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Results of Alaska's attempts to increase prey by controlling wolves

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The wolf in Alaska continues to thrive, to occupy its historical range, and to number in excess to 10 000 animals. Since statehood in 1959, Alaska has elevated the status of the wolf from "vermin" to a highly valued game and fur animal, an essential component of its ecosystem. In some areas, however, on occasion there are too many wolves to maintain a balanced ecosystem which can provide for the needs of both man and wolf. Where ungulate populations become depressed, wolf predation can sustain or even accelerate a decline once it has been initiated by other factors such as severe winters. In such instances the State has curtailed or reduced hunting seasons and bag-limits and has implemented wolf-reduction programs, using aerial shooting as the primary kill technique. Seven such programs have been implemented in the last seven years; five remain active; two were suspended when no longer needed. Discussed here are the results of a wolf-reduction program begun in 1976 on a 17 000 sq. km. area near Fairbanks and the impact on the declining moose and caribou populations there. Both populations have increased steadily after a 65 percent reduction in wolves. Implications of predator(wolf): prey(moose, caribou) interactions on management programs are noted, including the "anti-regulatory" effect wolves can exert on ungulate populations.

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Alaska's wolf (*Canis lupus*) population continues to thrive, numbering in excess of 10 000 animals. In addition, this fine animal continues as well to be the subject of considerable controversy, difficult management, and enlightening research.

Prior to Alaska's becoming a State some 23 years ago, the United States government had considered the wolf in Alaska as vermin and acted accordingly. There were no restrictions on the killing of wolves, and the Federal government carried out intensive wolf-killing operations throughout much of Alaska, using poisons, traps, and aerial shooting. The extensive control program during 1948—1959, coupled with unregulated public commercial aerial hunting for fur and bounties, reduced wolf numbers substantially in many parts of the State, and in the late 1950's and early 1960's the major ungulate prey populations (moose, *Alces*, caribou, *Rangifer*, and deer, *Odocoileus*) were flourishing and expanding.

Since 1959, however, the State of Alaska consistently and progressively has instituted management procedures designed to elevate the status of the wolf. In contrast to pre-statehood practices, Alaska has classified the wolf as both a "fur" and a "big game" animal; established seasons, bag-limits, and areas closed to the taking of wolves; outlawed the use of poisons; eliminated bounties; eliminated summer trapping and den hunting; and eliminated aerial sport hunting and indiscriminate control procedures. Under this management strategy Alaskan wolves now occupy virtually 100 percent of their historical range. The species has re-established itself in two areas from which it had been extirpated earlier: (1) the Kenai Peninsula, located just south of Anchorage, the population center of the State; and (2) the Coopper-River/Bering-River delta region at the head of Prince William Sound in southcentral Alaska. Wolves are not endangered in Alaska, and under enlightened management by professionals their status as a member of natural ecosystems is assured.

In some parts of Alaska, however, there are too many wolves for a balanced ecosystem which can provide for both man and wolf. Certain moose and caribou populations have become depressed because of one or more of the following reasons: severe winters, reduced food supply, excessive human harvest, heavy predation by wolf and bear (*Ursus arctos; U. americanus*). Once depressed, an ungulate population often does not recover quickly, especially in the presence of an effective predator such as the wolf. Wolves tend to concentrate mainly on the more vulnerable calves, yearlings, and associated females of moose and caribou — precisely those animals needed for the population to increase successfully.

To help rebuild these depleted moose and caribou

populations, the State has curtailed or reduced hunting seasons and bag-limits and has implemented wolf-reduction programs in certain areas, utilizing aerial shooting as the primary kill technique. There is little doubt that the aerial shooting of wolves is repugnant to many people. Nevertheless, it is an efficient and selective method of accomplishing the desired goal. Poison, extremely effective and once used by the Federal government, is an alternative which the State will not consider. Aerial shooting as presently used in Alaska is not "sport", but rather a management tool designed to control the balance between animal populations in an ecosystem that has been altered by man's influences and nature's vagaries. Due to the strong public interest in the wolf and the continuing controversy surrounding wolf-control, before initiating a wolf-reduction program my Department first holds public hearings in the communities within the region concerned. Local Fish and Game Advisory Committees throughout the State — 70 in all — play an important role in these meetings. It is our policy not to implement such a program unless we have strong public support. Within Alaska we do have such support.

The intent of these programs is to reduce temporarily the predation on depressed ungulate populations to permit them to increase more quickly. The alternative of doing nothing would allow the populations to decline to even lower levels or at best to remain at present levels or increase slowly over many years. This alternative is most undesirable from the standpoint of the needs of the local people, the wolves, other predators, scavengers, and the moose and caribou themselves.

From a human perspective, Alaskans depend greatly on protein obtained from the wild. In fact, meat from fish and big-game provides the bulk of the protein needs of many Alaskans; the loss of such of food supply can have a major adverse impact on their livelihood. Alaskan wildlife managers have attempted to maintain adequate stocks for human consumption. At the same time they are striving to provide for a balanced, healthy ecosystem that will help satisfy many of man's other needs and also will perpetuate the wolf as a necessary component of that system.

In 1976 the Alaska Department of Fish and Game initiated a predator(wolf): prey(moose) research/management study in interior Alaska on an area of 17 000 sq. km. to the southwest of Fairbanks. In this area, the moose is the primary prey species, with caribou secondary; and the wolf is the primary predator species, with bear secondary. Hunting by humans is an important mortality factor. In addition to periodic population surveys/censuses of the main species involved, a wolf-reduction program was carried out; an evaluation of that program constituted the central thrust of the study.

The results of this study have been gratifying, and will be published shortly by members of my Department's research and management staff — W. Gasaway, R. Stephenson, J. Davis, P. Shepherd and O. Burris — under the title: "Interrelationships of Wolves, Prey, and Man in Interior Alaska". The following remarks are taken directly or paraphrased from progress reports and the draft manuscript.

Numbers of moose and caribou had declined sharply in the study area during the early 1970s. The cause or causes of the declines were not well understood. Mortality from deep snow, harvest by hunters, and predation by wolves were implicated in the decline of moose; mortality from hunters and wolves also were implicated in the decline of caribou.

In an attempt to stop these declines and identify the cause, mortality from manageable factors (hunting and wolf predation) was reduced, and predator-prey research was intensified. The objectives of the study were as follows:

(a) to test the hypothesis that wolf predation was preventing the increase in numbers of moose and caribou during 1975 and 1976 (when the study began);

(b) to identify factors contributing to the declines and to better understand the relationships between these factors;

(c) if wolf reductions resulted in increased numbers of moose and caribou, to ascertain if it were a cause-and-effect relationship;

(d) to review moose-wolf relationships in ecosystems where wolf populations to a large extent are regulated naturally;

(e) to demonstrate the importance of man's harvest of prey species to the wolf-prey relationship; and,

(f) to identify the problems of managing prey populations for consumptive and nonconsumptive use where wolf populations are naturally regulated.

The conclusions of this study can be summarized as follows:

1. The moose population in the experimental area increased in the 1950s and 1960s following intensive wolf control, reaching peak abundance by the mid-1960s of about 24 000 animals. The population initially crashed to about 12 000 in 1965—66 because of deep snow and unavailability of browse; the decline continued until 1976, aggravated by excessive kills by man and wolves, with the population reaching a low of about 3 000 animals. After the crash the primary factors limiting moose were the interaction of periodic deep snow, harvest by man, and predation by wolves. The effect of the population crash was to increase the impact of predation on the moose population by lowering moose/wolf ratios.

2. Hunting by man and predation by wolf were principal causes of moose mortality from 1971 through 1975. Hunters removed from 6 to 19 percent of the moose population annually; the mean harvest rate equalled mean yearling recruitment. Predation by wolves was estimated to have removed approximately 20—25 percent of the moose during each of the winter 1973—74 and 1974—75, exceeding the annual recruitment of calf moose. In combination hunting and predation were responsible for the continued rapid decline after the severe winter of 1970—71.

3. The wolf-reduction program initiated in 1976 reduced the wolf population by about 65 percent, from 239 to 125 the first year and to 80 after three years. Survival of calf and yearling moose increased 2- to 4-fold after 1976; adult mortality declined sharply. Improved calf survival within the experimental area was directly related to the level of reduction of wolves. Since

1976 the moose population has increased steadily from a low of 3 000 to over 4 000 in 1981.

4. Hunting by man and predation by wolves were also the primary proximate mortality causes in the decline of caribou, which started about 1970. However, the calf recruitment was so low from 1971 to 1975 that significant decline would have occurred without any hunting. After 1973 hunting was stopped and predation alone suppressed any increase in the caribou population. Following the reduction in number of wolves after 1976, calf survival increased markedly and the caribou population grew rapidly, from a low of 1 800 animals to over 4 000 in 1981.

5. In retrospect, serious errors were made in managing the moose population in the experimental area during the early 1970s. Population size was not estimated accurately, and the rate of decline initially was underestimated. Analysis of data was not thorough or timely, and therefore appropriate hunting regulations were implemented belatedly. Biologists underestimated the combined impact of wolf predation and hunting on moose during the early 1970s, and mistakenly did nothing to control wolves. Mortality from severe winters, hunting, and wolf predation was largely additive. Underestimating the direct impact on moose and caribou populations of the human harvest and its combined effect with predation led to a grave management situation which allowed the continuation of hunting as before, including cow moose hunts, under the mistaken idea that the moose density was too high and low food supply was a problem. Belatedly it was realized that caution must be exercised in regulating harvests of ungulates in ecosystems where wolves essentially are regulated naturally.

6. Predation by wolves can have an "anti-regulatory" effect on ungulate populations, i.e., the effect of predation increases as ungulate populations decrease and vice versa. Various studies have shown that anti-regulatory control of ungulates by wolves can sustain or even accelerate a decline once it has been initiated by other factors, causing ungulates to reach extremely low densities. From the standpoint of ungulate management, the lack of a sensitive, fast-acting feedback mechanism that naturally regulates wolf numbers in response to changing prey density can either drive prey populations to unacceptable low levels or allow prey populations to reach undesirable high densities once they escape the effect of predation.

7. In attempting to manage an ungulate population in the presence of a more or less naturally regulated wolf population, reliance on the traditional sex and age ratios to assess population status can be misleading. Wolf predation on young can obscure a true assessment of the existing relationship between an ungulate population and its food supply. A low survival of calves viewed as an indication that a population is limited by food, when actually the cause is predation, could result in erroneous management decisions: e.g., an increase in hunter kill to reduce densities, with resulting further adverse effects.

8. Alaska does have areas where wolf and ungulate populations are controlled largely by natural events. These populations are exploited to varying degrees, but human harvest rates mostly are insufficient to alter substantially the impact of predation on ungulate prey. However, when predation does become a primary factor controlling the growth of an ungulate population — usually after that population has entered a significant decline due to other causes — then a manager really has only two effective options: (1) wait for the slow, more or less natural change of events, or (2) hasten the increase in prey by altering the control which predators exert on prey populations. Considering the lengthy period (maybe decades) that may be required for natural events to produce a major recovery in numbers of ungulates following a decline, it seems most prudent for a manager to utilize artificial control of predation to hasten the return. A low prey population (e.g., moose) followed by and concurrent with low predator population (e.g., wolf) would seem a contradiction to good management — not in the best interest of prey, predators, nor man.

9. To be effective, the wildlife manager must correctly identify and alleviate the factors that trigger and sustain ungulate declines. This is especially difficult in certain areas of North America where wolves remain abundant. A knowledge of the ratio of prey to wolves can assist in the initial interpretation of wolf-prey relationships in areas where limited data are available. In the experimental area under consideration the following conclusions seem valid:

(a) at a moose: wolf ratio of less than 20, predation usually is sufficient to cause a decline in moose abundance and a low survival of calves and adults;

(b) at 20—30 moose/wolf, predation can be the primary factor controlling numbers of moose; whether the moose population remains stable or declines is largely dependent on the combined effect of other factors influencing the dynamics of the moose population, including hunting, food supply, alternate prey, and winter severity; and,

(c) at a moose: wolf ratio greater than 20, moose populations may remain stable or increase if they are below ecological carrying capacity and other sources of mortality are not great.

I have presented a synopsis of results obtained from one of the predator: prey (i.e., wolf: moose) studies being carried out in Alaska by research biologists in my Department. The details will be available soon in publication. Since the initiation of this wolf-reduction program in 1976, we have implemented six others. Of the total of seven, two have been suspended because additional prey/wolf censuses indicated no need. It is most likely too that the program reported herein will be suspended after this year, because the moose: wolf ratio exceeds 30.

I wish to emphasize most strongly that Alaska will carry out wolf-reduction programs only when believed necessary to facilitate the quick recovery of depressed ungulate populations. We value the wolf as a nesessary component of our wild heritage and of the ecosystems which sustain man and other species. We intend to protect this species from extirpation, but at the same time manage the wolf for the benefit and enjoyment of all people.

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