

Intensive Management of Wolves and Ungulates in Alaska

Kimberly Titus

*Alaska Department of Fish and Game, Division of Wildlife Conservation
Juneau, Alaska*

Introduction

Across Alaska, all species of terrestrial wildlife and, in particular, big game currently occupy their historic range. Wolves (*Canis lupis*) and brown bears (*Ursus arctos*) are not, and have never been, listed under the Endangered Species Act. Wolves and brown bears are generally absent from the state's few urban areas, but both are often found within a few miles of downtown areas. Ungulates, including moose (*Alces alces*), caribou (*Rangifer tarandus*) and Sitka black-tailed deer (*Odocoileus hemionus sitkensis*) occur across the state. Moose and caribou numbers are regulated by many factors, such as range health, habitat type, weather, disease, human harvest and predation. Wolves, brown bears, and black bears (*Ursus americanus*) have, within their respective ranges, significant impacts on ungulate populations in northern regions. Understanding these relationships has been the subject of various research efforts over the past few decades (e.g., Gasaway et al. 1983, Gasaway et al. 1992, Boertje et al. 1996, Hayes et al. 2003). Over the same period, there has also been constant, public debate across Alaska about how to manage prey and predators, particularly control of predators to increase ungulates for human harvest (e.g., National Research Council 1997, Regelin et al. 2005). In fact, this debate has existed since before statehood in 1959 (Harbo and Dean 1983) and is ongoing (Decker et al. 2006).

High public interest in wolves and brown bears is confounded by some unique Alaskan laws and perspectives. Many Alaskans maintain a subsistence culture, tradition and lifestyle that depends on wild foods. This dependence is protected under both state (state subsistence statute) and federal (Alaska National Interest Lands Conservation Act [ANILCA]) laws. Therefore, despite the changing times, the public demand for access to food in the form of ungulates, salmon and other subsistence foods remains a cornerstone of fish and game management in Alaska. As a result, many Alaskans support intensive management programs, such as predator control. However, despite the

subsistence legislation and other legal requirements, some Alaskans and others from outside the state oppose active predator management aimed at increasing ungulate (particularly moose) densities for human harvest. For Alaskan wildlife managers, the complexity of the social, cultural and biological issues surrounding ungulate and predator management presents many challenges (e.g., Brown and Decker 2003, Decker et al. 2006). My objective is to provide background and context for understanding the current wolf-control programs in Alaska that are designed to increase moose populations for human harvest.

History, Background and Relevant Law

There is a long history of wolf control in Alaska that is related to promoting increases in ungulate populations. Policies regarding control of wolves have changed from one administration to the next and have changed under the federal government prior to statehood. Different administrations have been involved in planning and stakeholder processes, in land and shoot programs, in wolf reduction programs using state employees, in lawsuits, and in tourism boycotts (National Research Council 1997, Regelin et al. 2005). Some governors instituted wolf control; others did not. I will not review that history in detail here; rather, I will focus on the current laws and the status of the program over the past few years. Detailed reviews are provided elsewhere (National Research Council 1997, Regelin et al. 2005).

There are a few key sections of Alaska's constitution relevant to management of Alaska's wildlife. The constitution directs that natural resources shall be developed for the maximum benefit of the people and that natural resources such as wildlife, "shall be utilized, developed, and maintained on the sustained yield principle, subject to preferences among beneficial uses," (Article VIII, section 4, Constitution of the State of Alaska). The sustained-yield principle is a central theme of Alaska's wildlife management programs.

Under state law, wildlife regulation and policy are set first by the Alaska Board of Game through the regulatory process. The Alaska Department of Fish and Game (ADFG) then applies these regulations (seasons, bag limits, harvest methods) to meet a specified management objective. The commissioner of the department, who is appointed by the governor, also has authority to set and institute some regulations, as is the case with some aspects of predator control.

Alaska passed a subsistence law in 1978 requiring that a preference be given for hunting and fishing opportunities to those who customarily and

traditionally use these resources. Many Alaskans have a direct dependence on subsistence foods, especially through the harvest of ungulates. Moose and caribou are key subsistence species over large areas of interior Alaska where access to salmon may be lower than in coastal areas. While management must still occur under sustained-yield principles, the Alaska Board of Game must provide for subsistence opportunity, sometimes to the exclusion of other uses, such as hunting by nonresidents if harvestable surpluses are inadequate to satisfy all use. In addition to the state requirement to provide a preference for subsistence uses, the federal government also has a somewhat similar requirement in ANILCA. That provision provides a preference for rural residents of Alaska to harvest fish and wildlife resources on federal lands where allowed. Combined, both sets of laws direct regulatory bodies and wildlife managers to provide for species, like moose, in sufficient numbers to ensure that subsistence harvest can occur. This demand is unlike nearly any other state in the United States, and many rural subsistence users strongly support predator control to increase moose populations (Brown and Decker 2003).

In recent history, when Governor Tony Knowles was elected in 1994, he suspended the then-extant, ground-based, wolf-control effort and called for a review of the department's wolf-management program. The review was conducted by the National Academy of Science (NAS). The governor also established three guiding principles that must be met for wolf control to proceed. He directed that control programs: (1) be based on sound science, (2) be cost effective and (3) be broadly acceptable to the public.

The NAS review committee concluded that management and control of wolves could work in some circumstances (National Research Council 1997). The report indicated that the department's wolf- and ungulate-management programs were based on sound science, noting that there could always be more study and that the experiments could always be improved. The report also emphasized that wolf control would be controversial, costly and time consuming. Results from this report have been used by both critics and supporters of Alaska's predator-management programs.

After this review, a year-long, citizen-planning effort related to ungulate and predator management took place in one part of interior Alaska. The citizen group proposed a nonlethal, wolf-control program to increase the size of the depleted Fortymile caribou herd. After an intensive effort by trappers to reduce wolf densities, the department sterilized the alpha male and female wolves in specific packs and moved subdominant wolves elsewhere (Boertje and Gardner 2000). In combination

with a carefully planned harvest plan, the reduction in wolf predation helped the caribou population to increase from 22,000 to 38,000 during this period; the nonlethal program was controversial but not to the extent of earlier lethal programs.

The Alaska legislature passed an intensive management law in 1994. This law requires the Alaska Board of Game to identify big-game prey populations in the state that are to be managed for high human harvest, to establish population size and harvest objectives for these populations, and to develop regulations for intensive management. The board is precluded from significantly reducing hunter harvest of these populations through restrictions without enacting intensive management regulations unless the board can demonstrate that intensive management would: (1) be ineffective, based on scientific information, (2) be inappropriate due to land-ownership patterns or (3) be against the best interest of subsistence uses.

Predator control is an important tool for managers who are legally required to increase or maintain ungulate densities at high levels. Establishing a predator-control program is a lengthy process and not all requests for predator control have been approved by the Alaska Board of Game. The intensive management law has established a number of steps and qualitative thresholds that must be passed for a program to be approved. Legally, it takes at least 1 year and 2 public meetings to establish a predation-control program, but, in practice, the process usually spans between 2 and 3 years.

At the same time that the Alaska Board of Game was beginning to implement the intensive management law, a voter initiative (1996) and a voter referendum (1999) were passed related to banning same-day, airborne hunting of wolves. This practice had been legal in Alaska because federal requirements were met that required the hunter to be more than 300 feet (91.4 m) away from an aircraft before taking a wolf. And, it had contributed to keeping wolf populations reduced in some areas of the state. However, the same statute allows the same-day, airborne control of wolves through a permitted, nonhunting program when certain conditions are met. Five areas with predator-control plans have control programs for wolves that use aircraft, and all have been litigated by groups opposed to the practice.

Moose and Wolf Populations and Their Management

Moose are widespread in Alaska and constitute one of the most important hunting and food resources in the state. Hunter harvest of moose

ranged from 6,700 to 8,700 during 1996 to 2005, with a mean annual harvest of 7,500. Hunter harvest may be managed by restricting the harvest to one sex, by imposing antler restrictions, such as the spike-fork, 50-inch and 4-brow-tine regulations, and by issuing a limited number of permits. Three types of permits mainly are used to manage hunter participation in an area. In areas with very high hunter demand where subsistence is not a priority, a drawing (lottery) hunt may be used to limit the total number of hunters. In registration hunts, the number of permits is usually not limited, but these hunts are sometimes restricted to residents or to specific locations. In areas where there are not enough moose to satisfy the subsistence need, a subsistence permit hunt may be held. Subsistence permits are awarded only to residents based on a demonstrated history of use and dependence on the resource for food and on the availability of alternative resources. In some remote areas of the state, there is a late-winter, moose-hunting season designed to provide moose for subsistence hunters. Where moose numbers are at very low levels, locals have sometimes asked the Alaska Board of Game to completely close the hunting season in an attempt to eliminate all poaching and to help increase the moose population to allow for a future harvest.

Across much of interior Alaska, both north and south of the Alaska Range, large predators (wolves, brown bears and black bears) can maintain moose and sometimes caribou at low population levels (e.g., Gasaway et al. 1992, Boertje et al. 1996, National Research Council 1997). This can leave little harvestable surplus for humans. Alaska has an estimated 7,700 to 11,200 wolves. Wolves have never been threatened or endangered in Alaska, and they inhabit all of their traditional range, except within the largest cities. Wolves are harvested across the state, traditionally by trapping and hunting (Figure 1), with the total annual harvest averaging 1,500 from 1996 to 2005. Seasons and bag limits vary depending on whether wolves are harvested via hunting or trapping regulations, which differ.

Intensive Management and Wolf Control

There have been two intensively managed areas where predator control was either never implemented or has been terminated. One area with a program for nonlethal, wolf-control was for the Fortymile caribou herd, mentioned previously; the program is no longer in effect.

The other area is Game Management Unit 20A (6,796 square miles [16,601 km²]), south of Fairbanks (Figure 2), which is an example of how lethal

Figure 1. Total annual harvest of wolves, by method, in Alaska, regulatory years 1986 through 2005.

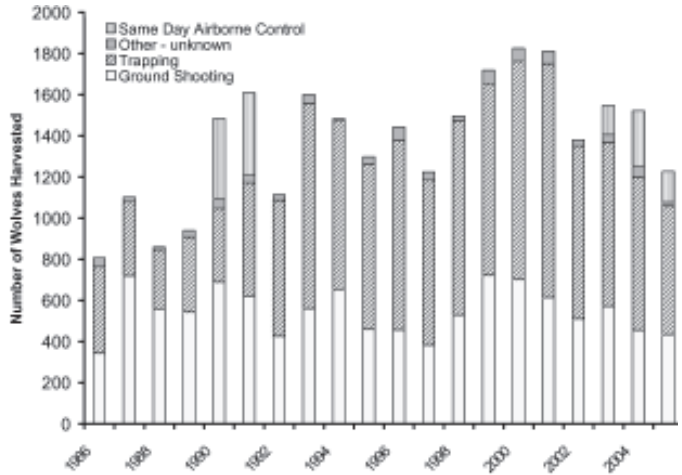


Figure 2. Locations of six areas in Alaska intensively managed to increase moose populations. Five of the areas (A, B, C, D, E) involve same-day airborne or aerial gunning of wolves since 2004 through a permitted control program. In one area (F = game management unit 20A), management of predators has been through hunting and trapping regulations.



Predation control areas are: (A) unit 19A, middle Kuskokwim; (B) unit 19D East, near McGrath; (C) unit 13, Nelchina Basin; (D) unit 16, upper Cook Inlet; (E) units 12, 20 and 25, upper Yukon-Tanana.

wolf control can lead to an increase in moose densities. The area contained only about 2,500 moose when wolf control was implemented in 1975. That wolf control program ended in 1982 and the moose population increased to between 10,000 and 11,000 moose by 1989; it remained near that level until 1992. Moose harvest at that time consisted of about 400 bulls each year. In 1993 and 1994, a wolf-

control program was implemented to reverse a dramatic decline in caribou numbers, but the primary beneficiary appeared to be moose. The wolf population was reduced by about 60 percent and the moose population increased to over 15,000. Harvest of antlerless moose was eventually implemented to meet intensive harvest objectives and to regulate the moose population (Boertje et al. 2007). Annual harvests of up to 1,100 moose have occurred over the last few years and appears to regulate the moose population. After 1995, wolves recovered to precontrol levels and the Unit 20A wolf population is now the highest-density wolf population in interior Alaska. Wolves are currently harvested by trapping and hunting, but their population is not being regulated by that harvest, and no control program is in place. Favorable habitat and weather conditions appear to have facilitated the increase in this moose population. This successful program suggests that, even in a northern system with multiple predators (wolves and brown bears in this case), wolf control can shift a moose population from a low-density to a high-density equilibrium where favorable habitat occurs. In these situations, the moose population can increase markedly.

Current (2006 to 2007) Intensive Management Programs Using Wolf Control

The intensive management law requires that the Alaska Board of Game establish predator- and prey-population objectives prior to instituting a predator-control program. The board sets prey-population objectives at a public meeting, after considering department staff reports on historic prey population and harvest levels, population parameters, habitat status, predation levels, as well as testimony from the public and local advisory committees. Once the prey-population objectives have been set, the department determines the size to which the wolf population would need to be reduced to achieve the desired prey densities. This wolf-population objective is included in a predation-control-area implementation plan that is then presented to the board for adoption into regulation. Wolf-take objectives represent the difference between the regulatory management objective and the department's current best estimate of wolf-population size. Wolf-population estimates are derived from results of aerial surveys, sealing information, productivity estimates and on immigration information. Population estimates and take objectives are revised annually as updated information becomes available. Wolf-take objectives for the winter of 2007 are between 382

and 664 wolves across all 5 predator control areas (Table 1). This figure includes wolves taken by normal hunting and trapping. Most wolves are taken during the last month of the wolf-control program, which closes on April 30.

Table 1. Wolf-population estimates and management objectives for five predation control areas in Alaska, fall 2006. Population estimates are adjusted annually as are control objectives depending on harvest and survey results from the previous year.

| Predation control area | Size in square miles (km ²) ^b | Wolf population estimate (fall) | Wolf population objective | Wolf harvest control objective |
|------------------------|--|---------------------------------|---------------------------|--------------------------------|
| Unit 13 | 15,416 (39,927) | 217–256 | 135–165 | 52–91 |
| Unit 16 ^a | 11,102 (28,754) | 139–176 | 30–60 | 79–146 |
| Unit 19(A) | 10,035 (25,991) | 45–71 | 30–36 | 9–35 |
| Unit 19(D)-East | 8,541 (22,121) | 85–100 | 40 | 45–70 |
| Upper Yukon/Tanana | 18,745 (48,549) | 300–425 | 88–103 | 197–322 |
| Total | 63,839 (165,342) | 786–1,028 | 323–404 | 382–664 |

^a Population estimates and objectives are for the entire game management unit.

^b Size is the area of the predation-control areas as defined in the overall regulation. The actual control activities are permitted on a smaller area.

Present wolf-control programs began in 2004 and rely on aerial gunning or on landing and shooting wolves. Pilot-gunner teams are permitted by the department after a review of experience and qualifications. The individuals act as agents for Alaska, which meets the requirements of the federal Airborne Hunting Act. Under that act, the department annually reports to the U.S. Fish and Wildlife Service the number of wolves taken under the intensive management programs. The permits are control-program specific, and the department has wide discretion in who obtains them. The control programs are directed management activities with an emphasis on effectiveness; as such, there is no requirement for fair chase such as there is for hunting activities. The programs incorporate strict reporting procedures, and those taking wolves must also have a trapping license. Once sealed, the wolf hide is the property of the permittee, and it may be sold or used just like a wolf taken through the state's normal trapping program. Permittees have received no compensation other than the fur value of the pelts they have taken.

Although the control programs occupy large portions of some game-management units (Table 1), lands managed by the U.S. Fish and Wildlife Service (refuges) and the U.S. National Park Service (parks and preserves) are excluded from the program without direction to the contrary by the respective federal agency. Federal land status has been one important factor in the Alaska Board

of Game not authorizing control in some areas with depressed moose and caribou populations and where much of the game-management unit is composed of one or more federal conservation units.

In all of the active control areas, moose hunting has become much more restrictive over the past one to two decades. In four of five control areas, nonresident hunting has been eliminated by the Alaska Board of Game, meeting the legal requirement of the state's subsistence law. Typically, the board restricts ungulate hunting before initiating intensive management, and hunting seasons and bag limits for wolves, brown and black bears are also liberalized.

The first area where intensive management was applied (in December 2003) was the area surrounding McGrath (Unit 19D-East; Figure 2, area B), a rural village on the Kuskokwim River without road connections to the rest of the state. The department conducted a stakeholder planning effort there and established a small experimental micromanagement area (EMMA) of 528 square miles (1,368 km²). The objective was to enhance moose survival rates by culling wolves. In addition, black and brown bears were captured and were moved from the area by department personnel for two summers. Before and during the predator control period, an intensive research project monitored the status of the moose population. Preliminary results suggest that calf-survival rates have increased significantly with the reduction in predators. In the past year, lethal control of bears was added to a portion of the plan area, with black and brown bear population reduction being authorized under baiting conducted by predator control permittees.

A second area with wolf control is Unit 13, the Nelchina Basin northeast of Anchorage and south of the Alaska Range (Figure 2, area D) where a program has existed since January 2004. Like Unit 20A, Unit 13 has an extensive history of intensive research and management involving moose, caribou, wolves and brown bears (e.g., Ballard et al. 1987). The area is large (15,413 mi² [39,919 km²]) and has long been an important area for hunting by local residents and by many in Anchorage and Fairbanks, who have road access to the area. Historical predator and prey management in this unit has shown that, when the late-winter (spring) wolf population was maintained at 135 to 165 wolves, annual moose survival was adequate to allow the population to increase. The precontrol wolf estimate (in 2000) in the area was more than 500 wolves. A total of 128 wolves were taken in regulatory years 2004 and 2005 using land-and-shoot control methods. This harvest, combined with additional wolf hunting and trapping

harvest and with liberal brown bear hunting regulations, has helped to arrest the decline of the moose herd. This moose herd has increased 14 percent from 2000 to 2006, based on annual surveys.

A third program north and east of the Nelchina Basin was established in the winter of 2004 to 2005 and is known as the Upper Yukon/Tanana wolf predation control area (Figure 2, area E). The original objectives of wolf control in this area were to increase the moose population across the area. But, more recently, the program was expanded to continue the growth of the Fortymile caribou herd. Similar to Unit 19D-East, brown and grizzly bears were added to the program, again as a ground-based, baiting program by permittees. Moose populations in much of this area have been at a low density since the late 1970s. Wolf harvest, combined with recent large burns that should enhance habitat, are expected to help the moose herd grow in this area.

A fourth area in the central portion of the Kuskokwim River is known as the Unit 19A wolf-predation control area (Figure 2, area A). Moose are heavily relied on in this area for fall and winter food by local residents who live in a number of small villages along the river. Habitat is not thought to be a limiting factor, and wolves are believed to be the primary factor limiting moose populations in this area. A total of 90 wolves were taken by aerial-control permittees in the first two winters of aerial control.

A fifth and more recent wolf-control program was established in Unit 16 on the western side of Cook Inlet, across from Anchorage (Figure 2, area C). As the moose population declined in this area during the 1990s the female-moose age structure became older because few calves were being recruited into the population. Habitat is not limiting. In this control area, both wolves and bears are thought to limit moose numbers. In the first winter (2004 to 2005) of wolf control in this area, 91 wolves were taken. It is believed that, in combination with lower wolf densities, a large increase in the harvest of black bears will be necessary to increase moose-calf survival and a resultant rise in moose density.

Conclusions

Alaska's intensive management law requires that the Alaska Board of Game and state wildlife professionals institute programs to increase certain depleted ungulate populations, so they are capable of sustaining high levels of human use. The ADFG has implemented intensive management regulations

promulgated by the board, resulting in five same-day, airborne, wolf-control programs at the present time. The predator-control plan for each of the areas requires that viable wolf populations be maintained in those areas and that the control programs are meant to be temporary measures, albeit sustained over multiple years to achieve desired results. Concurrent bear-control baiting programs have also been established in two of these areas. These intensive wildlife management programs are controversial, and the public wants a continuous evaluation of program efficacy. The ADFG is conducting research and is monitoring predator and prey populations in the control areas, both to guide adaptive management and to document the effects of predator reductions. These research and monitoring programs will not occur with equal emphasis in all areas, but I believe that the intent of the recommendations made by the National Research Council (1997) is being met. Recent funding from the Alaska legislature has been critical in ensuring that the research and monitoring programs are scientifically sound.

Information on responses of ungulates, predators and habitat over at least a few years will be necessary to adjust program goals in a given area. There are a number of factors that influence how moose and caribou populations will respond to predator reductions. First, not all ungulate populations are at the same population size, trend and age structure at the same time. Therefore, ungulates will not necessarily respond the same way to high wolf harvest. Second, habitat varies in quality and quantity. Third, winter-weather severity varies from year to year and from one area of the interior to another. Winter weather and snow cover can be important factors influencing ungulate survival, predation efficiency and success in meeting annual wolf-harvest goals. Over the next few years, each program will be evaluated by the public, the Alaska Board of Game and the ADFG to determine whether predator control will continue to be needed to meet predator and prey population and harvest objectives.

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