

Pages 347–348 in E.T. LaRoe, G.S. Farris, C.E. Puckett, P.D. Doran, and M.J. Mac, eds. 1995. Our living resources: a report to the nation on the distribution, abundance, and health of U.S. plants, animals and ecosystems. U.S. Department of Interior, National Biological Service, Washington, DC. 530pp.

Management of gray wolves (*Canis lupus*) and their prey in interior Alaska has been controversial for three decades (Harbo and Dean 1983). Recently, debate was rekindled with renewed interest in wolf control to bolster two populations of caribou (*Rangifer tarandus*). Our research in Denali National Park provides insights into the declines in caribou numbers over the last few years that are the basis of recent wolf control proposals. Our observations of fluctuating populations also illustrate the complexity of managing these predator-prey systems to meet a diverse array of public interests.

Wolves and caribou are two components of the large mammal community of Denali National Park that also includes grizzly bears (*Ursus arctos*), moose (*Alces alces*), and Dall sheep (*Ovis dalli*). With the 1980 park expansion to more than 18,800 km² (7,300 mi²) of central Alaska, this large mammal system became the only one of its kind that is virtually unaffected by human harvest. Therefore, Denali provides a unique opportunity to understand the natural interactions of these species and serves as a baseline for comparison with areas where hunting or other active wildlife management occurs.

We have studied Denali's wolves and caribou since 1986 to determine their numbers and status and understand their natural interactions in this protected subarctic ecosystem. Our studies began near the end of more than a decade of mostly light winter snowfalls of around 100 cm (39 in)/yr. Since winter 1988–89, we have experienced five consecutive winters with above-average snowfalls, including two record-setting years. During winters 1990–91 and 1992–93, more than 390 cm (154 in) of snow fell, four times as much as in the early years of our study. This change in snowfall had profound effects on the wildlife in central Alaska. The population trends of Denali's caribou and wolves are strong evidence of the natural fluctuations to be

expected in species inhabiting such dynamic and variable environments.

Counting Caribou and Wolves

Our research has relied heavily on radiotelemetry to study the dynamics of the wild caribou and wolf in Denali. We can easily find our radio-collared study animals by using signal-receivers mounted in small airplanes (Mech 1975). Locating radio-collared wolves allows us to count their packmates, determine the number of pups born to each pack, gain information on survival and dispersal, determine the size and location of each pack's territory, and estimate the total number of wolves in our study area (Mech 1973). Regular monitoring of radio-collared caribou provides information on calf production, survival, and seasonal distribution of the herd, and makes it easier to complete aerial surveys to estimate herd size and composition (Adams et al. in press).

Population and Weather

The Denali caribou herd grew from about 1,000 in 1975 to 2,500 by 1986, during a decade of mostly below-average snowfalls, and was increasing at about 7% per year in 1986 when

Wolves and Caribou in Denali National Park, Alaska

by

Layne G. Adams

L. David Mech

National Biological Service



Courtesy L.G. Adams, NBS

Wolf carrying week-old caribou calf.

our research began (Adams et al. in press; Figure). About 46 wolves inhabited the 10,000-km² (3,860-mi²) range of the caribou herd in the early years of our study (Meier et al. in press). The number of wolves was lower than we expected based on the abundance of large prey species in Denali. Light snowfalls were favorable to caribou, and few died. Wolves preyed primarily on moose; the few caribou they took were usually very young or very old (Mech et al. in press). Times were tough for wolves, with poor production of pups and high dispersal rates for young wolves. Also, fights between packs resulted in the deaths of several wolves.

With the onset of more severe winters, beginning with winter 1988-89, wolf numbers rapidly increased to 81 wolves in just 2 years (Meier et al. in press; Figure), primarily because of higher pup production and less dispersal of young wolves. Caribou were more vulnerable to predation in the deep snow and replaced moose

highly variable winter weather of the region. Within 8 years, the caribou herd increased by 36% and declined by 50%. At the same time, the wolves almost doubled in number and then declined halfway back to their original numbers.

The trends noted for the Denali caribou herd are representative of population trends of several mountain caribou herds throughout central Alaska, including the Chisana and Mentasta herds in the Wrangell Mountains, and the Delta and Macomb herds east of Denali Park in the Alaska Range. Unlike the Denali herd, which has been closed to hunting for nearly 20 years, these other caribou herds are important resources for subsistence and sport hunters alike. Hunting seasons have been closed for all four caribou herds because of the declines in the last few years.

These reductions in hunting opportunities have led to debates over the merits of wolf control to provide more caribou for human harvest. Arguments regarding allocation of harvestable wildlife between subsistence and sport hunters will intensify when hunting seasons are reopened. Although the future of wolves and caribou in interior Alaska is secure, natural fluctuations like those described here can be expected to generate continued controversy over the management and allocation of these important wildlife resources.

References

- Adams, L.G., B.W. Dale, and L.D. Mech. Wolf predation on caribou calves in Denali National Park, Alaska. In L. Carbyn, S. Fritts, and D. Seip, eds. Ecology and conservation of wolves in a changing world. Canadian Circumpolar Institute, University of Alberta, Edmonton. In press.
- Harbo, S.J., Jr., and F.C. Dean. 1983. Historical and current perspectives on wolf management in Alaska. Pages 51-64 in L.N. Carbyn, ed. Wolves in Canada and Alaska: their status, biology, and management. Canadian Wildlife Service Rep. Series 45. 135 pp.
- Mech, L.D. 1973. Wolf numbers in the Superior National Forest of Minnesota. USDA Forest Service Res. Paper NC-97. 10 pp.
- Mech, L.D. 1975. Current techniques in the study of elusive wilderness carnivores. Pages 315-322 in Proceedings 11th International Congress Game Biologists. National Swedish Environment Protection Board, Stockholm.
- Mech, L.D., T.J. Meier, J.W. Burch, and L.G. Adams. Patterns of prey selection by wolves in Denali National Park, Alaska. In L. Carbyn, S. Fritts, and D. Seip, eds. Ecology and conservation of wolves in a changing world. Canadian Circumpolar Institute, University of Alberta, Edmonton. In press.
- Meier, T.J., J.W. Burch, L.D. Mech, and L.G. Adams. Pack structure dynamics and genetic relatedness among wolf packs in a naturally regulated population. In L. Carbyn, S. Fritts, and D. Seip, eds. Ecology and conservation of wolves in a changing world. Canadian Circumpolar Institute, University of Alberta, Edmonton. In press.

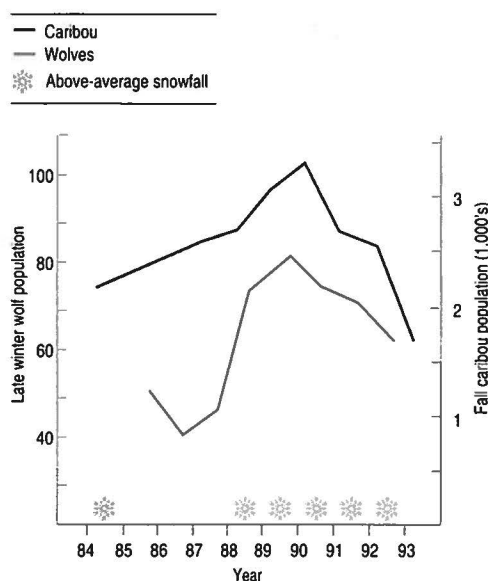


Figure. Wolf and caribou population trends in Denali National Park, Alaska, 1984-93.

as the most important prey species for wolves. Losses of adult cows increased eight-fold to nearly 20% per year. Fewer than 9% of the calves survived to 4 months old, compared to nearly 60% following the light snow winters (Adams et al. in press). The caribou herd stopped growing in 1990 at about 3,300 and plummeted to 1,700 by 1993, a 50% decline in only 3 years (Figure). With declining prey, the wolves also declined to about 60 wolves within the caribou herd's range, a 23% reduction between March 1990 and March 1993.

The fluctuations in wolf and caribou numbers observed in Denali National Park are probably indicative of normal adjustments to the

For further information:

Layne G. Adams
National Biological Service
National Park Service-Alaska
Region
2525 Gambell St., Room 107
Anchorage, AK 99503