

Wolf Management Programs

In Alaska

1975-1983



DIVISION OF GAME

November 25, 1983

Mr. John Shively, Chairman
Board of Game
c/o NANA
4706 Harding Drive
Anchorage, Alaska 99503

Dear Mr. Shively:

The enclosed report, "Wolf Management Programs in Alaska 1975-1983," was prepared by the Game Division in response to a request of the Board of Game at your meeting in March-April 1983. This report is intended to review the status of wolf management programs initiated since 1975.

The structure of this report contains a general introduction with a conclusions and recommendations section given before the main body of the report. The purpose of this arrangement is to accommodate those persons who may not have the time to review the entire report in detail. We encourage a complete assimilation of the report prior to the oral presentations during the upcoming Board meetings.

Specific recommendations are made for programs already established and general recommendations are given for consideration by the Board in regard to conduct of future wolf management programs. It should be noted that these recommendations are those of the Game Division and reflect our understanding of past directions from the Board based on the expressed wishes of the public.

The Alaska Wildlife Management Plans published in 1976, approved revisions, and proposed revisions to those plans which are germane to wolf management programs are not included in this report. Because this report is intended as an overview document, it does not attempt to include the vast amount of data available on wolves and wolf management in Alaska. Instead we urge that those persons interested consult wolf research reports, survey-inventory reports, ADF&G Wildlife Technical Bulletin No. 6, Wildlife Monograph No. 84, and other appropriate publications for these data.

Game Division staff will be prepared to present an oral summary of this report to the Board at the Fairbanks and Anchorage meetings. Appropriate visual aids and additional summaries of pertinent data will be presented also.

Copies of this written report are being provided to Board members and interested members of the public for their review prior to the Board meeting. Appendices 1, 4, 6, and 7 are being sent under separate cover. Complete copies of this report with all appendices will be available for Board members at the meeting; extra copies of technical materials will be available for the public.

Sincerely,

W. Lewis Pamplin, Jr.
Director

Enclosure

cc: Commissioner Collinsworth
Beth Stewart
Liza McCracken

ALASKA DEPARTMENT OF FISH AND GAME
JUNEAU, ALASKA

STATE OF ALASKA
Bill Sheffield, Governor

DEPARTMENT OF FISH AND GAME
Don W. Collinsworth, Commissioner

DIVISION OF GAME
W. Lewis Pamplin, Jr., Director

WOLF MANAGEMENT PROGRAMS
IN ALASKA
1975-1983

Prepared at the request of the Alaska Board of Game, November 1983.

WOLF MANAGEMENT PROGRAMS IN ALASKA, 1975-1983

INTRODUCTION

The history of wolf management in Alaska was thoroughly reviewed by Dr. Samuel J. Harbo, Jr. and Dr. Frederick C. Dean. Their report was recently published in "Wolves in Canada and Alaska: their status, biology, and management" (Canadian Wildlife Service Report Series, No. 45, 1983) (Appendix 1).

Harbo and Dean's review demonstrates that in Alaska both public and professional perceptions of wolves have changed in parallel with people's perceptions of wolves elsewhere. Wolves were once perceived as "all bad," but as more knowledge accumulated that judgment crumbled. Soon wolves came to be popularly viewed as "all good" because of their scarcity in most of the United States and a trend among scientists to believe that predation seldom affected numbers of prey. Most recently, as studies of wolves and other predators extended over longer periods and new studies reexamined predator-prey relationships, it has become clear that wolves are neither "all bad" nor "all good" regarding their effects on prey species.

In Alaska and elsewhere, scientists have learned that wolves can and do affect the abundance of prey species. Predation by wolves can affect prey numbers a little or a lot, for a short or a long period, depending on the circumstances. It has also become clear that mortality from predation is additive to other mortality. How acceptable the effects of predation are to people also varies. The International Union for the Conservation of Nature, a privately sponsored organization dedicated to wildlife conservation worldwide, recently pointed out that because of the variation in wolf-prey or wolf-prey-man relationships, control of wolf numbers may sometimes be necessary (Appendix 2). Wolf population management, or control, in Alaska is a perfect example of the situation described by the IUCN. Although wolves are neither good nor bad, their effectiveness as predators can restrict population sizes of prey and can affect people's opportunities to see and use prey species. However, while it may be entirely appropriate to regulate the effect of wolves on other species, there is no justification for their elimination. Alaska's wolf management programs regulate, not eliminate, the numbers of wolves and their influence on ungulate prey in selected portions of the State.

Moose and caribou populations increased to record levels following extensive reductions in wolf and, in some cases, bear numbers in much of Alaska during the 1940's and 1950's. However, there was little scientific documentation of changes in populations of predators and prey, and the role of predator reductions in wildlife management remained largely undefined. As a result, wolf reduction became a controversial issue when it was proposed as part of management programs intended to rehabilitate the many low and declining moose and caribou populations in Alaska during the 1970's.

During the past 15 years, research in many parts of North America, including Alaska, has shown that predation often controls the rate of prey population growth, can cause prey populations to decline, and can maintain prey populations at low densities. These facts have led to a reevaluation of the role of predator reduction in maintaining viable populations of ungulates such as moose, caribou, and deer. In Alaska, intensive studies of wolves and their effects on ungulate numbers began in 1975 in Units 13 and 20. These were followed by studies of black and grizzly bear predation on moose on the Kenai Peninsula, in Unit 13, and, recently, in the Yukon Territory.

These studies have shown that predation by both wolves and bears can have substantial effects on prey populations, and that like other factors including harvests by man and habitat, predation must sometimes be actively managed if moderate to high numbers of ungulates are to be maintained. It is now clear that without predator management there will be extended periods when ungulate populations will decline to low levels, to the detriment of both ungulates and the predators that rely on them for food.

Recent studies have shown that when food supplies for ungulates are adequate, mortality from predation is largely additive to mortality from other sources. For example, if predators annually remove 15% of a moose population, the total mortality of that population will be almost 15% higher than in the absence of predation. Predation does not simply replace other sources of mortality; animals that die from predation would often not have died from other causes. Therefore, by reducing predation the survival rate of ungulates can be increased. An appreciation of the additive nature of mortality from predation is fundamental to an understanding of wolf and ungulate management programs in Alaska.

The predator-prey ratios referred to in this report have proven to be useful in evaluating the status of populations. Studies of prey-wolf relationships in Minnesota, Michigan, Canada, and Alaska have shown that as prey-wolf ratios decline, prey populations are increasingly controlled by wolves. For example, in a simple moose-wolf system, ratios of 20-30 moose/wolf or greater are required for the moose population to remain stable. At lower ratios moose numbers usually decline. A ratio of more than 30 moose/wolf will usually allow moose to increase. In Alaska, the use of prey-wolf ratios can be more complicated due to the presence of additional species of both predators and prey.

Where wolves are the primary predator, the reduction of wolf numbers alone can be very effective in reversing declines in ungulate numbers. However, in many parts of Alaska black and/or grizzly bears are also present in significant numbers. These complex predator-ungulate systems are more difficult to manage, in part because only wolf numbers can be significantly altered at present. Because wolf populations can increase far more rapidly than bear populations, it is preferable to lower wolf numbers to allow declining ungulate populations to increase. Where bears, as well as wolves, are important predators on a declining moose population, wolves must be reduced to low levels with respect to moose. Even then, moose populations will not always respond with rapid growth because of continued losses to bear predation.

In this report, recommendations are made for ongoing and future management programs. Wolf management programs are reviewed in fairly general terms; the entire quantity of information collected on wolves and prey in the programs is too extensive for inclusion in a concise review. However, wolf management programs have been previously discussed at length in various Game Division documents. Several reports to the Board, Technical Bulletin #6, informational leaflets, annual survey and inventory reports, and research reports have covered wolf management and research programs, and related studies of prey. In addition, scientific papers on prey-wolf studies have been published. Wildlife Monograph No. 84 is the most recent and most comprehensive scientific publication on prey-wolf relations in interior Alaska. These various documents plus unpublished data provide the basis for this review.

As used in this report, the term "wolf management" refers to programs designed to manipulate wolf numbers to obtain specific management objectives for wolves and their prey. The practice of shooting wolves from an aircraft is termed "aerial shooting." This may be done only in connection with approved wolf management programs and under the conditions of a permit. "Trapping" refers to the practice of setting traps and snares and also shooting wolves from the ground by persons who are licensed to trap. "Wolf hunting" is taking or attempting to take wolves with a rifle from the ground, by persons licensed to hunt.

PURPOSE

The Alaska Board of Game in March 1983 requested this review of wolf management programs for consideration at the December 1983 Board meeting. This report includes an overview of objectives, results, and current status of various programs conducted since 1975.

CONCLUSIONS

1. Dr. Lloyd Keith recently reviewed knowledge of wolf-prey relationships. He concluded "There now seems little doubt that: (1) wolf predation is a major component of total annual mortality in many ungulate populations, (2) such losses are often largely additive to other kinds of mortality, and (3) wolf predation is, therefore, a significant controlling factor . . . " of ungulate population size. "The dynamics of ungulate and wolf populations are strongly linked, and management must take this into account." These conclusions accurately describe the status of wolf-ungulate relationships in Alaska and form the basis for contemporary wolf management programs.
2. In Alaska, reducing the level of wolf predation has allowed moose and/or caribou populations to increase in various Game Management Units including 13, 20, and 21. Few direct measurements of the effects of wolf reduction are available in Units 19, 23, 24, and in the Nowitna drainage in Unit 21.

3. Due to their relatively high reproductive rate, as well as high rates of immigration, wolf populations recover rapidly following reductions in numbers.
4. Recent studies have shown that black and grizzly bear predation can also have substantial effects on ungulate populations. This can lower the effectiveness of wolf management programs designed to rehabilitate low and declining ungulate populations.
5. The management of relatively simple prey-wolf systems is reasonably well understood. However, the management of more complex systems, in which more than one important predator and prey species are involved, is not as well understood, and the effects of management actions are less predictable until more is learned about these systems.

RECOMMENDATIONS

This section provides brief statements on each of the wolf management programs that have been approved since 1975. The recommendations included herein are those of the Division of Game, and reflect our understanding of prior decisions and directions of the Board.

Subunit 20A and part of Subunit 20C

Caribou and moose population objectives are currently being reviewed and management plans are being revised. The Delta Caribou Herd has reached its highest population level in recent history, and we anticipate that the management plan will suggest an optimal herd size near its present postcalving level of 7,500-8,000 animals. The moose population is currently estimated to be 25-30% of the historical high population achieved in the mid-1960's. The revised moose population objective probably will be higher than the current population of 5,000-6,000.

The annual rate of increase of both moose and caribou populations has been declining for the past 2 years. The Delta Caribou Herd may have stopped increasing. Wolf population size has increased in the last 2 years, and now approaches preremoval levels. Wolf management probably will be required periodically if the harvest of caribou is to remain at its present level but herd size is not increased. Periodic wolf removal will also be necessary for several years if a larger moose population and higher moose harvest are to be achieved.

The wolf management program should be continued in this area.

Subunits 19A and B

The public demand for moose in this area is not being met. Seasons and bag limits remain very restrictive and favor local moose and caribou hunters. Large numbers of hunters from adjacent Unit 18 are limited by the current restrictive regulations. The area's terrain and vegetation allow periodic high harvest of wolves by the public when favorable snow

and weather conditions occur and providing that a management program allowing aerial shooting persists. However, these weather conditions rarely occur. Moose population increases could result from periodic high harvests of wolves with no long-term detriment to the wolf population. However, the Board must understand that the Division does not have, nor is likely to have, sufficient funding to gather precise data on wolf or prey populations, nor to be able to precisely determine the effects of wolf removal.

Given the relative lack of data, we recommend that the harvesting of wolves by Departmental personnel or aerial hunting permits be suspended in Subunits 19A and B until a better data base is available

Unit 21 Innoko Drainage

The issuance of public aerial permits and Department efforts were suspended after the 1980-81 season. The suspension has continued because wolf trapping has accounted for a sizable harvest in the 1981-82 and 1982-83 seasons (Appendix 3). There are currently no Department plans to remove wolves. Public aerial permits will not be issued in winter 1983-84. There should be an assessment of the need for subsistence and nonsubsistence moose harvests in this area. Moose population objectives that will provide for reasonable human use should be established and a moose management plan prepared. The current moose population appears to be capable of accommodating the present levels of harvest and wolf predation. Unresolved State and Federal jurisdictional questions on the Innoko Wildlife Refuge may encumber moose and wolf management programs in the future.

Suspension of the Innoko drainage wolf management program should continue.

Unit 21 Nowitna Drainage

The wolf management program for this area was suspended in 1981. Public and Department aerial shooting could not be effective in the Nowitna National Wildlife Refuge because of unresolved jurisdictional questions. Subsistence needs for moose in this area are moderate, but the overall demand for moose is not being met by the present moose population, particularly in the lower Nowitna drainage. Moose population objectives and human use objectives should be established in order to evaluate the potential need for wolf management.

Suspension of the wolf management program should continue.

Subunit 20B

Moose population increases occurred in several parts of the Subunit as a result of the wolf management program, and public aerial shooting has contributed significantly to the success of this program. Department efforts should be expanded in areas where increased moose populations would provide the highest public benefit. Larger moose populations and increased hunting opportunity in 20B and in Subunit 20A and C will help relieve moose hunting pressure in outlying areas.

The wolf management program should be continued.

Subunit 20D

Wolf management efforts in Subunit 20D should be continued until moose and caribou population objectives have been obtained. Moose numbers in the Healy, Goodpaster, Volkmar, and Shaw Creek drainages are very low and probably declining. Moose numbers in the southwest portion of Subunit 20D appear to be increasing slowly. Recent increases in moose populations south of the Tanana River are attributed largely to public aerial shooting of wolves and the Department wolf reduction efforts in adjacent Subunit 20A. Department efforts should continue in eastern 20D to aid the recovery of the Fortymile Caribou Herd and of local moose populations. A revised moose management plan has been drafted for a portion of Subunit 20D south of the Tanana River. A revised management plan for the Macomb Caribou Herd is anticipated.

The wolf management program should be continued.

Subunit 20E and Unit 12 north of the Alaska Highway

Department wolf management efforts should continue in areas most accessible to moose hunters and in areas that will maximize benefit to the Fortymile Caribou Herd. Public aerial shooting of wolves should be permitted. The very low moose density and the mortality resulting from substantial numbers of grizzly bears may necessitate reducing wolves to a lower level than in other wolf management areas in order to stimulate moose population recovery. A revised management plan outlining population and harvest goals has been scheduled for the Fortymile Caribou Herd. Moose management plans should be prepared for moose populations in Subunit 20E and Unit 12.

The wolf management program should be continued.

NEW PROGRAMS

There may be biological or management justification for wolf management programs in some parts of Units or Subunits 12, 19D, 21, 24, and 25D. We are particularly concerned about the status of moose in Subunits 25D and 19D, where moose populations important to subsistence use appear critically low. However, despite the recent increase in data acquisition in these areas, the biological background is still less comprehensive than desired.

Issue Papers were drafted for wolf management programs in Unit 12 and a portion of Subunit 19D. They are currently under Departmental review.

Some areas where wolf management would very likely be beneficial to prey species do not lend themselves to effective manipulation of wolf numbers by public aerial shooting, and any effective program would of necessity include Department involvement. In addition the requirement for precise biological data on any proposed area means that budgets must be available to accomplish such work. Therefore, the availability of Department funding becomes crucial to obtaining ungulate and wolf population objectives.

RESULTS AND DISCUSSION

Unit 5

A wolf reduction was authorized for Unit 5 in the Yakutat area in 1975 because of a large decline in the moose population. The initial cause of the decline was severe winter conditions; however, after weather moderated the moose population did not appear to increase despite severely reduced harvest. Reducing the number of wolves was expected to improve moose survival rates and aid moose population increase. This wolf reduction program was not initiated because of economic limitations.

Unit 13

The Unit 13 wolf research program was approved in 1975. The objective of this research was to determine the effects of wolf predation on moose calf survival. Between 1976 and 1978, 60 wolves were removed in the 2,800 square mile research area. This reduced the density of wolves at the onset of moose calving by 42-58% during 3 summers.

The results of this study, in combination with extensive studies in adjacent areas, showed that wolves were not the primary factor limiting moose calf survival. Instead, predation by grizzly bears was the major cause of calf mortality. Prior to the reduction of wolf numbers, there were more than 50 moose present per wolf and substantial numbers of caribou were available seasonally. In retrospect, the Unit 13 project involved the reduction of a wolf population that was already low relative to prey; therefore, no large increase in calf survival could be expected. Complicating the interpretation of results that were based on changes in calf ratios were the facts that: (1) aerial moose surveys often do not accurately detect small changes in moose population ratios; and (2) wolf numbers in adjacent areas also declined as a result of high harvest rates. The adjacent areas were used to provide comparative data with which to evaluate the research results.

Results indicated calf-cow ratios improved slightly as wolf density declined both in and out of the research area, but ratios were not higher in the research area. Information from a simulation model of the moose population and from aerial population trend surveys suggested that reduced wolf density in and around this area stopped a slow decline in the moose numbers and allowed the moose population to increase at a rate of 3-4% annually.

The wolf reduction research and other studies in the area demonstrated that calf-cow ratios alone are not always adequate to evaluate the effects of wolf management programs on moose population dynamics. Trend surveys and data from radio-collared moose indicated that the survival of calf and adult moose improved as wolf density declined. However, calf-cow ratios did not reflect the magnitude of the improvement.

The study also showed how important grizzly bear predation on moose can be when bears are abundant. Following the wolf reduction phase, studies on grizzly bears indicated that bears were over 4 times more abundant than wolves were prior to removal and that bears preyed heavily on calf and adult moose, causing chronically low calf-cow ratios.

The Unit 13 study also demonstrated the rapidity with which wolves can repopulate suitable habitat. Wolf populations increased to 81% of the precontrol level 1 year after control was stopped. Within 3 years wolf numbers exceeded the precontrol level.

Subunit 20A and Subunit 20C East of the Nenana River

The program to remove wolves from Subunit 20A and that portion of Subunit 20C east of the Nenana River was proposed and authorized in 1974; however, legal action delayed the program until late 1975. The removal of wolves began in late winter 1975-76. The wolf population was reduced from about 240 to 60-80 during that winter. Subsequent removals varied in size, but were sufficient to annually hold the fall wolf population between 80-125 wolves through November 1978. By November 1983, the wolf population increased to an estimated 180-220 wolves. The moose population increased from about 2,800 in 1975 to over 5,000 in 1982. Moose have shown the greatest population growth rates in portions of the area where wolf removal was most effective.

The Delta Caribou Herd population also increased dramatically after the wolf population was reduced. The population numbered approximately 2,000 in 1976 and increased to approximately 6,500-7,500 based on a 1982 photo census. The Yanert Caribou Herd, which was thought to be a part of the Delta Herd until 1980, grew from a few hundred to about 1,000 animals during the same period.

The harvest of Delta and Yanert caribou was reduced by shortening the 1973 season, and then stopped by closing the season from 1974-79. Hunting was resumed in 1980 through a drawing permit hunt for bulls only. In the first season, 104 caribou were taken. The seasons have been progressively liberalized. In 1981, 268 caribou were taken, followed by 274 in 1982, and an estimated 1,200-1,500 caribou in 1983.

The moose harvest followed a similar pattern except that the moose season was never eliminated. Seasons were severely restricted from 1975-78 and then progressively liberalized. An average of about 65 moose a year were taken from 1975-78, and the number killed reached 300 by 1982-83. Additional details are reported in Wildlife Monograph No. 84 (published by The Wildlife Society) (Appendix 4), Wildlife Technical Bulletin No. 6 (Appendix 5), and Wildlife Information Leaflets (Appendices 6 and 7).

Units 23 and 24

A wolf reduction program was authorized by the Board of Game in 1976 to reduce predation on the declining Western Arctic Caribou Herd. In winter 1976-77, aerial permits were issued to the public to take wolves

in Unit 23 and in Unit 24 north of the Koyukuk River. During that winter, the program was halted by court injunction and subsequent action of the Department of Interior. Forty-eight wolves were taken under terms of public aerial permits. However, large wolf harvests by trappers in winters 1975-76 through 1978-79 probably contributed to a decline in wolf numbers and the rapid recovery of the Western Arctic Herd. Wolf numbers in Unit 23 declined from an estimated 720 in 1977 to an estimated 480 wolves in 1981. In addition to hunting and trapping, disease may have been a factor in the wolf population decline observed between 1977 and 1981. There are indications that wolf numbers are presently increasing in at least parts of the Unit.

The Western Arctic Herd increased from an estimated 75,000 in 1976 to nearly 200,000 in 1983, due largely to restrictions on seasons and bag limits that drastically reduced harvest between 1976 and 1982. The recovery of the herd was also aided in 1976 when a large portion of the population began wintering on the North Slope where wolf density is extremely low. The present size of the herd is more than adequate to sustain the present levels of harvest, predation, and other natural mortality.

A management plan that presents revised population and human use objectives for the Western Arctic Caribou Herd has been prepared and distributed for public review. Hunting regulations have been liberalized commensurate with the increase in herd size.

Subunit 19A and B

The wolf management program in 19A and B was authorized in 1979. Forty-five wolves were removed from 19A and B by the public in early 1979 (Appendix 3). The goal of reducing wolf numbers by approximately 80% was accomplished only in the Aniak drainage, and that portion of Subunit 19A was subsequently closed in 1979 to aerial shooting, hunting, and trapping. Ten to 20 permits have been issued each season since then, but few have been obtained by experienced aerial shooters and few wolves have been taken. The reported take by hunting and trapping was relatively high in winter 1980-81.

Relatively poor snow conditions have prevailed in the area since winter 1978-79, making an accurate estimate of wolf numbers and an assessment of wolf-prey relationships difficult as well as making aerial wolf hunting unpractical. An improvement in moose calf survival was not apparent following the reduction of wolves in the Aniak drainage, and surveys have been too infrequent to detect a population trend. The moose population in 19A appears to be low in density, but calves are common. The moose population trend in 19B is unknown. Harvest of moose has increased somewhat under liberalized hunting regulations; however, seasons are still fairly short.

A substantial portion of the 25,000 Mulchatna caribou can be found in Subunit 19A and B particularly during winter. The wolf-caribou relationship is not adequately understood. Because the caribou population has increased, hunting regulations have been liberalized and the harvest of caribou has increased.

The Innoko Drainage, Unit 21

The wolf management program in the Innoko drainage was authorized in 1979. Shortly after the program started, the Secretary of the Interior ordered the State to desist from issuing aerial permits within the area designated as the Innoko National Monument, which later became the Innoko Wildlife Refuge. Since 1979, substantial numbers of wolves have been removed from the drainage (Appendix 3). Although the evidence is inconclusive, the wolf population may have been reduced during winters of 1978-79 through 1980-81. The issuance of aerial wolf permits was suspended in winter 1981-82 because wolf and moose numbers were at the management objective.

Moose calf survival increased in the Innoko Drainage subsequent to the removal of wolves. From 1976 through 1979, there were approximately 20-40 calves/100 cows. After wolf removal (1980-81-82), 40-55 calves/100 cows were observed.

Although moose on the Innoko are particularly important to hunters from the lower Yukon and from the small communities of Takotna and Flat, hunters come from all over Alaska and from outside the State to hunt moose in the drainage. The estimated annual harvest in the Innoko drainage is approximately 200 moose.

The wolf management program in the Innoko drainage was originally intended to provide for an increased harvest of moose by residents of the lower Yukon. The order by the Secretary of the Interior in 1980 which prohibited aerial shooting of wolves in the Innoko Refuge defeated the purpose of the program because moose hunting by residents of the lower Yukon occurs primarily on the Refuge.

Nowitna Drainage, Unit 21

The wolf management program in the Nowitna drainage began in 1979. The objective was to increase moose survival and, thus, total numbers. During winters 1978-79 through 1980-81, 61 wolves were taken in the Nowitna drainage (Appendix 3). Public aerial shooting was relatively ineffective; however, Department efforts reduced the number of wolves in the upper drainage. Both the public and the Department were restricted from taking wolves by aerial shooting on the Nowitna National Wildlife Refuge.

The Department suspended issuance of public aerial permits and its own wolf removal efforts in 1981 because of the restriction of aerial wolf shooting on the Refuge and new information on the moose population size. An improved moose population estimate in fall 1980 showed the 1978 estimate had been low. The 1980 estimate was about 5,000 moose, compared to a previous minimum estimate of 1,000.

In fall 1980 the moose-wolf ratio in the upper Nowitna was estimated to be 30 moose/wolf, suggesting that the lightly hunted moose population might be sustained without further wolf removals. A higher ratio of about 55 moose/wolf appeared to exist in the lower Nowitna drainage in

1980, where most moose hunting occurs. However, poor calf survival was evident during 1982 moose surveys, and moose density had declined in the survey area suggesting that the prey-predator relationship may have changed. If poor calf survival persists, 2 options are evident: either the public will have to settle for reduced harvests or moose survival will have to be increased.

Subunit 20B

The wolf management program in Subunit 20B was begun in 1980. The objective was to increase the number of moose available for human use. Wolves were abundant in the early 1970's while moose numbers were declining due to high mortality of calves and adults. Calf survival declined during the early 1970s to a low of 23 calves/100 cows in 1975. Yearling survival was chronically poor (2-5 yearling bulls/100 cows). At the same time, record high harvests by hunters occurred with 1,600 hunters in 1973 taking 301 moose. To rectify this situation, the Department and the public requested a substantial shortening of the moose season and deletion of the antlerless moose hunt. The effect was a drastic reduction of the harvest to only 35 bull moose in 1976. At the same time the Department investigated causes for poor survival in the herd and considered corrective measures.

Reduction of wolf numbers on the Tanana Flats in Subunit 20A, where many Chena drainage moose migrate seasonally to calve, resulted in a substantial increase in calf survival to early winter in part of Subunit 20B (47 calves/100 cows in November 1977). However, overwinter survival, as indicated by the presence of yearlings in the population, remained relatively low. Because wolves are the only potentially important predator during the winter months, attention focused on wolf predation as the most likely cause of poor overwinter survival. Wolf surveys were initiated in the central part of Subunit 20B during spring 1978. Subsequent comparison of moose and wolf population estimates indicated that about 20 moose existed for every wolf. Previous studies indicated that moose populations were likely to be stable or decline when faced with a moose-wolf ratio of this magnitude. This information formed the basis for a proposed wolf management program to correct the situation. After extensive review, the program was approved in February 1980.

Public participation has been encouraged since the inception of the program. Aerial shooting permits have been issued annually to the public to augment hunting and trapping efforts. Public participation has proven cost-effective for the Department and has increased the flow of information necessary to improve assessments of the wolf population. Aerial shooting by the public has been effective in reducing wolf numbers on the Minto Flats, resulting in an increase in the moose population. Trapping by the public has contributed significantly to the total annual take (Appendix 3).

Department efforts were focused on rehabilitating the moose population in Subunit 20A during the initial years in which the Subunit 20B program was in effect. Little Department effort was expended in Subunit 20B until winter 1982-83 (Appendix 3). However, when conditions and

funding permitted, Department staff directed their efforts to reducing wolf numbers in the areas most accessible to Fairbanks residents. By fall 1982 the overall moose-wolf ratio improved to about 30/1 and the moose population was increasing slowly in the lower portions of the Chena and Salcha River drainages and on the eastern half of the Minto Flats. Survey data collected from these portions of the Subunits indicated good survival (41 calves/100 cows and 18 yearling bulls/100 cows).

The wolf reduction efforts in 1982-83 affected an area of 5,554 square miles in the central portion of Subunit 20B. In fall 1978-79 (prior to wolf removal), approximately 2,300 moose and 114 wolves occupied this area. It is estimated that 3,400-3,500 moose and 70-80 wolves occupied this area at the onset of winter 1983-84, resulting in a ratio of about 50 moose/wolf. A ratio of this magnitude should allow for more rapid growth in the moose population in this central area. Elsewhere in the Subunit, moose populations are believed to be either stable at low levels or continuing to decline. Management efforts should now be directed to some of those remaining areas.

Hunting seasons have been gradually increased in length since 1981 to allow hunters to benefit from the growing moose population, and harvest levels have increased. The legal harvest in 1982 from the central portion of Subunit 20B was 130 bull moose and represented about 4% of the estimated population of 3,200 moose. Moose mortality from hunting and other causes will be regulated to allow at least 10% annual growth in the moose herd until the population reaches the desired level.

The management objective for moose in Subunit 20B is to maintain relatively high numbers of moose for human use. To achieve that objective, periodic manipulation of wolf numbers will probably be necessary. However, wolves will remain an important part of the system and increased moose numbers will benefit wolves. If a large moose population can be sustained, the needs of both people and wolves can be more easily met. Providing hunting opportunity near Fairbanks has the added benefit of reducing competing hunting pressures in outlying areas where potential harvest allocation problems may arise.

Subunit 20D

A wolf reduction program was authorized in February 1980 for the area that is now designated as Subunit 20D. The objectives were to increase moose numbers and survival rates. Aerial shooting permits were issued to the public. No wolves were taken in winter 1979-80 by either the Department or by the public under aerial permits. During the period fall 1979 through spring 1983, 105 wolves were taken in Subunit 20D (Appendix 3). Most of these wolves were taken in southern and eastern Subunit 20D.

In November 1981, approximately 1,000-1,500 moose were estimated to be in that portion of Subunit 20D south of the Tanana River and west of the Johnson River. In this area, moose are increasing at about 5% per year. Moose calf survival has been increasing steadily and the rate of population increase should improve by 1984. There are about 40-60 moose/wolf in this area.

Moose populations in the remainder of Subunit 20D are at low densities. Data from aerial composition surveys suggest that the moose populations not affected by the wolf reduction are at best stable or declining. Moose numbers may have been stabilized in eastern 20D where wolf numbers have been reduced.

The status of the Macomb Caribou Herd is not well known. The population was estimated at 700 caribou in 1982. Hunting seasons for both caribou and moose have been very restrictive in Subunit 20D since population declines were recognized.

The southern portions of the Subunit afford good access for moose hunters. However, with the exception of the southwestern portion of the Subunit, the moose population has not grown enough to afford an increased harvest; therefore, seasons have not been liberalized. Thirty wolves were removed from the area south of the Tanana River in winter 1982-83. The effects of that removal will be measured in winter 1983-84. However, preliminary results show increased moose calf survival in several areas surveyed in November 1983.

A revised moose management plan has been drafted for that portion of Subunit 20D south of the Tanana River and west of the Johnson River (20D West). The proposed objective is to increase the population to between 1,600-2,400 by 1987. A population objective of 1,500 caribou was suggested in the draft of the Macomb caribou management plan prepared in 1980. Based upon the amount and quality of the caribou habitat, a higher objective of around 2,000 will probably be proposed in the revision scheduled for 1984.

Department wolf management efforts in winter 1983-84 will be directed at improving the knowledge of wolf populations and wolf-ungulate relationships in 20D West through radio-tracking and aerial surveys. Wolf removal should not be attempted unless there is sufficient information on wolf-ungulate relationships indicating the need, and unless funds are available.

Subunit 20E and Unit 12 North of the Alaska Highway

A wolf management program was authorized for this area in February 1982. Comprehensive moose, caribou, and wolf surveys were conducted for several years prior to the initiation of wolf reduction efforts. A goal of the wolf management program is to reverse the decline of the moose population. The program is also designed to increase numbers in the Fortymile Caribou Herd.

When the program began in 1982, there were about 600 moose in the 20E portion of the wolf management area. This population density of 0.2 moose/square mile is the lowest in interior Alaska. The Fortymile Caribou Herd was estimated to number about 8,000-12,000 animals. Unlike the moose population, which was declining, the caribou herd was increasing slowly.

Revised moose and caribou population objectives have been tentatively proposed. The proposed minimum population objective for moose in the management area is 1,800 and the Fortymile Caribou Herd population objective is 50,000. These population levels may be reached in 8-12 years, barring extremely severe winters, and if the wolf management program results in substantial increases in calf and adult moose and caribou survival.

In 1982, Department wolf management efforts were applied to a 3,000 square mile area in southwestern Subunit 20E where knowledge of wolf numbers was most complete. Forty-two wolves were removed from a population of 83 wolves known to inhabit this area. In winter 1982-83 Department efforts were applied in a somewhat expanded area, including eastern 20D, southwest 20E, and northern Unit 12. The wolf management program has reduced the total wolf population in this latter area from an estimated 168 in 1980 to an estimated 70 in November 1983; despite this rather substantial reduction in wolf numbers, the moose-wolf ratio of about 20/1 suggests that moose will probably not increase at a measurable rate. The wolf population should be reduced to obtain a ratio of 50-100 moose/wolf. This ratio may allow a moderate annual population increase. Grizzly bears are abundant in this area and are probably important predators on moose. If bear density does not decline substantially, wolves will have to be maintained at very low density to allow a moose population increase.

Because of the high percentage of mature bull moose and the continuing increase in the caribou population, hunting regulations have been liberalized. The moose season was closed in Subunit 20E from 1977 through 1980, but a short season continued in Unit 12 during this period. In Subunit 20E, about 20 moose and 24 caribou were harvested annually for several years before the wolf population was reduced. The 1982 legal harvest was 35-40 moose and 130 caribou. The 1983 harvest is expected to be about the same or slightly higher. At the proposed population levels, about 2,500 caribou and 200 moose could be harvested annually. These harvests would equal about 5% of the moose and caribou populations and approximately 5,000-6,000 moose, and the Fortymile Caribou Herd would be available to sustain natural mortality, including predation. If the moose and caribou population objectives can be obtained, a population of about 200 wolves could also be sustained; however, change in movement patterns by the Fortymile Caribou Herd could have a significant effect on the wolf population.

Wolf population responses to reduction

Two concerns regarding wolf populations subject to control through management programs are: (1) wolf populations will be extirpated; and (2) populations will recover so slowly that benefits of having wolves present will be largely lost for a substantial period of time.

This review of wolf management programs in Alaska confirms that the first concern can be dismissed. No programs proposed or implemented included plans to extirpate wolves, and none have done so. The second

concern is more complex to address but the answer is equally clear: wolf populations subject to high rates of removal recover very quickly when removal is reduced or stopped. This has been documented in Units 20A and 13 and in wolf populations across North America.

Dr. Lloyd Keith's recent review of information from several studies of wolf populations in Canada, Minnesota, and Alaska concluded that wolf populations can routinely compensate annually for removal by humans of up to 38% of their number without a population decline. Food supply, rather than removal by humans, was the most important limiting factor on wolf population recovery (and growth). These conclusions were based on observations of wolf populations in several different biological situations. The same review noted that "stationary" wolf populations, i.e., neither increasing nor decreasing, routinely contain 40% pups in fall, but changing populations commonly have a higher percentage of pups in fall in response to greater availability of food. Thus, wolf populations can grow very rapidly if they have adequate food and if mortality is low or moderate. Immigration to an area of low population also occurs. Because wolves can move great distances and have many young, immigration can be very important to population recovery.

Two examples, both involving intensive control, confirm the analysis discussed above. In the Nelchina Basin wolf research project described elsewhere in this report, wolves were nearly eliminated from a 2,800 square mile study area. Within 2 years after removal, the number of wolves reached 81% of the preremoval level. Within 3 years the wolf population exceeded the preremoval level. Similarly, in the Subunit 20 A/C wolf management program, wolf numbers were reduced from 240 in 1975 to between 75-125 by November 1979. Since then few wolves have been removed. The current estimated population is 180-220, having virtually doubled in 4 years to a size very near the preremoval population.

These wolf population recoveries could not have occurred if there was a food shortage, if high removal rates had continued, or if few wolves were available to migrate from adjacent areas. The documented recoveries in Alaska confirm earlier general observations that wolf populations can and do make rapid recoveries under favorable conditions. There appears to be no basis for concern that wolves will be long absent from any of their customary haunts in Alaska, unless habitat is substantially altered, major prey species become too scarce, or excessive removal by humans is pursued indefinitely over a wide area.

Wolf management techniques

The initial step in all contemporary wolf management programs has been to refine the estimate of wolf numbers through aerial track surveys in winter in the proposed management area. Reliable information from local pilots and trappers is used to confirm and augment the observations of Department observers. This technique has generally resulted in an estimate well below the actual wolf population.

The techniques used to reduce wolf populations have varied depending upon the physical characteristics of the area. Wolves can be removed efficiently by shooting from a fixed-wing airplane only in areas not heavily forested. The Board of Game has authorized the public take of

wolves as the primary method of reducing wolf numbers in certain areas, for example Units 23 and 24. In other areas, Department removal was the primary means of reducing wolf numbers.

Shooting from a helicopter and fixed-wing aircraft by Department personnel has effectively reduced wolf numbers in some areas, for example Subunit 20A. Also, wolf carcasses are recovered with a helicopter when they can not be retrieved otherwise, thus providing scientific data. The public is not allowed to use helicopters to hunt or trap.

Radio-collaring members of wolf packs has proved effective in some management and research programs. This technique was used in parts of Unit 13 and Unit 20 and was particularly useful in Subunit 20E where forest cover reduces efficiency of aerial shooting. Use of radio telemetry has enabled us to determine wolf pack sizes, territories, and predation rates in many areas. These data are valuable in assessing predator-prey relations, and radio-collared wolves aid in monitoring wolf population recovery.

Trapping has assisted in reducing wolf numbers in some Game Management Units. For example, trappers accounted for more than half of the 145 wolves removed from Subunit 20A and 20C east of the Nenana River in winter 1975-76. Trapping was also used effectively by the Department in forested areas of the upper Nowitna drainage.

The Board of Game concurred with the Department in placing several constraints on early wolf management programs. In Unit 5 and Subunit 20A, wolves were not to be reduced below the level that would yield a ratio of 100 moose/wolf or below 20% of the wolf population. In Units 23 and 24 the reduction was not to exceed 80% of the wolf population. The Department adopted more restrictive guidelines on the number of wolves to be removed and the conditions of aerial permits issuance in some of the more recent programs. Fifty moose/wolf has generally been established as a goal for wolf management programs in areas where predation by bears is not expected to be a major factor. This ratio is based on the results of studies in Michigan, Canada, and Alaska.

APPENDICES FOR WOLF REPORT

No.

1. Historical and Current Perspective on Wolf Management in Alaska, CWS Report Series No. 45.
2. Manifesto on Wolf Management, IUCN.
3. Wolves Killed In Wolf Management Areas.
4. Wildlife Monograph No. 84, TWS.
5. Wildlife Technical Bulletin No. 6, ADF&G.

6. Moose-Wolf Relationships in the Tanana Flats, 1954 through 1982, ADF&G.
7. The Delta Caribou Herd, 1950 through 1982; Caribou-Wolf Relationship, ADF&G.

Appendix 2. Item 7, IUCN Position Statement on Wolf Conservation

The IUCN Position Statement on Wolf Conservation, adopted by the Specialist Group in 1973 and endorsed by IUCN's Executive board, has been revised and the changes approved by the SSC. The most important revision is Item 7 on wolf control. The new version reads:

It is recognized that occasionally there may be a scientifically established need to reduce non-endangered wolf populations; further it may become scientifically established that in certain endangered wolf populations specific individuals must be removed by appropriate conservation authorities for the benefit of the wolf population. Conflict with man sometimes occurs from undue economic competition or from imbalanced predator-prey ratios adversely affecting prey species and/or the wolf itself. In such cases, temporary reduction of wolf populations may become necessary, but reduction measures should be imposed under strict scientific management. The methods must be selective, specific to the problem, highly discriminatory, and have minimal adverse side effects on the ecosystem. Alternative ecosystem management including alteration of human activities and attitudes and non-lethal methods of wolf management, should be fully considered before lethal wolf reduction is employed. The goal of wolf management programs must be to restore and maintain a healthy balance in all components of the ecosystem. Wolf reduction should never result in the permanent extirpation of the species from any portion of its natural range.

From: IUCN, Species Survival Commission Newsletter, June 1983 New Series No. 2. p.18.

Appendix 3. Number of wolves killed in wolf management areas, Alaska Department of Fish and Game, Region III, Fairbanks, 1975-83.

	GMU 19A & B	GMU 20A & 20C E. of Nenana R.	GMU 20B	GMU 20D	GMU 20E	GMU 21 Innoko Drainage	GMU 21 Nowitna Drainage	GMU 23 & 24
<u>1975-76</u>								
Public (hunt. & trap.)		78						
Department		67						
		<u>145</u>						
<u>1976-77</u>								
Public (hunt. & trap.)		26						157
Public (aerial)		*						48
Department		27						**
		<u>53</u>						<u>205</u>
<u>1977-78</u>								
Public (hunt. & trap.)		4						
Public (aerial)		*						
Department		39						Discontinued
		<u>43</u>						
<u>1978-79</u>								
Public (hunt. & trap.)	16	12				23	6	
Public (aerial)	29	*				11	5	
Department	**	18				**	**	
	<u>45</u>	<u>30</u>				<u>34</u>	<u>11</u>	
<u>1979-80</u>								
Public (hunt. & trap.)	6	11	14	5		2	3	
Public (aerial)	7	0	3	0		33	3	
Department	**	3	**	**		6	21	
	<u>13</u>	<u>14</u>	<u>17</u>	<u>5</u>		<u>41</u>	<u>27</u>	

Appendix 3. (Continued)

	GMU 19A & B	GMU 20A & 20C E. of Nenana R.	GMU 20B	GMU 20D	GMU 20E	GMU 21 Innoko Drainage	GMU 21 Nowitna Drainage	GMU 23 & 24
<u>1980-81</u>								
Public (hunt. & trap.)	46	11	15	9		4	5	(discontinued)
Public (aerial)	0	2	17	0		23	3	
Department	**	0	15	28		10	15	
	<u>46</u>	<u>13</u>	<u>47</u>	<u>37</u>		<u>37</u>	<u>23</u>	
<u>1981-82</u>								
Public (hunt. & trap.)	21	12	26	14	14	11	1	
Public (aerial)	1	7	4	4	*	Suspended	Suspended	
Department	**	20	2	5	42	"	"	
	<u>22</u>	<u>39</u>	<u>32</u>	<u>23</u>	<u>56</u>	<u>11</u>	<u>1</u>	
<u>1982-83</u>								
Public (hunt. & trap.)	20	10	22	16	27	50	12	
Public (aerial)	0	4	9	12	0	0	0	
Department	**	**	32	12	17	0	0	
	<u>20</u>	<u>14</u>	<u>63</u>	<u>40</u>	<u>44</u>	<u>50</u>	<u>12</u>	

* Not open to public aerial hunting.

** Department personnel not involved in taking wolves.

Appendix 3a. Total take of wolves by all means in wolf management areas, during the years they were authorized.

GMU	Years							
	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83
19A & B				45	13	46	22	20
20A & C	145	53	43	30	14	13	39	14
20B					17	47	32	63
20D					5	37	23	40
20E							56	44
Innoko				34	41	37	11	50
Nowitna				11	27	23	1	12
23 & 24		205						
Annual totals	145	258	43	120	117	203	184	243