

Denali Park Wolf Studies: Implications for Yellowstone

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Introduction

The Northern Rocky Mountain Wolf Recovery Plan approved by the U.S. Fish and Wildlife Service (1987) recommends re-establishment of wolves (*Canis lupus*) in Yellowstone National Park. Bills proposing wolf re-establishment in the Park have been introduced into the U.S. House and Senate. However, several questions have been raised about the possible effects of wolf re-establishment on other Yellowstone Park fauna, on human use of the Park and on human use of surrounding areas. Thus the proposed wolf re-establishment remains controversial.

Information pertinent to some of the above questions is available from a current study of wolf ecology in Denali National Park and Preserve, Alaska, which we began in 1986. Although Denali Park differs from Yellowstone in several ways, it is also similar enough in important respects to provide insight into questions raised about wolf re-establishment in Yellowstone.

Both Denali and Yellowstone are vast, multi-predator/multi-prey ecosystems with large herds of ungulates protected from hunting. Yellowstone Park itself covers some 3,472 square miles (8,888 sq km) and is surrounded by public wilderness encompassing several times that area. Denali includes about 7,000 square miles (17,920 sq km) of park and an apron of 2,000 square miles (5,120 sq km) of designated preserve.

Denali is home to some 2,000 moose (*Alces alces*) (Meier 1987), 3,000–4,000 caribou (*Rangifer tarandus*), including those adjacent to the park that are within range of park packs (L. G. Adams personal communication:1990), and 2,000 Dall sheep (*Ovis dalli*). Yellowstone supports an estimated 22,000 elk (*Cervus elaphus*) in winter and more in summer, 3,000 mule deer (*Odocoileus hemionus*) (Singer 1988), 2,700 bison (*Bison bison*) (Bishop 1989), and smaller numbers of other ungulates.

Grizzly bears (*Ursus arctos*), black bears (*U. americanus*) and coyotes (*Canis latrans*) inhabit Yellowstone and Denali, and compete in varying degrees with wolves for ungulate prey.

Furthermore, both parks are well-known and heavily visited by the public, most of whom are particularly interested in viewing wildlife. Broad vistas are features of Denali and Yellowstone alike, and they greatly facilitate wildlife observation.

During the public debate about whether wolves should be restored to Yellowstone,

the following questions are among those that have arisen: (1) would wolves decimate Yellowstone's elk, moose and bison? (2) would wolves jeopardize the park's grizzly bear population? (3) would wolves threaten human safety? (4) would large areas of Yellowstone need to be closed to protect wolves? (5) how many wolves would Yellowstone support? Since 1986, we have radio-collared 76 wolves in 14 packs in Denali, and have aerially radio-tracked them and their packmates approximately weekly, yielding 42 pack-years of data. Through 1989, we located radioed wolves 3,648 times and observed them and their packmates almost 3,000 times, including when they were traveling, hunting, feeding, attending dens and rendezvous sites, and dispersing. We also collected data on over 300 ungulates that the radioed packs killed.

Denali Findings Pertinent to Yellowstone

As with most wolf populations, the Denali wolves live in packs occupying exclusive territories (Figure 1). Pack sizes vary from the basic breeding pair up to a maximum of 27, but average about 9 during winter. Minimal estimates of their territory sizes range from 133 to 1,693 square miles (340–4,335 sq km), and average 463 square miles (1,184 sq km). Mean number of pups per pack surviving to winter was 2.0 in 1986, 2.4 in 1987, 5.1 in 1988, 4.0 in 1989 and 5.6 in 1990.

The wolf population appears to have been increasing throughout the study, and the density now has reached about one wolf per 39 square miles (100 sq km) for a total population of about 173 wolves in the habitable part of the park and preserve. Wolf numbers in the area are limited by intraspecific strife and dispersal. Of 59 radioed wolves whose fates were known, 20 percent were wolf-killed, 17 percent dispersed and 53 percent remain in the study area. Of 12 wolves radio-tagged in 1986 and whose fates are known, 33 percent have been killed by other wolves, 42 percent have dispersed and 17 percent remained in the population three years later, and one was killed by humans.

When wolves disperse from Denali, we do not follow them because of the great expense involved. However, indications are that generally the characteristics of wolf dispersal from Denali are similar to those of wolf dispersal elsewhere. Many dispersed wolves travel great distances and in every direction (Mech 1987). Denali dispersers that were killed by humans outside the park and reported to us have ended up as far as 250 miles (400 km) from the park and have gone in all directions.

Denali's wolves prey on all three of the park's ungulates. Because of observation bias—for example, moose carcasses last longer and are easier to see than are sheep carcasses—we have been unable to determine whether wolves are preying disproportionately on any particular prey species. Of 306 kills examined, 52 percent were moose, 34 percent caribou and 14 percent Dall sheep. Even considering the biases, however, these figures indicate that all three prey species are important to the wolves.

As in other areas, wolves in Denali tend to take certain prey disproportionately: young-of-the-year, old animals, males just before, during and after the rut (when rundown and undernourished), and individuals debilitated by arthritis and other conditions.

There is no indication that wolves are limiting prey populations in Denali at present. In fact, caribou are increasing (L. G. Adams personal communication:1990) as wolf numbers rise. This situation is reminiscent of the Isle Royale National Park ecosystem

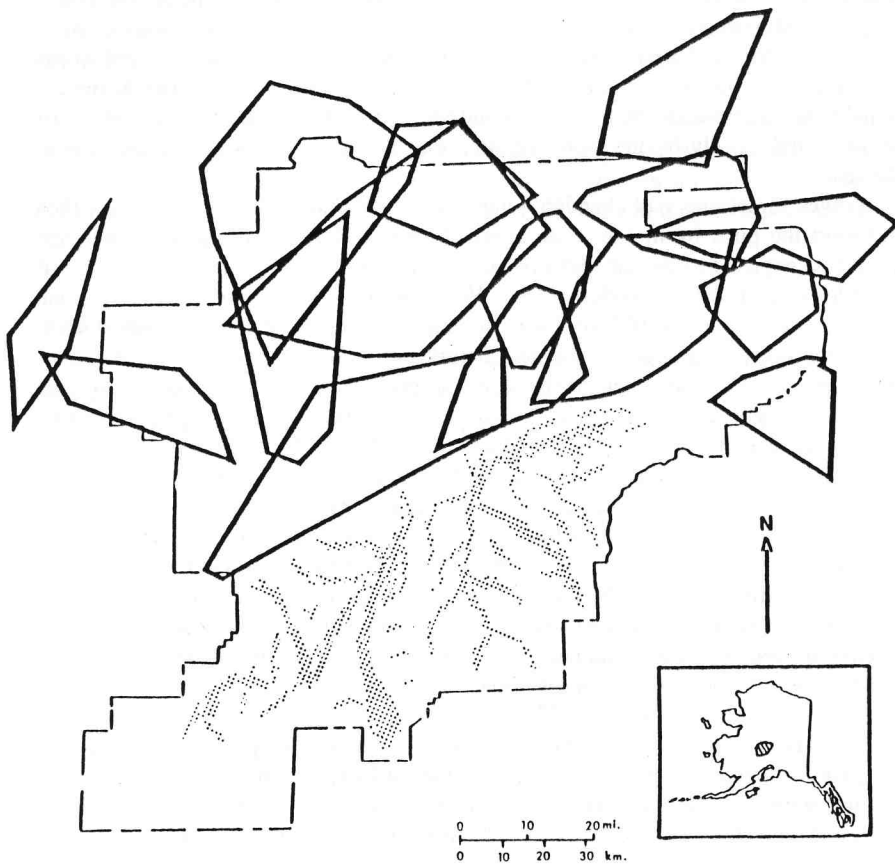


Figure 1. Wolf pack territories in Denali National Park as of 1989. Mountainous and glacial areas along southeast side of park are devoid of wolves and prey.

in which moose twice tripled their numbers in the face of a protected wolf population (Peterson and Page 1988, R. O. Peterson personal communication:1990).

Wolf interactions with grizzly bears may take several forms. Members of each species might kill members of the other; each might try to usurp kills of the other; and each might compete with the other for the basic food supply. That grizzlies kill and eat the same prey as wolves is well documented, and we have records of members of each species chasing the other off kills, and of each attacking the other.

Although generally wolves and grizzlies try to avoid each other, when they do encounter one another, the grizzly usually dominates, for example around kills. On the other hand, wolves occasionally kill grizzly cubs. Nevertheless, there is no evidence that the net result of wolf/grizzly interactions is of any consequence to either population.

The remaining issues on which the Denali study can lend insight to wolf reestablishment in Yellowstone regard wolf/human interactions. There has been some worry

that, if wolves were reestablished in Yellowstone, large areas of the park would have to be closed to prevent disturbance of wolves around dens and rendezvous sites.

Like coyotes and foxes (*Vulpes* spp.), wolves only use dens for about eight weeks in spring when they bear and raise their pups. Pups are born in May, and during the pups' first three weeks, they cannot maintain their own body heat. Thus they must be protected closely by the alpha female, who lies with them most of the time in the den.

Wolves sometimes will abandon a den if greatly disturbed by humans. They then transport the pups by mouth to an alternate den, and during the process the pups would be exposed to the air and any inclement weather. They might also be lost if the adults had to cross swollen rivers. We know of no records of such losses, and according to Chapman (1977:101) who summarized available data from many studies, "Pup mortality as a result of human disturbance has never been reported." Furthermore, we have documented the safe transport of pups about 10 days old from two litters for distances of about 1.2 miles (2 km) between dens, which supports data from several other studies (Chapman 1977, 1979). Nevertheless, the chances of mortality certainly must increase if pups are transported at an early age.

Therefore, it seems reasonable that in national parks some measure of protection should be afforded wolf dens before, and during at least the first four weeks after, the pups are born. Chapman (1977, 1979) found that in open country wolves were usually not disturbed by observers farther away than 0.5 mile (0.8 km). To be conservative, he recommended that an area within a radius of 1.5 miles (2.4 km) around the den be closed to human travel from about one month before denning until about three months after denning begins.

However, since Chapman (1977, 1979) completed his study, many more observations have been made that imply that at least in national parks, protection of wolf dens can be much less restrictive. For example, in 1990, a female wolf raised a litter of pups within 200 yards (200 m) of the road in Denali. Eventually she brought the pups out onto the road, much to the delight of the busloads of tourists who photographed them.

There still remains no record of wolf pups lost because of disturbance by humans. Therefore the only closures that might be necessary in Yellowstone would be areas of about 1 mile (1.6 km) radius around dens for about one month before denning to two months after, approximately March 15 to June 15. This is before the main tourism or backpacking season.

Regarding the contention that wolves are dangerous to humans, that can be dismissed as merely a popular misconception. Certainly any large carnivore, including even dogs and coyotes, should be viewed cautiously around children (Carbyn 1989), but the wolf's record is remarkably clean (Mech 1990).

Public Benefits of Wolves

Rather than being a danger to humans, the wolf should be regarded as a major tourist attraction. In Algonquin Provincial Park, Ontario and the Superior National Forest of Minnesota, throngs of tourists join evening trips to howl to wolves and listen for their responses.

In the latter area, several "aerial wolf safaris" are held each winter for members of the public to observe wolves on frozen lakes from aircraft, and the trips are usually

fully subscribed. Throughout most wolf range, the animals are so shy and secretive they can only be seen from the air. However, where they have been protected, such as in Denali, they are observable from the ground, and there they constitute one of the main attractions of the park.

Yellowstone could also boast the wolf as one of its foremost features. With its great herds of ungulates roaming open flats and valleys, the park would eventually see its wolves patrolling the same areas picking off prey in full view of the human visitors. That happens regularly in Denali, where an estimated 15 percent of the tourists observe wolves.

Conclusions

These are the lessons of Denali. If heeded, they should reassure authorities that restoring the wolf to its previous place as Yellowstone's top carnivore will not decimate the prey herds or the grizzly; it will not require closing of the park; and it will not scare away the tourists. Instead, the return of the wolf will herald a new era in which visitors to the nation's foremost national park will be treated to a more realistic view of how natural predator/prey systems operate.

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