

Population Management Needed To Avoid Further Extirpation of Caribou

A comprehensive review has shown that until habitat recovers, intensive measures to reduce predation rates are necessary for the survival of woodland caribou.

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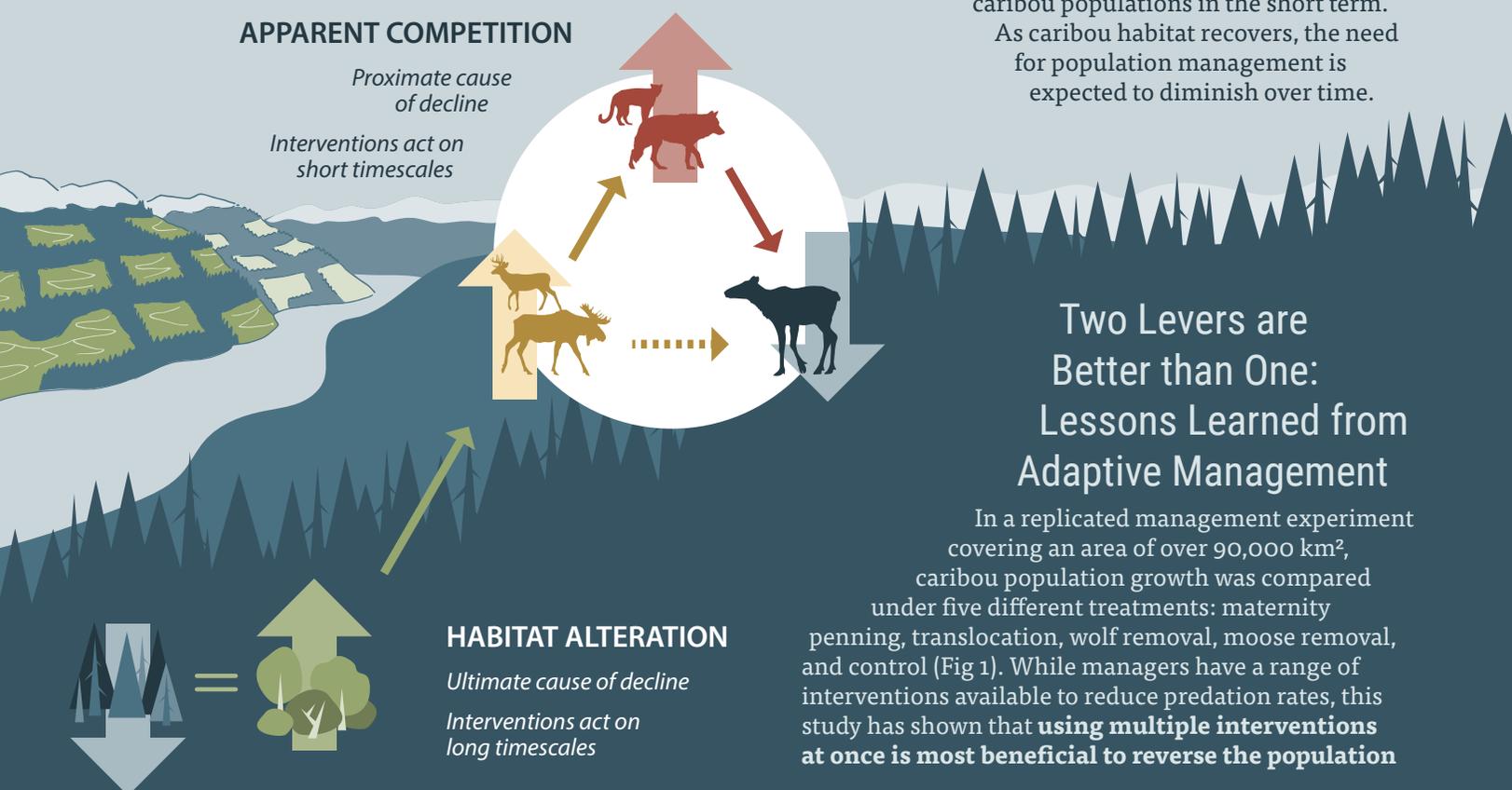
A Conservation Emergency

Woodland caribou have recently become extirpated from the contiguous USA, and many of the remaining populations in BC and Alberta may soon disappear without rapid emergency intervention.

Studies have shown that a core driver of this decline in caribou is habitat alteration. When forests are disturbed through industrial activity, the regenerating vegetation is initially dominated by deciduous plants, which are prime food for moose and white-tailed deer. In a process known as apparent competition, these increased populations of prey support an unusually high number of predators, which in turn place an unduly high predation pressure on caribou herds.

Complementary Approaches Needed for Short and Long-Term Recovery

Studies to date have focused on two related approaches to recovering caribou. The first involves protecting and restoring habitat. The second involves population management, which means directly managing populations of caribou, their predators, and competing ungulates. There has been debate about the role of these approaches in caribou recovery, but to date there have been few comprehensive studies which have tested these techniques at large scales. In a new, comprehensive analysis, we find that **immediate population management is needed to save remaining herds and avoid continued extirpation**. While habitat recovery and restoration is key for the long-term recovery of caribou, this recovery happens gradually over long time-scales. Population treatments are therefore necessary to increase woodland caribou populations in the short term. As caribou habitat recovers, the need for population management is expected to diminish over time.



decline. Combining treatments that act on both calf recruitment and adult survival (penning and wolf reduction, respectively) achieved the greatest improvement to the population growth rate. Overall, the benefit of population management is clear. In multiple cases, treatment implementation reversed an ongoing decline (Fig 2), while all control populations continued to shrink in size.

Half Measures Will Hamper Program Effectiveness

One key observation from this analysis was that caribou response was linked to treatment intensity. **In all instances where treatment intensity was limited (e.g. only a portion of wolves were removed from a caribou range), no change in caribou population growth was observed.** Treatment intensity is a critical factor in determining whether an intervention would benefit caribou. Managers should be aware that **half measures will erode confidence in a treatment as a viable conservation action.**

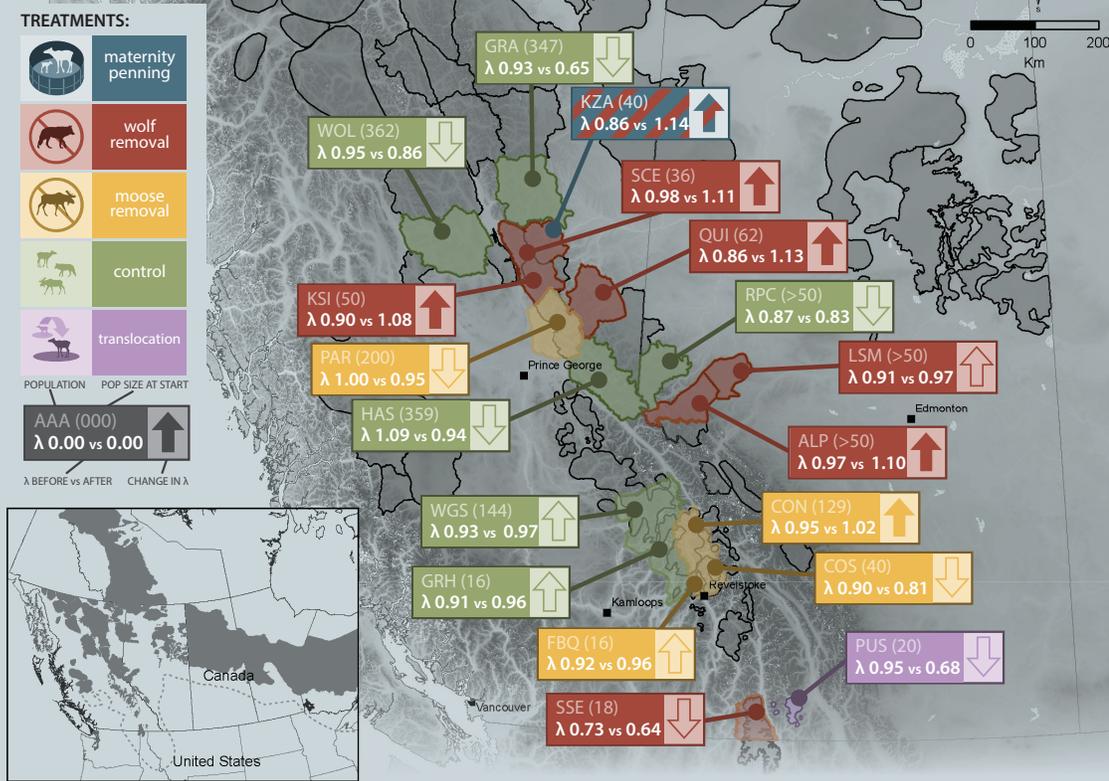


Fig 1. Population growth rates (λ) before and after treatments. Arrow direction indicates the change in growth rate, and a solid arrow indicates that the population has reversed its decline and is now increasing ($\lambda > 1$).

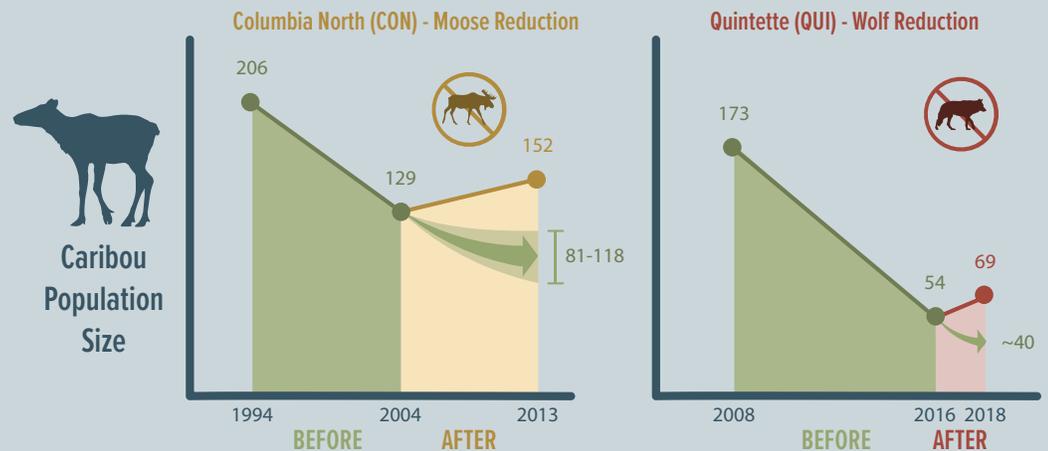


Fig 2. Two examples of caribou populations that ceased declining after a population treatment was applied. The projected decline in absence of treatment is also shown.

Population Management is Needed Regardless of the Initial Degree of Forest Alteration

The degree of habitat alteration did not dampen the observed patterns. **At these short time-scales, population management has a far greater effect on caribou population growth** than the amount of habitat that has been altered. While important for the long-term continuation of woodland caribou, **habitat recovery and restoration alone will not be enough to save herds facing impending extinction.**

This comprehensive synthesis has shown that the survival of woodland caribou depends on rapid population management. Treatments should be high intensity and, ideally, simultaneous. The need for population management is expected to decrease over time as habitat recovers.

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