

Historical and current perspectives on wolf management in Alaska

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Figure 1
Game management units in Alaska

1. Abstract

The significant socio-political events and conditions relating to wolf control and management in Alaska since 1900 are summarized. Indiscriminate killing, characteristic of the early 20th century, was supplemented with territorial bounties. Following World War II a federal control program was developed with emphasis on poisons and aerial hunting. Statehood in 1959 coincided with increasing concern for wolf populations; formal control was discontinued except around domestic livestock. The 1970s were characterized by sharp increases in wolf numbers, declining ungulate populations, state-initiated control operations, and intense complex litigation. Each of these phases has been covered in considerable detail.

2. Introduction

Wildlife management programs result from complex relationships between human values and desires and are not based solely on the biological components of resource systems. Consequently we have focused on the historical and socio-political framework. A review of the biological aspects of at least one series of recent wolf control actions is currently being prepared by the Alaska Department of Fish and Game (ADF&G). The present paper gives the outline of this review, but those who require greater detail will have to read extensively in the many documents we have referred to.

The authors prepared the following review, presented as an annotated chronology, to highlight agency programs, public attitudes, and some of the factors influencing them. A great deal of information was obtained from annual reports submitted by the federal Branch of Predator and Rodent Control (BPRC), Alaska District, of the US Fish and Wildlife Service (USF&WS) for the fiscal years 1950-65. For economy of space, specific references to these reports as well as citations for commonly known information are excluded. Alaskan geo-

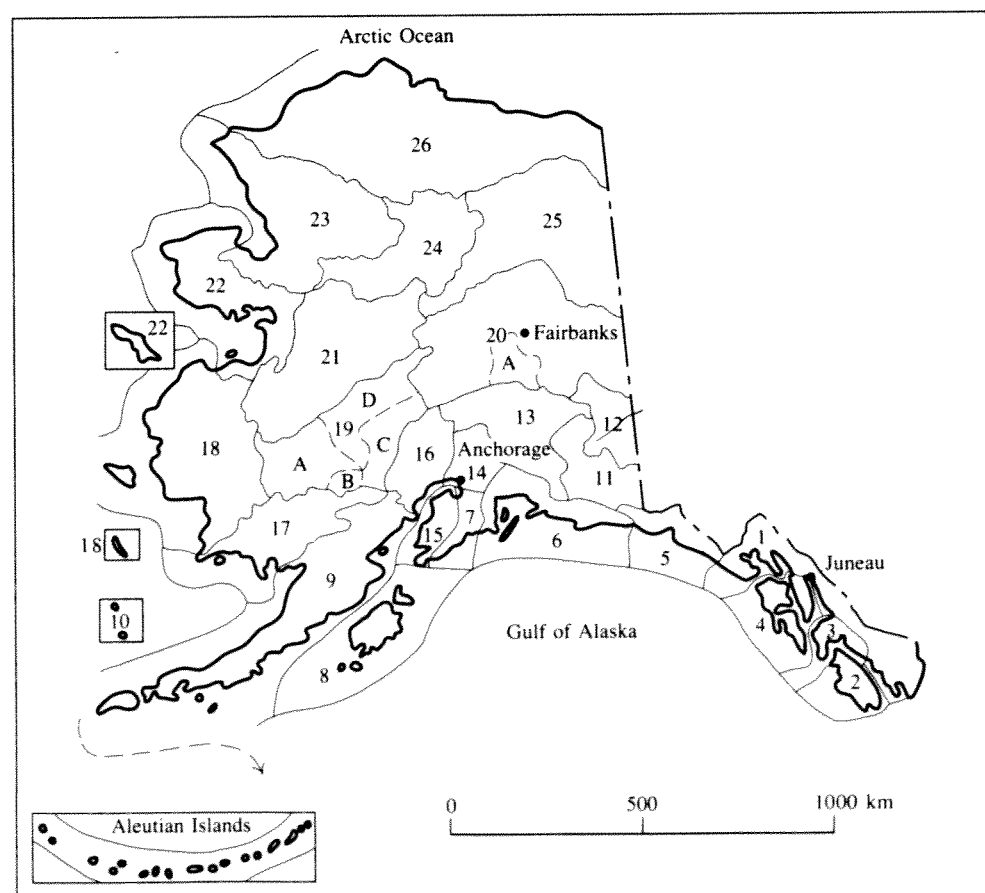
graphic names are referenced to appropriate Game Management Units (GMU) shown in Figure 1. Material in sections entitled phases I to IV are brief thumbnail sketches of events from the more distant past. Phase V deals with recent events.

3. Phase I — Indiscriminate wolf control during the early 20th century

During the early white settlement and mining period there was little if any organized government wolf (*Canis lupus*) control; the public generally considered wolves as competitors. Private control efforts were widespread

and quite possibly effective over large areas. 1900. There was extensive market hunting in interior Alaska because of the large number of miners. Dall sheep (*Ovis dalli*) were sold in Fairbanks (GMU 20) by the hundreds. Sledge-loads of moose (*Alces alces*) were dumped by the trail to town when outbound hunters reported that the price had dropped severely. Market hunters commonly poisoned the remains of carcasses in order to kill wolves. Wolf populations were reportedly low. 1903. The Camp Fire Club of America (CFCA) was formed. Influential members of the scientific community, such as Ernest Thompson Seton,

Figure 1



Note: Copies of ADF&G Federal Aid Wildlife Reports and other unpublished reports may be obtained from the Alaska Dep. of Fish and Game, Support Building, Juneau, AK 99801 or from the Fish and Wildlife Reference Service, Unit I, 3840 York St., Denver, CO 80205.

William T. Hornaday, and Gifford Pinchot lobbied strongly on Alaskan parks and wolf control (Belt 1956).

1914. The US Biological Survey was authorized by Congress to conduct experiments and demonstrations on animal control, including wolves (Young and Goldman 1944).

1915. The first federal appropriation was passed specifically for Biological Survey control work on federal lands (Young and Goldman 1944).

1915. The first territorial legislature passed a \$10 wolf bounty (Lensink 1959, in ADF&G Annu. Rep. for 1958). Bounties were paid continuously until 1968 (later in some areas), well after statehood.

1917. Congress established Mount McKinley National Park (between GMUs 13 and 20) after heavy lobbying by CFCA and others.

1926. In one of few recorded counts from the period, Frank Glaser, a guide who eventually became an expert federal wolf hunter, tallied 5000 Dall sheep in a 240-km stretch of Alaska Range just east of McKinley Park (BPRC 1953, unpubl. rep.). This indicated an abundance of sheep.

1936. William Beach reported few sheep in Mount McKinley National Park compared to his observations in 1925 (Belt 1956). Cahalane (1946) described considerable evidence relating the sheep decline with severe winters.

1937–47. CFCA urged wolf control in Mount McKinley National Park because of low sheep numbers (Belt 1956). The National Park Service initially responded by starting Adolph Murie's study of wolves and sheep in the Park. The US Biological Survey's pre-World War II wolf control work in Alaska mostly concerned reindeer (*Rangifer tarandus*) herds.

1944. Murie (1944) concluded: "The wolf is the chief check on the increase of the Dall sheep in Mount McKinley National Park . . . wolves prey mainly on the weak classes of sheep . . . [such predation indicates] normal predator-prey adjustment. . . . Differences of views on park management flared. Belt (1956) commented: "Murie's report failed to outline any emergency policy. It was an elaborate treatise on animal behaviorism. The only . . . indications of a policy were in favor of the wolf"

4. Phase II — Organized federal wolf control during territorial days

The federal wolf control program became one of the dominant aspects of wildlife management in Alaska. Biological information on predator-prey interactions was still scarce and public attitudes were still largely anti-wolf. 1945–46. CFCA drafted and had introduced into Congress Bill HR-5401, directing rigid control of wolves in Mount McKinley National Park (Belt 1956). The National Park Service reluctantly decided to kill up to 15 wolves (about 50%) on the Park sheep range before passage of the Bill (Cahalane 1946).

1948. The BPRC expanded its operations in Alaska. The acquisition of a Super Cub aircraft the following year allowed intensive aerial hunting.

1950. The BPRC's national policy contained the statement: "[On wilderness areas] . . . where predators do not jeopardize livestock or game on or near the area, the Fish and Wildlife Service does not advocate or practice predator control" (Presnall 1950). However, operations in Alaska left room for argument about the interpretation of "wilderness", "jeopardize", and "practice".

1951. Mount McKinley National Park wolf control ended; probably fewer than 12 wolves had been shot, snared, or trapped during the 6 years since Bill HR-5401 was introduced (W. Nancarrow, pers. comm.).

1952. Territorial Sportsmen Inc., a Juneau (G MU 1) club, began continuing financial support of local BPRC control work. "Operation Umiat" established three two-man hunting teams with aircraft, which covered approximately 65 000 km² on the north slope of Brooks Range (G MU 26) between 21 March and 8 May. Aerial hunting and poison baits killed 259 of the 334 wolves seen (BPRC 1952, unpubl. rep.; Leveque 1954). National publicity produced substantial adverse reaction. "Umiat" probably intensified the debate between biologists and control agents in Alaska regarding the need for widespread control. A. Starker Leopold and F. Fraser Darling, sponsored by the Conservation Foundation, toured Alaska during much of the summer; they saw most aspects of USF&WS and Alaska Game Commission operations.

BPRC restricted poison stations in southeast Alaska (GMUs 1–4) to the period 15 October – 31 March as protection for bears. Baits were often set on lakes by aerial drops (Fig. 2).

5. Phase III — Transition preceding state management

During the 1950s there were increasing differences of opinion between many biologists and most control agents about the necessity of wolf control. Public attitudes were slowly becoming pro-wolf, based largely on the wilderness symbolism of wolves and their rarity elsewhere; reaction against the use of poison increased.

Wolf control was becoming more oriented toward specific situations. Bounty systems were being questioned more frequently although many people justified them as a form of rural welfare.

1953. BPRC modified the "coyote getter" (cyanide bait gun) for use on wolves; in spite of problems, this became the standard control method in summer. A BPRC staff of six or seven field men covered the territory. Leopold and Darling (1953) discounted the significance of predation in unhunted or lightly hunted moose and caribou populations and urged local assessment before implementing wolf control. Fire was considered a major factor in the reduction of caribou winter ranges, and predation was recommended as one tool for regulating caribou numbers.

1954. Heavy reindeer losses to wolves were documented for the Kotzebue area (G MU 23).

1953–54. In southeast Alaska, the BPRC agent stated he was concentrating on specific problem areas in contrast to the scattered approach previously used.

It has to be admitted that after many years of bait station work on the beaches of southeastern Alaska nothing was learned of wolves except that they do come to the beaches and will be killed if they eat lethal baits (BPRC, unpubl. Annu. Rep. FY1954).

Three teams of private aerial hunters shot about 200 wolves in arctic Alaska; caribou

Figure 2

A USF&WS biologist and assistant examine wolf carcasses from a poison bait station near the interior village of Northway in the early 1950s. This scene closely parallels those seen at the time in coastal southeast Alaska (photo courtesy of USF&WS)



killed annually by Inupiaq in the Arctic were estimated at 15 000 (Woolford 1955, USF&WS, unpubl. rep.).

1955. Five teams of aerial bounty hunters shot more than 90 wolves in 6 weeks in northern Alaska.

1956. Crisler (1956) concluded that there was significant selection by wolves for weak and crippled caribou. Wolf populations were generally increasing throughout Alaska except on the

Alaska Peninsula (GMU 9). Bounty hunters took over 200 wolves in the Kotzebue region. 1957. The Secretary of the Interior closed the Nelchina Basin (GMU 13) to the taking of wolves to permit research on undisturbed predator-prey interaction; biologists felt caribou were nearing the carrying capacity of the range and thus increased predation was desirable.

The Territorial legislature transferred the Co-operative Predator Control Program from

the Treasurer's Office to the new ADF&G. A new co-operative agreement was signed: BPRC was to be in charge of control and ADF&G in charge of investigations. BPRC admitted that predator-prey interactions were not well understood, and that wolf propulations were increasing in spite of the control program.

A private aerial bounty team killed 118 wolves in the first significant hunt in the forested interior.

Figure 3

Seal blubber baits (3000 L) being prepared with strychnine in the 1950s (photo courtesy of USF&WS)

Over 200 dead moose, presumed wolf kills, were reported from the Koyukuk Valley (GMU 24); the spring snow had a hard crust, easing wolf travel.

BPRC was to decide the priorities, under its predator priority rating system, of three factors: human use of the area; predator and prey population levels; and range conditions. Strychnine was the common poison used (Fig. 3).

1958. *Arctic Wild*, a book by Crisler (1958), fostered much pro-wolf sentiment.

More than 1500 wolves were killed in the previous 6 years in GMU 26, which includes the Operation Umiat area. It was only in this year that biologists discovered the location of the calving grounds of the Western Arctic Caribou Herd, which uses parts of GMUs 23, 24, and 26. This late discovery is an example of the general lack of biological knowledge of Alaska wildlife. The total cost of wolf and coyote bounties in Alaska up to 1958 was over \$1.5 million.

1959. ADF&G analysis of bounty systems stated (Lensink 1959, ADF&G Annu. Rep. 1958):

Predator control is a necessary and valuable tool of wildlife and fisheries management. To be most useful this tool should be applied at the right place, at the right time, and in the most efficient way possible. All of these requirements can be met by a carefully designed program, but none of them is achieved with a bounty system.

BPRC reopened the Kotzebue station, particularly for wolf control around reindeer herds.

ADF&G began intensive studies on wolf carcasses. Burkholder (1959) reported no discernible prey selection in his Nelchina study.

The Predator Control Committee of the Tanana Valley Sportsmen's Association failed to reach agreement, after many interviews and two winters of study, on the need for wolf control or the methods to be used (Tanana Valley Sportsmen's Association, 1959, Fairbanks, AK, unpubl. rep.).



Figure 4

Methods used by the federal Branch of Predator and Rodent Control to remove predators in Alaska

6. Phase IV — State assumption of predator management

Control of predator management was assumed by the State of Alaska. Increased game, trophy, and aesthetic status for the wolf was widely promoted; at the same time public interest in environmental concerns grew rapidly. 1960. On 1 January the new State of Alaska assumed authority over decisions concerning resident wildlife and whether to conduct control. Game biologists felt it advisable to reduce both the Arctic and Nelchina caribou herds because of deteriorating range conditions.

Some polar bear guides, responding to the public's changed perception of wolves as trophies, began introducing their clients to aerial wolf hunts following the bear hunts.

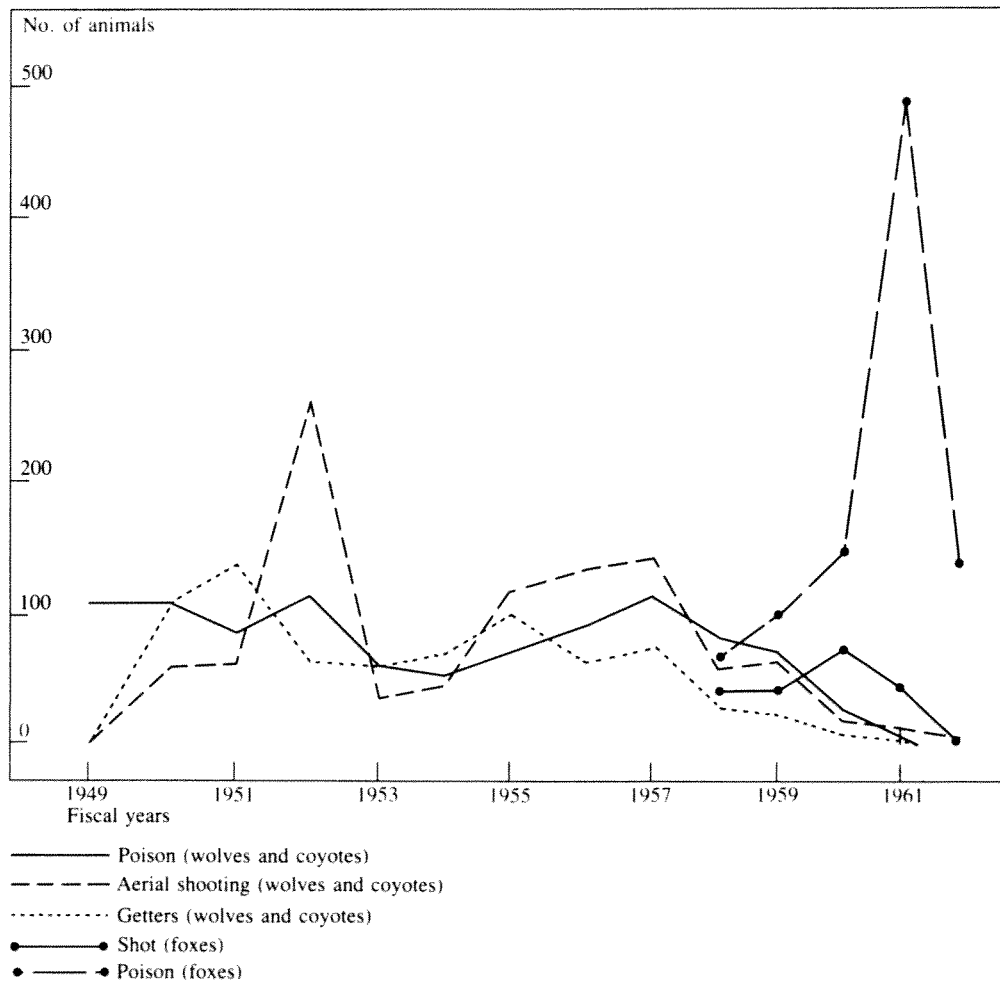
BPRC wolf control was restricted to reindeer range. By local agreement at Fairbanks, ADF&G decreed: (a) "getters" were to be used only in emergency situations, (b) bait stations were to be checked every 10 days, and (c) wolf carcasses should be recovered for biological study whenever possible. ADF&G required reduced wolf control on Tanana Flats (GMU 20) because the moose population was large and generally inaccessible; wolf numbers there were increasing slightly. In another area four wolves were released on Coronation Island (GMU 3) as an experiment with wolf-deer relations (Merriam 1964).

1961. The Alaska Big Game Trophy Club actively promoted trophy status for wolves taken after "fair chase". BPRC reduced their staff in Alaska to three permanent employees and ADF&G assumed responsibility for the Nelchina wolf study. Figure 4 summarizes BPRC control effort through 1962. Numbers of wolves were reported to be increasing generally except in arctic areas. Rausch presented a review paper on wolf management at the Alaska Science Conference (Rausch 1961).

1963. Mowat (1963) published a largely unsupported account of wolves; he discounted the significance of wolf predation on caribou. The book became a bestseller and generated widespread sympathy for wolves.

The Alaska Board of Fish and Game classified wolves both as big game and furbearers. The Board also promulgated regulations im-

Figure 4



posing a limit of two wolves taken by aerial bounty hunting in arctic Alaska.

1964. A study of Coronation Island showed a drastic reduction in the number of deer as a result of the wolves released there in 1960 (Merriam 1964).

The report of the Leopold Committee on federal predator control policy, given at the North American Wildlife Conference, recommended the establishment of an advisory board, the need for internal reassessment, and explicit criteria pertaining to the legal control of poisons, etc. (Leopold 1964).

Rausch (1964) summarized progress in wolf management and research in Alaska since 1959 and reported low wolf productivity in arctic Alaska.

1965. The Secretary of the Interior adopted the Leopold Committee report as policy. A study of wolf predation on moose on Isle Royale reported that wolves were strongly selective of calves and older adults and that, in general, predation was maintaining the moose herd within food limits and in good condition (Mech 1966). The study further promoted the positive image of the species.

1966. Gordon Haber began studies in Mount McKinley National Park; these led to an ecosystem model (Haber 1977) and hypotheses which he later invoked during a long debate with ADF&G.

1967. It was stated in the proceedings of a symposium on wolves that wolves in Alaska showed strong reproductive performance and that pup mortality was the cause of fluctuating populations (Rausch 1967).

A new federal policy on the control of damage by animals emphasized co-operation with states and landowners; operational guidelines appeared restrictive but essentially permitted most earlier practices (Anon. 1967, 1979).

7. Phase V — Active wolf control by state and court intervention

The next section deals with the last decade in greater detail. The various developments discussed in phases I–IV concerning changes from near-colonial status to statehood, increases in ecological understanding, changing emphasis from consumptive to non-consumptive interest in wildlife, and the development of legal processes to support public concern about environmental problems should be kept in mind.

During this decade, bounties were abolished, tight controls on aerial hunting were imposed, state biologists' attitudes toward wolf control changed, wolf control resumed, and the courts became involved.

In 1968 the Alaska State Legislature granted the Board of Fish and Game the authority to abolish bounties on an individual GMU basis. The Board did so in all except some GMUs in southeast Alaska, where a bounty persisted for several more years.

In 1971 US Congress enacted Public Law 92-157, known as the Airborne Hunting Act, which prohibited use of aircraft in hunting except under state permit. Alaska chose to continue issuing aerial hunting permits through the winter of 1971/72, which infuriated those who thought the federal law had completely banned such hunting. Partly in response to public outcry, the ADF&G Commissioner halted further issuance of aerial wolf-hunting permits.

Some groups bitterly denounced the cessation of aerial hunting. The Interior Wildlife Association, a newly formed organization whose goals were cessation of cow-moose hunting and reinstitution of wolf control, published the first issue of Alaska Wildlife Digest in the latter part of 1972. The Digest's articles attacking the ban on aerial permits matched the fervour of the arguments that only months earlier had castigated ADF&G for continuing permits. Thus, one segment of society elevated wolves to a value above that of other animals, while another seemed to place only negative values on wolves. A report on predator control and bounties in Alaska briefly summarized the situation that prevailed during the early years of statehood (Anon. 1972).

In 1973, the Board of Fish and Game and ADF&G published a series of policy statements made necessary by increasing human population and resource development (ADF&G 1973, unpubl. rep.). They included the statement that:

Traditionally, game management has emphasized maximum production of ungulates for man's use . . . [but] aesthetic or nonconsumptive uses are gaining prominence in resource management. . . . Wolves . . . will survive if ungulates are managed successfully, providing they receive a minimum of protection from humans. In this sense wolves can be considered an indicator of our stewardship of Alaska's land. Land areas supporting substantial populations of wolves have not been severely abused by man. . . . Whenever substantial conflicts arise between humans and wolves over the use of prey, the wolf population will be managed to minimize such conflicts. The various recreational and aesthetic values of the wolves will be considered equally with similar values of the prey species in the final management decision.

Many significant reductions in the sizes of important prey populations had occurred concurrently with increased protection afforded

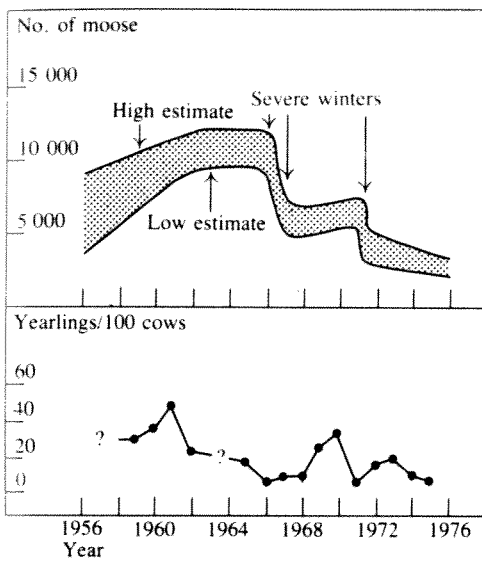
wolves from 1969 to 1972. Some examples are: the Nelchina Caribou Herd decreased from approximately 70 000 animals in 1962 to less than 8000 in 1972 (Bos 1975); the moose population in GMU 20A decreased from more than 10 000 in 1965 to about 2900 in 1974 (Coady 1976a,b; ADF&G 1979, unpubl. issue paper 79-07); and the Steese-Forty Mile Caribou Herd decreased from 40 000 in the 1960s (Skoog 1968) to approximately 5000 by 1974 (Davis *et al.* 1975, ADF&G Fed. Aid Wildl. Rep.). The coincidence of prey population declines and increased protection (and populations) of wolves increased the clamour to reduce wolf numbers, although other factors such as winter mortality and the increased take by humans were also clearly responsible for the declines.

By 1973 Alaskan wildlife managers had data from several depressed prey populations that seemed to implicate wolves (Rausch and Hinman 1975). In southeast Alaska for example, the abundant deer populations of the late 1950s and early 1960s declined by the early 1970s to low levels on all major islands where there were wolves, but persisted at moderate levels on major islands without wolves (Rausch and Hinman 1975, Olson 1979).

The decline of the GMU 20A moose population, a population now hunted mainly by Fairbanks residents using motorized surface vehicles seemed to be caused by weather (Fig. 5), harvest by humans (Fig. 6), and predation by wolves (Coady 1976a,b). Although the GMU 20A moose population had declined by 1971 to well below the carrying capacity of the habitat (Coady 1976a,b), poor calf and yearling survival followed the mild winters of 1971/72, 1972/73 and 1973/74 (McKnight 1974, 1975, and 1976, ADF&G Fed. Aid Wildl. Rep.; Coady 1976a,b). By 1973 the data convinced wildlife managers in Alaska that wolves, at the very least, contribute to declines in prey populations and help keep them low. By 1974 the managers reached a conclusion that was unthinkable 10 years earlier: in order to rehabilitate the depressed GMU 20A moose population so that desired levels of harvest by humans could be reinstated in a reasonable time, wolf control should be undertaken. ADF&G officials recognized public controversy would ensue,

Figure 5

Estimated moose abundance and yearlings per 100 cows in GMU 20A moose populations (courtesy of ADF&G)

Figure 5

requiring a cautious and considered approach on their part. In early 1975 a recommendation was submitted to the Board of Fish and Game for approval.

Using limited survey data, ADF&G biologists estimated the GMU 20A wolf population at about 175 (Rausch and Hinman 1975). Fairbanks residents believed wolves were numerous locally because during the winters of 1974 and 1975 30–35 dogs were killed by wolves at outlying homes in the Greater Fairbanks area. There was increased concern for the safety of school children walking to and from school buses during the dark, but in fact there were no instances of wolves attacking humans.

In February 1975 the Board approved a plan to hire private pilot-gunner teams to shoot wolves, directing the Commissioner to implement the plan immediately. A prompt law suit filed on 18 February 1975 in the Alaska Superior Court, Third Judicial District, by the Fairbanks Environmental Center, Friends of the Earth, and several individuals, resulted in an injunction on 3 March 1975 halting the program. The suit was resolved in favour of the plaintiffs, not on the grounds that the control activity was biologically inadvisable, but on a technical

violation of an Alaskan statute involving promulgation of regulations. Rausch and Hinman (1975) reported on the managers' perception of the wolf control controversy.

The acrimonious public controversy over wolf management in Alaska prompted the Commissioner, in a letter dated 17 June 1975, to request the National Audubon Society to conduct an impartial review of wolf management policies in Alaska. The Society confirmed their willingness to undertake such a review, specifying the funding needed. At the same time, ADF&G continued with its wolf reduction plans.

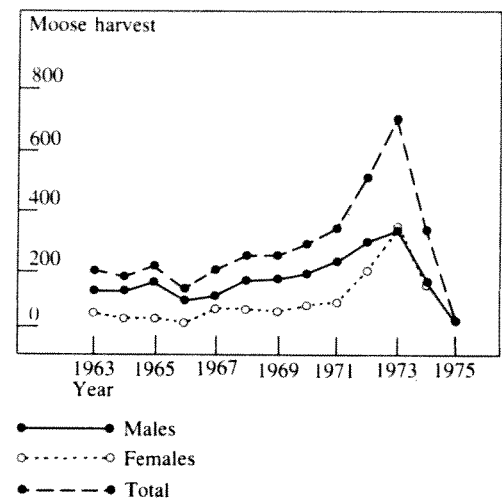
In spring 1975 the Alaska Legislature split the Board of Fish and Game into two seven-member boards, the Board of Fisheries and the Board of Game. In December 1975, ADF&G submitted a modified wolf control plan to the Alaska Board of Game (following the legal rebuff the previous March). Moose investigations in GMU 20A during 1975, following another favourable winter, revealed continued low calf and yearling survival with the depressed population either stable or still declining (McKnight 1976, ADF&G Fed. Aid Wildl. Rep.).

GMU 20A was not the only location in which officials felt action had to be taken. In GMU 5 a small moose population, important to local hunters, was subjected to significant wolf predation after severe winters and possible over-exploitation by humans had reduced the herd (Rausch and Hinman 1975). The human harvest of moose had declined from more than 300 annually in 1968 and 1969 to only 147 in 1973 (McKnight 1975, ADF&G Fed. Aid Wildl. Rep.). Wolf reductions were to be recommended if the monetary resources of ADF&G permitted.

A third project planned by ADF&G in 1975 was to carry out research on wolves in relation to moose in GMU 13, in order to learn more about wolf-prey ecology in Alaska. The project necessitated complete extirpation of wolves (about 45) in an 8000 km² experimental area, and subsequent comparison of moose (calf and yearling) survival with that in a nearby area where wolves had not been removed. A study on food habits and ecology was already in pro-

Figure 6

GMU 20A moose harvest from 1963 to 1975 (courtesy of ADF&G)

Figure 6

gress in those two areas, using radio-collared wolves; the study was supported by federal Pittman-Robertson funds (Stephenson 1978, ADF&G Fed. Aid. Wildl. Rep.). The new ADF&G project was reviewed and approved by USF&WS officials for federal aid. The Board of Game approved all three projects (GMU 20A, GMU 13 control study, and GMU 5) in December 1975, directing ADF&G to use fixed-wing aircraft and helicopters, with only ADF&G personnel participating. This last directive enabled the operation to be monitored and closely regulated in order to alleviate public concern about numbers and locations of wolves taken. The Board specified that wolf reductions in GMUs 5 and 20A should not exceed 80% and that the objective should be a ratio of 1 wolf to 100 moose. This ratio was based on observations that moose populations with ratios of 1 wolf to 20 or fewer moose declined (ADF&G 1979, unpubl. issue paper 79-07). Therefore it was considered that a population with a 1:100 ratio should surely increase. The wolf reductions in the three GMUs were tentatively scheduled to run for 3–4 years, but the GMU 5 project was never implemented because of inadequate funds.

Meanwhile ADF&G and the National Audubon Society had finalized the terms of the review of Alaskan wolf management policies.

However, in view of the above actions by the Board, the Society's Executive Vice-President, in two letters to the Commissioner, dated 16 January and 4 February 1976, expressed concern that the credibility of the review would probably be severely damaged. He reasoned that the public might gain the impression that "... the National Audubon Society consented to or gave tacit approval to ..." the control programs, and that "... our study team would be handicapped in its search for facts and unbiased opinion in the present atmosphere of emotionally charged controversy". Unless ADF&G cancelled the hunts, the Society would withdraw from the contract. The Commissioner responded in a letter on 9 February 1976 by stating, in part:

There was never a suggestion much less a commitment that any of our programs ... would be put on ice until the ... study had been concluded. We are certainly not attempting to polish our image by associating with the Audubon Society and ... our motives are sincere in seeking an objective third-party assessment of the wolf situation in Alaska.

If such an endeavor at this time would unavoidably implicate the Audubon Society in issues that could only prove damaging to your conservation objectives and credibility, then I can certainly understand the decision to abandon the study that we had contemplated.

The control programs proceeded, and the Society withdrew from the contract.

Meanwhile efforts to delay or stop the control programs were initiated. National television editorials generated a great deal of attention: ADF&G had to contend with substantial misrepresentation. Thousands of protesting letters were addressed to the Governor or ADF&G.

A calendar of the most important events follows:

5 Jan. 1976. A letter was sent by the Defenders of Wildlife to the Secretary of Defense demanding an Environmental Impact Statement (EIS)

before allowing control by ADF&G on the Department's lands in GMU 20A.

19 Jan. 1976. The USF&WS suspended funds for the wolf reductions in GMU 13. However, the State decided to continue the project using State funds.

22 Jan. 1976. The Deputy Assistant Secretary of Defense requested certain information about control programs and officially requested that the programs not be implemented on the Department's lands until further notice. The State acquiesced.

23 Jan. 1976. Defenders of Wildlife *et al.*¹ filed suit against the Secretary of the Interior in US District Court for the District of Columbia (DC) claiming that an EIS was needed for the GMU 20A project. A preliminary injunction was requested.

26 Jan. 1976. Preliminary injunction for GMU 20A was denied by the DC judge. Defenders of Wildlife *et al.*² filed suit against ADF&G and several officials in District Court for Alaska claiming that an EIS was needed for the GMU 13 control study. An injunction was requested.

28 Jan. 1976. A temporary restraining order was issued by the District Court judge in Alaska on the GMU 13 control study.

30 Jan. 1976. The Director, Bureau of Land Management (BLM) asked the Governor of Alaska to suspend wolf hunts in GMU 20A pending a resolution of the question raised in District Court in DC of BLM's management responsibility. The State acquiesced.

6 Feb. 1976. The Assistant Director of the BLM sent a memorandum to the State stating that the point raised on 30 January had been resolved. The State could, and did, continue the GMU 20A hunt.

¹Natural Resource Defense Council, Inc.; Animal Protection Institute; Int. Fund for Animal Welfare — USA; The Humane Society of the US; the Fund for Animals; Animal Welfare Institute; The Wild Canid Survival and Research Center — Wolf Sanctuary; and 4 private parties.

²The Humane Society of the US; Animal Protection Institute; Int. Fund for Animal Welfare — USA; The Wild Canid Survival and Research Center — Wolf Sanctuary; the Fund for Animals; Alaska Field Representative for Friends of the Earth; and 4 private parties.

17 Feb. 1976. Defenders of Wildlife *et al.*, in their suit in Alaska District Court, amended the complaint to include the Secretary of the Interior and the Director of USF&WS as defendants.

25 Feb. 1976. The District Court judge in DC ruled against Defenders of Wildlife *et al.*, stating that no EIS was required for GMU 20A.

27 Feb. 1976. Defenders of Wildlife *et al.*, in their suit in the Alaska District Court, further amended their complaint to include GMU 20A (designated Count II; Count I is the GMU 13 complaint) and unsuccessfully requested a temporary restraining order to stop the GMU 20A hunt.

8 Mar. 1976. The District Court judge in Alaska ruled that an EIS was not needed in the GMU 13 control study. He denied the permanent injunction relief requested and dismissed Count I.

9 Mar. 1976. Defenders of Wildlife *et al.* filed notice of appeal against Count I decision.

31 Mar. 1976. A telegram from the Office of the Secretary of Defense cancelled his request for temporary suspension of control programs on Defense lands.

5 Aug. 1976. Defenders of Wildlife *et al.* appealed the decision of the Alaska District Court to the Court of Appeals, Ninth Circuit.

13 Sept. 1976. The Alaska District Court granted ADF&G's motion for summary judgment of Count II. Count II was dismissed.

22 Aug. 1977. The Court of Appeals, Ninth Circuit, reaffirmed the Alaska District Court's decision of 8 March 1976.

The timing of these events gains meaning when it is realised that the short daylight period prior to late January, particularly in GMU 20A, and the predictably poor snow conditions after late March severely limit effective wolf control operations. Moreover, the actions relate almost exclusively to the National Environmental Policy Act of 1969 (NEPA), which requires a written assessment of environmental impacts before any major action by a federal agency can be undertaken.

The actions by the Secretary of Defense and the two court cases established several important points. The action regarding the Defense lands clarified that the State did have manage-

ment responsibility and authority on such lands. The case in the District Court for DC clarified that a 1968 Memorandum of Understanding between Alaska and BLM did not require BLM approval for a wolf-control project unless poisons were used, hence the project could not be considered a "federal-state program". The case also brought out that the fact of federal land being involved does not by itself make wolf control a "federal action". The judge in the DC case further stated that, "... even if a federal action is involved, ... such action does not constitute major federal action significantly affecting the quality of human environment ..." (criteria specified in Federal Register 1 August 1973.) The Alaska District Court reaffirmed the latter point, finding that killing all wolves in the GMU 13 experimental area would only reduce the entire GMU 13 wolf population by 13%; such reduction "... will not significantly affect the quality of the human environment ..." and hence is not a major action requiring an EIS. The Alaskan judge did not rule on the question of whether the action was a federal one.

One action not resolved to the State's satisfaction was the withholding of federal Pittman-Robertson funds from the GMU 13 control study. Even though the Alaska Court ruled that an EIS was not required, USF&WS did not reinstate the funds. In a 27 January 1976 letter to USF&WS the Chairman of the Board of Game questioned the appropriateness of the cut-off. He also implied an improper use of the EIS requirement when he stated:

Another major concern is that your recent directive contributes to a practice that in the long run may have serious consequences for all of us. That practice is the increasing use of the National Environmental Policy Act of 1969 in an obstructionist way. That is, if an impending action cannot be stopped on any other basis, demand an EIS. At the very least, the process will delay the action. Using environmental quality legislation in that fashion, particularly in an instance such as ours where our man-made perturbation (i.e. reducing

the wolf population in all of Unit 13 by approximately 14%) is of less magnitude than others generated by natural environmental processes (i.e. naturally occurring fluctuations in wolf numbers), will substantially reduce public confidence in such legislation, possibly stimulating proposals to substantially weaken the 1969 Act. I hope that the Fish and Wildlife Service's abrogation of the wolf study is not a correct measure of your willingness to be a party to the obstructionist practice.

Despite the obstacles placed in their path, ADF&G personnel thought they had removed all except two or three of the wolves inhabiting the GMU 13 experimental area (Stephenson 1978, ADF&G Fed. Aid Wildl. Rep.). In GMU 20A, the goal was not achieved; the ADF&G operation removed 66 wolves, 69 others were taken by private individuals engaged in commercial or recreational trapping (ADF&G 1979, unpubl. issue paper 79-07). The post-control wolf/moose ratio of 1:29-40 fell short of the desired 1:100, but did represent a substantial change from the pre-control ratio of 1:13 (ADF&G 1977, unpubl. rep.).

The lack of success at stopping the wolf control operation in court led some groups to seek redress in Congress. Four essentially identical bills were introduced into the House of Representatives during the summer of 1976. The bills specified that the Secretary of the Interior, in co-operation with the states, would make a comprehensive study of the wolf for the purpose of developing "... adequate and effective measures ... to conserve such animals and to insure humane treatment in all cases". The bills also specified that "... a moratorium of all hunting of these animals from aircraft ... and all large-scale killing of these animals, whether for research or any other purpose ..." would stop until the Secretary completed the study and made his recommendation. Congress would be authorized to appropriate \$50 000 for fiscal year 1977 and for each of two succeeding fiscal years. The bills were not enacted, undoubtedly due in part to very reasoned and persuasive

testimony submitted by the Director of USF&WS on 20 September 1976 at a subcommittee hearing. The Director pointed out that the bills infringed on the rights of states to manage their resident wildlife; the inadequacy of the suggested appropriation was also mentioned. Of special interest to Alaska officials were these segments of his testimony:

In January of this year we issued notice to the State Fish and Game Department suspending federal funding under the Pittman-Robertson Act of a wolf removal project pending review of the project design which subsequently was determined to be adequate. However funding for this project has not been reinstated. ...

As you know, Mr. Chairman, there was tremendous public interest generated over this matter. We are still receiving letters almost daily pleading for preservation of the wolf. ... There is ... no evidence that wolves are either declining or in critically low numbers in Alaska. The opposite, however, is true with regard to moose and caribou populations in certain areas of Alaska.

Although the advent of summer curtailed the wolf operation, thus quieting the controversy, there were new developments. Preliminary analysis of the July 1976 aerial surveys of the Western Arctic Caribou Herd indicated that the herd had declined from approximately 240 000 animals in 1970 to about 50 000 in 1976 (ADF&G 1976). The herd represented a critical subsistence resource for rural residents in northwest Alaska, with an annual take of approximately 25 000 animals (ADF&G 1976, unpubl. rep.). ADF&G immediately undertook emergency actions to rehabilitate the herd. As studies suggested that the herd's range was not implicated and that humans and wolves caused most of the mortality (ADF&G 1976, unpubl. rep.; Davis *et al.* 1975, ADF&G Fed. Aid Wildl. Rep.; Doerr 1979), emergency action to reduce the take by both was initiated. ADF&G closed the year-long open hunting season in August, pending development of very restrictive

new regulations, and formulated plans for wolf reductions in the herd's winter range. The agency held public hearings in Barrow (GMU 26), Fairbanks, and Kotzebue during early August to obtain public input on management plans. At the 4 August 1976 meeting in Fairbanks, the Alaska Conservation Society recommended the human take of caribou be reduced as much as possible (preferably to zero) and suggested that the current plight of the Western Arctic herd

... may be one of those unusual situations where short and long term human benefit, and perhaps even long term benefit to wolves themselves (since wolves depend on caribou) requires that the Department of Fish and Game reduce wolf numbers as a temporary, emergency measure to lessen the decline in the Western Arctic Caribou Herd [see also Weeden 1976].

Some conservation groups outside Alaska did not share those views. In an August news release, the Wildlife Committee, Atlantic Chapter, Sierra Club criticized ADF&G and cited numerous reasons why the control operation should not be undertaken. In addition, the news release contained these suggestions:

You may well ask what you can do to stop these hunts; all concerned citizens and environmental groups can take the following actions:

The State of Alaska has recently requested the federal government lift the moratorium on the taking of 9 marine mammals ... now protected under the Marine Mammals Act. Though the populations of these animals have reached somewhat healthy levels ... the State of Alaska, in light of its wasteful and environmentally unsound management of wolves, [should] not be given ... management of these mammals unless Alaska proves it is capable of conservative wildlife management practices such as in regard to its wolf population. Express these views to: Thomas Kleppe, Secretary of Interior ...

The release further suggests:

We know from last winter's experience that appeals to stop the wolf hunts were met with deaf ears by Governor Hammond of Alaska, the ADF&G and President Ford. This year we are approaching the one political figure we believe to have a deep enough interest in the environment to do something about stopping these perversions of game management. Write to Jimmy Carter asking him to publicly back-up our views concerning the destructiveness of these hunts and their unhealthy environmental character.

The Alaska Conservation Society, through its Vice-President, responded to that news release on 6 October 1976. The response included the following:

The news release "Alaska Plans Massive Expansion of Aerial Wolf Hunts" issued this summer by your committee is an embarrassment to Alaskan and national conservationists. You use bad facts and — not surprisingly — reach unsupportable conclusions. I hope this letter helps set you straight and can be the basis for a more accurate information program on your part. ... We have enclosed some information you should study carefully. Next time you want to make something public about Alaska, please check the facts. We'd be glad to help.

The Board, during the fall of 1976, directed ADF&G to conduct a wolf-reduction program in the high wolf density portions of the Western Arctic herd's winter range, located in GMUs 23 and 24. Again, up to 80% of the wolves in the designated areas were to be removed during the winter 1976/77, but by private hunting teams with permits and not by ADF&G personnel. On learning of the proposed action, legal representatives of the National Resources Defense Council, Defenders of Wildlife, and the Alaska Chapter of the Sierra Club

asked the Secretary of the Interior, in a letter dated 11 November 1976, to prepare an EIS prior to any State control activity. They contended that a Memorandum of Understanding of May 1976 between ADF&G and BLM, plus the fact that most lands involved were BLM lands, made BLM responsible for the control action, thus requiring an EIS. The Secretary did not write such an EIS. Meanwhile ADF&G implemented the program, making up to 30 permits for pilot-gunner teams available for issuance in November, a period of short days and poor snow cover. Few teams participated because most were waiting for the more favourable day length and snow conditions of late February. In February, however, court action ensued as follows:

4 Feb. 1977. Defenders of Wildlife *et al.*¹ filed suit against the Secretary of the Interior in US District Court for DC. The plaintiffs contended that two federal statutes, the Federal Land Policy and Management Act of 1976 (FLPMA) and the Alaska Native Claims Settlement Act required that the Secretary provide an EIS; they asked for an injunction.

14 Feb. 1977. The judge for the DC District court issued a preliminary injunction compelling the Secretary to order the State to halt the program on BLM-administered lands in GMUs 23, 24, and 26 (see Secretarial Order No. 2999 of 17 February 1977).

22 Feb. 1977. The State of Alaska and the Mauneluk Association, an Alaskan native organization, filed suit in US District Court for Alaska against the Secretary of the Interior (defendant) and Defenders of Wildlife *et al.* (intervenors) asking for a stay of the DC court's order. The State asked the court to declare that the Secretary had no power to stop the control effort.

1 Mar. 1977 (approx. date). The Secretary of the Interior appealed the injunction to the Court of Appeals for DC.

16 Mar. 1977. The judge in Alaska District

¹Natural Resources Defense Council; Int. Fund for Animal Welfare — US; The Humane Society of the US; the Fund for Animals; Animal Welfare Institute; The Wild Canid Survival and Research Center — Wolf Sanctuary; Friends of the Earth, Inc.; and 7 private parties.

Court declared in a preliminary finding that Alaska should have been a party to the case. He declared that no EIS was required. However, he did not grant the request for a stay of the DC Court's injunction, contending that two opposing decisions of District Courts placed the Secretary of the Interior in an untenable position.

11 Apr. 1977. The judge in the Alaska District Court case reaffirmed his preliminary finding. He also held that the Secretary of the Interior had the power to halt the wolf control program, but that an EIS was not required because the Secretary refrained from exercising that power.

21 July 1977. The State of Alaska appealed the judge's decision in the Alaska District Court case to the US Court of Appeals, Ninth Circuit. The State contended that the Secretary did not have power to halt programs. Eleven other states and the International Association of Fish and Wildlife Agencies joined as interested parties; the issue was rapidly widening to cover all non-migratory wildlife.

26 July 1977. *Defenders of Wildlife et al.* appealed the Alaska District Court judge's decision on EIS. They asked for confirmation of the judge's ruling on the authority of the Secretary to stop the control hunts.

22 Feb. 1979. The Ninth Circuit Court ruled that the Secretary of the Interior was not required to file an EIS, but it did not rule with regard to the power of the Secretary.

16 Mar. 1979. Court of Appeals for DC rescinded the injunction on Western Arctic Caribou Herd "for want of equity", and directed that the complaint be dismissed. "In an unpublished memorandum accompanying our order, we said that '[s]ound principles of comity dictate that this court should not undertake an independent examination of issues resolved by the Ninth Circuit ruling'".

28 Feb. 1980. The Secretary of the Interior filed Secretarial Order No. 3047 in the Federal Register rescinding the previous order closing all BLM-administered lands in GMUs 23, 24, and 26 to aerial hunting.

The court cases during 1977 again centered on NEPA requirements. The cases raised and clarified several important issues regarding EISs but failed to address one concerned with federal-state authority.

The Ninth Circuit Court, ruling on an appeal from the Alaska District Court decision, avoided the issue of federal-state authority, but did specify that the non-exercise of any authorities and duties possessed by the Secretary does not require an EIS. Also, the Ninth Circuit judges were reluctant to impose NEPA requirements in the absence of federal funding, as occurred in the Western Arctic herd action.

The Court of Appeals for DC essentially affirmed the Ninth Circuit Court's decision and reversed the injunction issued by the District Court for DC.

Although court action stymied western arctic wolf control after only nine wolves had been taken, the caribou herd was probably exposed to decreased wolf predation during the winter. Unexpectedly, about half the herd stayed throughout the winter on their summering area north of the Brooks Range; that area has low wolf densities (ADF&G 1977, unpubl. rep.). Of the half that wintered south of the Brooks Range, 75% wintered in an area from which 75 wolves were removed by the short-lived control action and by intensive private trapping and hunting. The latter was probably by Alaskans disgruntled over the litigation that stopped the control effort. In all of GMUs 23 and 24, nearly 200 wolves were taken by trappers and hunters during the winter of 1976/77 (ADF&G 1977, unpubl. rep.).

The wolf-reduction program in GMU 20A continued during the winter of 1976/77, with 27 wolves taken by the ADF&G control program and 26 more by trappers and hunters (ADF&G 1979, unpubl. issue paper 79-07). By April 1977 the wolf/moose ratio was estimated to be 1:50-80 (ADF&G 1977, unpubl. rep.). The decline in the moose herd was arrested and there was substantially increased survival of calves and yearlings in the control area. In adjoining areas with no reductions in wolves, the calf and yearling survival rates appeared unchanged from the pre-control levels (Hinman 1978, ADF&G Fed. Aid Wildl. Rep.).

The GMU 13 control study continued. During the winter of 1976/77, 12 wolves that either moved into the experimental area or had been there since the inception of the study were removed, bringing the total removed to 52

(ADF&G 1979, unpubl. issue paper 79-07). Moose-calf survival appeared to be slightly better in the wolf reduction area than outside it, based on mortality of radio-collared moose calves, but brown bear predation appeared to be a significant mortality factor (Ballard *et al.* 1981). ADF&G initiated a study to measure this.

No new wolf control programs were started during the winter of 1977/78. The program continued in GMU 20A with 39 wolves taken by ADF&G and 4 by trappers, resulting in a fall wolf/moose ratio of 1:40 by 1978. The moose population continued to increase; the available data suggested a 15% annual increase in the control area and only a 1% increase outside it. The pre-control population of 2900 moose in the fall of 1975, with a ratio of 14 calves/100 cows, reached 3500 by the fall of 1978, with a ratio of 50 calves/100 cows (ADF&G 1979, unpubl. issue paper 79-07). The results convinced ADF&G and the Board of Game that the control action in GMU 20A was the primary factor responsible for the increases. Furthermore, a wolf/moose ratio of 1:50, and not the originally proposed 1:100, seemed adequate for desirable growth.

The GMU 13 control study continued in 1977/78. Seven wolves were taken in the experimental area (ADF&G 1979, unpubl. issue paper 79-07). The moose-bear study confirmed that bears were causing heavy mortality to calves for several weeks after birth, creating additional problems for managers responsible for moose management (Ballard *et al.* 1981).

The success in GMU 20A stimulated an increased demand by residents elsewhere for wolf control in their areas. Recognizing that additional wolf control projects were likely, the Board took steps during the spring of 1978 to make wolf control a routine management task for ADF&G and not a special action imposed by the Board. On 7 April 1978 the Board adopted a Statement of Direction indicating the Commissioner could permit the use of aircraft in wolf control when he found that all the following conditions prevail:

1) the highest priority use of wildlife in an area is determined to be the use of prey species for food or recreational hunting;

2) the prey populations have been reduced to or are held at a level below that deemed to be the capacity of the habitat;

3) the prey populations are below levels that could reasonably satisfy the priority uses;

4) adequate control of predation cannot be accomplished by manipulation of hunting and trapping seasons and bag limits;

5) predation control based on aircraft use governed by a permit is judged to be an effective method for that area, and;

6) such predation control in an area can be adequately supervised and regulated.

The Commissioner was no longer always expected to seek prior approval before implementing aerial hunting, but he was directed to keep the Board informed of his actions.

An ADF&G report presented to the Board on 28 November 1978 identified seven new areas with chronically low ungulate populations that were being considered for wolf reductions. The ADF&G staff prepared issue papers for these areas and submitted them to the Commissioner for his approval.

By December 1978, Alaska lands legislation, which would ultimately be enacted and entitled the Alaska National Interests Lands and Conservation Act, was a sensitive issue in Washington, DC, and in Alaska. The entire series of legislative proposals was commonly referred to as "d(2)" legislation. Any Alaskan issue that could be controversial, both within and outside Alaska, received intense scrutiny with respect to repercussions on d(2). Consequently, the political ramifications as well as the biological worth of the new wolf-control projects needed careful evaluation. Four of the projects were deleted by the Commissioner before he informed the Governor of the proposed actions.

ADF&G held seven public meetings to assess reaction to the three remaining proposals; the reaction was mostly favourable. However, the Commissioner, caught between concerns of national and local politics, sought concurrence from the Board before acting. Meanwhile the GMU 20A control continued (18 wolves were removed during the winter), as did the GMU 13 control study in which 2 wolves were removed (ADF&G 1979, unpubl. issue paper 79-07).

The Board agreed on 9 March 1979 to wolf control in three new areas: GMUs 19A and B; the Innoko drainage of GMU 21; and the Nowitna drainage of GMU 21. The stressed populations were moose. All but GMU 19B are areas of importance to local subsistence hunters. Wolf/moose ratios in GMUs 19A and B, the Innoko, and the Nowitna were estimated (later revised) to be 1:15, 1:28, and 1:10 respectively. Issuing of aerial hunting permits to private pilot-gunner teams commenced on 11 March 1979.

The three new actions immediately provoked controversy. The Special Committee on Subsistence in the Alaska Legislature, in a news release dated 22 February 1979, criticized the actions as politically unwise in regard to d(2). Two court cases were initiated as follows:

12 Mar. 1979. *Defenders of Wildlife et al.*¹ filed suit against the Secretary of the Interior *et al.* in US District Court for DC, asking for declaratory and injunctive relief. The plaintiffs contended that the secretary had authority over control programs based on the Federal Land Policy and Management Act (FLPMA); hence an EIS was required.

13 Mar. 1979. The District Court for DC issued a temporary restraining order that enjoined the Secretary to "... take all steps necessary to halt aerial killing of wolves by agents of State of Alaska..." on the federal lands in the three control areas.

23 Mar. 1979. The District Court for DC issued a preliminary injunction and ruled that an EIS was needed. The Court also denied the Secretary's requests that the case be transferred to the US District Court for Alaska and that the action be dismissed for failure to join Alaska as an indispensable party.

Mar. 1979. Three private parties filed a case against ADF&G *et al.* in Alaska Superior Court, Third Judicial District, contending that the Board of Game had delegated powers to the Commissioner in excess of those authorized by the Legislature, and that the Governor had exerted undue political influence regarding the proposed wolf control projects. A requested temporary restraining order was denied.

Early Apr. 1979. The Secretary of the Interior *et al.* appealed the District court ruling to US Court of Appeals for DC.

31 Mar. 1979. The Secretary of the Interior filed Secretarial Order No. 3036 in the Federal Register, which closed all BLM-administered lands in the three control areas (GMUs 19A, 19B, and 21) to aerial hunting.

Aug. 1979. The Superior Court judge dismissed the case, ruling that proper authority existed and that no undue political influence was evident.

5 Feb. 1980. The Court of Appeals for DC ruled that the Secretary was not required to file an EIS. It also ruled on the authority of the State in wolf control (see below).

28 Feb. 1980. The Secretary of the Interior filed Secretarial Order No. 3047 in the Federal Register, which rescinded previous order (No. 3036).

The Alaskan Superior Court case emphasized the political sensitivity in Alaska. In a memorandum supporting a motion for summary judgement filed with the Court on 2 April 1979, the attorney for the plaintiffs stated:

This hunt, willingly or not, is a factor in the Congressional dynamics surrounding the d(2) deliberations. It has raised questions regarding the State's ability to manage wildlife (both moose and wolves), created controversy among the constituents of Congressmen from urban areas far removed from Alaska, and created some controversy between subsistence hunters and environmentalists who support a strong d(2) bill. Whether one views this hunt as a gesture of political suicide, or as a carefully orchestrated, if unsuccessful, attempt to split the ranks of the backers of the bill, it is clear that the hunt is enmeshed in political controversy.

¹Natural Resources Defense Council, Inc.; Int. Fund for Animal Welfare; The Humane Society of the United States; the Fund for Animals; Animal Welfare Institute; The Wild Canid Survival and Research Center — Wolf Sanctuary; World Wildlife Fund — US; and 2 private parties.

The actions in the DC courts essentially reaffirmed previous court findings regarding EISs. In addition, an important statement on state-federal authority emanated from that action.

The Defenders of Wildlife *et al.*, in their suit in District Court for DC, contended that FLPMA gave the Secretary of the Interior the power to close federal lands to the wolf control program, hence an EIS was needed regardless of whether he exercised those powers. The Court of Appeals for DC spoke directly to the authority question, stating that under the BLM Organic Act, Congress "... assigned the states the primary responsibility for the management of wildlife programs within their boundaries". The Court did note that Congress may pre-empt state management of wildlife on federal lands, but there must be clear intent by Congress to do so. In summary the Court stated, "Far from attempting to alter the traditional division of authority over wildlife management, FLPMA broadly and explicitly reaffirms it". The Circuit Court of Appeals reversed the District Court's ruling.

The hunts during the spring of 1979 accounted for 29, 11, and 5 wolves in GMUs 19A and B, the Innoko, and the Nowitna respectively. ADF&G judged the hunts effective only in the Aniak River drainage in GMU 19A; bad weather and closure of federal lands substantially decreased effectiveness in the other areas (ADF&G 1979, unpubl. issue paper 79-07).

During the fall of 1979, ADF&G presented to the Board issue paper 79-07 and supporting material about wolf control programs. The paper contained a statement clarifying the agency's position on wolf control, as follows:

The Department of Fish and Game acknowledges, as a basic proposition, that wolf-reduction programs which are intended to rehabilitate depressed ungulate populations are not needed to increase the population of either predator or prey species, but are for the sole purpose of providing more animals for human consumption.

The issue paper also reaffirmed that ADF&G would reduce wolf numbers only in response to a specific problem in a specific area; the Department would not issue aerial permits for sport-hunting purposes.

The issue paper made three recommendations for the winter and spring of 1980: first, that the control operations previously initiated in GMUs 19A, 19B and 20A be continued; second, that the programs in the Innoko and Nowitna drainages of GMU 21 be cancelled "due to budgetary constraints and in recognition of marginal effectiveness of wolf reductions in these areas as long as federal lands remain closed" (although a subsequent decision continued the operations in both areas); and third, that control be initiated in three new areas in GMU 20. Two of the new areas had depressed moose populations showing virtually no improvement even with very restrictive hunting seasons and bag limits (ADF&G 1979, unpubl. rep. issue paper 79-07). The other area had reduced moose and caribou populations.

Private pilot-gunner teams, under limited permits, were to conduct the operations, with the number of wolves to be removed from each unit specified. Based on the experience in GMU 20A, ADF&G managers hoped to establish a wolf/moose ratio of 1:50, rather than the previously used 1:100 ratio.

A fourth new area that had previously been included for control was deleted; the reason was given as follows:

In spite of the fact that all biological data strongly support the need for temporary wolf reduction in the area, the Department believes that it would not be in the best interests of the State to attempt a reduction program at this time. Factors involved in this decision include the proposed Yukon-Charlie federal withdrawal, the large percentage of other federal land, and the sensitivity of the land settlement question.

The control operations in GMUs 23 and 24 (the Western Arctic Caribou Herd action), begun in 1977, were still halted by a Secretary of the Interior's order, as mentioned earlier.

The order was only lifted on 28 February 1980, after the Court of Appeals in DC ruled favourably for the State.

The new wolf control operations did not occasion substantial new controversy, although several organizations such as Greenpeace did voice opposition. Apparently the public, particularly in Alaska, was accepting ADF&G's and the Board's assertions that, in order to attain goals they had defined following public input, both prey and wolves must be managed. Operationally, wolf control was becoming more of a routine management activity and less of a special, high visibility event requiring extensive public hearing and debate.

The wolf control situation during the winter of 1980/81 essentially remained unchanged from that of 1979/80. Even though all legal prohibitions against control were lifted with the 5 February 1980 Appeals Court decision, control operations were not resumed in the winter range of the Western Arctic herd. That herd had increased substantially, due to favourable winters, to restrictive hunting seasons and bag limits, and to the fact that most of the herd continued to winter in areas of low wolf densities.

The wolf control program in GMU 20A, initiated in the spring of 1976, is considered a success by ADF&G and the Board. Although the desired level of wolf reduction was never achieved, a dramatic increase in moose numbers occurred in the control area. The interim management objective of 5000 moose will be reached within 2 or 3 years. Whether that stocking level is the desired one in terms of habitat conditions, wolves, and humans is still an open question. Based on the desires of the public, particularly those living near the area, the main use of GMU 20A's wildlife resources is the consumptive use of moose. In order to sustain this use, it may be necessary to maintain wolf populations at an artificially reduced level.

What of the future?

Alaska's growing human population coupled with increased use of land for agriculture, forestry, mineral production, and urbanization will steadily reduce the habitat available for

wildlife, especially the many wide-ranging mammals. The Alaska National Interests Lands and Conservation Act has resulted in park or monument status, and thus legal protection for wolves, for about 6% of the gross area of the State. Seven of the National Park Service areas under complete legal protection each exceed 6900 km², and most units in this group exceed 13 000 km². These areas are well distributed over the entire State except in the southeast panhandle. In addition, this legislation placed another 5% in "preserve" status; although hunting will be permitted on preserves, wolf control is unlikely. The new refuges and the Forest Service's National Monuments in southeast Alaska probably have a similar status. It will be difficult to define or map the status of wolves on specific lands until regulations provided for under the d(2) legislation have been promulgated.

The demands on wildlife populations will increase significantly as the rural human population continues to grow, as the road system expands, and as the nation's food supplies become more expensive or scarcer for reasons paralleling the above. Consumption of wildlife will continue to be assigned high priority in Alaska on lands not managed intensively for primary uses incompatible with wildlife production. There will certainly be strong pressure for the control of wolf populations in areas from which humans are attempting to gain the highest possible yield of wild meat.

We anticipate further acceptance among ecologists and eventually the public of the role of predators in depressing prey populations and in prolonging recovery from lows caused by predation and other factors. The effectiveness of bears as predators in certain situations will be better understood; however, it seems that adjustments of hunting pressure on bears can substitute for "control" in this case. Wolf control will continue to become more of an operational process for ADF&G but will be conducted within clearly stated goals and criteria. The agency, working with the public, is well along in the development of detailed population-level management plans. Additional study is needed to understand sufficiently both predator-prey interactions and the most effective strategies of control.

Although it may appear to some that wolf management in Alaska has come full circle, the second round will be made under vastly different conditions and much stricter rules. ADF&G policy will probably continue to preclude poisons except in the most extreme circumstances; aerial hunting, objected to by some as unfair, is one of the most target-specific control methods possible; and wolf reduction will be directed at clearly specified areas. We hope that the future will be characterized by substantially increased knowledge of basic ecology and significantly more effective and mutually sympathetic communication between the many interested segments of society.