

Wolf Reduction to Support Caribou Recovery in British Columbia: Frequently Asked Questions

Why is predator reduction used to support caribou recovery?

The woodland caribou is a species of great ecological importance and has significant cultural and ecological value for people that call British Columbia home.

Once abundant, many caribou herds have declined steeply over the past several decades. The overall population in B.C. has gone from approximately 40,000 animals to 15,500 currently. Caribou recovery is a key priority of the Government of B.C., and predator reduction is one of a wide range of recovery actions being implemented in caribou ranges.

Predator reduction is recommended by the B.C. Caribou Science Team when:

- a herd is below demographic objectives (population)
- there is reasonable evidence (empirical data and/or Indigenous knowledge) that wolf predation is a limiting factor on the caribou herd
- current predator management activities alone cannot reach desired wolf densities
- there is high certainty that the herd is recoverable

Predator reduction will be conducted in a way where the long-term viability of wolves in the area is not threatened.

How are varying opinions considered?

The B.C. government is obligated to engage with guide outfitters and Indigenous communities in the areas where wolf population reduction measures have been proposed. Guide outfitters and trappers in candidate herd areas are contacted directly by the B.C. government to seek feedback on proposed wolf reduction activities.

Indigenous Communities are engaged and consulted via agreed-to processes. Feedback from these groups is summarized for consideration by statutory decision-makers.

It's anticipated that the general public will also provide comments. An [online survey](#) has been created so that citizens can make their voice heard and so the B.C. government can analyze the comments to understand public opinion in areas where predator reduction activities are proposed and in other areas of the province.

Why not let wolf and caribou populations find a natural balance?

Wolf populations are influenced by the abundance of their primary prey species, which include moose, deer, and elk. Changes to the landscape in caribou habitat — largely caused by natural resource exploration and extraction (i.e., forestry, oil and gas, etc.) — have resulted in a greater abundance of primary prey animals, which in turn has led to increased wolf populations.

The presence of more wolves has resulted in more encounters between wolves and caribou, and therefore increased wolf predation of caribou.

Caribou are not a primary prey species for wolves, but wolves can incidentally predate on them to the point of local extinction (“extirpation”). This phenomenon is called “apparent competition”, where the presence of one or more prey species (moose, elk, or deer) has a detrimental impact on another prey species (caribou) through a shared predator (wolves)¹⁻⁴.

Natural predator-prey dynamics have been disrupted by landscape changes. Allowing wolf and caribou populations to find a “natural balance” would lead to the permanent loss of caribou herds in many cases.

Wolves have always been around. Why are they a problem now?

Although wolves are not new to British Columbia, their numbers have increased. The increase can be attributed to discontinuation of large-scale predator eradication programs in the 1980s and to landscape changes in caribou habitat.

New “early seral habitat” (young forests) that result from timber harvesting improves conditions for primary prey species that support wolf populations. This leads to greater numbers of wolves in those areas⁵.

The increase in wolf abundance in caribou habitat is further exacerbated by the presence of linear features such as roads and seismic lines (i.e., corridors cleared of vegetation to assist with resource exploration and resource extraction). These features allow wolves to gain access to caribou habitat more easily and hunt caribou more efficiently⁶⁻⁸. Elevated rates of predation by wolves have resulted in declines in caribou populations. Currently, the federal caribou recovery strategy and provincial wolf reduction procedures identify a population density target of less than three wolves per 1,000 square kilometers in caribou range to support recovery efforts⁹. Wolf densities across the candidate herd areas prior to the start of the Province’s reduction efforts greatly exceeded the density target in all cases, by as much as five to eight times greater in some areas. While the Province develops and implements long-term habitat management to help lower wolf population densities, direct wolf reduction will support caribou conservation goals.

Does reducing wolf populations really help support caribou recovery?

The reduction of wolves has been the most effective short-term tool to halt or reverse caribou population declines, as assessed in a recently published research paper that compared the outcomes of different caribou management activities¹⁰. Caribou population declines were reversed in five of the seven areas where wolf reduction was conducted. The two instances where wolf reduction did not successfully reverse caribou population declines can be explained by either low rates of wolf reduction or by application to an extremely small caribou population.

Although this report identified wolf reduction as the most effective management tool to reverse declines in caribou population, it also noted that this benefit is further enhanced when paired with other caribou recovery actions. Furthermore, a recent assessment of the effectiveness of wolf reduction efforts to support caribou recovery in the South Peace region of B.C. noted a positive effect on caribou abundance¹¹.

Herds that were previously declining at a rate of nearly 15% annually stabilized immediately and their populations began to increase in response to wolf reduction. As of 2021, the population of South Peace caribou herds have increased by 81% since the initiation of wolf reduction.

How many wolves were removed in British Columbia last year and how much did it cost to do that?

In 2020-2021, 237 wolves were lethally removed to support the recovery of 13 caribou herds, at a cost of \$1.4 million. This includes costs associated with helicopter flights, the purchase and deployment of radio tracking collars, and other associated operational costs.

If reducing wolf populations is effective at reversing declining caribou populations, why aren’t wolf populations reduced in all areas where caribou are present?

Although caribou population declines have been reversed where wolf populations have been reduced, it is not a one-time management intervention. Wolf reduction at the scale necessary to allow caribou herds to

recover is expensive. If the habitat factors that support primary prey are not addressed, then wolf reduction measures would need to be continued indefinitely to maintain the benefit to caribou recovery.

When wolf reduction is stopped, the managed areas are quickly recolonized by new wolves and the risk of wolf predation on caribou will return^{12,13}. It is important to implement wolf reduction only on those caribou herds that need it most and have the highest likelihood of successful recovery, which includes herds where gaining habitat protection is more likely.

Why focus mainly on wolves as predators?

Ongoing monitoring of caribou has demonstrated that wolves are the leading cause of caribou adult mortality in most caribou populations in B.C.

Wolf populations, specifically, have increased as a result of changes to the landscape due to industrial activities, whereas other predator species have not responded to landscape changes the same way. It's also been demonstrated that wolves can endure high levels of population reduction without the risk of extirpation (i.e., the local population being completely eliminated). They can rapidly reproduce and recolonize areas when active reduction is stopped^{12,13}.

There is little risk of permanently extirpating wolf populations in areas where wolf reduction is applied.

Why are wolves removed using helicopters?

Aerial (helicopter-based) shooting of wolves is the most effective and humane method to sufficiently reduce population density across broad, remote landscapes.

Monitoring of wolf reduction activities is carried out to ensure safety, effectiveness, and the humane treatment of the animals. Aerial shooting methods used in B.C. are consistent with the most current guidelines for wild animal euthanasia in field conditions¹⁴. The intensity and efficiency of wolf population reduction that can be achieved through aerial shooting is critical because if wolf populations are not sufficiently reduced, caribou herds will remain at risk from unsustainable predation by wolves.

Due to the inherent difficulty in hunting and trapping wolves, ground-based methods of removing wolves are unlikely to be effective in reducing wolf abundance sufficiently over large and remote geographic areas to the level required to immediately halt or reverse caribou population declines^{15, 16}.

Lethally removing wolves using poison is not a method that is supported in B.C.

How do we get to a point where wolf reduction by helicopters is no longer necessary?

The high abundance of wolves that pose a risk to caribou populations are the result of modified landscapes that support higher abundance of primary prey animals¹⁷. Unless the underlying habitat disturbance that supports primary prey and wolves are addressed, the elevated predation risk to caribou will remain.

To achieve self-sustaining caribou populations, which is the ultimate goal of recovery efforts, caribou habitat must be protected, managed, or restored to reduce the proportion of habitat that supports elevated primary prey populations.

Literature Cited

1. DeCesare, N. J., Hebblewhite, M., Robinson, H. S. & Musiani, M. Endangered, apparently: the role of apparent competition in endangered species conservation. *Animal conservation* **13**, 353–362 (2010).
2. Serrouya, R. D. An adaptive approach to endangered species recovery based on a management experiment: reducing moose to reduce apparent competition with woodland caribou. *University of Alberta* (2013).
3. Seip, D. R. Factors limiting woodland caribou populations and their interrelationships with wolves and moose in southeastern British Columbia. *Canadian Journal of Zoology* **70**, 1494–1503 (1992).

4. Seip, D. R. Mountain caribou interactions with wolves and moose in central British Columbia. *Alces: A Journal Devoted to the Biology and Management of Moose* **44**, 1–5 (2008).
5. Ehlers, L. P., Johnson, C. J. & Seip, D. R. Evaluating the influence of anthropogenic landscape change on wolf distribution: implications for woodland caribou. *Ecosphere* **7**, (2016).
6. Whittington, J. *et al.* Caribou encounters with wolves increase near roads and trails: a time-to-event approach. *Journal of Applied Ecology* **48**, 1535–1542 (2011).
7. Dickie, M., Serrouya, R., McNay, R. S. & Boutin, S. Faster and farther: wolf movement on linear features and implications for hunting behaviour. *Journal of Applied Ecology* **54**, 253–263 (2017).
8. Latham, A. D. M., Latham, M. C., Boyce, M. S. & Boutin, S. Movement responses by wolves to industrial linear features and their effect on woodland caribou in northeastern Alberta. *Ecological Applications* **21**, 2854–2865 (2011).
9. Canada & Environment Canada. *Recovery strategy for the woodland caribou, southern mountain population (Rangifer tarandus caribou) in Canada.* (2014).
10. Serrouya, R., Seip, D.R., Hervieux, D., McLellan, B., McNay, R.S., Steenweg, R., Heard, D.C., Hebblewhite, M., Gillingham, M. & Boutin, S. Saving endangered species using adaptive management. *Proceedings of the National Academy of Sciences* **116**, 6181–6186 (2019).
11. Bridger, M. South Peace Caribou Recovery following Five Years of Experimental Wolf Reduction. *BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development* (2019).
12. Boertje, R. D., Valkenburg, P. & McNay, M. E. Increases in moose, caribou, and wolves following wolf control in Alaska. *The Journal of Wildlife Management* **60**, 474–489 (1996).
13. Bergerud, A. T. & Elliot, J. P. Dynamics of caribou and wolves in northern British Columbia. *Canadian Journal of Zoology* **64**, 1515–1529 (1986).
14. Leary, S. L. *et al.* AVMA guidelines for the euthanasia of animals: 2020 edition. in *American Veterinary Medical Association Schaumburg, IL* (2020).
15. Webb, H.F., Allen, J.R., & Merrill, E.H. Demography of a harvested population of wolves (*Canis lupus*) in west-central Alberta, Canada. *Canadian Journal of Zoology* **89**, 744–752 (2011).
16. Valkenburg, P., McNay, M.E., & Dale, B.W. Calf mortality and population growth in the Delta caribou herd after wolf control. *Wildlife Society Bulletin* **32**, 746-756 (2004).
17. Wittmer, H. U., McLellan, B. N., Serrouya, R. & Apps, C. D. Changes in landscape composition influence the decline of a threatened woodland caribou population. *Journal of animal ecology* **76**, 568–579 (2007).