It takes several hundred years for a forest to accumulate enough hair lichen to support mountain caribou. Old forests also provide forage in other seasons, so the loss of old growth affects food supply for mountain caribou. Other implications of habitat loss are of even greater concern:

- Habitat loss has made caribou more susceptible to predation. Formerly, caribou lived in areas dominated by old forest, while most large prey species occurred in or near disturbed sites, such as meadows, young forests, burns, and avalanche tracks. By separating themselves from other prey, caribou avoided the cougars and wolves that followed those species. This has now changed. Region-wide expansions of white-tailed deer, elk, and moose populations have been compounded by forest cutblocks, access roads, and human-caused fires, which have improved local conditions for those species within prime caribou habitat. The continuing fragmentation of remaining patches of old forest puts caribou in contact with the predators that are drawn to the elk, moose, and deer. **One result of this habitat change has been unsustainable levels of caribou predation in many areas.**
- As habitat has been lost and fragmented, what may once have been a single population of mountain caribou has become isolated into many smaller groups. These small herds are susceptible to periodic catastrophes such as avalanches or years of high predation. Human-caused barriers often prevent the exchange of animals and genes among groups. The result has been a steady loss of herds, causing ongoing reductions in the total range and numbers of mountain caribou. **There are now only about 1900 animals covering less than half of their former range, and the rate of decline may be accelerating.**

Identifying Habitat

In recent years, researchers have developed tools to predict mountain caribou habitat quality and population distribution across a range of spatial scales. These models are based on sampling of caribou occurrence and relative density, and of habitat use by each herd. Sample data are evaluated against habitat and human-use variables taken from various inventory systems that include forest, terrain, climatic, and human attributes. Quantification of these ecological relationships allows predictions of landscape quality and population distribution to be made. Such

models have now been completed for most mountain caribou herds and can inform decisions related to (1) maintaining or restoring habitat quality or connectivity at landscape scales, (2) minimizing unsustainable predation risk, and (3) restoring or augmenting populations.

What do the Models Show?

Models identify those landscapes where mountain caribou are most likely to benefit from habitat protection. Retaining the quality of suitable landscapes is a minimum requirement for rebuilding the rapidly declining population of 1900 to even the modest target of 2500–3000 cited in British Columbia's recovery strategy (MCTAC 2002). More specifically

1. Landscapes of high quality habitat can only be retained through management guidelines that protect large, contiguous tracts of old-growth forest, the key element of habitat models for each herd.
2. Landscape connectivity must be retained or restored to reverse population fragmentation. Coupled with knowledge of remaining caribou distribution, habitat models can suggest whether recovery is best achieved by protecting or restoring suitable habitat existing between herds, or by reintroducing caribou to reestablish population connections.

References

- Apps, C.D., and T.A. Kinley. 2000a. Multi-scale habitat modeling for mountain caribou in the Columbia Highlands and Northern Columbia Mountains ecoregions, British Columbia. British Columbia Ministry of Environment, Lands and Parks, Williams Lake, British Columbia.
- Apps, C.D., and T.A. Kinley. 2000b. Multi-scale habitat associations of mountain caribou in the southern Purcell Mountains, British Columbia. East Kootenay Environmental Society, Kimberley and Crestbrook Forest Industries, Cranbrook, British Columbia.
- Apps, C.D., and B.N. McLellan. 2004. Factors influencing the fragmentation of mountain caribou populations. British Columbia Ministry of Forests, Revelstoke, British Columbia.
- Apps, C.D., B.N. McLellan, T.A. Kinley, and J.P. Flaa. 2001. Scale-dependent habitat selection by mountain caribou, Columbia Mountains, British Columbia. *Journal of Wildlife Management* **65**:65–77.
- Hamilton, D., S.F. Wilson, and G. Smith. 2000. Mountain caribou habitat use and population characteristics for the central Selkirks caribou inventory project. Nanuq Consulting Ltd., Nelson, British Columbia.
- Johnson, C.J., D.R. Seip, and M.S. Boyce. 2004. A quantitative approach to conservation planning: using resource selection functions to map the distribution of mountain caribou at multiple spatial scales. *Journal of Applied Ecology* **41**:238–251.

Mountain Caribou Technical Advisory Committee (MCTAC). 2002. A strategy for the recovery of mountain caribou in British Columbia, Version 1.0. British Columbia Ministry of Water, Land and Air Protection, Victoria, British Columbia.