Alaska's 1992 wolf control plans | Why they failed | A political, biological and ethical analysis

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ALASKA'S 1992 WOLF CONTROL PLANS: WHY THEY FAILED
A Political, Biological and Ethical Analysis

by
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Preface

My experiences in Alaska and my introduction to the state's wildlife practices began in 1984 when I entered the state for the first time to participate in a three-month outdoor education program led by the National Outdoor Leadership School. Later, as an instructor for the school, I spent summers teaching in Alaska's Chugach, Talkeetna and Alaska mountain ranges. It was throughout these summers, which were filled with a myriad of wildlife sightings and encounters in the backcountry, that my interest in Alaska's wildlife management peaked. These experiences led me to study wildlife related topics at the University of Montana while pursuing a Master's degree in Environmental Studies.

In the spring of 1992 I was asked to be the executive director for a small non-profit organization, The Alaska Wildlife Alliance, whose primary issue is to oppose wolf control in Alaska. For close to one year I held this position, and worked almost exclusively to oppose Alaska's wolf control programs. I am currently an elected member of the Anchorage Fish and Game Advisory Committee and represent the Alaska Wilderness Recreation and Tourism Association on a planning team for the Fortymile caribou herd. This paper is, in large part, inspired by both my experiences in Alaska's wilderness and on the political front lines with The Alaska Wildlife Alliance, campaigning to put an end to the state's proposed lethal wolf control programs.
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Introduction

"When men come into a land to "tame" it, they replace wild game with domestic animals. The wolves prey on these creatures, the men kill them in turn, and reduce the wolf population generally, as a preventive measure to secure their economic investment. The two just can't live side by side. A step removed from this, perhaps, in terms of its justification, is the action of Fish and Game departments that kill wolves to sustain or increase the yield of big game animals so human hunters can kill them. This kind of "predator control" has historically accommodated economic and political interests ahead of ecological interests. And it has acted occasionally from a basis of bar stool and barbershop biology, not wildlife science."

Barry Lopez, Of Wolves and Men

Alaska's 1992 wolf control plans, which were the culmination of a long public process, failed to be implemented as intended for a variety of reasons. The following chapters analyze these failures as they relate to the political, biological, and ethical dimensions of policy-making. They also include an overview of America's historic relationship to wolf control, helping to place Alaska's 1992 wolf plans within their greater context. The main purpose of this work is to provide a reference for future wolf and predator management policy-makers, and any others who are interested in progressive reform of Alaska's wildlife management. The intent of this reference is to better inform policy-makers, so that they may more clearly understand the past and present failures encompassing this issue, avoid similar dilemmas in the future, and break Alaska's negative wolf control cycle. Alaska needs to create new and progressive solutions to wildlife management conflicts if wolves are to remain a valued and integral part of the state's ecosystems.

The chapters in this paper are organized in the following way:
The first chapter discusses the history of predator control in the United States and Alaska, exposing how deeply embedded predator control has been in western culture, western mind-sets and the development of America. Chapter two reviews the more recent political history of the 1992 wolf control controversy in Alaska, identifying the issues and players involved. This includes an overview of the state of Alaska's 1992 - 1993 wolf control plans, and incorporates a discussion of Alaska's fish and wildlife management system, Governor Hickel's administration's influence on that system, and the role of the public. Chapter three analyzes and critiques the Alaska Department of Fish and Game's (ADF&G's) biological foundations for the proposed wolf control in Alaska. Finally, chapter four explores the value-based implications of Alaska's wolf control programs and recommends that the state look beyond politics and biology to determine what it is that perpetuates this debate. Human imposed values relating to wildlife are critically intertwined in this controversy, and yet no formal discussion has addressed these concerns. In conclusion, this paper makes recommendations to the state and future policy-makers for improving future wolf management planning.

An additional purpose of this paper is to record some of the voices that were deafened during this and other similar debates with Alaska's wildlife management system. Those opposing the plan found that not only were wolves targeted for control in Alaska's wolf issue, but the majority of the public was also undermined -- many citizens, scientists, ecologists, natives, eco-tour operators, environmentalists, and animal rights activists among others. How were these people disregarded by the governing bodies over wolves, the Alaska Board of Game and the Department of Fish and Game?
Their testimony was dismissed as being the result of misinformation. Their words were not given thoughtful consideration, and thus they were silenced, annulled, rejected. The public was invited to participate in a process which it was led to believe was open, but in actuality this was not the case. Therefore, this paper records the events of the 1992 wolf issue and some of the opinions that were ignored during the controversy, so that those involved in the future can help make wildlife policy-making in Alaska and elsewhere a better, more enlightened and ethically concerned process.

Since the Middle Ages wolves have been the target of intense, diverging opinions and feelings in the western world. Hated, romanticized, symbolized, killed and revered -- the subject of fairy tales, hunting and trapping stories, and pagan and religious symbols -- wolves have played a significant role in western history. Historically wolf numbers in many areas of the world have undergone significant declines, and many countries are left with only remnant populations. Centuries of control attempts eliminated wolves from fifteen of the twenty-three European states, and several where wolves remain contain only a handful of wolves.\(^1\) In the United States, wolves were extirpated throughout 95 percent of their range in what is known as the largest attack ever waged on wolves in western history, described by some as a "holocaust."\(^2\)

The state of Alaska has done its share to reduce and eliminate wolves in certain parts of Alaska, though wolves continue to inhabit the state throughout much of their range. Alaska has experienced a host of wolf

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control programs since the early part of this century, when Euro-Americans first began settling this northern region. The state's proposal to begin wolf control in three large sections of Alaska in 1992 climaxed an ongoing controversy in the state regarding wolf management.

Contrary views and charged emotions continue to surround most any discussion of wolves, and Alaska's recent wolf control plans were no exception to this pattern. Examples of such perspectives expressed within recent years in response to a multitude of Alaska's wolf management plans include:

"We're feeding our big game to wolves for the benefit of the Lower 48 and a lot of carpetbaggers who have come up here to preserve us. They've done everything except put us in a bottle of formaldehyde or grain alcohol . . . . The wolf is a cowardly, skulking predator . . . . People, for some reason or another have fallen in love with a skulking, stinking predator. . . . And I have no respect for a predator, whether it be crocodile, wolf or lion. . . . And if you really want to get technical, we're probably the greatest predator of all. But as long as man is here and he was given dominion over the earth, we should use it wisely, prevent predators from taking it, and I think we should allow aerial hunting on the same day and you don't have to land."

-- Taken from the testimony of Joe Vogler, Board of Game Meeting, November, 1989

On the other side of the debate, Kathy Rowe wrote to the Anchorage Daily News on December 3, 1992:

I am truly disgusted with the Alaska Board of Game and furthermore, the way that this state treats its wildlife. These good ol' boys, most of whom were hand-picked by our most wonderful governor, and making severely destructive decisions and getting away with it!

So, you would like to use radio collars, planes, and any other means possible to find a minimum of 500 wolves and shoot their brains out . . . . for what? All of this for a special interest group, hunters. These people are whining that there are not enough caribou and moose for them to shoot. You won't get a shoulder to cry on here! Is the problem that you have to walk too far before you can take a shot?
Wolves are endangered in most of the Lower 48 states. Up here they are thriving. How wonderful it is that our state can host such gorgeous populations of wildlife. Let's treat them with appreciation and respect, not an invitation to their own massacre.

If you are as disgusted as I am about the decisions being made for us by our Board of Game and Governor, please write . . . .

Unfortunately, it might be too late to save the wolves from the onslaught of planes and trigger happy "officials." However, perhaps with public pressure we can prevent such horrible management techniques in the future.

In 1993, another outraged individual, a New Jersey photographer, threatened to kill one of Alaska Governor Hickel's family members for each wolf state game officials killed. His actions brought charges against him, and the man pleaded guilty to threatening Hickel's family in federal court in March of 1994 (Anchorage Daily News, 3/25/94, B-2). The wolf continues to maintain a polarized thread within the tapestry of contemporary Alaskan and western culture.

During the past three decades of state wildlife management, Alaska has experienced an exhausting list of wolf control programs (either proposed or implemented) and court battles over this issue. Discord regarding wolf management in Alaska has increased, soaring to new heights with broader public awareness, media involvement and successful opposition. In 1987, the state reached a stand-still concerning wolf management when Alaska's Governor Cowper removed funding for all of Alaska's wolf control programs, declaring his administration would instead further efforts to survey wolves. His actions crippled those in favor of wolf control.

In the years following Cowper's decision, a statewide planning effort to create a "Strategic Wolf Management Plan" which involved public input ensued. A team made up of members of the public was formed for the purpose of making consensus-based recommendations to the state about how
to create a statewide strategic wolf management plan. This planning effort intended to design a wolf management plan which "everyone could live with." In the midst of the planning effort, Alaska elected a new Governor, Governor Walter J. Hickel. Governor Hickel made appointments which changed some of the key players involved with the wolf planning effort. Many involved with the process up to this point believed Hickel's new administration changed the tenure of the planning process. As part of the final efforts of this plan, the Alaska Department of Fish and Game (ADF&G), under the new leadership of the Hickel administration, proposed three wolf control programs for Alaska in 1992. The three areas targeted for control were in the southcentral and interior regions of Alaska, close to both Anchorage and Fairbanks, and totaled approximately 43,000 square miles. Many involved with the plan felt the Hickel administration and ADF&G's proposals turned wolf management back in time. Some felt ADF&G had, in the end, made a mockery of the public process, and the new wolf plans were not ones "everyone could live with."

ADF&G proposed to reduce wolf populations in the control areas by up to 81%, which meant likely between 450 and 500 wolves would be killed in the first year alone. Prior to ADF&G's release of the new wolf plans, the state had spent two seasons radio-collaring wolves in the proposed control areas. The control plans, similar to others experienced by Alaska, intended to have biologists track the radio collared wolves with planes until the wolves led them to their packs. Once packs were located, helicopters transporting biologists armed with rifles would fly out to them and extirpate the packs. The motivation behind these actions was to increase moose and caribou numbers for the benefit of human hunters.
The majority of Alaskans, however, hunters and non-hunters alike, oppose such management measures. In addition, state and national environmental and animal rights groups, the tourism industry and others object to this approach. Thus, when the state decided to go ahead with their wolf population control plans, disregarding much opposition from the public, a large political battle ensued. Tactics employed by conservation groups and the media raised awareness of the issue across the nation and abroad. A tourism boycott of Alaska followed, and its pressure was felt strongly by the tourism industry and Alaskan politicians. For close to six months Alaska's management plans maintained the focus of state officials, politicians both in Alaska and Washington D.C., a coalition of up to fourteen state and national conservation and animal rights groups, the media and thousands of individuals across the United States, Canada, England, Germany and France. Thousands of letters protesting the wolf plans were sent to Governor Hickel. It was clear that a broad cross section of people felt adamantly opposed to the aerial gunning of wolves.

In an effort to try to understand the motivations behind the continued systematic killing and suppression of a species which has been eliminated or significantly depleted in the majority of its ranges throughout the world, this paper argues people must look beyond the political and biological realms of this issue. As chapter three will clarify, Alaska's ongoing wolf debate is not solely a scientific dilemma. The biological reasoning used by the state to support control programs in Alaska is often tenuous and, at times, appears lacking. Further, the cost of wolf control deletes any notion that economics is a driving force behind the state's programs. An August, 1995 Alaska Public
Radio Network news report quoted that the state spent close to $3,000 per wolf in its control program planned in 1992. It is likely this figure would increase if the overhead costs of all those involved in creating these control plans, including state officials, staff and the public, were incorporated into the equation. Several years of planning, staff time and state meetings went into creating the 1992 plans.

In addition, the economic losses incurred by the tourism industry during the 1992-3 tourism boycott were substantial. The tourism industry projected they lost between 100 - 150 million dollars in business as a result of the boycott. This loss significantly outweighs the revenue generated by hunters (~ 67 million dollars per year) and, one could argue, the value of theoretically a few hundred additional moose and caribou resulting from control efforts. It is difficult for a state that is faced with declining revenues, such as Alaska, to justify spending such significant amounts of money on programs as unpopular and contentious as wolf control.

Future policy-makers in situations such as Alaska's wolf control debate must begin to address the underlying tenets which motivate politics and biology, namely ethics and values. Alaska's wolf control debate actually centers around groups of people who possess differing value systems, as is evidenced by the testimony of professionals, lay-people and the general public at Board of Game meetings. The extirpation of wolves has been part of a cultural tradition in America which originates from a value-based perspective and approach to wolves. The driving force behind wolf control in Alaska is the aspiration to create more opportunity for humans to hunt moose and caribou. Many people do not view this devaluation of wolves or approach to wildlife management as an appropriate or ethical way to manage
this species. This conflict of values must be addressed if future wolf policy
decisions are to move forward in a productive, meaningful and effective way.
CHRONOLOGY OF EVENTS BETWEEN THE TIME ALASKA'S 1992 WOLF CONTROL PLANS ARE PASSED AND MARCH, 1995:

November 9 - 19, 1992 -- The Board of Game meets in Fairbanks and votes to adopt all three wolf control plans proposed in the Alaska Department of Fish and Game (ADF&G) Area Specific Management Plan.

November 19, 1992 -- Reporter, Timothy Egan, publishes an article in the New York Times informing the nation about Alaska's wolf control plans. He features David Kelleyhouse, Director of ADF&G's Wildlife Conservation Department by quoting him saying, "We feel we are going to create a wildlife spectacle on a par with the major migrations in East Africa. Mom and pop from Syracuse can come up here and see something that they can't see anywhere else on Earth." Egan's article is reprinted in newspapers across the nation.

November 20, 1992 -- January 31, 1993 -- Press from across the world begins to cover Alaska's wolf issue. CNN interviews The Alaska Wildlife Alliance and others and begins worldwide coverage on November 23. A coalition of up to fourteen local, state and national environmental and animal rights groups forms.


December 1, 1992 -- Governor Hickel is inundated with phone calls and letters opposing the wolf kill, and will receive over 45,000 such protests during this time. He proposes capturing and giving wolves away to states who want them as an alternative to aerial wolf killing. No states come forward to accept his offer.

December 5, 1992 -- The Governor yields to pressure from the public and the tourism industry, and suspends the wolf plans pending a "Wolf Summit" to be held in Fairbanks in January, 1993.

December 12, 1992 -- Demonstrations occur simultaneously in cities across the country (including Anchorage) in addition to Germany, England and Canada.
December 17, 1992 -- The environmental and animal rights groups coalition ask the Governor to cancel all wolf control plans in 1993 as a condition for their attendance at the Summit.

December 22, 1992 -- The state announces the cancellation of the wolf control plans for 1993.

January 15 - 18, 1993 -- Governor Hickel's summit is attended by hundreds of people including the Governor himself, ADF&G current and past representatives, Board of Game current and past representatives, biologists, tourism industry representatives, environmental and animal rights groups, pro-hunting and trapping groups, Alaska natives and individuals from both in and out of the state involved or interested in the debate. Professional mediators are hired to facilitate the summit which is filled with panel discussions, speakers and group discussions. Consensus is not reached regarding wolf control, but summary points from discussion groups are assimilated and distributed after the summit. They are intended to help direct the state in future wolf management decisions.

January 19-28, 1993 -- The Board of Game meets in Anchorage and rescinds both the Area Specific Wolf Plans and the Strategic Wolf Management Plan. This action essentially undoes the consensus-based work of the Wolf Management Planning Team and places wolf regulations back in time. Restrictions on public aerial-supported hunting are removed, and a ten mile wide buffer on the east side of Denali National Park which protects wolves whose territory extends outside the Park is removed. In addition, two no-hunting zones around Anchorage and Fairbanks are removed.

January 29, 1993 -- Hunting advocates push for legislation which would mandate predator control on lands across the state. Senator Bert Sharp, R. Fairbanks, introduces a bill called the "intensive management bill" which requires predator control and habitat manipulation throughout Alaska to boost hunting opportunity.

February 18 - 19, 1993 -- Hunting advocates in and near Fairbanks pressure ADF&G to declare an emergency in GMU 20A and begin wolf control immediately. ADF&G considers the request, and sends biologists out into the field to review the situation, but denies the request on the grounds that their biologists determine their is no biological emergency in GMU 20A. Chris Smith, ADF&G Fairbanks Regional Supervisor, states in a memo, "While snow conditions in the interior are generally more severe than normal this winter, there is no evidence that caribou or moose in GMU 20A are suffering major losses. Nor is there any basis for predicting that this winter's weather will have significant adverse effects."
October 1993 -- The Board of Game meets and votes to adopt a ground-based trapping wolf control program to be implemented by ADF&G in GMU 20A. In addition, ADF&G begins "trapper-education" classes to encourage individual trapping in this area. During the same time, Gordon Haber, wildlife scientist, is hired by Friends of Animals, Wolf Haven International and The Alaska Wildlife Alliance to be a "watch-dog" by flying and locating ADF&G trapping sites and witnessing first-hand how the operation is being run. Over the course of the winter Haber obtains footage of a lot of wildlife caught unnecessarily in traps.

April 1994 -- The first year of wolf control in GMU 20A under the current plan is completed. A total of 98 wolves are killed in the trapping program, and three out of thirty packs are exterminated. Non-target animals killed include 12 moose, two caribou, six coyotes, 13 foxes, 1 golden eagle, 1 wolverine and 1 snowshoe hair. Numerous other animals were caught and released unharmed. Private hunters and trappers killed an additional 37 wolves in the area.

June 1994 -- Senate Bill No. 77, the "intensive management" bill, passes the state legislature and is signed by Governor Hickel into law. It mandates that, "the Board of Game shall adopt regulations to provide for intensive management programs to restore the abundance or productivity of identified big game prey populations as necessary to achieve human consumptive use goals of the board in an area where the board has determined that 1) consumptive use of the big game prey populations is a preferred use; 2) depletion of the big game prey population or reduction of the productivity of the big game prey population has occurred and may result in a significant reduction in the allowable human harvest of the population ... ." As outlined in the bill, control of predation and prescribed or planned use of fire and other habitat improvement techniques are included in the concept of intensive management.

August 3, 1994 -- Anchorage Superior Court Judge, John Reese, orders the state to pay close to $10,000 in legal fees to animal rights group, Friends of Animals (FOA), after Governor Hickel sued the group for what he claimed was false advertising. FOA's ad calling for a tourism boycott outlined that the state planned to track radio-collared wolves from airplanes and shoot them as they returned to their dens. The Judge agreed with FOA's claim that the Governor was attempting to halt criticism of the state's proposed wolf control, and threw the case out of court in April, 1994.

November 9, 1994 -- The state continues the ground-based wolf control program in GMU 20A and widens the boundaries of the program to include an area close to the east side of Denali National Park. The goal of the plan is
November 30, 1994 -- Biologist Gordon Haber catches the state bungling the wolf control program. The state run program was intended to snare wolves around the neck which would kill them quickly and humanely. Haber finds this is not the case. Haber witnesses four wolves trapped, one by its neck, one by its chest and two by their legs. The wolf trapped around the neck is dead and frozen by the time Haber gets to the scene. The remaining wolves stand alive, waiting their fate for several hours or more. One wolf has chewed its leg off to free itself from the trap, and then stands next to the trap surrounded by its trapped pack-mates. When the Fish and Game biologist arrives at the scene, Haber films him while shooting the wolves. The first wolf receives four shots of the wrong ammunition, then waits passively as the biologist goes back to his plane to load his gun with the correct ammunition. The fifth shot kills the wolf. The rest are killed with one shot. These wolves were part of the Yanert pack, a pack numbering approximately 18 - 20 wolves prior to control. ADF&G believes it has reduced the pack to about 7 wolves.

December 1, 1995 -- Three days before Governor elect Tony Knowles takes office he asks then Fish and Game Commissioner Carl Rosier to suspend the wolf control plan pending an investigation. Stating, "no animal should be treated this way," Governor elect Knowles is disgusted and angered by what he sees on Haber's videos. Once in office, Governor Knowles hires the Alaska State Troopers to conduct an investigation of the GMU 20A wolf control plan.

January 23, 1995 -- The Board of Game rejects a regulation change which would ban same-day airborne hunting of wolves and other fur-bearers.

February 3, 1995 -- With the completion of an official investigation and report, Governor Knowles cancels the GMU 20A control program, and orders a review of the state's predator control policies. As quoted by the Anchorage Daily News (2/4/95), Governor Knowles states at a press conference, "The report shows the program was professionally mismanaged, caused indiscriminate killing of other wildlife and was an unacceptable way to treat any animal." Out of 109 wolves trapped during the program, approximately one-third of them were found alive by ADF&G. One-hundred-thirty-four wolves total were trapped or shot during the program. Ninety-six other non-targeted animals were caught in the traps, 62 of which died. These animals included: 35 moose, 14 caribou, 2 snowshoe hare, 2 grizzly bears, 3 wolverines, 10 coyotes, 26 red foxes, 4 golden eagles and 1 raven.

-- Three state senators introduce a bill which intends to bring back a wolf bounty of $400 per pelt for as many wolves as can be killed. One of the bill's sponsors, Sen. Robin Taylor, R-Wrangell, says, "We must take the wolf out of
Fish and Game's control and treat him like any other predator roaming around the house." Bounties were removed throughout most parts of Alaska by 1968.

March 5, 1995 -- In a final review of the wolf control program in GMU 20A, Fish and Game Commissioner Frank Rue determines that, all senior program managers in the Division of Wildlife Conservation, "urged the former director and the former commissioner to not implement this program. Their advice was not followed. . . . The Department . . . should never have initiated a ground-based wolf control program." (Anchorage Daily News, 3/5/95, B-3).

-- Since 1992, the Governor's office has received 180,000 letters about wolf control. They continue to receive several hundred per week.

March 19-31, 1995 -- In their March meeting, the Board of Game votes to resume wolf control in GMU 20A, beginning January 1, 1996. GMU 20A is the same area that Governor Knowles canceled wolf control in this past December, 1994, due to Haber's video tapes of the snared wolves. In addition, the Board directs ADF&G to draft "Implementation Plans" for predator management in GMU 20D and 19D to be reviewed in the fall.
Chapter 1

A HISTORICAL OVERVIEW OF PREDATOR CONTROL IN AMERICA:

"No other wolf killing ever achieved either in geographic scope or economic scale the predator-control war waged against wolves in the nineteenth and early twentieth centuries in the United States and Canada, . . . . Eric Zimen, a German wolf biologist, once remarked that he was utterly unable to fathom the relentless carnage. "We killed the wolf in Europe," he said, "and we hated the wolf, but it was not anything like what you have done in America."

Barry Holstun Lopez, Of Wolves and Men

Alaska's long-standing wolf (Canis lupus) management controversy is one in a long line of predator controversies in the United States and Europe. Anti-wolf sentiment has existed in western culture for centuries. Historically the wolf has been perceived as symbolizing Satan and as a creature waging war against livestock growers. As Barry Lopez illuminates in his book Of Wolves and Men, negative images of the wolf have been recorded in texts since the Middle Ages. In Dante's Divina commedia, which was published in 1481, the wolf was already depicted as a symbol of greed and fraud, and equated with seducers, hypocrites, magicians, thieves and liars destined to Hell. These are images that, in certain circles, the wolf has not been able to overcome. Negative sentiment regarding wolves built momentum over the centuries in Europe, and wolf "battues" or drives were organized, often ending in the deaths of hundreds of wolves at a time. When Europeans settled in American they brought with them their disdain for wolves, which

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seems to have escalated on American soil. Some argue that the demonstrated hatred and maltreatment of wolves in American history far exceeded that of any other creature. For example, Lopez writes:

...the wolf is fundamentally different because history of killing wolves shows far less restraint and far more perversity. A lot of people didn't just kill wolves; they tortured them. They set wolves on fire and tore their jaws out and cut their Achilles tendons and turned dogs loose on them. They poisoned them with strychnine, arsenic, and cyanide, on such a scale that millions of other animals -- raccoons, black-footed ferrets, red foxes, ravens, red-tailed hawks, eagles, ground squirrels, wolverines -- were killed incidentally in the process. In the thick of the wolf fever they even poisoned themselves, and burned down their own property torching the woods to get rid of wolf havens. In the United States in the period between 1865 and 1885 cattlemen killed wolves with almost pathological dedication. In the twentieth century people pulled up alongside wolves in airplanes and snowmobiles and blew them apart with shotguns for sport. In Minnesota in the 1970s people choked Eastern Timber wolves to death in snares to show their contempt for the animal's designation as an endangered species.4

While other species, such as the bat and coyote, have certainly suffered from widespread killing and torture, the wolf elicits unique, extreme and polar passions, seemingly unlike other creatures.

Federal Control Programs in the Contiguous United States -- a movement from wolves to coyotes

For centuries, before the arrival of European settlers to the new world, tribal cultures practiced agriculture -- forest, grassland and crop management, and hunting, using to their advantage what their natural surroundings afforded them. They worked within their landscape, not against it. The arrival of colonists in the 16th and 17th Centuries, however, changed this approach entirely. As Europeans arrived on the shores of the

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4Ibid., p. 139.
new world, bringing livestock and a different farming style, a conflict began between agriculturists and wildlife -- in particular, a conflict between livestock owners and predators. A war ensued between settlers and wilderness, where the newcomers set out to "tame" America's wilderness, suggesting that it was evil, like Satan, that it went against God and His wishes. Among other things, taming meant deforestation and subduing the natives, civilizing them, their culture and their land. It also meant introducing domestic livestock and crop species for farming, and killing the wildlife which came into conflict with these goals.

By 1630 the first bounty law was passed in Massachusetts -- an indication that struggles between predators and livestock owners probably existed before that year. Eighteen-eighty-five saw the first federal involvement in control work, when questionnaires regarding damage caused by birds were sent to farmers. The following year, the Division of Economic Ornithology and Mammalogy was created and its primary responsibility was to educate farmers about birds and mammals affecting their productivity. This Division later became the Bureau of Biological Survey. In 1909, Congress separated out funds for the United States Department of Agriculture (USDA) to conduct "experiments and demonstrations in destroying noxious animals."5 Direct Federal control work increased in 1913 when a limited budget allotment allowed for the control of plague bearing rodents in California. The first congressional appropriations for predator control operations occurred in 1915 when $125,000 were distributed for wolf and coyote management.

Opposition to Federal control projects was first recorded in 1930 when the American Society of Mammalogists issued a strong statement against the

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existing program. Congress' $1 million appropriation for that year was almost canceled. Instead this challenge led to full congressional hearings and, ultimately, the Animal Damage Control Act which passed on March 2nd of the following year. The Animal Damage Control Act allowed Federal control activities to continue, clarified their role, and encouraged cooperative agreements with state and local government, land agencies, and other entities. This Act is the primary statutory authority for the current Animal Damage Control Program, a Federal program directed by the USDA. It reads as follows:

The Secretary of Agriculture is authorized and directed to conduct such investigations, experiments, and tests as he may deem necessary in order to determine, demonstrate, and promulgate the best methods of eradication, suppression, or bringing under control on national forests and other areas of the public domain as well as on State Territory or privately owned lands of mountain lions, wolves, coyotes, bobcats, prairie dogs, gophers, ground squirrels, jackrabbits, and other animals injurious to agriculture, horticulture, forestry, animal husbandry, wild game animals, furbearing animals, and birds, and for the protection of stock and other domestic animals through the suppression of rabies and tularemia in predatory or other wild animals: and to conduct campaigns for the destruction or control of such animals: Provided, that in carrying out the provisions of this Section the Secretary of Agriculture may cooperate with States, individuals, and public and private agencies, organizations, and institutions.\(^6\)

This significant act paved the way for the "legitimate" eradication of several species in certain areas, and the deaths of millions of animals annually since its passage through the Animal Damage Control (ADC) Program.

Specifically for wolves, predator control in the early settlement years meant individuals indiscriminately killing wolves through the dissemination of poisoned meat carcasses, denning techniques (where wolf dens are raided and the pups destroyed), trapping, organized wolf drives,

\(^6\)Ibid.
hiring professional wolf hunters and various other community efforts. The federal approval and support of predator control coupled with an ever-increasing hatred of wolves ultimately led to this species near demise in the contiguous United States.

Militant anti-wolf sentiment coupled with organized government support for implementing predator control gave way to one of the most destructive periods in American history -- the poison campaign of the late nineteenth century. Strychnine-laced carcasses littered the west during this time. Aimed at killing wolves, they were indiscriminate, taking anything that ate them, including eagles and, occasionally, young children. Other species were also targeted during this time. Different methods and reasons were used to eliminate bison, antelope, and passenger pigeons. Up to 500 million animals may have been killed during the latter part of the century. One can only speculate about how many wolves were killed between then and the late 1930's and early 1940's, when the last wolves roamed the western states. Some speculate between one and two million.7

Eerily enough, widespread animal control continues in the contiguous United States through the ADC Program, and, as was true during the poison campaign of the nineteenth century, substantial numbers of animals not targeted are killed or injured regularly. Sixty-three years after the passage of the Animal Damage Control Act, the mission of the Animal Damage Control Program continues to be to, "provide leadership in wildlife damage control to protect America's agricultural, industrial and natural resources, and to safeguard public health and safety."8 It attempts to fulfill its mission through

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cooperative programs with Federal, state and private agencies or owners, research and evaluation of information, advising, training professionals and pesticide registration. The program's primary intent has been to protect agricultural interests, "including livestock, crops, aquaculture and mariculture, forests and rangelands. In addition, it has provided wildlife damage protection for property and public health and safety through the control of wildlife borne diseases and wildlife hazards to aircraft."9

More recently, "target species" of the ADC program include the following: badger (Taxidea taxus); beaver (Castor canadensis); black bear (Ursus americanus); bobcat (Lynx rufus); coyote (Canis latrans); gray fox (Urocyon cinereoargentius); red fox (Vulpes vulpes); mountain lion (Felis concolor); opossum (Didelphis virginiana); nutria (Myocastor coypus); porcupine (Erethizon dorsatum); prairie dog (Cynomys ludovicianus and C. gunnison); raccoon (Procyon lotor); striped skunk (Mephitis mephitis); cattle egret (Bubulcus ibis); European starling (Sturnus vulgaris); blackbird (Subfamily lcterinae), including red-winged, tricolored, rusty, Brewer's and yellow headed, brown headed and bronzed cowbirds, great-tailed, boat-tailed, and common grackles. These target species are known to cause considerable damage to agricultural interests. They "are regularly killed in high numbers . . . leading to the potential for substantial impacts; encompass a wide geographic range in the United States; [and are the recipients of] a wide range of chemical and nonchemical control methods . . . ."10

In 1988 the total number of animals killed by the ADC program was a staggering 4,600,717, comprised of 103 different species. Six-thousand, six-hundred and forty-two of those killed were non-target animals. The focus of

9Ibid.
10Ibid., p. 3.21
government predator control efforts in the lower forty-eight states has shifted from wolves to coyotes since the wolf’s eradication, but the methods used have been similar and equally as controversial for this related species. Since at least the 1960's, coyotes have represented approximately three-quarters of the animals killed by ADC. The methods used by ADC for population control include the following:

Population Management -- leghold traps; box traps; live capture (good in residential areas); snares; pole traps (effective for hawks and owls); quick kill traps; denning; shooting (aerial hunting -- common for coyotes); hunting dogs; Chemicals: 1) zinc phosphide - metallic toxicant; used for rat, vole, muskrat, nutria; 2) anti-coagulant rodenticides; strichnine - birds (1988 above ground use cancelled; below ground still used); 3) sodium cyanide - M-44: spring activated ejector device - coyotes; 4) compound 1080 (sodium fluoroacetate) rodenticide; used only in Livestock Protection Collar; 5) fumigants - burrowing animals; 6) starlice baits; 7) avian stressing agent - PA-14; used at winter roosts; insulating affect of feathers is lost.

The most commonly used methods for killing coyotes involve denning, shooting, aerial hunting, and spring activated sodium cyanide traps referred to as M-44's. Between 1986 and 1991, approximately 75% of ADC's operating budget went to western states, where 90% of their budget was used for lethal predator control. According to the Humane Society, "less than one percent of [ADC's] western funds (the largest single allocation of resources) [are used] on non-lethal damage control."  

In areas which historically have suffered agricultural losses due to wildlife predation preventive control techniques are used. Restrictions on preventive efforts vary state to state. A 1990 General Accounting Office

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13HSUS comments on DEIS submitted to: James W. Glosser, Administrator APHIS; Sept. 4, 1990; p. 1-3.
(GAO) report reviewed preventive control efforts in Utah in 1989. Although in 1988, on 60% of USFS grazing allotments in Utah no livestock predation occurred, aerial coyote hunting nevertheless took place between January and March in 1989. ADC literature states that the programs primary goal in lethal control is to target problem individuals. However, these winter "preventive" control efforts are not aimed at problem coyotes, rather they are non-selective. Former ADC trapper Dick Randall writes about preventive control:

Areas of "historic predation" are an ADC loophole through which wildlife can be destroyed on public land, using taxpayers' dollars to benefit a small group of ranchers. . . . What happens when APHIS kills a family of coyotes that was going about its business, helping to balance a very fragile ecosystem and not eating livestock? Another group of coyotes -- perhaps one that has a taste for sheep -- moves into the area. . . . To this day predator control remains nothing more than a war on whole species, and success is measured largely by the body count. 14

Randall's observations and experiences undermine the biological justification for this program.

ADC bases its coyote control on a 1975 study by Connoly and Longhurst which concluded that the "allowable" kill-rate for coyotes is 70% of the total population. In other words, according to this study up to 70% of coyote populations can be killed yearly without jeopardizing coyote viability. More recent studies, however, indicate that while a 70% allowable kill-rate may not ultimately undermine coyote population numbers, it does have a significant impact on the species. Many ecologists, biologists and researchers are beginning to question the scientific legitimacy of ADC's program.

Research regarding the effects of predator control on wolves and coyotes has been lacking since the start of government programs, and has not gone

much past determining how quickly these canids repopulate once large percentages of their populations have been removed. While opportunity for such studies on wolves currently exists in Alaska, neither state, federal or private biologists have ever undertaken this type of project. In other words, government control programs in Alaska have continued unchecked, without any legitimate understanding of how they effect wolf and coyote dynamics. Only one Alaskan independent wildlife scientist, Gordon Haber, PhD, has suggested that control efforts do impact wolf social behavior and pack dynamics and that more study is needed to determine the depth of the effects before further control efforts are implemented. He has presented his ideas at two wildlife symposiums since 1992 and has been met with lukewarm support at best. His suggestions are readily dismissed by Alaskan state game officials, and he was recently called a "pseudo-scientist" by the current Chairman of the Alaska Board of Game.15 Haber's arguments and critiques of current wolf management practices in Alaska will be reviewed more thoroughly in the third chapter of this paper.

The effects of predator control on coyotes has been a focus for one biologist, Robert Crabtree, an assistant professor of biology at Montana State University. At this time, Crabtree's preliminary findings are the only bits of information scientific literature has to offer regarding more comprehensive effects of predator control on canine populations. Crabtree has studied coyotes in Yellowstone National Park (YNP), and his research has found that predator control programs have profoundly effected coyote populations in both social and biological ways.

Crabtree discovered that coyotes respond to disturbance, particularly depletions of family numbers, in a couple of ways. For example, hunted populations of coyotes increase reproductive rates by 20--30%. The actual number of pups per litter will increase from three or four to eight or nine when a population is hunted. In addition, yearling females will reproduce in a less populated or hunted region, whereas in a more densely populated, less disturbed area, one-year old females will wait a second year before bearing young.\textsuperscript{16} John Alcock, an evolutionary biologist at the University of Arizona, states regarding these findings:

> Not only are they able to put their evolved intelligence to use in dealing with canicidal humans, their great reproductive flexibility complements their behavioral ingenuity. Coyotes, like many other animals, adjust their reproductive effort in response to changes in the density of their local population.\textsuperscript{17}

Disturbance of coyotes through widespread hunting significantly impacts reproductive rates in coyotes in a density dependent manner. Crabtree's findings suggest that coyote responses to significant reductions of their population likely render ADC control efforts ineffective.

Crabtree's research in YNP suggests other behavioral impacts on coyotes due to hunting pressure. A recent article describing research efforts in YNP indicates that decades of hunting pressure has created the solitary coyote known well in the west, and that coyotes in stable, undisturbed populations may well prefer to stay in packs. It reports:

> Using advanced research techniques, the team is finding coyotes in Yellowstone very different from those inhabiting other western lands, where they are annually subjected to multi-million dollar, tax-funded killing campaigns. Park coyotes have


more stable communities and social structures and hunt in packs like wolves. This is probably the normal lifestyle for coyotes; not the solitary life coyotes in the west have adopted to survive the advancement of civilization.¹⁸

Coyotes in Yellowstone could be exhibiting stable social behavior due to their escape of the "tax-funded killing campaigns." They may also form packs in Yellowstone in response to available food resources (namely large ungulates and carrion). This could be a return for the coyote to hunting techniques used prior to Euro-American settlement, when similar food resources were more plentiful throughout the west. In either case, it is clear that human encroachment in the United States, either through tax-funded killing campaigns and/or large ungulate number depletions, has greatly impacted coyote social behavior.

Yellowstone National Park research further clarifies that hunted coyote populations not only increase reproduction, but also experience increased dispersal by young coyotes. These dispersing coyotes take over vacated territories and are inexperienced, do not have secured social status, hunt alone, and may be more inclined to kill sheep — "a fast food."¹⁹

ADC's efforts are probably backfiring. The highest livestock predation rates occur in the spring, when coyotes are most likely trying to feed pups, and newborn sheep and calves are most available. Recent studies indicate that severe culling results in increased litter sizes, and if coyotes are feeding larger litters, pressure is greater on them to find food. This, in turn, probably creates higher numbers of sheep losses from coyote predation. Maurice Hornocker, a renowned predator biologist, questions the program, stating:

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¹⁹Ibid., p. 29.
We know so little about them [coyotes], and yet we spent millions and millions of dollars trying to get rid of them; it's a complete fiasco. . . . the best control is no control at all; they will limit their own numbers if you just leave them alone.\textsuperscript{20}

By basing the ADC program on an old study without considering new research, it is clear that the scientific justification for the program is not comprehensive. Unfortunately, control efforts promise to continue at their present rate unless public pressure forces the ADC program to change its course of action.

It would be difficult to overlook that anger felt for the wolf has been transferred to the coyote in the contiguous United States. That the wolf and coyote are closely related species, considered by many to be "vermin," viewed as eating off the fat of the land, and waging war against livestock owners ultimately has doomed these species to persecution. Once the wolf was exterminated, it appears Americans needed an alternative target upon which to project their fear, hatred and fury. Coyotes became that next target. Many Americans have exchanged the word coyote for wolf in the saying, "The only good wolf is a dead wolf!" One sheep herder echoed such a sentiment while commenting on the idea of administering contraceptives to control coyote populations rather than killing them when he said, "The only pill to give a coyote is one that will kill 'em deader than hell."\textsuperscript{21}

Lopez recognizes the connection between persecuted wolf and coyote and also suggests that perhaps as a people we should question our motives.

\textsuperscript{20}Ibid., p. 29.
and take a more profound responsibility for our startlingly oppressive actions which continue today toward these canids. He writes:

Incredibly, the unrestrained savagery that was once a part of wolf killing in the United States continues with efforts in America to control "brush wolves," or coyotes. These animals are hunted down by ranchers from helicopters with shotguns. Their dens are dynamited. Their mouths are wired shut and they are left to starve. They are strung up in trees and picked apart with pistol fire. They are doused with gasoline and ignited.

All this was done to the wolf -- and more. One of the cowhand's favorite ruses was to stake out a dog in heat in hopes of attracting a male wolf. During a copulatory tie the animals cannot break apart. Thus trapped, the wolf was clubbed to death.

It seems to me that somewhere in our history we should have attempted to answer to ourselves for all this.22

As Lopez suggests, Euro-Americans should question why it is that this "unrestrained savagery" has gone on for centuries and continues today. The acts described in this passage are acts of violence against wild canids. To suggest that predator control programs are based primarily in science or are grounded in rational thinking does not appear to be the case. It would be difficult to justify or rationalize the behavior outlined above on scientific grounds. The tradition of killing wolves began with a fear and hatred of wolves, and can be traced as far back as the middle ages. This emotive and violent approach has been transferred more recently to coyotes in the contiguous United States, but continues on with wolves in Alaska.

**Predator Control in Alaska**

While extirpated throughout most of the contiguous United States, the wolf somehow survived in Alaska, due in part to Alaska's vastness and

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geographic location, the time-frame of its development as a state, its human population size and its primarily non-agricultural approach to the land. Nevertheless, anti-wolf and predator sentiment has spanned the miles between the two regions, connecting their approaches to predator control. During the early portion of the 20th century, prior to World War II, there was little if any government organized predator control in Alaska. However, wolves were viewed as competitors, and private individuals, such as miners and trappers, took it upon themselves to control wolves. The methods used during this time included the use of poisoned carcasses, trapping, shooting and denning. A ten dollar wolf bounty was passed by the Territorial Legislature in 1915, the same year Congress appropriated its first funding for predator control operations on federal lands. Biologist Victor Van Ballenberghe (1988) reported that Kenai Peninsula wolves were extirpated by 1915. In addition he wrote, "Anecdotal reports suggest that wolves were scarce over much of Alaska by the 1920's. It is safe to say that they would have been gone had the country not been as vast as it was."23

Up until World War II, the Bureau of Biological Survey's wolf control efforts in Alaska primarily accompanied efforts to herd reindeer throughout portions of the state. An increase in the number of wolves occurred during World War II, but during the 1950's federal poison programs and aerial shooting over much of the state reduced wolf numbers again.24

For the decade between 1937 and 1947, the Camp Fire Club of America (CFCA), comprised of prominent biologists among others, strongly

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24Ibid.
encouraged that wolf control be initiated in Mt. McKinley National Park due to low Dall sheep (*Ovis dalli*) numbers. Apparently sheep numbers had declined since the mid 1920's, which biologists related to severe winters. Unclear as to how they should respond, the National Park Service initiated Adolph Murie's study of park wolves, which lasted from 1939 to 1944. His study was profoundly influencing in that it was the first wolf study to actually look at the natural history and habits of the wolf, trying to ascertain a better understanding of this creature. Murie concluded that:

. . . First, it seems apparent that the wolf is the chief check on the increase of the Dall sheep in Mount McKinley National Park . . . It appears that wolves prey mainly on the weak classes of sheep, that is, the old, the diseased, and the young in their first year. Such predation would seem to benefit the species over a long period of time and indicates a normal prey-predator adjustment in Mount McKinley National Park . . . The caribou is the main food of the wolf, and a heavy toll of the calves is taken. Yet the park herd of between 20,000 and 30,000 animals is apparently maintaining its numbers. After the first few days in the life of the calves the hunting of them by wolves necessitates a chase which usually eliminates the slowest and weakest. Since the caribou and the wolf (and also the sheep and the wolf) have existed together for many centuries, it is not surprising that under wilderness conditions the two species are well adjusted to each other. The status of the caribou should be watched because the herds spend much time outside the park where they are in territory open to hunting. In respect to the sheep, the caribou is an important buffer species . . . In considering the wolf and the general ecological picture in Mount McKinley National Park it must be emphasized that national parks are a specialized type of land use. Wildlife policies suitable to national parks -- areas dedicated to preserving samples of primitive America -- obviously may differ from those applicable to lands devoted to other uses.

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Because Murie did not make clear recommendations supporting or condemning wolf control, his study resulted in a flurry of controversy among park administrators. Pressure continued to mount regarding park wolf control when in 1946, a bill created by the CFCA, was introduced into Congress mandating control of wolves in Mount McKinley National Park. Though reluctant, the Park Service agreed to kill fifteen wolves, or fifty percent of the population during this time.

Organized federal control measures began to increase in the forties. In 1948 the federal Branch of Predator and Rodent Control (BPRC), Alaska district, U.S.F.W.S., acquired a Super Cub airplane for the purpose of administering wolf control. This allowed for intensive aerial hunting and began a long history and controversial tradition of wildlife management for the state. "Operation Umiat" began in 1952, a program dedicated to killing wolves through aerial hunting and poison baits on the north slope of the Brooks Range. Teams with aircraft covered approximately 65,000 square miles, and in total, 259 of the 334 wolves counted were killed. National outcry brought attention to the state, and the debate over wolf control in Alaska was firmly set into motion. In 1953 the "coyote getter," a cyanide bait gun, was modified and standardized for summer wolf control.

Overall, the 1950's were marked by controversy over wolf control in Alaska. Public opinion began to recognize the benefits of wilderness, and attitudes toward wolves -- a symbol of the wilderness -- became much more favorable. The wolf bounty system -- which accounted for $1.5 million by 1958 -- underwent scrutiny, though it was often rationalized as a source of

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rural welfare. Many biologists began questioning the need for wolf reduction. The general understanding among BPRC officials was that predator-prey relationships were not well understood and wolf numbers were on the rise in Alaska, despite the wolf control which had been administered up to the present. Alaska’s approach to wolf control up to this time had been scattered and indiscriminate, and an attempt was made to shift control toward specific situations. Alaska became its own state in 1959, and on January 1, 1960, the newly formed Alaska Department of Fish and Game took over predator management for the state.

Much remained unknown about Alaska’s wildlife during the first half of this century, yet wolf control was pursued nevertheless. For example, it was in 1958 that biologists discovered where the calving ground of the Western Arctic Caribou herd was located, and there was little if any understanding of how wolves in the area affected the herd. Yet, more than 1,500 wolves had been killed between the years of 1952 - 1958 in Game Management Unit 26 (appendix 1.1) within the herds range. There are still many unanswered questions regarding multi-predator / multi-prey relationships in Alaska. For example, to this day there has never been a complete census done of wolves or bears in the state. Thus the Alaska Department of Fish and Game does not know exactly how many wolves or bears currently exist in the state, or, for comparison, how many existed twenty-five years ago. The closest current estimates of wolf populations in Alaska are between five and seven thousand.

During the 1960's and '70's Alaska witnessed a rise in human population, increase in road access and a growing number of hunters. In addition, the '70's introduced a new form of off-road, over-land, motorized
travel -- the all-terrain-vehicle (ATV) -- which substantially increased access to wildlife. Many believe improved access created by ATV's has adversely affected wildlife populations. Wildlife populations began to show signs of impact in the 1970's. For example, in Game Management Unit 20 (a Game Management Unit which is close to Fairbanks and accessible by road) the moose population occurred in such high density in the 1960's and was so difficult to access once off the road, that the Alaska Department of Fish and Game (ADF&G) moved to curtail control of wolves in the area. However this population declined in the early 1970's. By 1975, after severe winters and possible impacts from increased motorized access, the moose population declined such that the Board of Game (the governing body over the ADF&G) approved immediate wolf control for the area.

The Fairbanks Environmental Center, Friends of the Earth and several individuals filed suit in Alaska Superior Court, challenging the Board of Game's (BOG) action. This resulted in an injunction, and the control program was halted for that year.

The following year, the BOG approved ADF&G's plans to: 1) administer wolf control in Game Management Units (GMU) 20A and 5, and 2) remove wolves for predator-prey research in GMU 13. The research proposed for GMU 13 included eradicating all wolves within an 8000 sq. km. area (which ADF&G estimated would be approximately 45 wolves), and then compare the moose calf and yearling survival rate in that area with that in a neighboring area where wolves were present. The Board directed ADF&G to use fixed wing aircraft and helicopters for all three projects, and not remove more than 80% of the wolf populations in GMU's 20A and 5. The objectives were to obtain a ratio of one wolf per 100 moose in both GMU's, because "moose
populations with ratios of 1 wolf to 20 or fewer moose declined (ADF&G 1979, unpubl. issue paper 79-07). Thus the Board determined that a wolf/moose ratio of 1:100 would surely yield an increase in moose. These actions heightened Alaska's wolf management controversy.

Defenders of Wildlife, a national environmental group, and other associated parties filed two suits over the proposed control and research programs in January, 1976. The first was against the Secretary of the Interior in US District Court for the District of Columbia (DC), requesting that an Environmental Impact Statement (EIS) was necessary before beginning wolf control on federal lands in GMU 20A, and that wolf control actions be suspended until further notice. The second suit was filed against ADF&G and several officials in District Court for Alaska, stating that an EIS was necessary for the proposed research in GMU 13, because the control efforts involved federally managed land by the Bureau of Land Management. The suit also requested an injunction. In both cases the courts ruled that EIS's were not necessary for wolf control action, but the plaintiffs were successful in stalling the programs until mid-March of that year, past the good tracking time for effective wolf control. The outcomes of these suits were significant in clarifying that: 1) the state does have authority and responsibility to manage wildlife on federal and other lands; 2) that Bureau of Land Management (BLM) approval for wolf control programs on BLM managed land is not required (unless poison is used) due to a 1968 Memorandum of Understanding between the BLM and Alaska; and 3) that wolf control taking place on federal land does not by itself constitute a "federal action."

Efforts to squelch wolf control in Alaska in 1976 did not stop with litigation. Four bills were introduced into the U.S. House of Representatives
during the summer. The bills directed the Secretary of the Interior to undertake a comprehensive study of Alaskan wolves to ensure humane treatment of them and their conservation, and to halt all large-scale killing and aerial hunting of wolves until the Secretary had completed his study and made recommendations. The proposed legislation also authorized Congress to appropriate $150,000 between 1977-'79 toward this end. The bills, however, were never passed. 

Between 1977 and 1987, many wolf reduction programs were proposed and implemented, and controversy continued to surround the issue. Fifty-five proposals came before the B.O.G. during this decade, thirty-five of which were approved. Nine lawsuits, complaints and appeals were filed by environmental groups and individuals in U.S District Court for D.C., Alaska Superior Court and with the State Ombudsman in an effort to put a halt to the programs. In 1977, the State of Alaska and a native organization, Mauneluk Association, responded to one lawsuit, which had resulted in a temporary injunction and stopped wolf control on BLM lands, by filing suit against the Secretary of the Interior and Defenders of Wildlife et al.. The state and Mauneluk Association claimed that the Secretary of the Interior had no authority to stop the control. The courts decided in favor of the state's actions in this and all but one other case, and these rulings reconfirmed that neither Environmental Assessments nor Environmental Impact Statements were necessary for state organized wolf control on federal lands.

The one case where the courts ruled against the state occurred in 1983. Those opposing wolf control experienced a brief hiatus when the state Ombudsman determined that wolf control policies approved by the B.O.G.

28 Ibid. p. 51 - 64.
that year had not been established under the guidelines of the Alaska Administrative Procedures Act. Wolf control proposals for the 1983-4 year were therefore considered invalid, and were put on hold until a review of all reduction programs was underway.

In addition, seven bills were introduced into the Alaska State Legislature in 1985 and 1986. Six of the bills attempted to weaken existing restrictions on wolf reduction programs. The seventh bill proposed to prohibit aerial wolf hunting. Only one of the bills, which allowed moose and caribou baiting in trapping efforts (including aerial trapping), passed both houses of the legislature, but it never became law because it was vetoed by the Governor.

In 1987, newly elected Governor Cowper announced that no public monies would be spent on wolf control programs and that instead his administration would support wolf surveys. Between 1985-86 ADF&G spent over $40,000 to track and kill 32 wolves in GMU 20B, and Governor Cowper indicated the state could not justify this type of use of funds. Wolf control was authorized by the B.O.G. in GMU 20B until 1989, but funding was no longer available. This meant that environmental groups and affiliated parties were successful to a point in their attempts to put an end to the state's wolf management methods. First, all the lawsuits filed resulted in enough delay of the wolf control programs to curtail much of the wolf killing, and second, the state -- the Governor and wildlife officials -- began to realize that a change needed to occur. Governor Cowper stated in an interview, that when wolves get killed, "there is a great howl from all over the place and there are 49 lawsuits filed and it turns out that we always back away. We say, okay we won't do it anymore and I just don't want to repeat that anymore . . .

I've got enough things to attend to without having to become a party to 12 or 15 lawsuits. . . ."30

While the Governor's action provided hope for change, the B.O.G. worked to dilute his intentions by approving large expansions of land-and-shoot hunting possibilities. This meant that private individuals were allowed greater access to killing wolves. The B.O.G.'s decision essentially instigated defacto wolf control through private hunting means. The Alaska Wildlife Alliance Newsletter reported on this expansion:

"As expected, the November, 1989 meeting of the Alaska Board of Game was indeed bad news for Alaska's wolves. After overwhelming public testimony opposing the practice of land-and-shoot hunting of wolves, the Board expanded this method of "hunting" to four new Game Management Units (it was previously legal in seven GMU's). The additions include units 11, 12, 13 and 20, totaling approximately 96,027 square miles! Most of interior and western Alaska is now open to land-and-shoot hunters . . . . The Board also voted to allow "subsistence" hunters to use aircraft to hunt wolves in National Park Preserves. As an indication of the change in the Board towards increased wolf killing (brought about by Governor Cowper's recent appointments), the Board approved land-and-shoot wolf hunting in at least one area where even the Alaska Department of Fish and Game said it was not indicated!

. . . Public testimony revealed everything from the fact that land-and-shoot is impossible to do legally, to its being the only effective "tool" to "control" wolves. It was repeatedly stated by the Board and the Alaska Department of Fish and Game (ADF&G) that land-and-shoot is an effective "tool" that must be used to keep wolf populations at low levels. One board member even endorsed land-and-shoot hunting as the best alternative available for controlling wolves, since Governor Cowper opposed state funds for wolf control programs! Yet while all its proponents readily admit it is a form of wolf control, land-and-shoot hunting is not governed by the same guideline regulations covering "official" wolf control programs."31

30Ibid., p. 2.
State wolf estimates in 1989 indicated that approximately 75% of Alaska's wolf population inhabited the interior areas where land-and-shoot became legal. Liberalizing hunting in this manner is a form of population control, and though the ADF&G was not formally implementing wolf control programs, wolf reduction was still occurring through increased private hunting. The transfer from control programs to liberalized private hunting and back to control programs is one that occurs repeatedly in Alaska's predator management history. The end result is similar in that a large percentage of wolves are killed. It is different in that wolf control programs tend to target specific areas, where in private hunting wolves are killed indiscriminately.

Meanwhile, in October of 1989, the ADF&G presented a paper to the B.O.G. entitled "A Proposal to Develop a Strategic Wolf Management Plan for Alaska," which intended to review and revise Alaska's approach to wolf management. ADF&G hoped to put an end to the extreme controversy over wolf management by suggesting the creation of a "Wolf Management Planning Team" made up of 10 -12 interested citizens. The team, constructed of representatives of all sides of the issue, was intended to work through a consensus process and make recommendations to the state about how to formulate a Strategic Wolf Management Plan. This attempt brought Alaska into the next phase of wolf management history.

**Conclusion:**

It seems evident when reviewing America's approach to wolves that a widespread, systematic attempt to extirpate this species has occurred. In some instances, such as in Alaska, attempts to radically suppress wolf populations
continue, and certain individuals would no doubt like to eliminate them entirely. The justifications offered for Alaska's wolf control programs are to increase prey species for the benefit of human hunting. The 1992 Alaska Wolf Management Plan is just another in a long line of acts motivated by this proclivity.

European-Americans' approach to wolves has and in some cases continues to be an example of a speciesist perspective, where prejudice and oppression relating to particular species or other natural phenomenon are on par with racism and sexism. Ethicist Deborah Slicer clarifies:

... speciesism is an irrational bias toward members of one's own species and against members of other species.

Certainly America has experienced an "irrational bias" toward humans and against wolves.

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Appendix 1.1  Map of Alaska's Game Management Units
# Appendix 1.2

## Table of Alaskan Wolf Management Activities: 1976 - 1988

(Compiled from information provided by: Harbo, Dean, "Historical and current perspectives on wolf management in Alaska;" Richardson, "Wolves in Alaska 1980 - 1991;" and newsletters from The Alaska Wildlife Alliance.)

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<th>Suits filed (opposed)</th>
<th>Bills intro'd (favoring)</th>
<th>Bills intro'd (opposed)</th>
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Total: 1 9 6 1 55 32

* numbers in this column refer to Game Management Units where control was approved;

** FCC ordered ADF&G to stop using radio collars in control work;

*** proposed by Advisory Committees;

**** Trapper Education began to enhance number of wolves trapped;

***** proposed by Subsistence Resource Commission for Wrangell St. Elias National Park;

****** authorized but lack of funds prohibits implementation of wolf control;

******* Governor Cowper pulls funds for wolf control;
Chapter 2
ALASKA'S 1992 - 1993 WOLF CONTROL CONTROVERSY

"You can't just let nature run wild!"
--- Alaska Governor, Walter J. Hickel, 1992

Controversy regarding Alaska's wolves has existed since the early part of this century. Prior to Alaska's statehood, the federal government was responsible for managing Alaska's wildlife. Debate over wolves in the early 1930's led the federal government to hire Adolph Murie in 1939 to study wolves and their impact on prey species in what was then Mt. McKinley National Park. In 1959, when Alaska officially became a state, the state took over control of its wildlife management.

THE STATE OF ALASKA'S WILDLIFE MANAGEMENT SYSTEM

Alaska's fish and wildlife management system prides itself as unique and unlike other states because it was set up specifically to provide the public access to influence fishing, hunting and trapping regulations. In 1960, when the state took over wildlife management from the federal government, the Alaskan public wanted to have a voice in management decisions. Today this intent continues with a system including a Board of Fisheries, Board of Game, Joint Board of Fisheries and Game, Commissioner of Fish and Game, Advisory Committees, and the Alaska Department of Fish and Game. These offices are charged by the Alaska Constitution, article VIII, Section 2, to ensure the "utilization, development and conservation" of resources "for maximum benefit" of the public. In 1975 the original, single Board of Fisheries and
Game became two, separate boards, which still meet jointly to discuss changes in regulating advisory committees and subsistence related issues, or other mutual concerns.

The Board of Game (BOG) includes seven members who are appointed by the Governor for three year terms. These terms are staggered so as to provide continuity among the board primarily when state administrations change. Each board member must be confirmed by a joint session of the state legislature. The state believes that, "the strength of the board system is in its broad based public participation format. This forum allows for people with divergent views an opportunity to air their ideas about complex allocation and management problems before regulatory decisions are made."34

The Alaska Administrative Procedures Act mandates that the public be notified thirty days prior to any changes in regulations, and action can only be taken on topics that are noticed. The public is noticed by a summary of proposed Game Board action, and has the opportunity to comment both in written form prior to action and through oral testimony during scheduled public hearings ("Board Regulatory Process" flow chart, Appendix 2.1). Upon hearing and considering public testimony, the boards are responsible for making allocations and regulatory decisions. The boards fulfill their responsibility by deliberating and voting on proposed policies. The Department of Fish and Game must manage fish and wildlife resources based on the boards' decisions. The Commissioner is the ex-officio secretary of the boards, and the boards have authority to delegate to the Commissioner.

Advisory Committees are intended to provide local, public forums on fish and wildlife issues and are comprised of up to fifteen elected members of

34State of Alaska, Board of Fisheries/Board of Game New Member Orientation, p. 15.
the public. Advisory Committees are responsible for reporting opinions expressed during the forums to the boards at scheduled board meetings. Advisory Committees have distinct authority in certain areas, and have a working relationship with both the ADF&G and the Board of Game. For example, Advisory Committees can close a fishing, hunting, or trapping season if they deem it is necessary. Specific responsibilities of the Committees include developing regulatory proposals, evaluating proposed regulatory changes, and helping to develop regional management plans, among others.35 There are currently eighty Advisory Committees across the state with 900 to 1000 members.

THE ALASKA WOLF MANAGEMENT PLANNING TEAM

Since Governor Cowper's decision to halt state funded wolf control programs in 1987, Alaska was grid-locked over the issue of wolf management. During the years leading up to Cowper's decision, the state had spent a lot of energy and resources debating and implementing wolf control, and for many the subject was not just going to go away. There existed enough pressure from both sides of the issue -- those pressuring the state for wolf control, and those opposing it and willing to file suits to fight it -- that attempting to resolve some of the conflict outside of court appeared to be the best way to proceed. Discussions about wolf management between ADF&G and the Game Board ensued. Talk of forming a citizen's advisory group to resolve the wolf management conflict became a reality in 1989, when ADF&G began choosing individuals to form a Wolf Management Planning Team. Creating

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35Alaska Department of Fish and Game, Advisory Committee Manual, September 1993., p. 17.
the Wolf Management Planning Team (WMPT) was an attempt on the part of the state to bring individuals from all sides of the issue together for discussion and a consensus-building process. A professional mediator was hired by the state to facilitate the meetings. The intent in forming this group was to finally resolve some critical issues surrounding wolf management, such as: is wolf control ever a legitimate management tool?; if so, when? The state's desired goal was to have the team come to some resolve over wolf management in the state, and for the team to make recommendations to ADF&G about how to manage wolves. The department intended to use the recommendations as guidelines for future wolf management. As stated in the Introduction to the WMPT recommendations:

The Alaska Wolf Management Planning Team was created in November 1990 to try to forge an agreement on new approaches to wolf management in the state. Representatives from both the State Department of Fish & Game and the State Board of Game indicated at the beginning of the process (and reaffirmed often) that it was their intent to draft policy, review and, as necessary, redraft regulations, based on the consensus recommendations of the team.

It took the ADF&G one year to appoint members to the Wolf Management Planning Team, but by 1990 the team members were chosen. The Team represented a broad spectrum of opinion on wolf management, and included:

Bob Ahgook (Eskimo subsistence hunter/trapper, Anaktuvuk Pass)
Scott Bothwell (Sportsman, member of the Alaska Outdoor Council, Fairbanks)
Valerie Brown (Executive Director of The Alaska Wildlife Alliance, Anchorage)
Dave Cline (Regional Vice President, National Audubon Society, Anchorage)
Ray Collins (member of the McGrath Fish and Game Advisory Committee and the Interior Regional Council, McGrath)
Peggy Cowan (Education Specialist, Alaska Department of Education, Juneau)  
John Doore (Self-described "wolf enthusiast," Anchorage)  
Robert Heyano (Native hunter and trapper, Dillingham)  
Larry Holmes (Member of the Anchorage Fish and Game Advisory Committee, Girdwood)  
Chuck McMahan (Hunting Guide, hunter, trapper and pilot, Glenallen)  
Ann Ruggles (Independent wildlife biologist, Fairbanks)  
Dean Wilson (Fur buyer and trapper, Copper Center)  
Wayne Regelin (Deputy Director of Wildlife Conservation, ADF&G Fairbanks)  
Connie Lewis (Facilitator, Keystone Center)

The team met monthly between November 1990 and April 1991, for periods lasting up to two working days. Meetings involved presentations and discussions regarding history, biology, public attitudes and policy relating to wolves. Specifically they included:

1) an exhaustive review of information about wolf biology, predator/prey relationships, population dynamics, past control efforts, hunting and trapping statistics, etc., 2) respectful consideration of every team member's interests and concerns about wolf management, 3) development of findings, goals and principles 4) two public forums, and 5) wide ranging consideration of management options.  

After six months of formidable work the team reached consensus on enough aspects of wolf management to make recommendations to the Department. These recommendations came after many difficult compromises and discussions among team members. Each member did not necessarily support each recommendation. The recommendations incorporated many topics regarding wolf management, including habitat conservation, enforcement, nonconsumptive uses of wolves and their prey, consumptive use of wolves,

operational management plans, wolf control in intensive management areas, research, inter-agency agreements, education and information exchange and public participation.

With regards to the actual killing of wolves for wolf population control, the team made specific recommendations. The Team suggested using a six zone management system to define types of management within a specific area. The zones were to range from total protection, where hunting, trapping and wolf control are not allowed, to a zone where the objective is to "maintain a high sustainable harvest of wolves and their prey," where wolves can be controlled by hunting, trapping, "land and shoot" hunting, and aerial shooting by the public and ADF&G.

As is currently set up, Alaska's wildlife management system utilizes Game Management Units (GMU's) which break the state up into different management areas (please refer to GMU map, appendix 1.1). Some of these areas span large tracts of land; for example, GMU 13 comprises 23,376 square miles, approximately the size of the state of West Virginia. The WMPT recommendations suggested assigning different zones to Game Management Units to determine management within these GMU's (please refer to WMPT zone recommendations, appendix 2.2). More specifically, critical delineations relating to the killing of wolves in the recommendations included the following language:

CONSUMPTIVE USE OF WOLVES

. . . Population goals will be set for game management units or subunits through operational management plans that consider all relative biological factors. . . .Wolves can be subjected to control when it is needed, under the criteria and methods described in section IV. F of this report. These intensive management areas should be no larger than absolutely essential to achieve specific management objectives as specified in operational management plans. Wolf control is not
intended to be a common practice. The team recommends that intensive management designations will be established only in a small portion of most game management units. (Section D, E)

Thus, the Team agreed that there were times when wolf control might be appropriate, but that implementation of such an act should be in restricted and specific areas, and only for a short period of time. Wolf control was not acceptable as a regular management tool according to the team.

HOW THE STATE INCORPORATED THE PLANNING TEAM'S RECOMMENDATIONS

Once the WMPT made recommendations, the state identified the following succession of events as its intended course of action:

1. Disband the WMPT after its final recommendations are submitted to the ADF&G (June, 1991);
2. Create a Strategic Wolf Management Plan which indicates the overall guidelines and intent for wolf management in Alaska;
3. Once the Strategic Wolf Management Plan is adopted by the Game Board, The ADF&G breaks down the state into areas and constructs "Area Specific Wolf Management Plans."
4. The ADF&G devises "Implementation Plans" for areas where wolf control is "needed to achieve management objectives."  

While on the surface the role of the planning team may have seemed clear, many details of the process were not carefully worked out. For example, mixed messages were sent out by the ADF&G from the start about what the specific role of the Team would be and how the ADF&G would incorporate their recommendations. In a letter sent out to interested parties soliciting nominations for team members, the Department indicated that one of the objectives of the Team would be, "To recommend specific management

options for ensuring the long-term conservation of wolves in Alaska and for satisfying the greatest variety of public desires for wolf management in the state" (emphasis added). Additionally, the minutes of the first Team meeting stated:

... the planning team will make recommendations that the [Department] will use to develop a statewide wolf management plan and will make proposals to the Board of Game to change hunting and trapping regulations related to wolves.38

Yet ultimately, ADF&G chose to limit the objective of the team to, "developing broad recommendations, which they then turned over to the department to "pick and choose from" in developing the agency's plan. However, this is a fundamental difference between traditional advisory committees and consensus processes. As discussed above, a consensus agreement is not a smorgasbord. It is a house of cards that must either be taken as a package or rearranged with extreme care."39

The decision to limit the team to broad recommendations was reached because the Department acknowledged that considering the team recommendations as anything more than just advice would compromise their authority as an agency.40 What this meant in the end was that the Team would make general recommendations which the Department would consider and ultimately determine which, if any, of the recommendations to use. Because the recommendations were general as opposed to specific, the Department was also left with the job of "interpreting" the recommendations...

40Ibid. p. 131.
and incorporating them as it saw fit into specific management objectives. This afforded ADF&G considerable latitude with their interpretations.\textsuperscript{41}

**Strategic Wolf Management Plan**

In November, 1991 the Game Board met to deliberate and vote on a Strategic Wolf Management Plan drawn up by the ADF&G. The Board adopted a zonal management system as the Planning Team had recommended, but changed it to a seven zone management system. Wolf control was possible in three of the seven zones outlined by the Game Board (please refer to State Adopted Zone System, appendix 2.3).

One critical action the Department and Board took was to further define different types of wolf control to be used, namely "wolf regulation" and "wolf reduction." This action was not based on the Team's recommendations. "Regulation," as stated in the adopted Strategic Plan means, "maintaining the number of wolves in an area at a moderate size below what the prey could support without intervention, either through regular or temporary measures." In order to maintain wolf populations below their natural levels, wolf control would have to occur, by definition, over a prolonged period of time. This approach is not in keeping with the WMPT recommendations, which specified that wolf control was not "intended to be a common practice." The second approach to control defined in the Strategic Wolf Management Plan is "wolf population reduction." "Wolf population reduction" is defined as, "temporarily reducing the number of wolves to a lower level to allow a prey population to grow to objective levels."

\textsuperscript{41}Ibid. p. 195.
incorporating both of them as acceptable approaches in the Strategic Wolf Management Plan was a significant turning point away from the recommendations of the WMPT. Ultimately this decision may well have led to the demise of the Department's plans.

**Governor Hickel's Administration**

Critics of wildlife management and wolf control in Alaska have long held that the state's management system is biased toward people favoring wolf control for the benefit of human hunting. For example, many have suggested that Advisory Committee and Game Board members should be restructured so as to more fairly represent all interests in wildlife management. The WMPT recognized this as an issue and recommended that for improved public participation it may be appropriate to restructure Advisory Committees so that they are "more representative of local user groups and geography."42 The following are quotes from two former Advisory Committee members discussing inadequacies and biased representation on Advisory Committees:

Gina Soltis, Middle Nenana River Advisory Committee Member, Testifying at the Board of Game meeting, 11/92:

It has become very obvious that not only the committees but the state views those committees as being representative of the citizens of an area. And they do not represent the citizens of an area. The citizens of the area view the committees as a group of hunters regulating themselves. Non-hunters don't go to the meetings. So when you take the opinions of the committees and think that you're getting an accurate reflection of the people in the area, well it's just plain wrong.43

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43Board of Game Meeting, Fairbanks, Public Testimony, Tape 20B, November 9-19, 1992
Jan St. Peters, Healy Alaska, former member of the Cantwell Advisory Committee, Testifying at the Board of Game meeting, 11/92:

My experience certainly was a very intimidating one. I am a little thicker and hard skinned now than I was then, but after three or four meetings of really being harassed and insulted, I chose not to attend any more of the meetings. I will say that the leader of that group was very supportive, but none of the other people on the advisory committee was. I can say that in hindsight and with my experience now, I wouldn't let it bother me, like I did then, but I think people feel pretty intimidated being a part of that process when the people that are on those committees represent just one group of people or one interest, and sometimes make it very uncomfortable for people who feel another way to be part of that process. And then it was frustrating for me too, a couple years ago, when so much testimony at the hearings here overwhelmingly were opposed to aerial control hunting of wolves. And then the decision of the then board, it wasn't the same as here, said 'well we realize that the public testimony went very strongly one way, which was against it both in Fairbanks and Anchorage, but we want to weigh heavily the information that we got from the local advisory boards. And having been a part of that process for a short amount of time, and seeing how that worked, I felt very discouraged that the public testimony played such a little role at that time of the board's decision to make decisions concerning wolves.\textsuperscript{44}

Roger Huntington, one of the board members listening to the above testimony admitted that, at times, he too had problems with the overall makeup of the advisory committees.\textsuperscript{45} The same bias also exists, however, within the Board of Game, and many environmental groups, members of the public and tourism industry have gone on record stating this critique. Dave Lacey, an individual involved in tourism and rural economic development on the Yukon river, stated while testifying against wolf control to the Board of Game in November, 1992:

\textsuperscript{44}Board of Game Meeting, Fairbanks, Public Testimony, Tape 21A, November 9-19, 1992
\textsuperscript{45}Board of Game Meeting, Fairbanks, Public Testimony, Tape 20B, November 9-19, 1992.
I understand from a historical and even a present day standpoint that
the board has been dominated by sport and commercial interests, and I
would hope that you would take that into account.46

The Alaska Wilderness Recreation and Tourism Association officially
recommended that the Board of Game should, "be better balanced through
the inclusion of board members who represent non-consumptive users of

The Board's literature, "Board of Fisheries/Board of Game New Member
Orientation" states:

In the United States we all expect that public policy decisions will be
"fair," and that our views will be taken into account. This is a
fundamental tenet of government in this country. We expect and
demand that our government officials hear us out, take us seriously,
and treat our concerns fairly.

These expectations are even more intense when the issues are related
to common property resources like fish and wildlife. The lay board
system with its advisory committees and extensive public hearing
process provides the kind of framework where such expectations stand
a better than average chance of being met.

. . . Although Alaska's regulatory system offers an extremely accessible
forum, the effectiveness of this forum can only be assured if the public
views board members as unbiased and fair. Board members are
appointed by the governor to serve every member of the public.

Political appointments often bear controversy, and, of course, the overall
make-up of the Advisory Committees and Game Board influences the
outcome of the votes. During the 1992 wolf controversy, many members of
the public did not view the Board of Game as "unbiased" or "fair," and this
situation has not changed to date.

During the time the WMPT's work was underway, there was a change in
state administration. The inception of the WMPT occurred under Democrat

46Board of Game Meeting, Fairbanks, Public Testimony, Tape 19B, November 9-19, 1992
Governor Cowper's administration, and mid-way through the Team process, Independence Party candidate, Walter J. Hickel, was elected Governor. Hickel was well known to the state and came to office with an aggressive "pro-development' reputation. He had already served as Republican Governor of Alaska in the early '70's, when the Alaska pipeline was created, and went on to Washington to fulfill the role of Secretary of the Interior during Nixon's presidency. When Governor Hickel took office in 1991, his appointments to wildlife posts were very controversial. To many, Hickel's appointments seemed to take wildlife management back in time. For example, Hickel appointed one of the most visibly extreme wolf control advocates in the state as Director of ADF&G's Division of Wildlife Conservation, Mr. Dave Kelleyhouse. For many who had been involved in the wolf control debate, the delicate, consensus-based maneuverings of the Wolf Management Planning Team seemed all but over when Kelleyhouse became the state's Director of Wildlife Conservation. Greenpeace Alaska spokeswoman, Cindy Lowry, stated in response to his appointment in 1992:

"It's our worst nightmare come true. It's pretty unbelievable. It certainly doesn't bode well for wolves. It seems to me it's like declaring war on wolves." 47

Commissioner Carl Rosier indicated Kelleyhouse had been appointed because of his keen "enthusiasm" and "drive" for intensive wildlife management. 48

Kelleyhouse's widely known nickname in the state is "Machine-Gun Kelleyhouse." He acquired this nickname when he was a field biologist for the department after he made an attempt to purchase a machine gun for aerial wolf control work near Tok in 1981. His superiors approved his plan,

but once news of the purchase leaked to the press, then Commissioner, Ron Skoog, cancelled the purchase.

Controversy flared around Kelleyhouse again in 1987, when the Game Board attempted to remove Kelleyhouse from his position as ADF&G area biologist after he published an article in the Tok newspaper. The article discussed raw and unpublished data from research done by ADF&G and the U.S. Fish and Wildlife Service on wolf/prey relations. In his article, Kelleyhouse extrapolated the number of prey killed by wolves counted from one month's research to reflect the number killed over the entire winter, and suggested that up to 3,000 moose and caribou could have been killed by wolves near Tok. He compared this number to the 400 moose and caribou taken by human hunters, so as to suggest a disproportionate number of prey taken by wolves. Kelleyhouse's article sparked much debate. Many thought it was an attempt to stir up controversy over wolves with the intent of getting residents and advisory committees to propose wolf control in the area. It was described as "inflammatory" by U.S. Forest Service biologist and Game Board member, Victor Van Ballenberghe.49 Lew Pamplin, then Director of Wildlife Conservation, stated:

My response to that article was that I read that article and tossed it in the trash can. It's not good science... The data isn't a question. It's a question of how the data was used.50

Board member and wildlife cinematographer, Joel Bennett, responded to the situation:

50Ibid.
If I was commissioner, I would know what I would have done with Kelleyhouse. I would have fired him seven years ago. . . . He lives and breathes predator control.\textsuperscript{51}

Those who opposed past wolf control programs by the state were concerned that the relationship between the WMPT and the department would change with Kelleyhouse's appointment. When questioned about this, Kelleyhouse suggested he would consider recommendations before suggesting any plans. In addition he stated:

\begin{quote}
We'll always have to manage wolves as we would any species. We're not living in a park.\textsuperscript{52}
\end{quote}

\textbf{AREA SPECIFIC WOLF MANAGEMENT PLAN}

Once the Strategic Wolf Management Plan was adopted by the BOG, ADF&G set to work out management plans for specific regions of Alaska. The first areas they concentrated on were the southcentral and interior regions of the state. When ADF&G published a second draft "Area Specific Wolf Management Plan for South Central/Interior Alaska" in the summer of 1992, it seemed clear that Hickel's new administration was headed back to large scale wolf control programs, and that the attempt to create a plan that "everyone could live with" had been undermined. The first draft of this plan was adopted by the board in March, 1992. Briefly what the drafts proposed was to implement wolf control in three large geographic areas known as the Nelchina, the Tanana Foothills and the Upper Tanana/Fortymile areas. The following is an overview of what the Department proposed:

1) Nelchina area (GMU 13A,B,C,D and E):

   Historically the Nelchina area (GMU 13) has been a popular hunting place in Alaska due to its accessibility from both Anchorage and Fairbanks, the two largest population centers in Alaska. It is the largest of the three areas targeted for control, spanning 23,376 square miles (as stated earlier, close to the size of West Virginia). GMU 13 reaches north/south from the Alaska to the Chugach mountain ranges, and east/west from the Richardson Highway (adjacent to Wrangell St. Elias National Park) to the Parks Highway, which transects Denali State Park and borders Denali National Park. In 1992 the Nelchina caribou herd's population was estimated to be approximately 45,000, a level ADF&G biologists considered to be the carrying capacity of the habitat, and one which exceeded their population objectives. Their intent was to reduce the caribou population by 5,000 through annual harvests. In addition, the moose population included 22,000 moose (an overall density of .9 moose per square mile), which the plan stated was "a relatively high-density moose population for interior habitats." In spite of these documented, healthy and plentiful ungulate populations in the area, the Department proposed to decrease the wolf population, from an estimated 223 to between 150 - 200 wolves, using the "wolf population regulation" method. The Department proposed the regulation be done through public "land and shoot" hunting and regular hunting and trapping methods.

2) Tanana Flats (GMU 20A):

   Including approximately 10,000 square miles, the Tanana Flats area lies adjacent to Fairbanks and Denali National Park and Preserve. It is considered

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53 Alaska Department of Fish and Game, Division of Wildlife Conservation, Area Specific Wolf Management Plan for South Central / Interior Alaska, Draft Plan, p. 15.
to be one of "the most important areas for use of wildlife in Interior Alaska and has a history of high consumptive use of moose, caribou and sheep by the public." GMU 20A is used extensively by residents of Fairbanks and non-resident hunters, and therefore has been considered to be a non-subsistence use area by the Joint Boards. Justification for intensive management in this area is to attempt to produce high ungulate numbers for Fairbanks resident and non-resident hunters, so that pressure and conflict with subsistence users in other portions of Alaska can be reduced.

The plan under consideration for GMU 20A proposed the following:

a) To increase and maintain the caribou population from its 1992 estimated level of 5500 - 6500 at a midsummer population of 7000 - 9000;
b) To increase and maintain the moose population from its 1992 estimated level of 5500 - 6500 at an early winter population of 11,000 - 15,000;
c) To increase and maintain the Dall sheep population from its 1992 estimated level of 2000 - 4000 at a mid-summer population of 4000 - 6000.

The 1992 estimated wolf population in the area was 131 - 165, and, according to the plan adopted by the Game Board, the Department could not reduce late winter wolf numbers below 45. As stated in the BOG findings:

A) for up to 3 years beginning January 1, 1993, the commissioner may reduce the wolf population; however, the commissioner may not reduce the late winter population within the control area to below 45 wolves; and
B) Department personnel may take wolves by trapping, snaring, and shooting, including shooting from aircraft between October 1 and April 30.55

3) Upper Tanana/Fortymile Area (GMU 12, 20B, D and E):

55 Ibid., p. 21-22.
The Upper Tanana/Fortymile Area is situated in the eastern portion of the Interior management area, and borders Canada on its eastern side. It includes approximately 9,700 square miles. The main impetus behind proposing wolf control in this area was to attempt to restore the Fortymile caribou herd (FCH). Population estimates suggest that this herd once numbered ~ 500,000 animals, and due to over harvesting by past generations and other environmental factors the herd was reduced to < 6,000 in the mid-1970's. Conservative harvest management increased the herd size during the past two decades, and the 1992 population estimate was 20,000 - 22,000.

The proposed management objectives for this area included:
a) To restore the (FCH) to a population of 60,000 by the year 2000;
b) To increase and maintain the early winter moose population from its current estimated level of 3400 - 4000 to 9,000 - 10,000;
c) To reduce wolf numbers from their current estimated population of 180 - 225 to between 40 - 70, and maintain this level for five years between 1993 - 1998. Control was to be implemented by Department personnel by "trapping, snaring, and shooting, including shooting from aircraft between October 1 and April 30, during the term of the program.\(^{56}\)

The Area Specific Management plan differed significantly from the recommendations of the Wolf Management Planning Team in the following ways:

1) The Planning Team recommended that intensive management designations would be established only in a small portion of most GMU's and that wolf control would not be a common practice. Yet the Department

\(^{56}\)Ibid., p. 28.
proposed intensive management areas for entire management units in addition to adjacent units:

With regards to zoning, the Area Specific Plan differed radically from the recommendations of the Planning Team in that the majority of GMU's zoned for wolf control did not have small, specific areas destined for control. Instead, entire GMU's were zoned for control and in some cases, sections of other GMU's were added on to make the control areas larger than the parameters of single GMU's (please see map as it appeared in the Area Specific Management Plan for South Central/Interior Alaska, appendix 2.4 and 2.5). In the plan, the majority of the 108,000 sq. mile planning area was zoned 5, 6, or 7, where wolf control could take place. Within the proposed control areas, the plan prioritized GMU's targeted for wolf control within the coming year, which included GMU's 13A, B, C, D, and E (Nelchina Caribou area), 20A (Tanana Foothills) and parts of units 12, 20B, D and E (Upper Tanana/Fortymile area). These areas combined to total approximately 43,000 square miles.

2) The Department proposed using wolf control as a regular management tool within the largest area targeted for control:

The Department proposed using wolf control as a regular management tool by allowing the public to take wolves by the "land and shoot" method, and through regular hunting and trapping methods. As proposed, the program would be authorized for a five-year term, and then would be subject to reauthorization. Thus the Department intended to maintain the wolf population below a level the prey base could otherwise support over a five year period or longer. This proposal seemed to be in direct conflict with what
the Planning Team had recommended, which was that "wolf control is not intended to be a common practice."

At this stage in the process it seemed clear that Director of Wildlife Conservation, Kelleyhouse, was pointing predator management back in time -- back to when large scale wolf control programs were a routine wildlife management tool. Fury was added to the fire by the fact that ADF&G had radio-collared wolves in the proposed control areas during the winter of '91-92, and the Department intended to use radio telemetry to locate packs for the control work. When interviewed by an Anchorage Daily News reporter, Fairbanks regional supervisor of the Division of Wildlife Conservation stated there were two purposes for the collaring:

One was to gather additional information on the wolves' movement and behavior patterns so we could put the best possible information forward to the board for their decision. The other was to have those collars on the wolves so that if the board did authorize we could conduct the program as best as possible.57

Needless to say, those opposed to the type of control programs historically implemented in Alaska were stunned that after the new planning process, involving a consensus building approach, the state was again confronting the same kind of wolf control it had battled for the past decades. Those opposed to past control attempts and who had participated in the Wolf Management Planning Team felt there worst nightmare had come true. In a letter to Governor Hickel urging the Governor to intercede in the wolf plan, Regional Vice President for National Audubon Society, David Cline wrote:

. . . After having worked very hard with eleven other Alaskans on the State's "Wolf Management Planning Team," I'm appalled at what I see a few department hardliners and their limited public supporters trying to accomplish. The planning team's principle aim was "to get past the controversy (wolf control) and develop a plan everyone can live with." While none of the planning team members were completely satisfied with the planning process for wolf management, all agreed that everyone should win something. But given what ADF&G is now proposing for wolves, I can't see that conservationists got anything. In fact, we now have less to show for our cooperative efforts in wolf conservation than before the planning team sat down at the negotiating table!

The zonal concept to wolf management that several members of the team, including myself, reluctantly agreed to, ranged from Zone 1 (full wolf protection) to Zone 6 (intensive wolf management). The team agreed that ADF&G should seek balance between the extent of the zones, and that intensive, ongoing wolf control would never be justified over broad geographic areas as an ongoing management practice. ADF&G's response to these and other recommendations is to essentially ignore them. Not only are their zone 1's hard to find on a map, but by some accounts not a single wolf pack in the state will be protected from being killed by hunting, trapping or wolf control! This even applies to wolf packs in Denali National Park that range beyond park boundaries. Meanwhile, ADF&G has added a seventh zone and is now requesting authorization from the Board of Game to conduct ongoing intensive management, including aerial wolf control, over vast areas of southcentral and interior Alaska.

By throwing out the planning team's many sensible recommendations, department extremists have betrayed the consensus building process designed by their own department. They are now making a mockery of the public process on this controversial issue by essentially deciding to reinstate aerial wolf control before the process currently underway is completed. They are also jeopardizing the credibility of the wildlife profession and ADF&G by attempting to manipulate the public with misleading information. . . .

Thus began the controversy which dominated the media between November, 1992 and March, 1993, and led to a tourism boycott of the state.

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58 David Cline, Regional Vice President, National Audubon Society, Letter written to Governor Walter J. Hickel, 30 October, 1992.
THE ROLE OF THE PUBLIC:

By the time the Area Specific Management Plan came before the board for a vote, five out of seven Game Board members had been appointed by Governor Hickel. They included: Richard Burley, Fairbanks (Chairman), Roger Huntington, Galena; Al Franzman, Soldotna; Jack Didrickson, Palmer; and Ken Johns, Copper Center. Many felt Hickel’s board appointments were one sided, representing only hunting interests in the state. They proved this to be true when all of Hickel’s appointees voted in favor of the three proposed control programs. Only one member of the board, Skip Wallen, who was appointed by former Democratic Governor Cowper, did not vote to pass the Department’s preferred options in the Area Specific Management Plan. The following quotes from the Chairman of the Board indicate his contentment with the plan:

*Dick Burley Re: Implementation Plan, GMU 13, 11/92*

. . . I think that we were able to draft a Strategic Management Plan with the idea that it was going to protect the values of a lot of people. . . . We've received an awful lot of written testimony, written comments. We've sat through several days of public testimony, listening to the public trying to find out what they wanted, which way they wanted the board to go. Not being surprised by the diversity of that public testimony, I think the board tried to be responsive to that testimony when we did finally adopt the Area Specific plans. And we tried to accommodate that wide range for the public. . . . We now have before us an implementation plan for unit 13, which involves probably one of the most controversial issues that will come before this board, and that's public participation in land and shoot. While I know it's distasteful for many people, I also realize that it is a way for the public to participate in utilizing the resource. . . . But this is a way for some people to harvest some wolves, which is allowed under the Strategic Plan that we adopted. And in order for the department to authorize that continued harvest by the public with land and shoot, we incorporated into our proposal some factors that the department has to consider each year to continue authorizing that. They established some parameters for minimum wolf populations in subunits of unit 13. They established prey populations. They established prey/calf
recruitment rates, and then they established the fact that they were going to evaluate the winter severity index. . . . I believe all of these things together will help ensure that the department is managing the resources for the people of Alaska and the people of the entire nation. While some of them might disagree with the way things are done, I believe that it's been responsive of the department to come before the board with an aggressive management plan for unit 13. . . . And as we vote on this proposal, I am going to vote in support of it. And I'm going to vote in support of it because land and shoot in unit 13 is not new. It's something that has been going on for years. And it has showed that through that method, the public has been able to keep the predator level at a desired level -- a level which I feel comfortable with in this implementation plan.

Dick Burley's quote speaks to two of the most critical complaints of those who opposed previous state control programs and the proposed Area Specific Wolf Management Plan. The first is that Burley admitted in his quote that "land and shoot" has been a common practice in GMU 13 for years, and therefore he is in favor of returning to that method of hunting to regulate wolf numbers. In other words, the Area Specific Wolf Management Plan did not offer a new and progressive wolf plan -- something that all interested parties could live with -- based on the work of the Wolf Management Planning Team. Rather, it proposed to turn back the clock and reinstate control programs similar to those historically implemented by the state. Returning to a "business as usual" wolf control program was not in keeping with the Planning Team recommendations. It missed the whole point of the consensus building exercise and purpose of the planning team.

The second contentious point in the wolf control debate was that Burley stated the Department and Board took all of the public's concerns into consideration when passing the plans. Others disagreed. There was an enormous amount of opposition to the plan from both Alaskans and those from out of state. For example, four to six weeks before the board met, the
Division of Tourism was notified by numerous individuals and groups stating they would cancel their trips to Alaska if the state went ahead with the proposed wolf control plans. In addition, written comments from both in and out of state sent to the Board of Game were overwhelmingly opposed to the proposed wolf control.

In October of 1992, The Alaska Wildlife Alliance and Wolf Haven International commissioned Dittman Research Corporation, a reputable polling company in Anchorage, to survey the Alaskan public regarding its views on wolf control. The survey reflected the interests of 641 rural (defined as inaccessible by road) and urban residents from all over the state, of which 34% had hunted big game during the previous five years. The survey results indicated the Alaskan public overwhelmingly opposed the type of control program proposed by the state.

The results reflected that 66% of Alaskans were opposed to the public shooting wolves from the air through land-and-shoot hunting practices, and 74% of the public opposed state agency personnel shooting wolves from helicopters and airplanes. Only 8% of the overall population and 10% of the hunters surveyed supported an increase of the current levels of wolf kills per year. Over 1,000 out of an estimated 6,000 - 7,000 wolves are killed annually through regular hunting and trapping methods. The majority of Alaskans favored a decrease in the amount of wolves killed per year. A strong majority of the public -- including a clear majority of hunters -- did not believe that reducing wolf numbers would result in more moose and caribou for hunting. The results were consistent across the state. A later survey completed by the Alaska Visitors Association found similar results to be true among Alaska's public.
During public testimony at the November Board of Game hearing, a letter was circulated to the Game Board that had been signed by seven state and national environmental groups opposing all three control plans. Also, petitions with signatures of over 6,000 citizens opposing the plan were submitted to the Board. There were no petitions in favor of wolf control. The petitions opposing control were submitted by myself, representing The Alaska Wildlife Alliance, and Melodie Bankers, a lawyer and board member for Wolf Haven International, testifying on behalf of Wolf Haven International, Defenders of Wildlife, Sierra Club, and an Alaskan group, The Southeast Alaska Conservation Council (SEACC). Bankers testimony challenged Chairman Burley’s words regarding public representation. She addressed many of the common complaints about the Area Specific plan, and emphasized that the board did not take the overall public into consideration, but rather catered to a minority interest group. She stated in her testimony:

The combined membership of these [those that she represents] organizations exceeds half a million. I’m here to testify on behalf of nonconsumptive users as well as hunters who are members of our organizations. Petitions have been submitted to the Alaska Department. These petitions were signed throughout the United States in a limited period of two days and this many were signed only in the Tacoma area. In addition, petitions have been signed and submitted to you at a meeting of the gathering of original peoples of central, north and south America at a pow-wow recently. All of these petitions recognize that we are tourists and we come to Alaska and spend our tourist dollars here. The issue of wolf control as you’re aware is highly emotional and deeply divisive. . . . We in the environmental community have not changed our minds about wolf control. Most of us continue to vehemently oppose state sponsored aerial wolf control programs. We do however want to make it clear that we are not opposing normal ground trapping and hunting of wolves in Alaska. Especially when these activities relate to the legitimate needs of customary and traditional subsistence users. What we see now in this Area Specific Management Plan is anything but the spirit of give and take. The Alaska Department of Fish and Game has attempted to
interpret and manipulate the team's recommendations to their own advantages specifically to more extensively control wolf populations in Alaska under the guise of sound wildlife management. I recommend to you that you remember that tourism is an important industry for the economy of Alaska. The opportunity for a chance encounter with a wild wolf is clearly among the reasons we come to Alaska and spend our money in this state rather than somewhere else. . . . In conclusion, if the plans are not amended before adoption to eliminate land and shoot aerial gunning, do not take a broader ecosystem protection approach, do not consider the values of the residence of this state as demonstrated by the Dittman Research Corporation survey, do not downgrade artificially high population objectives and do not reflect the consensus arrived at over six months of give and take by the planning team, we are prepared to take whatever steps are necessary to effectuate wolf conservation plans that represent the compromises and desires of the residences of this state and the rest of the United States. Because most of the wolves we are talking about today live on federal land they belong to more than Alaska. They are part of the natural heritage of all Americans.

The Wolf Management Planning Team discussed the role of non-Alaskans in wildlife management decisions, because this had been a concern for many during past controversies over wolf control. The Team recommended that the state allow that, "all groups, including those representing national interests should have equal access to and consideration during the Board of Game process."\textsuperscript{59} However, instead of allowing equal access to non-Alaskans, the Board chose to dismiss the concerns of "outsiders" by suggesting that letters and petitions addressed to the Board were the result of misinformation which had been distributed by environmental and animal rights groups. For example, Roger Huntington addressed the issue of misinformation when he stated:

\ldots One thing I'm concerned about is what's going on as far as perceptions by the public both in Alaska and nation wide. When I read

letters, you know, calling me as a board member or the state, you know, paralleling us to be Nazi’s and slaughterer’s of wolves, and blood thirsty hungry demons, you know. It was stirred up through some misinformation.

Later during the Public Testimony Huntington continued:

I recognize the big problem is in the sociological sense, in dealing with people. . . . And . . . trying to meet the . . . sociological needs of all the people -- not only the people of the state of Alaska but throughout America -- as we're inundated by hundreds of letters from all over the world, even Canada and Scotland, and I think somewhere in there, generated by what I can call, that you referred to, misinformation.

Chairman Burley's sentiments on this topic came out later in a letter to the Anchorage Daily News editor, scolding the editor for printing a press release from The Alaska Wildlife Alliance. He wrote:

Once again The Daily News has allowed itself to be tricked by The Alaska Wildlife Alliance and its pseudo-scientist, Gordon Haber. By unquestioningly printing an Alliance press release, The Daily News again has allowed opponents of wolf control to interject erroneous "facts" into the debate.60

Hickel appointed board member Jack Didrickson stated at one point during the controversy:

This isn't the first time the public is wrong, and they are wrong. This method of taking wolves from the air, it's the only way. Just because they're wrong, it doesn't mean the board has to play along with it.61

The state carried this notion of misinformation so far that Governor Hickel actually sued Friends Of Animals, a national animal welfare group, after they placed ads in USA Today and The New York Times indicating that the state planned to track radio-collared wolves to their dens and shoot them from airplanes. Hickel claimed the ads had lied about Alaska's planned wolf

61 Jack Didrickson, Board of Game meeting deliberations, January, 1993.
control program. He speculated the ads had cost the state $50,000 worth of tourism money. Quoted in the Anchorage Daily News, Hickel stated, "We are not going to allow ourselves to be intimidated by an ad like this." The judge ultimately sided with Friends of Animals stating that Hickel tried to fight a political battle through the courts that was, "at best poor judgment, and at worst bad-faith litigation." In addition, the judge ordered the state of Alaska pay close to $10,000 in legal fees to Friends of Animals. President of Friends of Animals, Priscilla Feral, awarded the Governor a lifetime membership as a token of the groups' appreciation for Hickel's help with their cause. She stated he helped keep the controversy in the press much longer than the organization could have hoped to do on its own, and indicated they will use the $10,000 to buy more boycott advertisements.

Anchorage Daily News columnist Mike Doogan summed up the opinions of many involved in the wolf issue when he wrote:

The board's policy serves only the narrow interest of the minority of Alaskans who hunt.

That might have been OK once. It's not anymore. Life has gotten more complicated. Other groups with other values want to have a say. Environmentalists. Animal rights groups. Businessmen hurt by the tourism boycott that derailed the wolf-killing plans.

And this bothers the board. They want to do things the old cozy way. Listen only to the insiders: advisory boards full of hunters, fish and game managers, hunting lobbyists who used to be fish and game managers. You know, science.

. . . Their stubborn refusal to adjust to the changing politics of game management plays into the hands of their opponents. If they don't talk smarter and act smarter, they simply won't get to make important

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63 Ibid.
64 Ibid.
game-management decisions anymore. They'll decide, the public will react, and they'll be overridden.65

SPORT VS. SUBSISTENCE HUNTING IN ALASKA

An additional criticized aspect of the 1992 proposed wolf control plans was that the control plans were created to primarily benefit urban hunters from Fairbanks and Anchorage, Alaska's largest urban centers. The control plans targeted areas which historically have received significant hunting pressure by Fairbanks and Anchorage resident hunters. The three areas are in relative close proximity to the two cities and are accessible by road. One of the three areas targeted for control has been designated a "non-subsistence use area" by the Alaska Joint Boards of Fisheries and Game, because of its extensive use by residents of Fairbanks and nonresident hunters. Rural subsistence hunters may have benefited somewhat indirectly from potentially decreased hunting pressure in subsistence areas not accessible by road.

Thus the 1992 wolf control debate was not one concerned foremost with subsistence, rural hunters; nor was it rooted in multi-cultural differences. To the contrary, many believe ADF&G's plans did not effectively incorporate native and rural subsistence concerns. Thus the debate was principally a single-culture dispute which stemmed from a difference of opinion over the treatment of wolves between members of the public at large and distinct interest groups, including sport hunting, environmental, animal rights, and tourism groups.

While the 1992 wolf control plans did not directly involve native, subsistence interests, the plans were part of a broader yet related conflict.

brewing in the state between urban and rural hunters. This conflict exists between "sport" and "subsistence" hunters over access rights to game for hunting. A landmark case in 1989 effectively eliminated a rural, subsistence priority regarding use of fish and wildlife in the state, which the state had granted since 1978. The Alaska Supreme Court decided that, according to Alaska's state constitution, it was unconstitutional to provide a rural preference regarding access to fish and wildlife. The court's decision eliminated a distinction between sport and subsistence hunters and fishers, and, in the eyes of many, including the federal government, directly threatened the protection of cultural and traditional uses of fish and wildlife by native and other rural Alaskans. Since Alaska's Supreme Court decision, the federal government has taken over fish and wildlife management on federal lands in Alaska so as to ensure a subsistence and rural preference on these lands.

Tension between native leaders and the Hickel administration increased during Hickel's tenure as governor. The 1992 wolf management plan was one of several examples regarding fish and wildlife management where native and subsistence concerns were not necessarily a priority for the Hickel administration. Native leaders and organizations never officially came out stating whether they were in favor or opposed to the wolf control plans, and they kept a low profile throughout almost all of the events surrounding the adoption of the plans. Their silence spoke loudly.

When Governor Hickel finally buckled from the pressure of the tourism boycott and suspended the wolf control plans, he organized a wolf summit in January, 1993. He invited natives to be involved with the summit. Chairman of the Tanana Chiefs Conference, Mitch Demientoff of
Nenana, indicated during the Alaska Perspectives Panel at the summit (which both he and I participated in as panelists) that he and those he represents were not willing to play along with the Governor. He stated:

The Governor was mad at us because we wouldn't take the heat earlier, when they were planning the conference. We wouldn't take the heat. We wouldn't send a large native delegation come out here and say, "we want wolf control."

"Well why won't you do it? They do that over in the Yukon Territories."

Hell, in the Yukon Territories, they don't mess around with the subsistence business. They got native preference over there. Right on top. That's what works for them. It's right on top."

While Demientoff finally chose to be vocal, the Chief of the Athabaskans, Peter John of Minto, did not speak directly to the issue of wolf control. Hickel scheduled a visit to Minto, a rural Alaskan village, for those attending the wolf summit. What individuals found there was a man and a community desiring to teach and talk to people about their traditional ways, but not a community wanting to address Hickel's wolf control controversy.^^

Conclusions:

In conclusion, the state of Alaska ignored input by the public and failed to incorporate the recommendations of the Wolf Management Planning Team, a citizens advisory council, in good faith into their Strategic Wolf Management Plan. The Planning Team recommended a six zone management system (A-F), where wolf control could occur in two of the six zones. Further, the team defined restricted terms for wolf control. They recommended that, wolf control should not be a common practice and that

intensive management designations were to be established only on a small portion of any Game Management Unit being considered for control. In addition, control methods were to be limited to the minimum amount of time necessary to achieve the desired level of wolf control, according to the recommendations.

Instead of incorporating the Planning Teams recommendations, ADF&G and the Game Board redefined their recommendations such that several pertinent aspects no longer represented the work of the Planning Team. For example, the state came up with their own seven-zone management system, and definitions for two different types of wolf control -- wolf regulation and wolf reduction. In the plan passed by the Game Board, wolf population regulation and reduction would have occurred over vast areas of the southcentral and interior regions (43,000 square miles out a 100,000 square mile planning area) for a minimum of five years, and possibly for as many as ten. This is not necessarily short term, nor is it in the spirit of the Wolf Management Planning Team recommendations. The control would have reduced wolf populations by approximately 80%, killing between 400 and 500 wolves.

Doug Pope, Chairman of the BOG when the Strategic Wolf Management Plan was adopted, emphasized the state's inadequacies in incorporating public input into their wolf management plan when he stated in a recent interview:

Well the reality of what . . . the implementation meant was they implemented a different plan then we adopted. . . . The whole consensus was that the wolf management zones were going to be very small, discrete areas. And as soon as the meetings stopped the department started relaying the concept that they had to stick out these whole Game Management sub-units rather than do some actual zoning where they had planned to do some serious work. Rather than, for example, do it in that part of Game Management Unit 20 that they
ended doing the wolf control in, rather than zoning that particular area and taking testimony as to why that particular area deserved to be a zone where they were going to implement wolf control. What they did is they sort of stampeded the hunting community into believing that they had to create these massive zones because if they didn't then there was going to be no opportunity ever to have wolf control in that game management unit. And that's where they really undermined the whole consensus. So when I said that they implemented a different plan than was adopted, the plan that was implemented didn't look anything like the plan that was adopted...  The zones were supposed to be very small and discrete. In other words confined to the specific area of need that they can identify. And that then the idea was that, by having the board involved on a regular basis, ... there would be more opportunity for public input. And that's what we thought was the key to the whole thing was that each time they [the Department] wanted to implement wolf control in a specific zone, then they'd have to come back to the board and say this is why we want to change this zone from 'x' to 'y' ... and this is the biological justification for it. And then there would be an opportunity for public comment. ... We felt that that was probably the best check on the whole process. If there was an opportunity for public input then flaws in the plan would come out, and it might be decided by pure power, but the way things have gone in the past, because of the large scale plans that had received so much public opposition, we thought that if there was an attempt to do that again there would public opposition. But what they did was, because they didn't want to come back to the board and they didn't want to have public input ... I went to a couple of these Advisory Committee meetings and saw their presentation and it was very clever. The whole come on was, 'we have to do this, or ... we're never going to be able to kill wolves in this area again. It's going to be blocked up and we won't have an opportunity to make more for everyone and so therefore it'll all be subsistence. And that was basically the whole thing. So it was real predictable what was going to happen. ... And Kelleyhouse, at that point, when I saw that happen, which was right at the end of my term, I concluded that the best thing to do was just to give him as much rope as possible to let them hang themselves. Which they almost did.

(Interview in Anchorage, October, 1994)

The state of Alaska's 1992 wolf management plan is a poignant illustration of how historically Alaska's wildlife management system has allowed sport hunters to regulate themselves. While the remaining public may be invited to participate in an "open" process, the public often is not involved fairly or
equally.
Appendix 2.1

**BOARD REGULATORY PROCESS**

Public Participation

Local Advisory Committees
80 Committees across the state
Each committee has up to 15 members elected by the community.

ADF&G Technical Assistance

Public Participation

Board of Game
7 Members
appointed by the Governor
confirmed by the Legislature

Board of Fisheries
7 Members
appointed by the Governor
confirmed by the Legislature

Public Participation

ADF&G
Technical Reports
Population Assessments
Etc.

Acceptance of Proposal
By Majority Vote
Including Amendments by the Boards

Technical Review
by ADF&G
and certified by Commissioner of ADF&G

Approved by
Attorney General

Filed by
Lieutenant Governor

ADF&G
Implements Regulations
and Manages according to Regulations
5. Zone areas into various levels of management intensity:

a. Areas where no hunting, trapping, or wolf control is allowed. Examples of such areas are long established National Parks (2% of the State). These areas may be expanded, through the operational management plans, by including portions of new national parks, national wildlife refuges, state parks, and road corridors, especially where wildlife viewing opportunities exist.

b. National Parks and Monuments established by ANILCA where hunting or trapping are permitted only for local residents that qualify as federal subsistence hunters. No same-day-airborne hunting of wolves is allowed. No wolf control is allowed. These areas cover about 7% of the State.

c. National Preserves created by ANILCA where hunting and trapping are allowed for the general public. No same-day-airborne hunting of wolves is allowed. No wolf control is allowed. These areas cover about 5% of the State.

d. National wildlife refuges where hunting and trapping are allowed for the general public. Wolf control is permissible, but only when compatible with the purposes for which the refuge was established and under stringent conditions. These areas cover about 20% of the State. Same-day-airborne hunting should not be allowed.

e. Areas where hunting and trapping are allowed for the general public. The Team was divided on the issue of whether same-day-airborne hunting of wolves be allowed. No wolf control is allowed except in those areas designated for intensive management (under category f). These areas include portions of state lands, BLM, private owned lands, and military lands.

f. Areas where the objective is through intensive management to maintain a high sustainable harvest of wolves and their prey while ensuring their conservation over time. Hunting and trapping are allowed for the general public. The Team was divided on the issue of whether same-day-airborne hunting of wolves should be allowed. Wolves can be subjected to control when it is needed, under the criteria and methods described in section IV. F of this report. These intensive management areas should be no larger
than absolutely essential to achieve specific management objectives as specified in operational management plans. Wolf control is not intended to be a common practice. The team recommends that intensive management designations will be established only in a small portion of most game management units. These areas would include portions of state lands, BLM, private owned lands, and military lands.

The definition of "same-day-airborne hunting" in current ADF&G regulations is: "Not hunt game or help someone else take big game the same day airborne until after 3:00 a.m. the next day. However, this section does not apply if you have flown on an airplane that is a regularly scheduled jet airplane. . . ." As written, this definition includes "land and shoot" which is a term in common use (i.e., it is not defined in the regulations) meaning to land an airplane as close as possible to the target animal(s) and then to jump out and shoot. The Team agreed that land and shoot, as currently interpreted by the USFWS, is almost impossible to practice without being in violation of the Federal Airborne Hunting Act and could not be permitted anywhere except as a means of control in intensive management areas (in which case an exemption to the Federal Airborne Hunting Act is provided). The Team was divided on whether in categories "e" and "f" to allow same-day-airborne hunting with certain constraints (e.g., a requirement for distance from the plane, within line of sight, or a certain length of time before shooting). Some members of the Team opposed same-day-airborne hunting of wolves, with or without added constraints because of problems with enforcement, also that it exempts wolves from the same protection given to most big game species. Some felt that same-day-airborne hunting will continue to convey a negative image of wolf hunting and the Alaska Department of Fish & Game to many members of the public. There was a concern among some other Team members that without land-and-shoot and/or same-day-airborne hunting there would be almost no opportunity for reasonable success for a sport hunter, resident or nonresident, to legally take a wolf in the winter when the hides are prime.
Appendix 2.3

STRATEGIC WOLF MANAGEMENT PLAN
STATE ADOPTED ZONE MANAGEMENT SYSTEM, 1992

Zone 1 — Full Protection
Human use goals in this zone are:
   1. to provide areas where wolves and prey are fully protected from hunting and trapping.
   2. to provide opportunities to view, photograph, hear, enjoy and learn more about wolves and prey in an unaltered environment.
   3. to provide opportunities for scientific study of wolves where human influence is minimal.

Conditions of use and management:
Hunting or trapping of wolves or prey is not allowed. Human activities and developments are regulated to keep disturbance of wolves and prey to a minimum.

Zone 2 — Wolf Protection
Human use goals in this zone are:
   1. to provide areas where wolves are fully protected from hunting and trapping.
   2. to provide opportunities to view, photograph, hear, enjoy and learn more about wolves where they are not hunted or trapped.
   3. to provide opportunities for scientific study of wolves where they are not hunted or trapped.

Conditions of use and management:
Hunting or trapping of wolves is not allowed. Hunting or trapping of other species may be allowed.

Zone 3 — Minimum use / Minimum management
Human use goals in this zone are:
   1. to provide areas where wolves and prey are not significantly influenced by people and are affected primarily by natural environmental factors.
   2. to provide opportunities to view, photograph, hear, enjoy and learn more about wolves and prey in nearly unaltered environments.
   3. to provide opportunities for scientific study of wolves where human-caused mortality and manipulations are not significant factors.
   4. to provide opportunities to harvest a small portion of the wolf and prey populations to meet special needs.

Conditions of use and management:
Hunting and trapping of wolves and prey is allowed, but harvests will be very low in most areas. Wolf population regulation and reduction are not allowed.

Zone 4 — Moderate use / Minimum management
Human use goals in this zone are:
   1. to provide areas where wolves and prey are primarily affected by natural environmental factors, but some influence by people is permitted.
2. to provide opportunities to view, photograph, hear, enjoy and learn more about wolves and prey in an environment that may be slightly altered.
3. to provide for moderate harvests of wolves and prey by people.

Conditions of use and management:
Hunting and trapping of wolves and prey are allowed, but harvest rates will be kept low to moderate by hunting/trapping regulations or remote access. Wolf population regulation and reduction are not allowed.

Zone 5 — Moderate Use / Moderate management
Human use goals in this zone are:
1. to provide areas where wolves are influenced by both natural environmental factors and by people.
2. to provide opportunities to view, photograph, hear, enjoy and learn more about wolves and prey under managed conditions.
3. to provide for moderate harvest of wolves and prey by people.

Conditions of use and management:
Hunting and trapping of wolves and prey are allowed. Moderate harvest rates will be maintained. Wolf population regulation and reduction may be considered at the request or concurrence of the land owner/manager.

Zone 6 — High use / Moderate management
Human use goals of this zone are:
1. to provide areas where wolves are managed for high human use.
2. to provide opportunities to view, photograph, hear, enjoy and learn more about wolves and prey under managed conditions.
3. to provide for high harvests of wolves and prey by people.

Conditions of use and management:
Hunting and trapping of wolves are allowed and may be encouraged. Wolves and prey will be managed to provide for moderate to high harvests. Land-and-shoot taking of wolves as a regulation or reduction measure may be allowed under permit. Wolf populations may be regulated at levels below those which would occur naturally. Wolf population reductions are not anticipated, but may be allowed.
Zone 7 -- High use/Intensive management

Human use goals of this zone are:

1. to provide areas where wolves and prey are intensively managed for human use.
2. to provide for high harvests of wolves and prey by people.

Conditions of use and management:
Hunting and trapping of wolves are allowed and may be encouraged. Wolves and prey will be managed to provide for sustained high harvests. Land-and-shoot taking and aerial shooting of wolves as a regulation or reduction measure are allowed under permit. Wolf populations may be regulated at levels below those which would occur naturally. Wolf population reduction may be necessary.
Appendix 2.4

Management Zone Map

Legend

Zones

MAP 2
Appendix 2.5

Southcentral and Interior Alaska Game Management Units and State Proposed Wolf Control Areas

Map provided by Gordon Haber
Chapter 3

A BIOLOGICAL ANALYSIS OF ALASKA'S WOLF PLANS

"Only recently have we begun to appreciate that who does science affects the kind of science that gets done."

Londa Schiebinger, Nature's Body

Just as controversy surrounded the public process regarding Alaska's proposed wolf control programs, the Alaska Department of Fish and Game's biological justifications also sparked much debate. The Alaska Department of Fish and Game's (ADF&G's) own research has often suggested that, in many cases, wolf control does not appear effective in raising ungulate population numbers. Wildlife biology is a relatively new field and the interactive ecology of wolf, bear, moose and caribou populations is still not fully understood. Researchers admit that much remains unknown about these populations, and consensus among experts regarding predator/prey dynamics does not exist. Proposing an aggressive wolf control program, such as the Area Specific Management Plan for Southcentral, for some wolf experts meant putting the cart before the horse. Many independent scientists and wolf experts contradicted ADF&G's justifications for the plan, stating they were unfounded, ill-advised or just plain wrong.67

The purpose of this chapter is to take a closer look at the three areas targeted for wolf control in 1992 by analyzing the biological justifications offered by ADF&G for their proposed programs. This is accomplished by: 1) reviewing the status of those species considered beneficiaries or targets of the

control -- caribou (*Rangifer tarandrus*), moose (*Alces alces*), wolf (*Canis lupus*), and to some extent grizzly bear (*Ursus arctos*) -- in the three Game Management Units (GMU's 13, 20A and 20E) charted for wolf control, and 2) discussing results of existing studies and other available information regarding these populations. This chapter also analyzes pertinent ecological information of the three control areas. The purpose of this analysis is to reveal the 1992 wolf control programs within their larger context, and allow those individuals entering the debate to determine whether or not the 1992 wolf control programs are appropriate. A closer look at the dynamics of wildlife populations within the areas targeted for control will uncover substantive discrepancies between published ADF&G research results, opinions of many experts in predator and prey ecology and the proposed wolf control programs.

**BACKGROUND AND GENERAL CONSIDERATIONS:**

Years of widespread wolf control programs has led some wolf researchers to criticize ADF&G for being "anti-wolf." For example, John Theberge, Professor of Ecology at University of Waterloo, who has spent more than twenty years conducting wolf research in Ontario, and has published works on wolf-ungulate relationships, wolf control and wolf predation, stated in a review of ADF&G's wolf control plans:

While I have attempted to approach this review impartially, that is not entirely possible as human psychologist research attests. The same, of course, holds true for biologists of ADFG who have been known to hold pro-wolf killing views for many years, and always argue facts from that side to do the same. I object vigorously to the ADFG statement at the end of Appendix IV to any connotation of impartiality of ADFG biologists because they "work closely with federal and
Canadian wildlife biologists." You pick your colleagues just like you pick the references you want to support the conclusions you want in this highly complex and controversial area of applied ecology. I note no reference to any of my publications in this ADFG document, although some are most certainly relevant.\(^6\)

Wildlife scientist and long-time critic of ADF&G, Gordon Haber, Ph.D., called the state's proposal, "voodoo biology," and published a lengthy critique of the plan. Wolf ecologist Paul Joslin wrote that poor science was used to justify the wolf kill. Another scientist suggested Alaska's wolf control plans were, "not fully justified."\(^6\)

In fairness to ADF&G, wildlife management is a relatively new field, and there are still many unanswered questions regarding multi-prey/multi-predator systems. National Park Service biologist, Layne Adams, discusses the complexities associated with managing Alaska's wildlife in the following passage:

Wildlife management is a relatively young discipline that got its start in the 1930's. Up until the last decade or so, wildlife management was truly an art. Wildlife biologists had limited field "data" on animal abundance, species interrelationships, and human harvest. They applied what they could of general ecological principles, theories, and hypotheses (many were untested and a few were dead wrong) to pick a course they hoped would maintain reasonable wild populations and provide for sustained human harvest. The chances of being "right" were not very great, particularly in the vast and complex environment of Alaska. It is amazing to look back and realize that research into wolf/prey relationships did not really get started until the late 1950's. It wasn't until the late 1960's that wildlife professionals and the public alike were beginning to realize the complexity of predator/prey systems and the important role of predators. The importance of bears as predators of ungulates did not come to light until the late 1970's -- early 1980's!


Since the mid-1970's, wildlife management has become more of a science and a little less of an art. . . . Still, the species' interactions are highly variable and factors that affect them can be subtle. Even today, many of the tools regularly used in wildlife biology are "blunt" and can only provide general answers to our research/management questions. . . . Alaska is big and diverse and we will never have the manpower or money to gather, analyze and digest all the information that could be used to help with wildlife management decisions.

One must realize, then, that often wildlife managers operate without knowing exactly what end products their actions will yield. Efforts should continue to gain more knowledge about these complex systems.

One example of an area of wildlife management which is not well understood involves multi-predator/multi-prey systems. Alaska is composed of many multi-predator/multi-prey ecosystems, which present complexities and challenges for wildlife managers. Several conceptual models have been presented to better understand the dynamics between multi-prey and predator systems (Haber 1977, Messier and Crete 1985). One model used to try to explain the situation in the Tanana/Fortymile area is the "low-density dynamic equilibrium" (Messier and Crete 1985), where, "combined predation by wolves (Canis lupus) and bears (grizzly bears Ursus arctos, and/or black bears, U. americanus) can maintain moose populations within a low-density dynamic equilibrium (LDDE) for extended periods in unexploited and lightly harvested systems. . . ." Determining which if any of the predators are the primary predators of a given population is the first

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challenge to wildlife managers. Once that information is clear, then appropriate management decisions can be made accordingly.

Layne Adams, discusses multi prey and predator systems, and the challenges they pose to biologists in the following passage:

Areas of the state where wolf management is the most controversial have two or three large predators (wolves, brown/grizzly bears, and black bears) and either primarily moose as prey or several prey species (moose, caribou, and Dall sheep). These multi-predator and multi-predator/multi-prey systems are obviously more complex than systems with one predator and one large prey species. For example, a second prey species can either increase predation on the initial prey species . . . or reduce predation. Also, bears and wolves vary in their importance as predators on ungulates with age of the prey, season of the year, density of prey, and density of the predators. The effects of these predators on their prey can be additive to each other, replacements for each other or anything in between.

. . . In places where wolves and bears occur together, predation can maintain moose populations at low levels, but apparently this does not apply to caribou. . . . It is not clear whether moose populations can "escape" from this limitation by predators on their own, but in some of Interior Alaska nearly two decades of low moose abundance have gone by, with no indications of change in the near future. On the other hand, several caribou herds in the state are increasing even though they are faced with both bear and wolf predation. Where moose and caribou overlap, increasing caribou herds may divert predation pressure from these low-density moose populations and give them the opportunity to increase. 72

Other factors to consider are the effects of management actions on these multi-predator/multi prey systems. For example, possible wolf-bear competitive releases may occur in these systems, and social fragmentation of wolves during wolf control may effect the amount of predation in a system. Gordon Haber explains these phenomena in the following passage:

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Wolf control applied unnecessarily to a wolf/bear-moose system could end up prolonging a moose recovery and necessitating heavier bear control, because of a potential for wolf-bear competitive release: Under natural conditions, wolves frequently harass bears that hunt moose in the same areas; removing wolves via control may allow some of these bears to increase their predation activities. Furthermore, partial, random wolf control does not necessarily result in a proportionate reduction in wolf predation and could lead to more of it, because of increased social fragmentation of the wolf population, exaggerated kill rate changes (e.g., pairs may end up killing as often as groups of 6-7), and other nonlinear effects involving not only the relationship between wolf numbers and wolf predation but also between both of these variables and ungulate numbers.

For these and other reasons (including access, size and vastness of the state, and resulting difficult enforcement dilemmas), the challenges accompanying wildlife management in Alaska are unique in the United States.

One other area relevant to this paper which continues to puzzle biologists involves caribou ecology. Caribou and their dramatic population fluctuations have left biologists pondering many unanswered questions, and subsequently exploring differing theories and management approaches regarding caribou population dynamics. For example, an ADF&G study by Davis et al. (1991) reported:

We possess only rudimentary understanding of the relationship between movements and distribution and the demography of caribou herds. . . Opposing views are emerging among caribou biologists regarding basic social organization of caribou, including herd identity, definition, and fidelity to calving areas and seasonal ranges (Bergerud et al. 1984, Carruthers 1985, Martell and Russell 1985).73

In spite of the opposing views, it does appear widely accepted that caribou populations fluctuate from extremely high numbers to low-density

populations, the latter which can last for extended periods of time. Davis et al. (1991) stated:

Empirical data from individual case histories suggest that recurrent fluctuations are the only model supported. It can be argued theoretically that this is an artifact of several of the models working interactively. The empirical evidence suggests that low, relatively stable equilibria densities of caribou are frequent for periods of time, but there is growing evidence that caribou frequently escape predation and attain high densities.74

For example, in one of the areas targeted for wolf control in 1992, the Fortymile caribou herd is thought to have numbered between 500,000 and one million animals during the 1920's, and was considered one of the largest herds in the world. It then decreased in size during the 1930's and reached a low of about 10,000 - 20,000 animals during the 1940's.

In lieu of these apparent natural population fluctuations, ADF&G's ultimate goal in their 1992 Area Specific Plan regarding caribou is to stabilize caribou populations so that they maintain specific population levels over prolonged periods of time. Haber suggests the Department's orientation is, "a 'farming' approach [which] seeks to maximize annual yields . . . with little if any concern for the natural patterns of change, behavior, movements, etc. of the target population or its natural interactions with other populations and species."75 While the Department seeks to create a stasis among certain caribou herds, Haber suggests allowing natural population fluctuations to occur, which he believes will ultimately benefit caribou, other wildlife affected by caribou and Alaskans in general -- both hunters and non-hunters alike.

74Ibid., p. 49.
There is substantial evidence suggesting that caribou expand their ranges as their numbers enlarge, and some have been known to mix with other herds as a result. For example, the Mulchatna caribou herd in southwestern Alaska, which has grown from approximately 1,000 caribou in 1949 to ~110,000 in 1993, is presently moving into areas it has not entered for between fifty and one-hundred years. Also, populations considered to be remnants of once larger herds, are still part of an unsolved puzzle. The Delta and Yanert herds in interior Alaska, for example, are thought to be remnants of the Fortymile caribou herd, and were considered distinct herds until 1987. Distinct herds are defined by many caribou biologists as those which are believed to remain faithful to specific birthing areas, and therefore are unique or separate from other herds. In 1987, the then increasing Delta herd overlapped the Yanert range, and has continued to share habitat and birthing grounds with the Yanert herd. These two populations are now considered a single herd, and their union begs many questions, including: 1) what would happen to this combined herd if the Fortymile herd reached peak numbers again? and, 2) would it intermingle with the Fortymile, becoming part of it, and lose its distinct identity? These and many other questions about caribou remain unanswered.

One theory, which originates primarily from R. O. Skoog's research during the 1960's and '70's and is supported by Haber, suggests that, left up to natural fluctuations, caribou herds in Alaska and the Yukon's interior interact with each other as a single system, oscillating between high and low

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population levels with accompanying range shifts and dispersals. Haber clarifies:

System-wide (Alaska-Yukon) caribou changes are driven primarily by long term variations in the 6-7 major herds. . . . Per details given in Haber (1977, 1990, 1991a, 1991b) and Haber and Walters (1980) - i.e., emphasizing a continuing rapid increase of the Western Arctic Herd toward a range-limited peak and simultaneous temporary suppression of the major central herds, it should be possible to restore the dominant pre-1960's Alaska -Yukon pattern of asynchronous peaks, lows, and region-to-region shifting. A return to this more natural system behavior could result in much larger (system-wide) numbers of caribou and a higher average annual statewide caribou yield - perhaps as much as double or triple the present harvest, without a need for wolf control. . . . The major centers of harvesting would shift from region-to region (at intervals of decades), much the same as they did for at least 8,000 years prior to the mid 20th century, when Alaskans apparently were able to hunt caribou nomadically on a large scale even without the benefit of the airplanes, highways, ATV's, snowmachines, and other advanced technology that are now available to assist us.77

Some caribou experts have criticized this theory and approach to management for lack of evidence. While at this time it certainly is not clear whether or not Alaska-Yukon caribou actually can operate as one system given the right set of circumstances, it seems premature to rule out all aspects of this theory given our "rudimentary" knowledge of caribou, and the relatively short time biologists have gathered more accurate information about these ungulates. In support of Haber's theory, Theberge writes:

There is no reason to suppose that ecological and evolutionary processes do not operate over such a broad scale. The fact that we do not understand these operations is a constraint imposed by the spatial and temporal scale of scientific inquiry which we can conduct. Yet a sensitivity to the existence of these mega-patterns is important if there is any desire to manage wildlife within any semblance of an ecosystems and landscape context. To try to stabilize naturally fluctuating systems, over any extended periods of time, is simply ecologically wrong. . . . From a political standpoint you may feel compelled to spend public

77Ibid., p. 21.
money to speed things up. From an ecological standpoint, a rapidly increasing ungulate population has a different effect on vegetation than does a more moderately expanding one.\footnote{John B. Theberge, PhD, Professor of Ecology, University of Waterloo, "Brief Comment on G.C. Haber's "Wildlife Management in Alaska", January 14, 1993, p. 1.}

It is also quite feasible that, even if the type of interaction Haber and others suggest existed between the major herds at one time, this interaction may never resurface due to human encroachment and impacts on caribou ranges.
While it is true that many questions remain unanswered within the field of wildlife management, there appear to be some clearer paths wildlife managers and policy-makers can take which, considering the body of knowledge already available, seem more appropriate than others.

NELCHINA/SUSITNA BASIN IN SOUTHCENTRAL ALASKA, GMU 13:

Bordered by the Alaska range to the north, the Chugach range to the south, the Wrangell Mountains to the east and the Talkeetna range to the west, Game Management Unit 13 includes 23,376 square miles (45,000 square kilometers), the largest of the three areas targeted for control. This area consists of a large basin which is drained by the Matanuska, Susitna, Copper, Nenana and Delta river systems, and is spotted by spruce forests, lakes, streams, muskegs and ponds in the lowlands. Alpine tundra and shrub lands are important to wildlife at slightly higher elevations. Approximately 31% of the unit is above 4,000 feet elevation, and consists of rock, glaciers and snowfields. Currently there are healthy populations of moose, Dall sheep and caribou in the area. Wolves and grizzly bears populate this unit, and have been heavily hunted and controlled in this area since the 1940’s. Eighteen percent of the annual statewide harvest of caribou and moose takes place in GMU 13.

Nelchina Caribou Herd:

The Nelchina caribou herd finds its home range within this area, a herd currently numbering approximately 45,000. The Nelchina herd’s habitat
includes the Copper River and Upper Susitna River basins and the mountains found within and bordering the region (please see appendix 1 and 2 for home range of the Nelchina caribou herd). Calving occurs in the eastern portion of the Talkeetna mountain range.

Researchers believe that the Nelchina herd has peaked twice in the past 100 years, once in the mid-1800's and again in the early 1960's. After its first peak, the herd is thought to have declined for close to seventy years, finally increasing again between 1942 and 1962. Biologists suggest that the herd numbered up to 70,000 at its peak in the 1860's, and then declined for seventy years following, until it reached a low of approximately 10,000.

Between 1848 and 1885, the population was considered very abundant, and ranged from the Talkeetna Mountains eastward over the whole Copper River basin (Skoog 1968). In later years, when the herd size had decreased, the caribou population was found to remain closer to the Talkeetna mountains.

There are discrepancies regarding population estimates throughout the literature discussing the Nelchina caribou herd. Censusing techniques have only recently become more accurate, and, therefore, many previous attempts at estimating herd sizes were inadequate. The first aerial survey completed for the Nelchina herd was in 1948, when approximately 4,500-5,000 caribou were counted. The technique used in this initial survey was later questioned regarding accuracy. It is now thought that a more valid assessment of the herd would have numbered 10,000 for that year.

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80 Ibid., p. 163.
81 Ibid., p. 163.
In a paper presented to the First International Reindeer and Caribou Symposium, Bureau of Land Management biologist, J. E. Hemming (1972), indicated the following population estimates for the Nelchina Caribou herd between 1948 and 1967:

<table>
<thead>
<tr>
<th>Year</th>
<th>Estimate</th>
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<tbody>
<tr>
<td>1948</td>
<td>10,000</td>
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<td>1956</td>
<td>45,000</td>
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<td>1957</td>
<td>48,000</td>
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<td>1961</td>
<td>69,000</td>
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<tr>
<td>1962</td>
<td>71,000</td>
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<tr>
<td>1967</td>
<td>46,000</td>
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</tbody>
</table>

Researcher R. O. Skoog (1968) believed the Nelchina herd likely exceeded 80,000 in the early 1960's, whereas Hemming above estimated the herd at approximately 70,000. Van Ballenberghe (1985) believes, "the evidence indicates that the autumn 1964 population was larger than that of any preceding year and likely exceeded 90,000 animals." During the late 1960's, the Nelchina herd began a dramatic decline, and again how much the herd actually declined is not clear. By 1972, photocensus estimates indicated the herd had crashed and numbered a mere 8,094, however other ADF&G biologists have indicated it dropped only to about 10,000. Discrepancies embracing as large a margin of error as between 2,000 and 10,000 animals can significantly change the outcome of wildlife management decisions and seriously impact wildlife populations.

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82Ibid., p. 163.
84Ibid., p. 712.
While biologists continue to disagree about which factors most significantly affect caribou demographics, it is generally accepted that the Nelchina herd probably experienced its radical decline in the 1960's due to a combination of over-hunting and severe winters. Other possible causes of decline include: 1) egress, where potentially large numbers of Nelchina caribou moved to other ranges, such as to the Fortymile area; 2) lowered recruitment, which has decreased since the mid-1960's due to hunter selectivity and a decline in the number of females in their prime reproductive years (ages 2 - 5). The percentage of females found in the kill steadily increased overall from 25% in 1957 to 53% in 1971; 3) calf production, which may have been lowered due to range degradation; 4) calf mortality, due to weather and predation. 1972 was the worst winter on record and resulted in the latest recorded spring migration of the Nelchina herd. In addition, the wolf population had increased since 1963, perhaps because it was shadowing the increase in caribou numbers; 5) increased adult mortality, due to hunting and wolf predation.\(^8^6\)

Hunting pressure increased on Nelchina caribou after 1954, when harvest levels rose both absolutely and proportionately.\(^8^7\) Between 1955 and 1962, it is estimated that an average of 8% of the adults were harvested. Harvest levels were consistently higher during this period due to longer hunting seasons, greater use of off-road-vehicles and snow machines.\(^8^8\)

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\(^8^8\) G. N. Bos, "A Partial Analysis of the Current Population Status of the Nelchina Caribou Herd," Biological Papers of the University of Alaska, Special Report Number 1, September, 1975, Proceedings of the First International Reindeer and Caribou Symposium, 9-11 August,
During the years between 1964 and 1972, the hunting season was extended three months, and harvest levels averaged 6,300. This harvest level occurred during the period of dramatic decline for the herd. A record harvest occurred in 1971 - 1972, when greater than 9,000 caribou were taken. This harvest was larger than the estimated population size the following fall.89 Between 1972 - 1981 harvest rates were drastically reduced when the hunting season was shortened, bag limits were reduced and a permit system initiated in order to reduce the number of hunters participating. Over the following decade, the herd began to increase, and by 1981 it was thought to contain 20,730 caribou.90 During the last decade, the herd continued to grow, and in 1992, when the ADF&G's Area Specific Management Plan for South Central/Interior Alaska was released, the herd numbered approximately 45,000.

As stated in the plan, the ADF&G's population objectives for the Nelchina caribou herd were to:

...stabilize the herd at about 40,000 total animals in 1992 with a minimum of 40 bulls/100 cows and 40 calves/100 cows; and to maintain 1990 - 92 levels of animal growth and condition. Herd size and the bull: cow ratio presently exceed population objectives.91

ADF&G, then, wanted to reduce the number of caribou in the herd because at that time, the herd exceeded population objectives by 5,000 animals. Further, ADF&G stated in a report about the Nelchina caribou herd between 1990 - 1992:

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80ibid., p. 712
Currently, wolf predation does not present a biological problem in the Nelchina herd as it is not resulting in a population decline. . . Wolf predation on Nelchina caribou is unknown.92

ADF&G information regarding wolf predation and its effects on the Nelchina herd does not build a strong case supporting wolf control. To the contrary, ADF&G biologists have concluded that wolf predation does not present a biological problem in the herd and wolf predation effects on the Nelchina herd are unknown. ADF&G's proposal to manage by killing wolves for no substantiated biological reason did not serve to win over public support. It served only to heighten controversy and further erode the public's confidence in ADF&G's professional expertise and decision-making abilities regarding wolf management. The Strategic Wolf Management Plan was intended to be a plan everyone could live with. If the Department was seeking public backing for its wolf plan, it should have presented better information and a stronger case supporting the need for wolf control.

Moose in GMU 13:

In the Area Specific Plan for South Central/Interior Alaska (January 1992), ADF&G reports that the moose population numbers approximately 22,000 in GMU 13. This number translates into a density of 1.4 moose per square mile of area below 4,000' in elevation in this unit. Moose density has hovered between 1.4 and 2.0 moose per square mile between 1986 and 1992.93 ADF&G also indicates that the current population size, "is a relatively high-

density moose population for interior habitats."\(^{94}\) According to ADF&G, GMU 13 moose increased during the 1950's, reaching a peak in 1960. The winter of 1961-62 was severe, and precipitated a moose population decline. In addition, severe winters in 1965-66 and 1971-72 are also thought to have decreased the moose population. The winters of 1972 through 1975 were relatively mild; however the GMU 13 moose population remained low, according to the ADF&G, with a calf:cow ratio of 15:100 in 1975. A study was initiated by ADF&G to try to determine what factors were affecting moose numbers.\(^{95}\)

Wolf predation was believed to be the reason moose numbers were not increasing. However, food habit research on the wolf in GMU 13 concluded that, "moose comprised the bulk of the year-round diet [of wolves], but rates of predation on calves were not sufficient to cause the low moose calf:cow ratios in the basin."\(^{96}\) In addition, moose pregnancy rates were normal (88%), and the physical condition of moose in the Nelchina Basin rated, "high, and indicated that deteriorating range conditions probably were not the cause."\(^{97}\)

The Department began a close study of moose calf mortality in three areas of the Nelchina and upper Susitna river basins. This study assessed the effects of wolf predation on moose calf survival in part by eliminating wolves from certain areas and lowering wolf densities. The first area, "Area 1, the Susitna River Study Area (SRSA), was chosen because the gray wolf population was already low (1 wolf / 567 sq. km), compared to the two other areas where wolves occurred on the average every 277 sq. km. The low wolf

\(^{94}\) Alaska Department of Fish and Game, Division of Wildlife Conservation, Area Specific Wolf Management Plan for South Central / Interior Alaska, September 9, 1991; p. 15.
\(^{96}\) Ibid., p.336.
\(^{97}\) Ibid., p. 336.
density in the SRSA, an 8,000 square mile area, was the result of a wolf elimination program by ADF&G five years earlier (1976-77). During this study (Ballard et al. 1981), 136 moose calves were radio-collared in the three study areas during 1977 and 1978. Ballard et al. (1981) were able to determine the fate of 96% of the calves radio-collared, and lost contact with three radio-collared calves. Thirteen calves, or 9.5% died as a result of abandonment from radio-collaring activities. Sixty-six (55%) of the remaining 120 calves, died during their first six months of life from natural causes. Eighty-six percent of those naturally caused deaths resulted from predation. The biologists found that, in all three study areas, the most significant predator impacting moose calves was the brown bear. Brown bear kills accounted for 79% of the natural mortality of radio collared moose calves. Further, the researchers learned that, "the differences in wolf density among the study

**Predator control literature suggests, and ADF&G often justifies its wolf control programs by stating, that exploited wolf populations restore themselves within a couple of years. Here is one example found in ADF&G's own literature where this simply is not true, where perhaps unknown environmental or human-impact factors are limiting the wolf population. There are other areas in Alaska where wolves appear to have never completely recovered after wolf control programs, including the Arctic (Van Ballenberghe, "Wolf Management in Alaska: Are We At A Crossroads?", Institute of Northern Forestry, 201 East 9th Avenue, Suite 206, Anchorage, AK 99501; Paper Presented at the IUCN Wolf Specialists Group Species, Survival Commission Meeting, Fairbanks, AK, 12 August, 1988.), northern Bristol Bay Area(ADF&G, Wolf Survey Inventory Report, 1 July, 1991 - 30 June 1992), Denali State Park, where wolves have been virtually eliminated for almost 15 years (Dan Elliot, State Park's Citizen Advisory Board member, "Crying Out For Denali State Park Bears!", The Spirit, News from The Alaska Wildlife Alliance, Vol 12, No. 1 January - February, 1993, p. 9.) and some areas of the Fortymile country (an individual from the Tok area wrote to the Board of Game during the 1992 wolf controversy expressing his concern over certain areas in the Fortymile area where wolves had not repopulated since the last round of wolf control). Also, wolves have successfully been depleted or removed from regions where reindeer herding currently is practiced in Alaska. ADF&G divulges no information regarding the loss of wolf populations in certain parts of Alaska. Since there has never been a complete census done of wolves in Alaska, there has never been, and still is no concrete point of reference for wolves in many given areas of the state. Most of ADF&G's literature suggests the wolf population in Alaska is healthy and totals between five and seven thousand. There are no indications that wolf numbers have fallen in certain pockets of the state, and the situation remains that population trends cannot be effectively monitored across the state due to current lack of information.
areas did not appear to be an important factor affecting calf mortality."\(^{99}\)

Preliminary data indicated that either small or no increases occurred in the calf : cow ratio following wolf population reduction. Ballard et al. concluded that, "no substantial increases in calf survival were observed following reductions in wolf densities. The hypothesis that wolf predation was the main cause of moose calf mortality in the Nelchina Basin (Bishop and Rausch 1974) is not supported."\(^{100}\)

In other words, ADF&G's own data, biologists and published literature conclude that wolf control in GMU 13 has little or no effect on moose calf survivorship. More importantly, Ballard et al. (1981) found that brown bears were the most significant predator of moose calves. All other things being equal, calf survivorship is one of the most critical components in herd growth, as long as the habitat and environment (both external and internal) of the herd is healthy and can withstand growth. This information does not support a measure to implement wolf population reduction in order to increase moose population numbers.

**Wolves in GMU 13:**

Since the 1940's, when the federal and later state governments got involved, wolves in GMU 13 have been subject to exploitation and population control. Little is known about the status of wolf populations in GMU 13 prior to 1948. Early reports by explorers suggest that both wolves and ungulates were scarce in this area in the late 1800's.\(^{101}\) During the 1930's, wolf

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\(^{100}\)Ibid., p. 342.

sightings increased and wolves were considered to be more common, as was
documented in Murie’ reports (1944) and indications from a local resident
and pilot. Federal programs to eliminate wolves began in the 1940's in this
area. Using poisoning and aerial gunning, the federal government reduced
wolf density in GMU 13 significantly between 1948 and 1953. It is believed
that only twelve wolves were left in the area by 1953 (Rausch 1969). In
1957, biologists estimated the Nelchina caribou herd to be close to its carrying
capacity, and the Secretary of the Interior stopped all wolf hunting in GMU 13
in order to allow for research on undisturbed predator-prey interactions. Also
increased predation was desirable because the herd may have been nearing
carrying capacity. ADF&G biologists believe that wolves increased to
approximately 125 by 1961, after the federal control program was stopped and
when the moose population was thought to be at its peak. Biologists then
thought that wolf numbers, "may have increased to a peak of 350-450 by 1965
when the moose population was declining (Rausch 1967, 1969; Bishop and
Rausch 1974)."

During ongoing predator/prey relationship research in this unit between
1975 and 1984, wolf densities in GMU 13 (not including the Susitna River
Study Area (SRSA) and areas above 1,220 meters in elevation) varied from
10.3 wolves/1,000 sq. km in autumn 1975 to 2.6/1,000 sq. km in spring 1982.
By extrapolating wolf density estimates to available wolf habitat in GMU 13,
including the SRSA, GMU 13 biologists estimated that wolf populations ranged from 426 wolves in autumn 1975 to 109 in spring of 1982.

It is thought that wolf numbers reached their peak in 1975 - 1976, but declined each year after as a result of aircraft-assisted ground shooting and state wolf control programs. Ballard et al. found during their studies between 1975 - 1982 that trapping and aircraft assisted hunting were responsible for up to 61% of the mortality of wolves. Natural mortality was in addition to hunting and trapping, and was responsible for 20% of wolf deaths. State wolf control between 1977 - 1978 accounted for 6% of wolf mortality. Ballard et al. (1987) concluded that the wolf population was being controlled primarily by human hunting and trapping. They found that, "mortality levels and rates of increase were inversely correlated, indicating that this wolf population was being controlled primarily by human harvest." Ballard et al. (1987) indicated that an overall mortality rate of 50% would keep the wolf population in GMU 13 stable.

This information is curious in light of the fact that wolf densities overall in Alaska are low when compared with other wolf densities in North America, and wolf populations throughout much of Alaska are limited by human harvest. A table of reported wolf densities (published in 1987) indicates that during the 1970's and 1980's the reported wolf densities in Alaska were as follows:

<table>
<thead>
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<th>Area</th>
<th>(wolves/1,000 sq. km)</th>
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<td>Tanana Flats, AK (Stephenson 1977):</td>
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<td>Nelchina Basin, AK (Ballard et al. 1975-82):</td>
<td>3-10</td>
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<td>Brooks Range, AK (Stephenson 1975):</td>
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<td>Kenai Peninsula, AK (Peterson et al. 1984):</td>
<td>11-20</td>
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107 Ibid., p. 28.
Reports from other parts of North America included:

Superior Nat'l Forest, MN (Van Ballenberghe et al. 1975): 42
Beltram Island State Forest, MN (Fritts and Mech 1981): 7 - 30
Algonquin Park, Ontario (Pimlott et al. 1969): 39
West Canada (Carbyn 1975): 4
Baffin Island, Canada (Clark 1971): 3
Manitoba, Saskatchewan and Northwest Territories (Parker 1973): 2

These numbers suggest that portions of Canada and Alaska have similarly low wolf densities.

While it may perhaps be argued that overall Alaska and Canada's habitats do not allow for densities as high as other parts of America, it is important to realize that parts of Canada and Alaska have undergone similar wolf management approaches. Wolves can and have reached higher densities in Alaska than are indicated in the majority of areas above, and Alaska's habitats and certainly GMU 13 can withstand greater densities of wolves than exist there now. However, since the federal government began wolf control programs, and subsequently since the state took over the stewardship of wildlife in Alaska, management approaches in general have been to maintain wolf populations below what the habitat and prey species can support. The 1992 Area Specific plan is a perfect example of this type of practice. The goal for wolves in GMU 13, as stated in the Area Specific Plan, is, "maintaining wolf numbers substantially below their potential."\textsuperscript{109}

Wolf densities in GMU 13 have been significantly limited without state sponsored control, due to heavy exploitation of wolves through regular hunting and trapping practices. In GMU 13 and in other GMU's in Alaska, wolf control programs are an additional pressure to wolf populations which

\textsuperscript{108}Ibid., p. 25.
\textsuperscript{109}Alaska Department of Fish and Game, Division of Wildlife Conservation, Area Specific Wolf Management Plan for South Central / Interior Alaska, September 9, 1991; p. 52.
are already being maintained at a significantly reduced level. Wolf specialist, Paul Joslin, stated regarding wolf density in Alaska:

Only now is the public coming to recognize that, while Alaska could at one time boast that it had the highest density of wolves to be found anywhere in America, today it is a poor second, falling far behind Minnesota.110

A recent letter to the editor in the Anchorage Daily News, written by J. Michael Devitt, echoed Joslin's comments:

Surely in a state the size of Alaska, which has far fewer wolves per square mile than Minnesota; which has far fewer people per square mile than Minnesota; and which has a hunting population similar in size to Minnesota, we should be able to co-exist with a few thousand wolves.111

Wolves in GMU 13 and the Alaskan wolf population overall are undergoing continuous human harvest pressure and exploitation. This pressure is similar to current practices regarding coyotes in the contiguous United States referred to in chapter one.

Ballard et al. (1987) learned that moose composed approximately 70% of wolf kills in GMU 13. During May and June, 30% of moose killed by wolves were moose calves, which was less or in proportion to the calf : adult ratio. This changed during winter months, when 40% of the kills were calves, and calves represented only 12-20% of the population. This information suggests that moose calves were perhaps more vulnerable than adults in winter due to environmental factors such as snow cover. Adult moose were the most common prey for wolves, composing 38% of the observed kills (total of 439).112

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110Paul Joslin, PhD, Director of Research and Education, Wolf Haven International, Letter to Governor W. J. Hickel, January 16, 1993, p. 3.
Ballard et al. (1987) concluded that wolves were not inhibiting the growth of the moose population in GMU 13. Based on a model created by Keith (1983), where a "ratio of 132 moose : wolf prior to calving would be sufficient to produce a stationary moose population if kill rates equaled 8.1 adult moose/wolf/year," Ballard et al.'s (1987) study ascertained that moose : wolf ratios between late spring 1980 through late spring 1984 were too high to stabilize growth of this moose population. They determined that:

Comparison of yearling moose recruitment rates in 1980 - 81 and 1983 - 84 with estimated mortality due to wolf predation indicated that wolf predation was not preventing moose population growth at that time.\(^{114}\)

It seems quite possible that even with a higher wolf density, wolf predation would not have impeded the increase of the moose population in GMU 13. Data that Ballard et al. (1987) presented regarding their study illustrates that, in 1980 - 1981, wolves were estimated to have killed 78 adult and yearling moose in a 2,435 - sq. km. portion of the SRSA. This was the equivalent of 6% of the adults and yearlings present on June 1, 1980. The following year's recruitment rate totaled 24% of the population. Likewise, in 1983-4 wolves were estimated to have killed 97 adults and yearlings in a 3,735 sq. km. area of the SRSA, which represented approximately 4% of the adults and yearlings present on June 1, 1983. The following year's recruitment rates were estimated at 19%. Thus Ballard et al. (1987) concluded in both instances that wolf predation during low wolf densities (the wolf population was decreased by approximately 50% in the 7,262 sq. km SRSA in GMU 13 from

\(^{113}\)Ibid., p. 42.
\(^{114}\)Ibid., p. 44.
approximately 425 in 1975, a pre-control level, to approximately 109 by
1982\textsuperscript{115} did not prevent the moose population from increasing.

In either of the above mentioned kill estimates, if one imagines that
wolf numbers had not been reduced (making them 50% higher than they
were for the above results either before or after the control period), and if
subsequently the moose kill rates doubled for '80 - 81 and '83 - 84, the
following spring recruitment rates still would be significantly higher: 12%
moose killed out of 24% recruitment rate in 1981, and 8% moose killed out of
a 19% recruitment rate in 1984. Doubling the kill rate for a 50% increase in
the wolf population is likely greater than a realistic proportional increase
would be because wolves in larger packs do not necessarily kill
proportionately more.\textsuperscript{116} This could suggest that even at higher densities, the
predation rate by wolves may not impede the moose population from
increasing.

ADF&G's research regarding wolves in relation to both caribou and
moose in GMU 13 does not suggest that wolves are limiting either
population. To the contrary, it indicates that wolves, at either low or higher
densities are taking well below recruitment rates for either moose or caribou.
There is no apparent support in ADF&G literature for implementing wolf
control.

The type of wolf control proposed for GMU 13 was very controversial
and did not gain support from the majority of the public. ADF&G
recommended that the public be involved in fixed-wing aircraft-assisted
hunting, or "land-and-shoot" hunting or "aerial trapping" ("land-and-shoot"

\textsuperscript{115}Ibid., p. 24.
\textsuperscript{116}Gordon C. Haber, Ph.D., "Wildlife Management in Alaska: Southcentral-Interior Wolf
Control and Related Issues, Wolf Haven International, Tenino, WA and The Alaska Wildlife
hunting and "aerial trapping" are identical practices, only implemented under different permits). This type of hunting allows individuals to be airborne the same day they shoot wolves (which is illegal for most species because it easily leads to harassment, violations of the Federal Airborne Hunting Act and excessive killing), and also allows for planes to track wolves from the air. This practice is very controversial for Alaskans, and was banned in 1991 after an incident involving gross violations and illegal wolf hunting practices by an Anchorage orthopedic surgeon that attracted national media attention. Some background information about this practice may put it into perspective and illustrate the ephemeral nature of the state of Alaska's wildlife management decisions:

Dr. John ("Jack") Frost was a known wolf-hunting advocate in Anchorage, and had testified before the Board of Game in favor of aircraft assisted hunting and trapping. In 1991, Frost, was arraigned on charges that he violated the Airborne Hunting Act, the Lacey Act, and participated in illegal hunting and trapping in a National Wildlife Refuge in 1991. Radio transmissions recorded by the National Park Service were submitted as evidence against Jack Frost in court, and excerpts of these tapes are as follows:

"They're right under my right wing right now, heading the same way I am, so I'm going to ride over this way a little more."
"The front two are considerable bigger."
"OK . . . they're doing good right now."
"Well . . . I'm north of you . . . is that the way you're going to push them?"
"Shot at wolves twice . . . let him go for now."
"We had five on the run, shot two."
"Jimmie got one."
"He wasn't completely dead . . . We'll go back later. The damn thing jumped up and bit my wing."
"It's always fun. Yes, Jimmie saw them."
"I wasn't paying attention too much, except for tree tops and trying to move him back on to the lake."
"Hello Jack."
"Is this Bill?"
"Skipper said, thank you, Jack."
. . . "Jimmie stuck three arrows in him."
"He was still blinking his eyes at us, so I didn't want to take a chance of getting bit, so we'll go back a little bit later."
"He had an arrow up his ass and he didn't like that one bit."117

The Alaska Wildlife Alliance reported more on the case:

Further investigation on the ground in this area revealed wolf tracks, within the Kanuti National Wildlife Refuge, that showed abrupt changes in direction, including sharp reversals in course, periodically intersected by aircraft ski tracks in a snaking pattern atypical of a normal landing, taxiing or take-off pattern. The snow was three feet deep and the wolf tracks "showed a wolf falling down occasionally and between leaps were spots of urine, indicating the wolf to be exhausted and under stress." Aircraft and wolf tracks of this nature at five different sites indicated aircraft on the surface had been chasing wolves. Several skinned wolf carcasses which had apparently been shot with rifles and/or bow and arrow were found in the area.118

Alaska is a vast state with limited funds for enforcement personnel. The state cannot ensure that hunting, especially aircraft-assisted hunting, is practiced legally.

In an interview in the spring of 1991, before same-day airborne hunting and trapping was banned, former ADF&G biologist and Board of Game member, and current United States Forest Service biologist, Victor Van Ballenberghe, stated about "aerial trapping" and land-and-shoot" hunting:

I think that we probably ought to eliminate land-and-shoot hunting. It's something that's been done for quite some time; it's a tradition and it has a lot of supporters. But to me, it is fraught with problems and, to me, the only way to solve those problems is really to prohibit the

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117Wayne Hall, ed., "Alliance Interview With Dr. Vic Van Ballenberghe Continues . . .," The Spirit, News From The Alaska Wildlife Alliance, March - April, 1991; Vol, 10, No. 2; p. 3.
118Ibid.
practice. I don’t think we can solve the problems and still permit the practice.\textsuperscript{119}

When asked if he thought aerial trapping and land-and-shoot hunting had been used in such a way that the public was actually involved in ongoing wolf control, just not control which was so deemed officially by the state, Van Ballenberghe responded:

They have been in the past, in my opinion. I’m not sure about the present. In some of the areas where land-and-shoot was resurrected at the November, 1989 Board of Game meeting, there was no need to resurrect it for control purposes because the number of wolves in relation to the prey there was so low that the wolves really weren’t having any impact on moose and caribou populations, or the harvest. As I say, I’m not sure what the situation is now, but in the past, in my opinion, land-and-shoot was endorsed by a lot of people who felt that if land-and-shoot went away, that wolf populations would go sky high and impact moose and caribou.\textsuperscript{120}

The plans for GMU 13 seemed to be repeating history in Alaska. Wolf control was not warranted biologically, but was nevertheless promulgated based on tradition and an unfounded fear that if wolves are not removed, wolf populations will multiply in an unlimited fashion.

ADF&G’s published literature for GMU 13 indicates that the Nelchina caribou herd has exceeded the Department’s population objectives, that wolf predation is neither limiting nor presenting a biological problem for the Nelchina herd, and that wolf predation effects on the Nelchina herd are unknown. In addition, the moose population is reported to be healthy and at a "high-density level" for its habitat. Long term studies in the area which compared lower and higher density wolf populations and their varying effects


\textsuperscript{120}Ibid.
on moose yielded that no significant increases in calf survival were observed following wolf reduction. Wolf predation was found not to limit or hinder moose population growth in this area.

In spite of these conclusions, the ADF&G proposed wolf control for this area. The justification given for this action was:

Moose and caribou are abundant in GMU 13. The wolf population is highly productive because of the plentiful prey base. Annual pup recruitment can account for 30-40% of the population. At current population levels, unless a significant proportion of annual recruitment is harvested, wolf numbers will increase. Only by maintaining wolf numbers substantially below their potential can human use objectives for moose and caribou populations be achieved.121

This justification, however, is not supported by ADF&G's own literature, and wolf control does not appear to be justifiable. ADF&G information indicates that brown bears are playing a significant role in predation of moose, and that killing wolves is not likely going to lead to the Department's desired results. Many involved in the debate questioned the intent of the plan and the integrity of the Department. Is this an example of the Department's "anti-wolf" mentality that Theberge speaks of? To many ecologists and scientists, environmentalists, animal-rights activists and general members of the public, the answer is, 'yes.' Director of Wildlife Conservation, Mr. Kelleyhouse, seemed to be pushing his own agenda through the public process.

121 Alaska Department of Fish and Game, Division of Wildlife Conservation, Area Specific Wolf Management Plan for South Central / Interior Alaska, September 9, 1991; p. 52.
The Tanana Foothills and Flats area (GMU 20A) is located in east-central Alaska, south of Fairbanks. Geographically, this area experiences an abrupt change from the lowlands (Tanana Flats) in the northern portion of this unit to the northern foothills and mountains of the Alaska range (Tanana Foothills). Elevations rise up to 4,000 meters, though ungulate populations generally are not found above 2,000 meters. The Tanana Flats area lies above permafrost with primarily poor drainage, many shallow ponds, bogs, and some clear streams flowing into large glacier-fed rivers. There are some scattered hills in the Flats as well. Fire has played a significant ecological role in the Tanana Flats area, resulting in vegetation consisting primarily of shrubs, young forests and mature black spruce stands. The Tanana Foothills vegetation includes: white spruce, black spruce, paper birch and quaking aspen at lower elevations. Shrub communities including willow and dwarf birch give way to alpine tundra at higher elevations. Winter remains in the region from October through April, with temperatures frequently hovering between -10 to -40 C during those months. Snow levels usually remain below 80 cm.

GMU 20A's proximity to Fairbanks has created high public use and interest in this area. GMU 20A is considered one of interior Alaska's most important moose hunting areas. It has also supported caribou, sheep and, in some parts of the area, aerial wolf hunting activities (much of GMU 20A is forested and therefore does not provide good aircraft-assisted wolf hunting opportunity). Because GMU 20A is primarily used for sport-hunting
activities from residents of Fairbanks and individuals from out of state, this area is considered by the Joint Boards to be a "nonsubsistence use area." ADF&G has targeted this area for intensive management of its wildlife.

**Delta Caribou Herd:**

Not much information on the Delta Caribou Herd (DCH) exists prior to the 1950's. Caribou ranging between the Canadian border and the Nenana River have been documented since at least 1918 (Murie 1935), though their herd identity has not been well understood. Some researchers suggest that the Delta herd and others in proximity to it are remnant populations of the once expansive Fortymile Herd.\(^{122}\)

A handful of separate herds were thought to inhabit areas close to the Delta herd, including the Mentasta, Chisana, Macomb and Yanert herds. Initially, biologists spent time trying to identify distinct herds, using Skoog's (1968) definition which delineates, "... a herd becomes an entity (subpopulation) when it establishes a calving area distinct from that of any other herd and uses this area repeatedly over a period of years."\(^{123}\) Prior to 1987, the Delta herd was considered a distinct herd (please refer to appendix 3 for range of Delta herd). Early reports suggested that the herd contained no more than three hundred caribou during the 1940's - 1950's. During the late 1950's and 1960's it was thought that the herd rapidly increased from

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approximately 1,500 - 3,000 caribou to about 5,000. The herd apparently declined in the 1970's and by 1973 was thought to include 2,400 animals.

Between 1973 - 1979 there were no population censuses done for the Delta Caribou Herd, even though wolf control was either implemented or proposed during these years. Population trends during this time, therefore, are based in part on conjecture. By 1976, biologists thought the herd contained between 1,500 - 2,000 caribou, based on aerial surveys and extrapolations from recruitment rates. During this year, "the population probably began to increase when recruitment increased during 1976. This change coincided with wolf removal and began 3 years after hunting had ended."\textsuperscript{124}

By 1979 population estimates suggested the herd numbered 4,191 caribou. The herd continued to grow exponentially (at a rate of $r = 0.18$) between 1979 - 1982. Once hunting increased, the growth rate slowed, leaving the average growth rate between 1979 and 1989 at 0.10.\textsuperscript{125} In 1987, a growing Delta herd overlapped the Yanert range during all seasons, and since 1988 there has been no biological basis for distinguishing the herds. The Delta herd reached a population high in 1989, when population estimates suggested the herd numbered approximately 10,700. Poor summer calf and adult female survival rates between 1989 and 1991 apparently catalyzed a decline. The Delta herd continued to decline through 1992, at a rate of 40% between 1989 and 1992. Population estimates in 1991 and 1992 indicate the herd now numbers approximately 5,800.\textsuperscript{126}

\textsuperscript{124}ibid., p. 33.
\textsuperscript{125}ibid.
\textsuperscript{126}Alaska Department of Fish and Game, Division of Wildlife Conservation, Area Specific Wolf Management Plan for South Central / Interior Alaska, September 9, 1991; p. 28.
Some researchers speculate that the Delta herd's suggested range, habitat and climatic conditions found within its range limit the herd to low numbers (between approximately 3 - 5,000). A number of researchers indicate that high numbers in the herd (between 7 - 10,000) can only be maintained for short periods due to these environmental limitations. Haber indicates that the known history of the Delta caribou herd suggests that it experiences, "a variety of prohibitive "population responses" and "precipitous declines" [which] are likely to occur at herd sizes above ~5,000-6,000."\textsuperscript{127}

Dry summers and harsh winters are also recognized by ADF&G and many others as factors potentially impacting Delta herd growth. ADF&G biologists, Valkenburg et al. (1992), began a study of the herd to try to determine the reasons for its decline. Their study hypothesized that, "warmer and perhaps drier than normal summer weather played a key role in reducing parturition, and probably conception rates of adult females and reducing body condition in calves and adults. The relatively severe winters of 1989-90, 1990-91, and 1991-92 probably contributed to increased adult, yearling, and winter calf mortality,"\textsuperscript{128} which Valkenburg et al. (1992) attributed primarily to wolf predation. Valkenburg et al. (1992) outlined that the Delta herd decline was caused by, "poor calf survival from birth to October, increased mortality of adult females during winter and summer, and lower May parturition rates in females \( \geq 36 \) months old."\textsuperscript{129} It is interesting

\textsuperscript{129}Patrick Valkenburg, "Investigation of Regulating and Limiting Factors in the Delta Caribou Herd," Alaska Department of Fish and Game, Division of Wildlife Conservation, Federal Aid
to note that other herds declined during the same period, including the Denali, Chisana, Fortymile, Macomb, and Mentasta herds.

Other significant information from the Valkenburg et al. (1992) study includes: 1) the pregnancy rate of radio-collared caribou cows ≥ 36 months old declined significantly in 1990 and 1991, from a mean rate of 87.7% between 1984 and 1989 to 71.6% in 1990 and 1991;\textsuperscript{130} 2) the fall ratio of calves : 100 cows declined steadily and drastically from 65 in 1979 to 8 in 1991, with a significant drop between 1989, 1990 and 1991 when the ratios were 36, 17, and 8 respectively (the average ratio between 1979 and 1989 was 39.9, with the lowest recorded ratio during that decade being 29 in 1982);\textsuperscript{131} 3) the mean weight of 10-month-old Delta caribou herd calves fell steadily from 62.3 in 1983 to 54.0 in 1992 -- the lowest recorded ever (records date back to 1979).\textsuperscript{132}

Valkenburg et al. (1992) suggested that perhaps a combination of snow depth and dry, warmer summers have affected herd growth. Between 1980 and 1989, the average snow fall recorded was 9.6 inches, with the highest snow fall at 25 inches in 1985. In 1990 and 1991, snow fall increased dramatically with 43 and 41 inches recorded respectively. A correlation between calf : cow ratios and snow depth based on preliminary data appears evident. Between 1981 and 1989, the average calf : 100 cows ratio was 35.4. When snow levels leapt to 43 inches, the calves : 100 cows ratio dropped to 17 in 1990, and 8 in 1991. In addition, the mean summer temperature has increased steadily from 56.5 in 1980 to 59.5 in 1991.

\textsuperscript{130} Ibid., p. 5.
\textsuperscript{131} Ibid.
\textsuperscript{132} Ibid., p. 17.
Furthermore, in September of 1992, the Delta herd made an unusual northeasterly movement toward Fairbanks, perhaps indicating environmental limitations of their range had forced an exit. ADF&G reported:

On about 20 September, most of the herd was in the western foothills of Subunit 20A. However, by 28 September, the herd had made a highly unusual northeasterly movement from their normal rutting area in southwest Subunit 20A, and virtually the entire Delta herd was on the Tanana Flats. On 5 October we estimated that 1,600 Delta herd caribou were within 10 miles of Fairbanks based on the distribution of radio-collared caribou. Approximately 700 of these had crossed the Tanana River and were west and north of Fairbanks. Record-breaking snow and cold in September probably precipitated this unusual movement. Twenty-four inches of snow fell in September which is more than three times the previous record snowfall. Temperatures were 13 degrees F colder than average, making it the coldest September on record.133

This highly unusual movement suggests something significant occurred between the herd and what is considered its normal range.

Based on the data thus far, Valkenburg et al. (1992) concluded that:

The fact that there was a significant reduction in pregnancy rate of adult (4 years and older) females in 1990 and 1991 and a significant reduction in mean body weights of 10-month-old females in 1990 - 92 indicates that nutrition of DCH caribou has been relatively poor in recent years. Whether the effects are primarily from poor winter or summer nutrition is still unclear; however, summer nutrition is generally agreed to be the primary factor influencing pregnancy rate.134

Similar problems affecting the Delta herd were determined to exist in 1974, when reproductive failure was found to be a significant contributing factor to the decline of the herd in the early 1970's. Declining caribou calf/cow ratios

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134Ibid., p. 9.
suggested that calf mortality increased steadily between 1970 - 1974, and by 1974 almost all calves died prior to winter.\textsuperscript{135}

In spite of existing data suggesting climactic and habitat condition limitations on Delta caribou, ADF\&G has continued to focus much of their research efforts on wolves and their impact on this herd. Predator impacts on ungulates have been the focus of many ADF\&G ungulate related studies throughout the state. Van Ballenberghe (1985) pointed out that:

\ldots of the factors that influence the demography of caribou and affect their rate of increase, predation, principally by gray wolves, has received much attention. Despite this, caribou biologists disagree on the relative importance of predation as a regulation factor for caribou.\textsuperscript{136}

The most recent and complete study of the demography of the Delta herd, which synthesizes information from the past ten years, is a good example of how wolf predation remains a focus of ADF\&G ungulate studies. Several objectives of the Davis et al. (1991) study on the Delta herd, for example, surrounded wolves and their potential impact on the herd. Their objectives included to determine: "\ldots caribou : predator ratios in the range of the DCH and YCH [Yanert Caribou Herd]; \ldots the correlation between wolf abundance and the number of caribou killed by wolves; [and] \ldots if caribou killed by predators are taken in proportion to their representation in the population in terms of sex and age.\textsuperscript{137} While many other objectives were listed in the


study, habitat, range limitations and climactic considerations, which seem to be significant limitations on this particular herd, were not included.

If ADF&G's aim is to try to present clear data on how wolves limit caribou populations, Davis et al. (1991) did not produce those results. Davis et al. (1991) found that the wolf : caribou and wolf : caribou equivalent ratios for 1975 (prior to wolf control in 1976 - 1982 and 1984) and comparison ratios from 1985 are as follows:

1975: 239 wolves, 2,900 moose, 2,000 caribou = 1 wolf : 45 caribou equivalents
1985 195 wolves, 8,500 moose, 8,000 caribou = 1 wolf : 172 caribou equivalents

These ratios indicate that there were less wolves per ungulate in 1985 than in 1975. Using a model designed by Keith (1983), Davis et al. (1991) determined that in order for the Delta caribou herd to be stabilized by wolves, one-third of their diet would have to be caribou, an equivalent of eight caribou per wolf per year. However, they discussed the results of a study by Gasaway et al. (1983), which revealed that out of 156 wolves taken between 1975 - 1979 throughout GMU 20A, stomach contents occurrence indicated frequencies of: 55% moose and 12% caribou. Wolves were apparently preying significantly more on moose than on caribou in the area, and caribou did not approach the one-third level needed in the wolf's diet to stabilize the herd. In 1977, the ratio of caribou to moose was ~2,000 : 3,300, and, in 1991, it was ~5,700 : 11,072. Given the high percentage of moose Gasaway et al. (1983) found in GMU 20A wolf diets, and that currently there is a larger proportion of moose to caribou than there was in 1977, it seems unlikely that wolves would be preying more on caribou now. It also seems unlikely that wolves,

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138Ibid., p. 42.
139Ibid., p. 43.
either in 1977 or now, are stabilizing or significantly decreasing the Delta Caribou herd. Further, Valkenburg et al. (1992) found with regard to recruitment that, "... 10 month-old calf weight was the most important variable in predicting fall calf : cow ratio, and the caribou : wolf ratio did not explain significant additional variation."\(^{140}\)

Still, ADF&G's focus on wolves in its research continues to highlight the wolf as a primary negative factor on the herd, and arguably perpetuates a negative image of the wolf. The following passage regarding wolves and the Delta herd is an example of this:

> Throughout the history of the DCH there has been a negative correlation between wolf abundance and recruitment rate of caribou; the correlation has been positive between wolf abundance and the natural mortality rate of caribou. Determining if this relationship is one of cause and effect is confounded because of unknown density-dependent relationships within the caribou population.\(^{141}\)

While computer generated graphs may well indicate that such a correlation exists between wolves and the Delta herd, this relationship may not be relevant when determining current problems within the herd. Given that the herd is presently experiencing stresses related to health, nutrition and recruitment rate, highlighting the wolf correlation appears misleading. Many feel that continuing to focus on wolves as the primary negative influence on the Delta herd is misdirected. At present the "high" number of wolves is not what seems to be limiting the herd.

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Julie Kitchens, a Ph.D. candidate in Wildlife Biology at the University of Alaska, Fairbanks, spoke in support of a change of focus within ADF&G research when she testified at the November, 1992 Board of Game meeting. She testified:

"I am a PhD student at the University of Alaska, Fairbanks, working on caribou... I have worked with the Central Arctic Herd, and the Delta caribou herd. I want to talk specifically about the Delta caribou herd since we're talking about intensive management in area 20A. I'm going to go through some history I'm sure that most of you guys know already. Bear with me; it will be short. The Delta caribou herd had 6,000 animals in the '70s before wolf control. At the time they had a 70% pregnancy rate in two-year old caribou, suggesting high nutrition and a very healthy herd. They implemented wolf control, and over a number of years, 80% of wolves were removed. The herd began increasing, but the pregnancy rate for two-year olds dropped to 10%. The herd peaked at 12,000 three or four years ago, and wolves are back to the numbers they were prior to wolf control. In the last three years, the herd has declined by 50% to about 5 or 6,000 animals. The calves are small. The cows are small. The animals are small suggesting that nutrition may be involved, and that it may not be a simple cause and effect relationship between wolves and caribou. The point I want to make is that I would like to see Fish and Game look closely at all parameters: habitat, pregnancy rate, body condition, bull/cow ratios, etc.. If these variables are at a healthy level, and it is concluded that the herd and habitat are in good shape, but that the animals are in a predator pit, I would then support temporary wolf control measures.

The reality of the situation is that ADF&G has not thoroughly researched these other factors; nor have they attempted to educate the public about them as much as they have wolf predation. Rather than trying to figure out what really is ailing the herd and representing a clear picture to the public, ADF&G is once again focusing on wolves. The Department is offering to sacrifice wolves as a "quick-fix" remedy and hoping their efforts will achieve some results. If there is any effect from wolf control on the Delta herd, it will likely be a band-aid cure that is very short lived.
While wolves may hold prey species down at low-density levels for extended periods of time in some situations, such as in a "predator pit*** scenario, this phenomenon is not completely understood. Van Ballenberghe elaborates:

While the literature contains examples of healthy North American wolf populations keeping suppressed prey populations at low levels for periods of time, the literature also contains examples of healthy wolf populations doing essentially nothing to prevent the natural rebound of depressed prey populations of both moose and caribou, including in Alaska.142

Fred Harrington, Ph.D. and Professor at Mount Saint Vincent University, Canada, further clarifies the Delta area situation regarding wolf control, the predator pit theory and how this relates to ADF&G' proposal:

Immediate action (i.e., increased predator control) may temporarily restore the prey, but it may take a long period of habitat recovery before past conditions can return. It would be much better for the ADF&G to educate its public (and its politicians) to the fact that there are often no short term fixes when it comes to wildlife management, particularly in northern latitudes. The public must learn that patience is often necessary in order to maintain healthy wildlife habitat. Quick fixes oft times backfire. . . . However, predator control is not a necessity to release caribou or moose populations from the predator pit, as has been shown by decades of wolf-moose research on Isle Royale or the example of the George River population in Labrador/northern Quebec.

***The term "predator pit" was introduced into caribou ecology through discussion of multiple equilibria theory. The predator pit involves the theoretical concept that an upper-level stable equilibrium exists (e.g., from intraspecific competition for food) until disruption by "catastrophe" occurs. For example, densities can be lowered by events such as emigration, severe weather, or excessive hunting. Because of a lowered density, a population would crash because of heavy predation, despite high natality. Theoretically, a lower, stable equilibrium (the predator pit) would occur as predators switched to alternate prey. Unfortunately, use of the term predator pit has been expanded to include situations where caribou populations are low or reduced and predation identified as a significant limiting factor." (James L. Davis et al., "Demography of the Delta Caribou Herd Under Varying Rates of Natural Mortality and Human Harvest and Assessment of Field Techniques for Acquiring Demographic Data," Alaska Department of Fish and Game, Division of Wildlife Conservation, Federal Aid in Wildlife Restoration Research Final Report, January 1991, Projects W-22-5 through W-23-3 Study 3.33, p. 44.)

In fact, P. Valkenburg, J.L. Davis and D.V. Granggaard, all with the ADF&G, concluded that there "is mounting evidence that caribou herds frequently escape the "predator pit" without man's intervention. (p. 282, Proc. 4th N.Am. Caribou Workshop, St. John's Nfld., 1991).

ADF&G's proposals for the Delta area elicited a great deal of controversy and criticism from both professional biologists and the public at large.

As a result of the Delta herd's decline to an approximate population of 5,800, the 1991 - 93 winter hunting seasons were closed. For many familiar with the history of the Department's management of this herd, this action seemed curious, considering that, ten years prior, ADF&G set out to decrease the Delta herd, which numbered 6,500, to an objective of 4,000. At that time, they reduced caribou numbers through human harvest. Gordon Haber writes regarding this:

Finally, the management objectives and alleged user demand for GMU 20A caribou have been rather fickle and elusive over the years, in a manner reminiscent of the objectives and alleged demand for GMU 20A moose. In ADF&G (1983), a herd size objective of 4,000 caribou was specified for the Delta Herd. The herd had increased to ~6,500 as of 1982 (following wolf control), so ADF&G (1983) concluded that "... steps to decrease [the] herd size ..." should be taken. In ADF&G (1991c), the objective for the Delta and Yanert herds combined was specified as "6,500 or more." This objective was almost certainly met by summer 1992, but it has now been replaced by yet another objective - 7,500 - 8,500.

What the Department's actions over the past ten years suggest is perhaps a lack of understanding of what the Delta herd's habitat can sustain, especially given the climactic conditions of the area. ADF&G admits that, in 1976, it was, "uncertainty about the optimal population level [which] prompted

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managers to allow the herd to continue growing."¹⁴⁵ Almost twenty years later, ADF&G still has not determined what the "optimal population level" is for the herd -- one which is based on realistic limitations of their habitat.

Critics of the Department's proposals to try to inflate the Delta herd emphasize the short-sightedness of these actions. Albert M. Manville, Ph.D. and Senior Staff Wildlife Biologist and Director of Science Policy for Defenders of Wildlife, who has studied Alaska's wolf programs since at least the mid-1970's, wrote in 1992 regarding the Delta herd:

In the Tanana Flats, Division of Wildlife Conservation Director Kelleyhouse describes the ungulate situation there as "a real emergency" because the caribou herd, now numbering 5,750, has declined by 50% since 1989. Yet Mr. Kelleyhouse fails to acknowledge that the herd has seen wide fluctuations, from a low of 2,000 in 1976 with subsequent increases to over 10,000 in the presence of wolves. In fact, over the past 50 years, herd size there has averaged between 3,000 and 5,000. Dry summers and harsh winters will likely prevent the Department from reaching a goal of maintaining a population of 7,500-8,500 heavily hunted caribou -- even if there are only a few wolves.¹⁴⁶

Former Commissioner of Fish and Game (1972 - 1977), Dr. James W. Brooks, questioned the Department's actions when he wrote:

Three or four smaller herds can be recognized, being relics of past expansions of one or another major herd. These lesser herds occupy marginal ranges that have sustained them for several decades, but which seem to limit their capacity to increase. The Delta herd is a good example, originating from the Forty Mile herd about 1930 or 1931. No good record exists of the size of the Delta herd until 1964 when the Department estimated that it contained 5000 animals, about the same number that exists today although it has varied in size during the

interim. The wisdom of trying to increase the size of this herd might well be questioned, given its reasonable stability under the scope of weather conditions, predation and hunting pressure endured over the past half century or more.\(^{147}\) Convincing evidence and testimony suggest that ADF&G needs to refocus its research on the Delta herd away from the realm of wolves and toward determining the actual needs of the Delta herd in relation to its environment. This should be done to ensure the health, safety and conservation of the herd. Without an attempt in this direction, the herd will continue to be compromised by management actions, such as the one proposed in 1992, which tries to increase a Delta herd, which is clearly showing signs of climactic and nutritional stress, up to 7,500 - 8,500. Given the current status of the herd, this management objective appears to be based more on political pressure originating from hunting-advocate demands — "the major driving force in most wolf management controversies in Alaska"\(^{148}\) — and less on the conservation of the herd.

**Moose in GMU 20A:**

While little quantitative data exists for the moose population in GMU 20A prior to the 1970's, biologists believe that moose were increasing in this area during the 1950's. Moose in GMU 20A are thought to have reached a peak in the early 1960's, with an estimated population of approximately


During the late 1960's and early 1970's, moose numbers declined rapidly, and researchers believe that by 1975 the population reached ~ 2,800. In 1976, the moose population began a steady increase which has lasted to the present. By 1988, ADF&G estimated there were 9,296 moose in GMU 20A, and 11,072 by 1991, which is an average density of 2.2 moose per square mile. The average density of moose in GMU 20A in 1991 was relatively high for interior Alaskan habitats.

In a study begun in the mid-1970's, Gasaway et al. (1983) set out to determine what the limiting factors were for this moose population. They ascertained that a severe winter and heavy browsing began the downward trend in 1965-66, which was perpetuated until 1976 by additional harsh winters, over-harvesting by humans and predation by wolves. Between 1970 - 74 specifically, hunting was the primary cause for decline in the moose population. Gasaway et al. (1983) stated:

Beginning in 1970, the number of moose and the percentage harvested by hunters rapidly escalated because of increased numbers of hunters, improved access, and increased use of snow machines and aircraft. Rapidly rising meat prices and a beef shortage also resulted in increased hunting effort, and we estimated that 19% of the moose population was harvested in 1973. . . During this period [1970 - 74] the mean estimated annual percentage of standing stock harvested was 10% . . . which equaled the mean rate of yearling recruitment during May. . .

Errors in harvest management during this time, reduced this population to dangerously low levels. Reduced harvest rates starting in 1975 helped ease pressure on the moose population. Gasaway et al. (1983) concluded:

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150Ibid., p. 1.
151Ibid., p.22.
In retrospect, errors were made in managing the moose, caribou, and wolf populations in our study area during the early 1970's. Moose population size was not estimated accurately enough, and its rate of decline was initially underestimated. Consequently, appropriate hunting regulations were implemented belatedly. Also, biologists underestimated the combined impact of wolf predation and hunting on moose and caribou during the early 1970's and did not adequately manage wolves. During this period of intense hunting, biologists patiently awaited a compensatory rebound in yearling recruitment from improved range that would offset harvest. However, it was a futile vigil -- calf moose and caribou became increasingly scarce through 1975. Mortality from severe winters, hunting and wolf predation were largely additive. Underestimating the direct impact of man's harvest on moose and caribou populations and its compounding effect on predation led to a grave management situation...

Further, Gasaway et al. (1983) identified other forces affecting the herd, including: 1) browse availability, which during and after the climax-level population likely inhibited moose population growth when "heavy browsing reduced plant vigor and killed willow (Salix spp.) in areas where moose concentrated (p. Shepherd and O. Burris, pers. observ.) High moose density and reduced browse availability probably contributed to the extensive die-off during the severe winter of 1965-66 (Bishop and Rausch 1974);" 2) deep snow and severe winters in 1965-66, 1966-67, and 1970-71 were, "particularly important in causing the decline of the moose population," and effected moose survival and abundance; 3) age demographics, which indicated that high calf numbers in the 1960's resulted in a lot of mature moose in the 70's (during 1972-74, 41% of the cows in the population were ≥ 11 years) which consequently were dying, and likely added to the downward trend of the herd; and 4) prey : predator ratios were steadily falling with the herd, and, "thus the

\[152\]Ibid., p. 46.
kill by hunters, like that of severe winters, increased the potential effect of predation on moose."153

In addition, the existence of both migratory and non-migratory moose in GMU 20A were discovered by Gasaway et al. (1983). Migratory moose, they found, spend every summer in the Tanana Flats area, where they calve, then travel to adjacent hills and foothills for the winter months. The Tanana Flats area is the primary summering and calving ground for GMU 20A moose. Non-migratory moose in this area are the only year-round, big-game prey for wolves. Unlike in GMU 13, where grizzly bears are the primary predator of moose, and the Kenai Peninsula, where black bears are responsible for the majority of moose predation, Gasaway et al. (1983) found wolves to be the primary predator of moose in the Tanana Flats. The Tanana Flats area is not prime bear habitat, though black and grizzly bears are present, but not abundant.

As part of their research, Gasaway et al. (1983) reduced the wolf population (estimated at ~239 in 1975) by more than two-thirds in GMU 20A between 1976-79. After the initial year of wolf removal, Gasaway et al. (1983) found that higher calf : cow ratios existed the fall of 1976. They reported:

All indices of calf and yearling moose survival abruptly increased in the experimental area beginning in 1976. This increased survival coincided with the reduction of wolves. During summers 1976 - 78, survival of calves of radio-collared cows was more than twice that during summers of 1974 - 75. Improved calf survival resulted in an average of 500 more calves present during November 1976 - 78 than during November 1973 - 75.154

Though not discussed in this context by Gasaway et al. (1983), mild to moderate winters also must have played an important role in turning the calf

153Ibid., p. 23, 21, 28, 29.
154Ibid., p. 19.
survival rate around. Predator control in GMU 20A was accompanied and followed by relatively mild and moderate winters with low snow accumulation. This combined with improved habitat quality and reduced human harvest likely aided the recovery of the moose population. Manville wrote:

While the extermination of the wolves in this area coincided with an increase in moose, that increase was also due to mild winters, improved carrying capacity of the habitat, and reduced public hunting of moose. Moreover, the data from studies on wolf control in the Nelchina Basin and the Fortymile area unquestionably do not scientifically support this program. The benefits of wolf control to moose have been minimal. The classic wolf control failure was conducted in the 3,200-square-mile Susitna River study area from 1976 - 1978 where all wolves were killed (Ballard et al. 1987, Wildl. Mono. 98). This resulted in no net increase in moose there since wolves turned out not to be the major predators of moose.\(^{155}\)

ADF&G's 1992 Area Specific Plan indicated the moose population in GMU 20A was somewhere between 9,700 and 12,300. In the plan it was clearly stated that population objectives for the GMU 20A moose population were being met. ADF&G outlined:

Current management objectives for Unit 20A call for a population of 11,000 to 13,000 moose and a minimum bull : cow ratio of 30 bulls : 100 cows. Past harvest goals call for an annual harvest of up to 400 bulls until these management objectives are reached. These objectives are currently being met.\(^{156}\)

In spite of the fact that ADF&G moose objectives were already being met, ADF&G proposed wolf control to benefit the moose population. The

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\(^{156}\) Alaska Department of Fish and Game, Division of Wildlife Conservation, Area Specific Wolf Management Plan for South Central / Interior Alaska, September 9, 1991; p. 32.
Department divided GMU 20A into two separate planning areas, the Tanana Foothills and the Tanana Flats areas. The proposed management focus in the southern, mountainous portion of GMU 20A, or the Tanana foothills, was on caribou, because the Delta herd primarily inhabits this portion of GMU 20A. The Department identified that, "a reduction in wolf predation in only the foothills and mountains of the Alaska Range should be sufficient for management of the Delta caribou herd, since the herd spends most of its time in this portion of the unit." An added benefit of wolf reduction in this area would have affected resident moose, and incidentally benefited moose migrating through, though moose increases were not the priority. Wolf reduction in the Tanana Flats area, on the other hand, was proposed specifically to benefit moose.

Departing from the published plan which had been available to the public for comment for eleven months, ADF&G introduced a last-minute, more aggressive proposal for GMU 20A during the 1992 November Board of Game hearings. In their new proposal, they offered two new alternatives which intended to raise the moose population from its then current level of ~11,000 to between 16,000 - 23,000. Needless to say, this action created even more controversy at the Board of Game meetings. In the end, the Board adopted a plan which would raise the moose population from between 11,000 - 15,000. With this alternative, the Boards approved a harvest objective of 800 - 1,500 moose per year, a leap which at the very least doubled, and at the most more than tripled the 1991-2 harvest rate.

Between 1970 - 74, when the population was declining from approximately 20,000 to 2,800, the annual harvest was ~ 600, and this level of

\[157\text{Ibid., p. 35.}\]
hunting led to the near demise of this moose population. Average harvests over five-year periods up to the present have not exceeded 617 moose. Between 1963 - 69, the average harvest was 311. From 1969 - 74, the average harvest totaled 617, though in 1972 and 1973, when the population was being grossly overharvested, there were 699 and 964 moose harvested respectively. Starting in 1975, harvests were drastically reduced due to the moose population decline, and since 1982, harvests have averaged 370 bulls.\textsuperscript{158} This average harvest of 370 bulls has adversely affected the moose population, for starting in 1988, "moose hunters in southwestern Subunit 20A were required to take only bulls with ≥ 50-inch antlers. That regulation was imposed in response to declining bull: cow ratios in areas where numerous trail systems allow motorized access."\textsuperscript{159} Thus the 1992 last-minute, proposed harvest objective of 800 - 1,500 moose per year is unprecedented in this area, and comes at a time when the moose population is already suffering effects of hunting pressure.

The history of moose in GMU 20A leads one to question whether or not this aggressive harvest objective, with a total population numbering between 11,000 - 15,000, is truly sustainable. It appears evident that, if it is in fact possible to harvest at this level in GMU 20A, the only way for it to be sustainable is if the high harvests are done in conjunction to ongoing, long-term, aggressive wolf control. The action by ADF&G and the Board of Game to drastically raise harvest objectives and manage toward that goal, revealed perhaps more than any other action the strong political allegiance state wildlife managers have with the sport hunting community. This aggressive

management approach happened as a result of pressure from the Alaska Outdoor Council, Alaska Wildlife Conservation Association (both influential sport-hunting advocacy groups) and some local advisory groups who lobbied the Department for greater hunting opportunity. Critics of the action outlined that: 1) it would unnecessarily compromise the moose population and it appeared to be irresponsible management to hunt at such high levels, as this population's history indicates; 2) it was unfair to the public to drastically alter management objectives at such a late date, without time for the public to comment on the changes; and 3) this action seemed to steer far away from the consensus process involved in the Wolf Management Planning Team, which recommended wolf control be done only on a short-term basis.

In conclusion, the GMU 20A moose population has experienced an upward trend since 1976. The most recent population estimate suggested moose numbered ~ 11,072 in 1991. ADF&G identified that the management direction for this population intended to reduce wolf numbers from an estimated 220 - 296 down to a minimum of 55, continue increasing the moose population up to 15,000, and harvest between 800 - 1,500 animals. This moose harvest level is two to three times greater than the average harvest since 1982. Harvests between 1969 - 74, which averaged 617 when the moose population numbered between 20,000 - ~2,800, almost extirpated GMU 20A moose. In light of this history, the Department's aggressive harvest objectives are questionable and appear overzealous.

Additionally, it is unclear whether wolf control will significantly affect the moose population during a time when it is expanding its numbers, and
appears to be a healthy and strong population. It appears that wolf control is not proposed in this area to enlarge the moose population, but more accurately, its purpose is to eliminate wolf predation so that human hunters can take a greater percentage. Harrington elaborates on this in the following passage:

ADF&G's widespread use of predator control, however, is more than a "quick fix" intended to rescue "prey populations in peril." It is also being proposed as a means to inflate human harvest levels, over the long term, for populations that are not now in danger or residing within a "predator pit." For example, in GMU 20A, the objective of wolf control is not to increase the moose population at all, but simply to shift the bulk of the harvest from wolves to humans. This approach is chillingly articulated in ADF&G's proposal: "To maintain high harvest levels for people, predator numbers will usually have to be reduced frequently or regulated at some level below that the prey populations would naturally support if there were no human harvest" (p.72). Clearly, the gunning down of a valued wildlife species, not for food or fur or even sport, but merely to get it out of the way, is an unacceptable practice for a state wildlife agency as we approach the 21st century.\(^\text{160}\)

Eliminating wolves simply to get them out of the way so that human hunters can pursue a larger take is a different use of predator control than the one intended by the Wolf Management Planning Team. The state's actions here also seem questionable considering the first goal listed in the Strategic Wolf Management Plan is, "To ensure the long-term conservation of wolves throughout their historic range in Alaska in relation to their prey and habitat."\(^\text{161}\) As Harrington indicated above, this practice was unacceptable to many involved in the debate.


\(^{161}\)Alaska Department of Fish and Game, Division of Wildlife Conservation, Strategic Wolf Management Plan, October 30, 1991, p. 5-6.
Wolves in GMU 20A:

Federal predator control programs began in the Unit 20A area in 1954 and lasted through 1960. Wolves were considered plentiful in the 1950's prior to federal control, and P. Shepherd, a predator control officer in the area, observed that wolves were scarce by 1958.\footnote{Gasaway et al., "Interrelationships of Wolves, Prey and Man in Interior Alaska," \textit{Wildlife Monographs}, Vol. 47, No. 3, July, 1983, No. 84, p. 11.} Biologists believe wolves rebounded and reached a peak abundance in the late 1960's. By 1972, A. Wright, a wolf hunter and guide doing aerial surveys for the ADF&G noted that wolf numbers had declined.\footnote{Ibid., p. 12.} The first estimate of the wolf population considered to be accurate, based on many hours of flight time doing aerial surveys, occurred in 1975. It yielded an estimate of 239 wolves and 23 packs in GMU 20A. Between 1976-1979, Gasaway et al. (1983) removed up to two-thirds of the population, and estimated there were eighty wolves in GMU 20A in 1978. Wolf control continued in GMU 20A through 1982, and was implemented again in 1984. Since then wolves have been regulated by human harvest and natural causes. In 1991-92 the ADF&G Area Specific Plan indicated the wolf population estimate in GMU 20A was 220 - 300 wolves. ADF&G stated the population has, "fully recovered from wolf control programs which ended in 1982."\footnote{Alaska Department of Fish and Game, Division of Wildlife Conservation, Area Specific Wolf Management Plan for South Central / Interior Alaska, September 9, 1991; p. 26.}

For the three years prior to Gasaway et al.'s (1983) experimental wolf removal program (which started in 1976), 20% of the wolves in GMU 20A were harvested by public trappers and hunters. Thirty-eight to 61% of the wolf population was eliminated between 1976-1979, with ADF&G using helicopters and fixed-wing aircraft to shoot entire packs and individual
wolves when possible (Gasaway et al., 1983). Public harvest also contributed significantly to the removal of wolves in the area during the control period, and by 1978, the wolf population had been reduced by two-thirds.\footnote{Gasaway et al., "Interrelationships of Wolves, Prey and Man in Interior Alaska," \textit{Wildlife Monographs}, Vol. 47, No. 3, July, 1983, No. 84, p. 5.} In their study, Gasaway et al. (1983) stated that harvesting GMU 20A wolves at ≥ 20% of their population had significant effects on the GMU 20A population. They clarified:

Sustained annual harvests ≥ 20% of early winter wolf populations have had significant effects on wolf numbers in North America where wolf productivity was low. Populations have not grown at harvest rates of about 25% (Pimlott et al. 1969; Van Ballenberghe et al. 1975; R. Peterson unpubl. data). In our experimental area [GMU 20A], an approximate harvest rate of 20% by trappers during 3 winters before wolf removal was significant in limiting wolf numbers. With pups composing 30% of our population during 1975-76, the population could not have been stable if natural mortality had exceeded 10%, and generally, natural mortality rates exceed 10% (Van Ballenberghe et al. 1975; Mech 1977a; Ballard et al. 1981; R. Peterson, unpubl. data). Keith's review indicates harvest rates in excess of 30% generally have caused wolves to decline.\footnote{Ibid., p. 28.}

This paragraph indicates that with a harvest rate ≥ 20% of the wolf population in addition to natural mortality levels above 10%, the wolf population in GMU 20A has been limited by harvest pressure and declining for some time. Harvest rates have equaled 20% or more on and off since at least the 1970's.

However, discrepancies elsewhere in the study indicated that the wolf population in GMU 20A is "naturally regulated," and not limited by human hunting pressure. For example, in the abstract which identifies the study's objectives, Gasaway et al. (1983) wrote:

Objectives of this study were to define factors limiting a moose and caribou population; to review moose-wolf relationships in ecosystems where wolf populations are, to a large extent, naturally regulated; to
demonstrate the effects of man's harvest of prey species on the wolf-prey relationship; and to identify problems of managing prey populations for hunting and nonconsumptive human use where wolf populations are naturally regulated.\textsuperscript{167}

Gasaway et al. (1983) further emphasized the notion that wolves are naturally regulated in GMU 20A and in general in Alaska's interior when they state in their final sentence of their concluding statements:

Therefore, great caution must be exercised in harvesting ungulates in ecosystems where wolves are harvested lightly or are essentially naturally regulated.\textsuperscript{168}

By their own admission, Gasaway et al. (1983) found that wolves were regulated by harvest pressure prior to their wolf removal program, and this population has a history of being regulated by harvest pressure. In light of this, it is interesting to note that wolves were held responsible for taking between 13 - 34% of the moose in GMU 20A between 1973 - 75.\textsuperscript{169} However, in 1988 - 89, wolves killed only 9.9% of moose in 20A.\textsuperscript{170} It seems likely that this decrease is the result of an already significantly harvested and reduced wolf population in GMU 20A.

If ADF&G is suggesting to the public that wolf populations in Alaska are "naturally regulated" when in fact they are significantly impacted by human harvest, such that their populations are fighting to remain stable or perhaps declining, this should be classified as misinformation. There is a critical difference between a population which is naturally regulated and one which is receiving continuous pressure through population reductions from

\begin{itemize}
\item \textsuperscript{167}Ibid., p. 1.
\item \textsuperscript{168}Ibid., p. 46.
\end{itemize}
hunting and/or control. It is unfair to the public to suggest otherwise, and
discriminating between the two situations -- natural versus harvest
regulation -- is important so that the public and others involved in wildlife
management decisions have accurate information and a legitimate reference
point from which to base decisions. It is these kinds of discrepancies
regarding wolves which ultimately lead many wildlife experts and members
of the public to question ADF&G's published information and credibility
regarding wolves.

Finally, in spite of all of the studies, biologists and ecologists are still
searching for understanding of prey : predator relationships. Gasaway et al.
(1983) writes:

> The influence of wolf predation on ungulate population growth
> remains poorly understood in spite of many comprehensive studies on
> wolf-ungulate relationships during the past 20 years . . . 171

The influence of bear predation is also often not understood. In GMU 20A,
bears have been harvested beyond sustainable levels since 1982. ADF&G's
1992 Area Specific Plan outlines:

> The numbers of grizzly bears in Unit 20A is lower than normal because
> a study of the effects of harvests on grizzly populations required high
> harvest rates since 1982. The reduction in caribou hunting opportunity
> is expected to reduce the number of grizzly bears harvested because
> many bears are taken incidentally by caribou hunters. Over the life of
> this plan, bear numbers should increase slowly.172

Both bears and wolves have received significant harvest pressure in GMU
20A.

GMU 20A needs careful scrutiny, for it is the one unit which ADF&G
highlights as an example of successful wolf control programs. The

171Ibid., p. 2.
172Alaska Department of Fish and Game, Division of Wildlife Conservation, Area Specific
Department supports decisions for wolf control, citing that wolf control has successfully increased the Delta herd in the 1970's, and that moose calf survivorship increased after wolf control in 1976. Upon closer inspection, however, one learns that caribou may have increased in the '70's as a result of wolf control, but pregnancy rates dropped, and now it appears the herd is limited nutritionally. Both cows and calves are small, and the population has rapidly declined by 50%. Whether wolf control was beneficial to the herd in the long term is arguable. Certainly at this time it appears the Delta herd is undergoing nutrition and habitat-based stress. Regarding the 1992 wolf control plans to benefit moose, it seems as though the Department intends to eliminate wolves in order to abolish competition for human hunters, not to enhance the moose population.

UPPER TANANA, FORTYMILE CONTROL AREA, GMU 12, 20B, D & E:

The Upper Tanana, Fortymile control area is a 9,700 square mile area in the northeastern, interior region of Alaska. It is north of the Alaska range, south of the Ray and White mountains and abuts the Canadian border to the east (please see Haber map for location clarification). Alaska's interior contains both alpine, sub-alpine and forested regions, with primarily tundra, extensive flats, rolling hills and glaciated mountains in the Alaska range. Tree species in the interior include: black spruce, white spruce, paper birch, aspen, balsam poplar and tamarack. Large shrubs include alder and a variety of willow species.
Fortymile Caribou Herd:

The Fortymile Caribou Herd (FCH) is a unique herd in Alaska because it shares its range between Alaska and the Yukon, with portions of the herd often wintering in Canada (please see appendix 3.4 for range clarification). It was possibly the largest herd in Alaska during the earlier part of this century, and was significant for providing food initially to Athabascans and miners, and now to various settlers in its range. The FCH is considered an important herd for other reasons as well: it is thought that movements of the herd during this century effected population dynamics of adjacent herds, and the FCH may have been responsible for originating a number of small herds in neighboring areas. Several emigrations of the FCH northeast to the Porcupine herd have been reported. Apparently during the 1920's, the Fortymile herd, "swamped the Nelchina herd during many winters in the 1920's, but the effect on Nelchina herd numbers is not known (Skoog 1968)."\(^\text{173}\)

Ronald Skoog, Commissioner of Fish and Game in Alaska between 1977 - 1983, devoted twelve years of research to Alaskan caribou and concentrated much of his efforts on the FCH. Before the turn of the century, Skoog indicated that the FCH was moderate in size. Between 1900 - 1925, the herd expanded to peak numbers, reaching a size of \(~ 568,000+\) (Murie, 1935). Evidence suggests, "that in the early 1900's, this herd was . . . substantially augmented by an influx of animals from the eastern arctic, or what is now called the Porcupine herd."\(^\text{174}\)


herd, and what a spectacle it must have been to watch in the following passage:

In 1921 the author estimated the numbers in the Yukon-Tanana herd during the migration in the fall of 1920, using data obtained directly and from reports of other observers. The southeast migration of the herd covered a strip approximately 60 miles wide, 40 miles representing the part traversed by the main body and 20 miles that covered by scattered bands. The herd took about 20 days to pass one spot. During 8 of the 20 days about 1,500 animals in the main herd passed each day over a 1-mile strip and during the remaining 12 days about 100 animals a day.\textsuperscript{175}

From this siting, Murie estimated the herd size to be greater than 500,000, which he thought was a conservative estimate. He actually thought it may have been closer to a million.\textsuperscript{176} Thus, the FCH was considered the biggest herd in Alaska and one of the largest in the world.

The Fortymile herd first experienced a decline during this century in 1928. This decline was not continuous, though marked a turning point for the population.\textsuperscript{177} During the early 1930's, "a decline in numbers commenced and the herd's pattern of movements changed drastically. No migrations through the Alaska Range occurred after 1931. Caribou became scarce in many districts that had recently enjoyed a bountiful presence. Alaska Game Commission reports of this period comment on large numbers of caribou from this herd joining the Porcupine Herd whose numbers then reached levels not seen before."\textsuperscript{178} By the mid 1930's, the herd had reached its


\textsuperscript{176}ibid.


\textsuperscript{178}James W. Brooks, "Perspectives on the Forty Mile and Delta caribou herds relative to predation by wolves for discussion at the Wolf Summit Conference," Comments presented at the Wolf Summit, Fairbanks, AK, January 16 - 19, 1993, p. 3.
fastest rate of decline, and in the early 1940's, it was estimated to contain between 10,000 - 20,000 animals. Causes for the decline are unknown, though market hunting as a result of the mining boom significantly impacted the herd.

Sometime during the 1940's, the herd began to grow again, which some have suggested was a result of federal wolf control programs. However information is insufficient to accurately determine what caused the recovery of the herd size. R. Skoog reported that the herd increased to ~ 50,000 by 1953, though other estimates suggest it was closer to 40,000. Emigrations north-northeast of the FCH to the Porcupine caribou herd were reported during both 1957 and 1964. Up to 30,000 animals may have emigrated during either movement, though it is unclear how significant or long-term the reduction was for the FCH. Some evidence suggests that the caribou may have later returned to the Fortymile herd.

Given the available information, one can only speculate about why the FCH decreased during the 1930's, increased during the 1940's, and why portions of it joined the Porcupine herd. Possible explanations include that the herd had reached the carrying capacity of the habitat, which was likely depleted during the herd's peak numbers in the early part of the century. Nutrition levels likely were reduced for the caribou, which could have resulted in a decrease in herd size, possibly through failing health of the herd.

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This may have triggered emigration. While federal wolf control in the 1940's may have temporarily reversed the herd's decline by easing predation pressure, ultimately other prevalent environmental factors likely overcame the herd. This situation may be an example of how wolf control might provide short-term relief in certain situations, but ultimately does not stabilize or increase a herd, because wolf predation is not the overriding cause for decline. Other prevailing environmental factors determine the health and size of a herd. Valkenburg et al. (1994) reviewed this section of the herd's history and reported:

Both Skoog (1968) and Davis et al. (1978) noted historical correlations between wolf numbers and caribou numbers, but neither proposed predation as a causal factor. Skoog (1956) also discounted hunting but thought that it may have become an important suppressing factor once the herd had declined to a lower level. The FCH survived the gold mining boom and the market hunting that accompanied it. The herd's decline in the 1930's occurred after mining peaked. Other caribou herds throughout interior Alaska also declined during the 1930's (Skoog, 19689) suggesting the influence of widespread phenomena.\footnote{Patrick Valkenburg, David G. Kelleyhouse, James L. Davis, and Jay M. Ver Hoef, "Case History of the Fortymile Caribou Herd, 1920 - 1990," Rangifer, Nordic Council for Reindeer Research, P.O. Box 378, N-9401, Harstad, Norway, 14 (1), 1994 , p. 17 - 18.}

This passage suggests that human encroachment played a role in herd size reduction as well as other environmental phenomena.

Population estimates between 1955 - 1960 indicated the FCH had grown to approximately 65,000 (Davis et al. 1978), and then declined steadily through the 1970's. No accurate population estimates actually exist between 1961 - 1973, and it is now thought that estimates during this time were much higher than actual herd size. In 1969, biologists thought the herd numbered 20,000,
and between 1970 - 1972 less than 15,000. More recent data suggests the herd numbered between 8 - 10,000.\textsuperscript{183}

Overestimation of the FCH had significant management repercussions, when as a result harvests were greater than the herd could withstand. Between 1950 - 1975, the average harvest varied from 270 - 2,300. In 1970 - 1972, harvests of the FCH, "greatly exceeded the yearling recruitment rate and contributed greatly to the population decline during this period."\textsuperscript{184} Davis et al. (1978) attributed the herd's decline from 1960 - 1975 to high human harvests and wolf predation, though biological information is inadequate to discount other causes such as lowered productivity, nutritional limitations and/or adverse weather.\textsuperscript{185} Valkenburg et al. (1989) reported:

It is clear that overharvesting of caribou, especially during the late 1960's and early 1970's, contributed to the 1960 - 75 decline. . . . In addition, the status of the FCH was inadequately monitored and its size was grossly overestimated.\textsuperscript{186}

Davis et al. (1978) also noted that the age structure of teeth from over seven hundred FCH jaws collected was similar to that of the Nelchina herd when it was declining, as opposed to when it was increasing in 1960.\textsuperscript{187} This may indicate that the age demographics of the herd played a role in its decline.

\begin{footnotesize}
\textsuperscript{184}Ibid., p. ii.
\textsuperscript{186}Ibid., p. ii.
\end{footnotesize}
The lowest population estimate on record for the FCH occurred in 1974 - 1975, when the herd was thought to number 4,000. Estimates in succeeding years indicated a steady increase in herd size, and by 1981 and 1988 herd estimates were 10,192, and ~ 20,000, respectively.

During the mid 1980's, when the FCH was increasing, researchers found that the natality rate of radio-collared females (≥ 3 years) was 90%, which was similar to the Delta and rapidly growing Western Arctic herd at the time. The mean calf : female ratio was 34 : 100 between 1985 - 87. Based on available information and conjecture, Valkenburg et al. (1989) attempted to compare predator : prey ratios in the 1980's with the 1970's, supposing the wolf densities were similar during 1986 and 1976. They found that in 1986, when the population estimate totaled 15,303, the wolf : caribou ratio was 1 : 53, and the wolf : prey ratio was 1 : 103 - 111 caribou equivalents (including moose and Dall sheep). For 1976, they suggested the wolf : caribou ratio was 1 : 23, and the wolf to caribou equivalents ratio was 1 : 72. This latter ratio is considered a low prey biomass level, one where, "wolves are considered likely to control ungulate numbers (Pimlott 1976, Mech 1970, Parker 1972, Bergerud 1983.)" In spite of this supposed low prey biomass level and unfavorable wolf : prey ratios, the FCH increased in the 1970's. Valkenburg et al. (1989) came up with two possible explanations for this. The first was that biases within the estimates may have confounded the results, and also that spacing of wolves and caribou is critical. They clarified:

As our understanding of predator-prey systems increases, we are recognizing that simple ratios alone do not explain the response of prey

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populations to their predators. Perhaps greater emphasis should be placed on spatial, functional, and behavioral aspects for predator-prey relationships. . . [Further,] contrary to moose (Crete and Messier 1984, Van Ballenberghe 1987), caribou may not become trapped in a "predator pit", even when they are at historic low levels (i.e., when wolf : caribou ratios are proportional to "predator pit" wolf : moose ratios) (Singer 1985).\footnote{Ibid., p. 9 - 11.}

This information is critical to future wolf control debates for this area, and ADF&G still needs to research the different aspects mentioned above and determine if the situation referred to as "predator pit" pertains to caribou before implementing future wolf control programs.

In addition, Valkenburg et al. (1989) estimated the average wolf kills approximately 8.2 caribou / year. Thus the total amount of caribou eaten by wolves between 1986 - 87 was estimated at 2,228, or 16% of the population.\footnote{Ibid., p. 10.} With this level of predation, and with an average calf : 100 cow ratio of 39.4 between 1976 and 1981, the FCH increased by approximately 10% per year. This trend, where the FCH increased at a mean annual rate of about 7 - 10%, was consistent for all years between 1975 - 1990. In 1990 the population estimate was 22,700.\footnote{Patrick Valkenburg, David G. Kelleyhouse, James L. Davis, and Jay M. Ver Hoef, "Case History of the Fortymile Caribou Herd, 1920 - 1990," \textit{Rangifer}, Nordic Council for Reindeer Research, P.O. Box 378, N-9401, Harstad, Norway, 14 (1), 1994 , p. 21.}

Because the FCH has the greatest potential for growth of any reasonably accessible caribou population in Alaska, ADF&G has advocated and implemented predator control -- both grizzly bear and wolf -- from 1981 - 1987. After reviewing a wolf reduction program that lasted from 1980 - 1983, Valkenburg determined that wolf control did not increase the fall caribou calf : cow ratio. He clarified the following:
It is not possible to determine the effect of the 1980 - 1983 wolf control program on either the growth rate of the FCH or on the mortality rate of adult females because no reliable caribou census or adult mortality estimates are available for the years immediately preceding the control program. It is apparent, however, that the removal of wolves in 1981 - 1982 did not increase the calf : 100 cow ratio in September - October during 1982 - 1985 (Table 2), perhaps because wolves were only removed from a portion of the caribou winter range. Wolf packs within the summer range of the caribou herd were largely unaffected by harvest or control because the FCH summer range was inaccessible and because the primary goal of wolf control was to increase moose numbers in the southeast corner of the FCH winter range. . . . In 1982-1983 and 1983-1984, virtually the entire FCH spent the winter within the wolf control area.\textsuperscript{192}

Several important aspects of the wolf control issue in this area surface in the above passage. They are: 1) if a management goal is to determine whether or not wolves are limiting Fortymile caribou, it appears that research needs to be focused on calving and summer range. This is evident from the past reduction program, when the majority of caribou spent their winters during the control program within the parameters of the control program, and there was no resulting increase in the growth rate of the herd; 2) the next logical step for research in this area would be to try to answer the following question: are wolves impacting caribou enough at the calving grounds or during the summer so as to significantly slow their growth rate? If not, then we know that wolf control probably will not improve the growth rate of the herd, because it has proven to be ineffective in the winter range.

Further, the above passage reveals that wolves are inaccessible to both hunters and agency personnel in the caribou summer range. This probably indicates that forest cover is deterring aerial hunters from accessing wolves in the area. Haber (1992) clarifies that extensive forest cover in the

\textsuperscript{192}Ibid., p. 21.
Tanana/Fortymile area limits Same-Day-Airborne hunting.  Unless some radical alteration of the habitat occurs, which likely would threaten the caribou, this situation will not change, and wolf control efforts will continue to be ineffective in the summer range. Thus we can deduce that, since wolf reduction in the FCH winter range did not effect caribou growth rates, and if it is not possible to effectively access wolves in the summer range, wolf control does not appear to be a reasonable management alternative for enhancing caribou in this area.

One additional and significant point the above passage makes is that appropriate information does not exist in order to determine if wolf reduction efforts positively impacted the Fortymile herd. ADF&G's literature is filled with examples of control programs being implemented without adequate information to determine their effectiveness. One other example of this, discussed in this paper, occurred with the Delta herd, when, in 1976 - 1979, wolf control was initiated to increase the declining herd. In this example, there were no censuses done between 1973 and 1979, and therefore effects of the wolf reduction program were not possible to ascertain. More recently, in the 1991 Area Specific Plan for South Central/Interior Alaska, ADF&G was positioning itself to undertake yet another wolf control program.

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****If it is determined that wolf control must be done to alleviate pressure on an ungulate population, then aerial control is the most efficient and effective method of wolf population reduction. Ground-based trapping programs are arguably less humane, and are somewhat random, as are ground-based hunting efforts using snow machines. Haber (1988) outlines that selective pack removal is the most effective way to do wolf control.

in GMU 13 in order to benefit caribou, without knowing the effects of wolves on the Nelchina herd\textsuperscript{195} (please refer back to GMU 13 section of this chapter). Many opposed to ADF&G's wolf control programs, and the circumstances under which it has historically implemented wolf control, have criticized the Department for using wolf control in an arbitrary and capricious fashion. Wolf reduction programs have been implemented without proper research prior to, during or after the control. As a minimum it seems appropriate to carefully census a herd before implementing control, and determine if predators are truly limiting the herd in any significant way. Censusing must also occur during and after predator control so that any results of the program may be established. As a result of ADF&G's haphazard approach to predator control, there exists no substantiated evidence that predators have impacted the growth of the FCH in any significant way.

In a paper published just last year, a group of prominent FCH biologists (including then ADF&G Director of Wildlife Conservation, David Kelleyhouse) admitted biologists are only now beginning to realize that perhaps factors other than wolves have affected the FCH recruitment rates. They wrote:

\begin{quote}
The possibility exists that weather also could have been a factor in low recruitment during the early 1970's. In the FCH, calf percentage in September - October was correlated with climatic factors during 1952 - 1990 . . . Biologists are only just beginning to investigate these relationships in caribou, but it seems likely that there are periodic climatic conditions that are unfavorable for growth in caribou herds. Possible mechanisms include nutritional stress through insect harassment . . . lower summer nutrient content of plants . . . and
\end{quote}

winter stress leading to increased early summer mortality of calves and increased vulnerability of caribou to predation...\textsuperscript{196}

By turning its focus away from wolf predation and its effects on caribou, ADF&G could open themselves up to a whole new world of information -- one which has the potential of truly bringing in accurate information about ungulate ecology, and how it does or does not relate to predation. This new direction in research is worth advocating for and supporting in the future.

In 1991, when ADF&G recommended wolf control to increase the FCH, the herd had been increasing continuously for over a decade, at a rate of \( \geq 10\% \) per year. Valkenburg et al. (1994) reported that, "unless major adverse environmental changes occur, the current numerical and functional relationships between wolves and the FCH should not severely limit recovery of the FCH."\textsuperscript{197} Former Commissioner of Fish and Game, James Brooks critiqued ADF&G's 1991 proposed wolf control plans by stating the following:

\begin{quote}
It seems to me very probable that caribou do have physiological and behavioral sensitivities to forage composition and availability that simply are not evident from the gross nature of our observations. . . . The lately proposed wolf reduction program was premised on the assumption that ranges utilized by the Delta and Forty Mile herds have the capacity to produce and maintain at least two or three times the number of animals now present based on higher population sizes that have occurred periodically in the past. Unfortunately, we do not know the conditions that gave rise to past population eruptions, but it is clear that they were preceded and followed by long intervals of relative scarcity. Severe weather with heavily crusted snow prior to and during the critical calving period could play an important role in reducing
\end{quote}


populations and predation could extend the times of scarcity, but response to the changing conditions of the range, particularly winter range, associated with high population levels must be a fundamental regulating mechanism as it was proven to be with reindeer. Considering that the last two minor expansions of the Forty Mile herd in 1953 and 1964 ended with emigrations to the eastern arctic, things apparently were not right for a large population increase in the core area even though the eastern and southeastern parts of the range in the Yukon have probably regenerated to provide excellent winter forage. If conditions are now favorable for the onset of an expansive phase in the Forty Mile herd, it will occur in the face of wolf predation as it always has. If increased utilization by humans could be substituted for wolf predation, it would be beneficial, but there is often a wide gap between hunting opportunity and harvest success where caribou are concerned. Because wolves themselves are a harvested resource of substantial value to humans and a prominent ecological element in a complex wilderness fauna, their sacrifice in attempts to manipulate greater production from the Delta and Forty Mile caribou herds would be a certain loss with dubious if any benefits.198

Due to lack of information, it is unclear if any past wolf control programs in the Fortymile area have boosted growth of the caribou herd. It is known, however, that some of the most recent control efforts in the area did not increase the calf:100 cow ratio between 1982 - 1985. At a ≥ 10 % growth rate for more than the last decade, the FCH seems to be a healthy and strong herd at this time. Given the information we have on past wolf control programs in this area, and the effects of wolf predation on caribou herds in general, there is little if any supporting evidence which favors implementing wolf control. The Fortymile herd is increasing at its own pace, and it seems prudent to allow the herd to continue to do so. This action seems particularly appropriate given the costs and controversy surrounding wolf control.

With tremendous foresight, Olaus J. Murie stated that habitat encroachment by humans and economic developments would present the

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great caribou herds of the north with their most daunting threats. He wrote in 1935:

The caribou's greatest menace is not the wolf, nor the hunter, but man's economic developments. . . . Caribou require much territory, because of the nature of their winter food, and it would not be wise to permit overcrowding of the range. A serious decrease in numbers should also be guarded against as Alaska becomes more thickly settled and many of its frontier conditions pass. In the more densely populated parts of the United States we are learning that in the agricultural development of this country we have made inadequate provision for big-game range. Such a condition should be forestalled in the course of the economic development of Alaska. 199

In support of Murie's statement, it seems appropriate for ADF&G to turn its attention more to habitat encroachment issues which continue to affect the herd, and away from targeting wolves as the primary threat to caribou. In addition, ADF&G should ensure that human hunting will never again compromise the herd the way it did in the late '60's and 70's.

Moose in the Upper Tanana/Fortymile Area, GMU 20E:

Moose in GMU 20E were not systematically surveyed until 1981. Though ADF&G often reports that the moose population and other ungulate populations in southcentral Alaska irrupted in the 1950's as a result of federal predator control programs, these statements often cannot be substantiated. In the 1960's it is suggested that the moose population in the Tanana/Fortymile area declined rapidly when control programs ended. Gasaway et al. (1992) indicated that following this decline, moose were in a "low density population"200 which continued through the 1970's. Between the mid-1970's

200William C. Gasaway, Rodney D. Boertje, Daniel V. Grangaard, David G. Kelleyhouse, Robert O. Stephenson, and Douglas G. Larsen, "The Role of Predation in Limiting Moose at Low
and early 1980's moose densities continued to remain low, and this stasis prompted experimental predator control programs and research.

Haber and Walters (1980) refute ADF&G's population trend claims for wolf - ungulate populations prior to 1981. Haber writes:

> Although there were no organized attempts to census wolves in the upper Tanana-Fortymile region prior to winter 1981 - 82, and despite Gasaway et al.'s (1992) emphasis that ADF&G did not begin "accurately estimating" wolf numbers until then, various ADF&G reports and publications - including at least four by Gasaway and co-authors . . . still reach detailed conclusions about changes in wolf abundance all the way back to the late 1940's.

It is claimed that federal wolf control (including poisoning) beginning about that time and continuing through the 1950's reduced wolf abundance to low levels, and that this triggered major moose and caribou increases in the 1950's - that the wolves "responded" by increasing to high numbers in the 1960's, whereupon by the mid 1960's the moose and caribou populations began "declining steadily" and reached low abundance by the mid 1970's, with the wolves then "declining precipitously." At least two ADF&G reports (ADF&G, 1989a, 1991a) even make the claim that there were "about 600" wolves in GMU 20E during the alleged mid 1960s - early 1970's wolf population high.

These claims, together with similar non-census claims about 1940's-1970's upper Tanana-Fortymile ungulate population trends (later), are reminiscent of the unfounded claims by Gasaway et al (1983) as to pre-1970s wolf-ungulate trends in GMU 20A. In both cases it is a nice, tidy-sounding story of cause and effect, but one which has little scientific basis, for which numerous discrepancies and other problems can be identified upon closer scrutiny (e.g., as Haber and Walters [1980] pointed out regarding claims about early wolf-caribou correlations).

It is true that much of the studies and literature cited in this paper contain information which suggests that ungulate populations irrupted following federal predator control programs in the 1940's, and that as soon as they

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stopped, wolf numbers increased and predator numbers decreased. While perhaps some of these claims may be legitimate, Haber's point rings true. ADF&G does present this information to the public in a nice tidy package of cause and effect (please see ADF&G Survey Inventory Reports, the 1992 Area Specific Wolf Management Plan, and other literature cited in this paper for illustrations of this), which belies the more complex truths involved in these multi-predator/multi-prey systems.

The number of prey per predator in the Upper Tanana / Fortymile area is currently very low, which is one of the primary motivating factors behind predator research and control in this area. Gasaway et al. (1992) reported, "the numbers of prey per predator in the [Tanana/Fortymile] experimental area in 1981 are among the lowest reported in North America." These biologists suggest that the predator/prey system in the area is an example of the "low-density dynamic equilibrium" (LDDE) model. They suspect the combined predation of wolves and grizzly bears, which they indicate are lightly harvested, have been maintaining the moose population at a low level for an extended period of time.

Gasaway et al.'s (1992) research on the effects of wolves on moose in GMU 20E included an experimental area (Mosquito Flats) consisting of approximately 9,200 sq. kilometers, and two adjacent control areas (please refer to appendix 3.5). One of the control areas bridged both Alaskan and Yukon land, and predator numbers were reduced in the experimental area. In 1966 a large fire created prime moose habitat in the Mosquito Flats area,

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supporting primarily willow and birch, which provides critical winter and summer habitat for moose. During their research, caribou also spent portions of three seasons (spring, autumn, and winter) in the experimental area, and less time in the control areas.

Sixteen wolf packs ranged either partially or entirely in the 9,200 sq. km. experimental area, and wolf removal efforts covered all of the pack's ranges -- an area totaling 15,500 sq. km. It was estimated that a total of 125 wolves made up those sixteen packs, which were reduced to 52 wolves after the first year of control (1981-2), and 34 wolves after the second year (1982-3). Over the course of the next five years with public hunting and trapping continuing but no ADF&G wolf control, the wolf population recovered to approximately 76 - 83 (late winter surveys), where it remained until the early 1990's. ADF&G also liberalized grizzly bear harvest regulations in 1981 - 87, in an effort to reduce bear predation. Grizzly bears were harvested at a rate of 8% annually, which is "sufficient to cause the population to decline slowly." For the majority of the 1980's, then, wolves were maintained at much lower densities than the habitat can withstand, and bears were declining at a slow rate.

Gasaway et al. (1992) concluded that wolf removal did not effect moose calf survival, and did not increase moose abundance in the area. They wrote:

The 1981-83 wolf removal in a portion of the experimental area allowed us to conclude that wolf predation on calves was not a detectable source of additive mortality when grizzly bears were abundant. Reducing wolf numbers from 85 during early winter 1981 to 19 during April 1982 in and around the Mount Veta-Mosquito Flats survey area produced no treatment effect on calves per cow or yearlings per cow for the 1982-86 cohorts . . . Failure of calves per cow to increase during the 1980's wolf removal indicates either grizzlies were the predominant predator on young calves before and after wolf numbers.

203ibid., p. 19.
204ibid., p. 20.
were reduced, or increased grizzly bear predation compensated for reduced wolf predation.\textsuperscript{205}

Once again, wolf removal was not successful in producing the results that the Department had hoped to accomplish. Their experiments indicate that bear predation plays a primary role in the Tanana/Fortymile area.

Further, Gasaway et al. (1992) concluded that nutrition was not a limiting factor of moose in the experimental area, for size of moose, body fat, and pregnancy rates were all comparable to six other moose populations in AK. There was no starvation observed during their study, and Gasaway et al. (1992) found there was low competition for browse -- only 6 - 7\% of the preferred willow twigs were browsed in the experimental area. They determined that, "because indicators of strong nutritional stress were not observed during the low-density period, we concluded that moose density was well below KCC [ecological carrying capacity]."\textsuperscript{206}

Lastly, Gasaway et al. (1992) judged that human harvests of moose were not limiting the population, which accounted for only 1.5\% of the total annual mortality rate, whereas other causes were responsible for 37\% during the mid-1980's. However, high caribou harvests which radically decreased the alternate prey source may have affected the moose population by boosting the effects of predation.

Gasaway et al. (1992) found that grizzly bears were the predominant predator on moose in the Tanana/Fortymile area, and had they been, "severely reduced along with wolves, we would have observed increased calf survival."\textsuperscript{207} Apparently 92\% of the prey biomass killed by grizzlies during

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\begin{itemize}
\item \textsuperscript{205}Ibid., p. 31-32.
\item \textsuperscript{206}Ibid., p. 20 -21.
\item \textsuperscript{207}Ibid., p. 32.
\end{itemize}
1985 - 86 was composed of moose. As an alternative to aggressive bear control, the biologists experimented by altering food availability in the area. They air-dropped up to fifteen tons of train-killed moose and other meat during May and June of 1985. They observed many predators -- wolves, grizzly and black bears -- on the carcasses. They found this to be a very effective alternative, for, "the early winter calves per cows in the Mosquito Flats increased to 53/100 cows... compared with a range of 11-15/100... during the preceding 3 years and 26 - 36 / 100... during the following 2 years."  

In their final recommendations, Gasaway et al. (1992) advised that when future predator manipulation occurs for the purpose of increasing moose, it should include a plan which would reduce bear and wolf predation simultaneously. They outlined:

Plans for manipulating predation should consider altering wolf and bear predation simultaneously rather than intense management of 1 predator species. Nonlethal means, e.g., diversionary feeding and habitat management, may reduce predation by both wolves and bears simultaneously. . . . Reducing predation of only 1 species may result in compensatory predation by another species, hence diminishing the effects of intense single-species management. . . ."

While wolf control did not work to increase moose, diversionary feeding techniques did achieve short-term, positive results. Neither wolf control or diversionary feeding techniques contain long-term solutions, which ultimately all wildlife policy-makers should be seeking. Given a choice between the two options, however, this paper recommends that diversionary feeding be given priority attention in future management plans for this area.

208Ibid., p. 27.
209Ibid.
210Ibid., p. 49.
The most recent moose census done in GMU 20E occurred in 1988, and it suggested the moose population had increased to 4,400 from a population of 2,530 in 1981.\(^{211}\) This accounts for a steady increase in the population at a rate of approximately 4-5% per year since 1981, and a population density increase of 88 moose/1,000 sq. km. in 1976 - 81 to 157/1,000 sq. km in 1981 - 88.\(^{212}\) Calf survival has also increased, which ADF&G attributes to the reduced grizzly bear population in the area. The 1993 ADF&G Survey Inventory report specifies that, "grizzly bears are the predominant predator on moose calves in this subunit."\(^{213}\) It further clarifies that there is a rising wolf population in GMU 20E, and along with this trend, the number of yearling bulls has increased:

The 1991 yearling:cow ratio, estimated by doubling the number of yearling bulls observed, was 33:100 exceeding the 5-year average of 25:100. The cause of increased survival for this age class is unknown as the wolf population increased 30% the past 2 years. Caribou availability has probably contributed to reduced wolf predation on moose.\(^{214}\)

This information further supports the notion that wolves are not limiting the moose population in the Tanana/Fortymile area. In addition, it is likely that steadily increasing caribou numbers will further ease moose predation pressure without future predator manipulation. Since both wolf and bear control are not well accepted by the public and do not necessarily achieve

\(^{214}\)Ibid.
desired results, and since we know that both moose and caribou numbers are increasing, one very good alternative for future management of this area would be to let the current trend play itself out. If Department and public pressure force quicker results than naturally will occur at this time, a short-term diversionary feeding program should be considered. Using diversionary feeding as an alternative, the current unsustainable level of grizzly bear harvesting by humans could be halted.

In the 1992 Area Specific Plan for South Central/Interior Alaska, the ADF&G reports they intend to increase hunting in GMU 20E dramatically. The average number of moose hunters in GMU 20E over the past five years has been 300. The Department states that, "harvest goals have called for increasing hunter participation from 300 to 800 hunters by the year 2000, with a hunter success rate of 35 percent."215 This statement suggests the Department is actively seeking to increase hunting in this area, and nowhere do they substantiate that such a demand for it exists. It appears here as though ADF&G is perhaps taking on the role of advocating for hunting (just as it is currently doing with trapping*), which seems inappropriate.

Further, as outlined in the Area Specific Plan, ADF&G wants to increase the moose population from its current estimate of ~4,000 to between 8-10,000. They state this goal will not be obtained with current growth rates by the year 2000. Thus the Department's justifications for implementing wolf control to benefit moose in the Tanana/Fortymile area include: 1) so that hunting participation can increase from 300 to 800 hunters by the year 2,000; and 2) to

*ADF&G announced in early February, 1995, that it is producing a video which will be sent all over the world to try to educate people about trapping in Alaska, which is done primarily with "leg-hold" traps. The European community has agreed to ban furs trapped with leg-hold traps, which are considered inhumane.
increase the moose population from ~4,000 to 8-10,000. However, ADF&G researchers have determined that wolves are not limiting moose, and past wolf control programs have not increased the moose population in GMU 20E.

Wolves in the Upper Tanana/Fortymile area:

Murie reported that wolves were "common" in the Tanana/Fortymile area until about 1908, "rare" between then and after 1923, and increasing during the late 1920's. They are thought to have reached a stable population size in the 1930's and '40's. Separate observations during the 1940's and 50's yielded differing opinions of the abundance of wolves. Skoog (1956) indicated wolf populations were low during this time, while Kelly (1951) suggested they were plentiful. Federal control maintained the wolf population at low numbers during the 1950's by using poison baits, "getters" and aerial hunting. Gasaway et al. (1992) reported:

> The high density of wolves in the region (Murie 1944) was rapidly reduced by a federal predator reduction program during 1948 - 60. . . . Wolves were killed by strychnine-laced baits dropped from airplanes, cyanide guns (coyote-getters), shooting from airplanes, year-round trapping, and snaring . . . . Bounties encouraged public harvest using the above methods, except that poisons were restricted to government use.

Grizzly and black bears also experienced substantial losses during the federal control programs. Gasaway et al (1992) reported:

> Grizzly bears were "intensively exploited during the 1950's. Poisons and snares used during the wolf reduction program (1948 - 1960) killed

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grizzly and black bears incidental to killing wolves . . . Also, miners shot bears to minimize conflicts, and bears were killed in snares that were set year-round to catch wolves for bounty.²¹⁸

In the 1960's, after federal predator control programs ended, ADF&G's observations suggest wolves became plentiful again, and then decreased during the mid-1970's, shadowing ungulate numbers.

In 1981, when ADF&G began accurately estimating the wolf population in this area, Gasaway et al. (1992) simultaneously began a wolf reduction program. Gasaway et al. (1992) determined that wolves in their experimental area (~125) were near ecological carrying capacity (KCC) before wolf removal. Wolf productivity levels increased significantly after wolf reduction occurred. Also, Gasaway et al. (1992) learned that wolves in the area remained within their territories and did not follow migrating caribou.²¹⁹

While discrepancies of wolf population estimates for the latter 1980's exist within ADF&G publications, the range of estimates provided include 173 - 235 wolves. The past three years have seen a decline in wolf numbers in this area: the fall 1991 estimate was 175 - 206, spring 1992 estimates were 136 - 147 and the spring 1993 estimate was 110 - 120. A harvest of 28-32% of the population in 1992-93 exceeded the sustainable <25%, and caused the population to decline.²²⁰

When interviewed by the New York Times, Wildlife Conservation Director, David Kelleyhouse highlighted the Department's justifications for

²¹⁸bid., p. 20.
²¹⁹bid., p. 19.
the plan. He stated, "We feel we are going to create a wildlife spectacle on a par with the major migrations in East Africa... Mom and pop from Syracuse can come up here and see something that they can't see anywhere else on Earth." Kelleyhouse's remarks were followed by the Board of Game indicating that local economies would benefit from tourist dollars through this action. They wrote:

People who wish to view the wildlife spectacle of massive Fortymile caribou migrations are unable to do so because of the small size of the herd. The local economy suffers from the lack of cash that would be brought into the communities by people coming to view or hunt the FCH.

These combined remarks caused an avalanche of criticism and ultimately led to a tourism boycott of the state.

Conclusion:

Existing literature discussing wildlife and related issues regarding the three areas targeted for wolf control in 1992 does not provide strong support for the wolf management plans proposed and adopted by the state. Each area -- Nelchina/Susitna Basin, Tanana Foothills and Flats and Upper Tanana/Fortymile -- comes with its own natural history, environmental considerations and human encroachment concerns. The situation in one area regarding ungulates is quite different from that of other areas, and thus generalizations are difficult to make regarding predator/ungulate management. However, it is apparent that ADF&G's own scientific

221Timothy Egan, "Alaska to Kill Wolves To Inflate Game Herds," *New York Times*, November 19, 1992, A16 L.
information does not fully support their control proposals. ADF&G's biological justifications are neither foolproof nor are they widely accepted by other wolf experts. Much controversy still surrounds ADF&G's proposals. Further, biological necessity does not appear to be the major driving force behind the control programs.

The studies highlighted in this chapter also clarify that Alaskan wildlife managers are still missing pertinent threads of information regarding Alaska's complex wildlife tapestry. These deficiencies have limited the breadth of the debate which, up to now, has revolved around predators and predator/prey relationships. Wolves have been a primary focus of most of the studies relating to ungulates within ADF&G research. ADF&G's tendency to dwell on the potential negative effects of wolves on ungulate populations has left existing literature and human understanding of other critical ecological components of these systems inadequate. Research on wolves, for example, has taken precedence over research on habitat, nutritional needs, climate-related concerns and other predators, such as bears. ADF&G's focus on wolves appears to be part of an age-old, western cultural bias against wolves.

The scientific focus of this controversial wildlife policy debate needs to shift so that it includes aspects other than predator/prey relationships. For example, the number of predators per ungulate population does not necessarily determine whether or not predators are adversely affecting prey. Alaskan wildlife managers must look beyond the traditional predator/prey studies and begin to gather more information on climactic, habitat and nutritional effects on ecosystems so that predator/prey relationships can be understood within their larger context.
An additional disturbing element of this debate is that there are currently no operating guidelines, standards or determined biological thresholds which trigger consideration of predator control. Right now, the state of Alaska can implement predator control whenever the political mood is favorable. For example, a "predator pit" situation does not have to be identified before wolf control is implemented. Ungulate numbers can be high and wolf control can still be proposed, as was the case in GMU 13. There are also no research guidelines in place during predator control programs. Thus, Alaska has experienced a multitude of wolf control programs and, in many cases, has not been able to assess their positive, neutral or negative effects due to lack of monitoring and analysis. It is time for the state to establish these standards so that future wildlife management programs can appear to be more credible.

Finally, since biological necessity seems not to be the major driving force behind the 1992 proposed wolf control, political pressure and differing values must be addressed as core areas of the controversy. It is perhaps toward the arena of ethics and values that Alaska must turn most of its attention regarding wolf management at this time. A change has occurred amongst the majority of people in Alaska, and ADF&G and the hunting-advocate community must begin to accept these new views and incorporate them fairly into future wildlife management.
Alaska's caribou herds, showing approximate ranges of the Porcupine (13) and Fortymile (7) herds. From Hemming (1971).
Appendix 3.2  Map of Approximate Ranges of the Nelchina Caribou Herd

Approximate range of the Nelchina caribou herd 1848-1885. Prepared from descriptions of Glenn and Abercrombie (1899), Allen (1900), Rohn (1900) and Skoog (1968).

Approximate range of the Nelchina caribou herd 1900-1948. Prepared from descriptions of Glenn (1900), Mendenhall (1900), Osgood (1901), Capps (1927) and Alaska Game Commission (1925-1948).
The study area and caribou distribution as known at the onset of this study.
Appendix 3.4  Map of Fortymile Caribou Herd Ranges

Figure 1: Past and present ranges of the Fortymile caribou herd.
Predation Limiting Moose at Low Densities—Gasaway et al.
Chapter 4

THE WIDER VIEW: Ethical Considerations in Alaska's Wolf Issue

But I want to emphasize in no uncertain terms that this is not an issue of biology: it is an issue of values and ethics. It matters not at all whether or not wolves are reducing ungulate numbers if people find the concept of killing such highly evolved social animals repugnant, and they object to your concept of managed "wilderness" where predators are managed in favour of prey. . . . I sincerely hope that the idea of providing a wildlife viewing spectacular in Alaska by killing predators, as described by Mr. Kelleyhouse in the New York Times, is viewed by both the majority of Alaskans and others throughout the U.S. and Canada as inappropriate, cowboy wildlife management, regardless of whether or not, by killing wolves, you can achieve such a purpose.

Values set the broad parameters for environmental management, a fact I believe you have not adequately assessed.223

John Theberge, Letter to Governor Hickel, December 7, 1992

In discussing the Alaskan wolf issue from an ethical and value-based perspective, this chapter will use ideas presented in an essay entitled, "Ethics, Science and Environmental Regulation," by Donald A. Brown.224 Brown's essay identifies inadequacies which exist at the environmental policy-making level due to a reluctance on the part of policy-makers to include the ethical and value-based concerns in environmental debates. Brown outlines how ethics and values are central to most environmental policy debates, and that

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they should be of primary concern during environmental policy discussions. He asserts that science and technical expertise, at the exclusion of ethical inquiry, has dominated environmental controversies. This assertion certainly applies to the Alaskan wolf controversy.

Wildlife management in Alaska involves many political, ecological and ethical complexities, each with their own values-related concerns. In order for policy-makers to begin discussing values regarding the wolf issue, the complexities involved must first be identified and addressed. Following this, an ethically based system can be devised which can allow for a legitimate process of decision-making to occur. While it is not in the scope of this chapter to discuss all of Alaska's values-related issues regarding wildlife in detail, this chapter will attempt to introduce some of the broader ethical concerns surrounding the wolf debate. To better relate Brown's ideas to the specifics of the Alaskan wolf debate, this chapter also utilizes the writings of environmental ethicists Paul Taylor and Eugene Hargrove, among others, to help inform the discussion.

In Brown's essay, Brown clarifies that ethics and value systems are essential to determine whether or not to go ahead with an environmental project. In addition, the author contends that ethics and value systems should be a focus of environmental policy debates. Brown also distinguishes the roles of ethics and science in these debates, suggesting they both are critically important, but that science should be used as a tool in order to make what are ultimately ethical decisions. Brown states, "ethics is concerned with the ends that should be chosen by people. Science is extremely important in most environmental ethical discussions because, once a particular goal is chosen, science can evaluate various means that are available to achieve the
goal. Science can also analyze which ends are feasible.” Thus Brown considers science an important tool in determining the feasible outcomes of projects, but it is secondary to the necessary ethical discussions revolving around community decisions. He further clarifies:

It is generally accepted that science cannot deduce prescriptive statements from facts. That is, one cannot deduce "ought" from "is" without supplying a new minor premise. One cannot introduce an evaluative term, such as "optimal solution," into the conclusion of an argument if the prior premises of that argument are entirely nonevaluative . . . . Therefore, on this largely traditional view of the logic of ethics, science cannot answer ethical questions all by itself.

For example, in order to determine if society should choose to use nuclear power, science is critical in clarifying what risks are involved in such a decision. Whether or not those risks are worth taking, however, is a value-based decision.

Belief in science is at a peak in western culture, and science and objectivism has in many ways replaced religion as the primary belief system. One example of this is that science is held in highest esteem during environmental policy forums. Brown, however, outlines significant shortcomings within science, stating that the narrow focus of the scientific method has limitations and causes value distortions. Brown writes:

Because of the primacy given to scientific truths by technically trained persons, issues that can be dealt with on quantitative terms are more sympathetically considered than issues that involve more difficult qualitative or ethical concerns. . . . Scientists are trained to report impersonal data from which all subjective elements have been removed, to reduce all issues to a scale that can be quantitatively manipulated, to think of nature as lifeless substance with measurable...

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226 Ibid.
analytic parameters, and to transform social questions into technical questions.\textsuperscript{227}

In Alaska's wildlife management debate, the transformation of wolves -- a species which elicits intense emotions, which for some enter a spiritual realm -- into "lifeless substance with measurable analytic parameters," immediately positions the Alaskan wolf debate in conflict. Limiting the wolf discussion to a narrow, scientific scope, as has been done, stifles, flusters and distorts the dialogue at the policy-making level. Brown further suggests that attempts by those pursuing the scientific method to separate values and facts are often difficult or impossible, for human values determine the direction of scientific research. He outlines:

Philosophers who have been concerned about how people understand facts, a topic studied within a branch of philosophy called hermeneutics, have come to realize that what one sees is usually a product of cultural tradition; there are no acts of pure perception that are not dependent on prior value choices. In this context, the decision about which "facts" to focus on in the analytical stage of research cannot avoid value questions. For example, should the environmental impact analysis of a dam consider protection of the habitats of deer and elk or should it consider potential destruction of the habitats of skunk or coyote? The decision of what to study is frequently a question of value, not of fact.\textsuperscript{228}

Brown further clarifies how limited the technical community can become. He states:

The technical community often focuses on those aspects of a problem it knows something about while ignoring others. . . . What the public usually sees, however, is a debate about a narrow range of the technical issues with the participants in the debate acting as though they understand and are dealing with all issues that should be of concern to the public. In this way, the public policy debate is often a language game in which the jargon of the specialty of the analysts sets the allowable limits of where to start and stop the investigation. Value

\textsuperscript{227}Ibid., p. 347.
\textsuperscript{228}Ibid., p. 335.
conflicts which should be resolved politically are then hidden in what look like rational and objective calculations.\textsuperscript{229}

As Brown suggests, the value conflicts surrounding Alaska's wolf controversy were not formally discussed in 1992 and thus were hidden within a limited scope of technical information outlined in Chapter 3. Certainly Alaska's wolf control controversy is an example of a debate where only a narrow range of the technical issues have been considered.

Throughout his essay, Brown delineates failures which commonly occur within the environmental decision-making process related to the inability of decision-makers to discuss inherent value and ethical concerns. The first such failure Brown describes exists within the regulatory setting. He outlines:

**Failure #1: The assumption that environmental dilemmas can be decided through technical terms, while value concerns are left undiscussed.**

"In this way, agency technicians apply science derived "facts" to politically derived rules. The model envisioned in this conventional view of administrative decision making assumes that the technical problems under consideration can be dealt with in technical, analytical terms and that the values of the administrator and the value problems embedded in the environmental controversy can be eliminated from the administrative process. Does the relegation of these "fact-value" questions to "technical" experts systematically distort the important values and ethical questions that are necessarily embedded in the environmental questions under consideration? I believe the answer is clear.\textsuperscript{230}

As Brown points out, the question of whether or not wolf control is an ethically acceptable alternative to the public was not discussed by government appointed or agency personnel at any stage of the 1992 - '93 wolf controversy


\textsuperscript{230}Ibid., p. 333.
-- not during the Wolf Management Planning Team meetings as is reflected in the Team's recommendations, ADF&G organized public meetings, or November '92 Board of Game meeting. After the wolf control plans were temporarily canceled, some discussions at Governor Hickel's Wolf Summit mentioned briefly that values were a part of the debate.

During the Summit, groups comprised of people from all over the country holding a variety of perspectives on wolf control attempted to discuss and summarize consensus-based points about wolf management. Nine groups created a total of ninety-two summary points, three of which recognized differing values, beliefs and philosophies to be part of the debate. These summary points read as follows:

* Some philosophies do not allow for a consensus solution (Group 2)
* Avoid biases, disrespect for differing values (Group 3)
* People should tolerate other life styles, beliefs and values (Group 8)231

While these summary points were intended to help guide the state in future wolf management decisions, there has yet to be any formal discussion regarding values related to wolf management.

**Failure #2: There is no accepted consensus among environmental policy-makers regarding which ethical value system to use.**

The second failure Brown outlines is the failure on the part of those involved in environmental policy-making to reach a consensus on which ethical value system to apply to environmental problems in question. Brown clarifies that ethics is concerned with prescriptive statements. It is the,

231 Alaska Department of Fish and Game, Summary, Alaska Wolf Summit - 1993.
"domain of inquiry that attempts to answer the question 'What is good?' . . .
[whereas science is a] discipline that attempts to make descriptive statements about the nature of reality through analysis of facts and experience."^{232}
Brown points out that the philosophical community has not reached consensus about ethical approaches to environmental problems, though the most commonly used approach is a utilitarian one, where the, "underlying assumption . . . is that an option should be chosen that creates the greatest happiness for the greatest number of people,"^{233} and all other sentient life.

Utilitarianism, was not the approach used by the state during the 1992 wolf conflict. Had the state chosen a utilitarian approach, it may have avoided national outcry, but also risked changing the face of wildlife management in Alaska. With the formation of the Wolf Management Planning Team (WMPT), the state attempted to create a wolf management plan which included something for everyone -- a plan that everyone could live with. While initially this may sound utilitarian, the WMPT did not actually apply a utilitarian approach.

In a situation where the majority of people oppose the idea of wolf control, a team might have produced results which created the greatest happiness for the greatest number of people if the majority of team members opposed wolf control and the starting point for discussions was determining whether or not wolf control is acceptable in any circumstance. This was not the case with the state's team. The state brought a group of team members together which attempted to have all interests fairly equally represented. The purpose of the team was to hammer out a compromise over when wolf

\cite{233}Ibid., p. 337.}
control would be acceptable, not if it would be acceptable. Thus right from the onset, neither the team nor the state were headed toward recommendations which could be considered utilitarian. That a utilitarian approach was not used is supported by the Dittman poll, as outlined in Chapter 2.

A challenge to Alaska's policy-makers, along with the philosophical community's at large, will be to determine which ethical value system to use in the wolf and other wildlife debates. This challenge will not come without hardship and fundamental change in the state's approach to wildlife policy-making.

Failure #3: Facts and values are not necessarily distinguishable to humans because humans are a product of their culture and environment.

Another failure Brown identifies is an inability among humans to separate facts from values. He identifies that fact and value are not necessarily distinguishable because people are a product of their culture and environment. He writes:

Analysis of environmental "facts" usually requires prior value decisions about level of detail, burden-of-proof, and quality of data. Thus, a value choice is implicit in almost every choice the technical analyst makes. . . these value choices are rarely identified in the technical analyses or in the public policy debate.

Regarding wolves, western cultural biases, which have included devaluing wolves, have led scientific hypotheses and research to feature wolves in a negative light. Historically, the field of wildlife biology and, more specifically, ADF&G have not been excluded from these biases.

Underlying value choices which have existed throughout much of the history of wildlife management in Alaska include that: wolves are
understood or perceived to negatively impact prey populations; both individual and packs of wolves are replaceable or disposable; ungulates hold greater value than wolves or other predators; a priority of wildlife management is to make ungulates available for human hunting, often at the expense of predator species. These approaches to wolves and prey are value-based.

Wolves often are not portrayed favorably or given the benefit of the doubt even in objective terms in ADF&G research. For example, ADF&G publications rarely discuss the ecological benefits of wolves within an ecosystem. Another example is that wolves were hypothesized to be the limiting factor of the moose population in GMU 13 and 20E, when in reality brown bears have a greater impact. This misled hypothesis was likely the result of a cultural bias against wolves. Additionally, that biologists are only now beginning to research the effects of climate, habitat and nutritionally-based effects on herds, such as the Fortymile caribou herd, is an example of how cultural limitations have narrowed the scope of scientific research.

No ADF&G research has tried to analyze the impacts of wolf control on the social behavior of wolves and their packs, for example, as Robert Crabtree has done in Yellowstone regarding coyotes (please see chapter 1). When Gordon Haber suggests the state should explore the impacts of wolf control on pack social behavior, he is often publicly ridiculed.

Most of the ADF&G studies referred to in chapter three portray the wolf as a primary cause for the decline of ungulates. Even in situations where not enough data exists to determine if wolves are actually limiting ungulate populations, ADF&G biologists suspect wolves. For example, in Ballard et al.'s, "Ecology of an Exploited Wolf Population in South-Central Alaska,"
(1987) which focuses on GMU 13, the authors state that, "Relatively low wolf densities in both the SRSA [Susitna River Study Area] and remainder of GMU 13, combined with lack of moose population estimates before wolf control and biases associated with annual moose sex and age composition transects (Caughley 1974), provided inadequate data for evaluating the impacts of wolves on the moose population. However, there were other indicators that suggested reduced wolf densities may have increased moose survival." Though by no means definitive, the authors discuss how wolf densities in the SRSA were negatively correlated with subsequent autumn moose calf : cow ratios from spring during the study, and offer that this suggests "reduced wolf densities may have contributed to increased calf survival." Simply the suggestion of such a correlation, given the limited technical data, suggest a cultural bias and helps perpetuate an age-old bias against wolves.

On the other hand, when the authors of the above study have an opportunity to down-play the perceived negative impacts of wolves on prey populations, they remain quiet. For example, in their conclusion the authors discuss litter sizes. They state, "Mean litter size per pack in late summer varied from 3.7 to 7.3 pups with smallest litters occurring during years of highest wolf and lowest moose densities." (Ballard et al. 1987). This statement may suggest that wolf populations could be naturally regulating themselves depending on prey availability and their own population size. Rather than exploring this possibility, or offering this as a suggestion, no comment is made by the authors relevant to this observation.

235 Ibid. p. 43.
The only statement that is made about natural wolf population regulation comes prior to the conclusion when the authors cite studies from other biologists (which their own research does not appear to support) which suggest that, "no sensitive, fast-acting feedback mechanism regulates numbers of wolves relative to declining prey densities (Packard and Mech 1980). . . . [which, in conjunction with bear predation] could increase the frequency and severity of predator-sustained declines in ungulate populations and decrease the likelihood that ungulate populations would escape control by predators under natural conditions (Ballard et al. 1987).236

The 1992 Area Specific Management Plan also portrays wolves as the primary cause of ungulate number declines. The description of Unit 20A provides a good example. ADF&G wrote:

In Unit 20A, the moose population had fallen from a high . . . Caribou numbers had also dropped . . . .Wolf control was initiated in late winter of 1976, and by fall 1978 the wolf population had been reduced by two-thirds. In response, the moose population grew to the present level of 11,100. . . . The Delta caribou herd also grew rapidly, reaching a peak in 1989. Then between 1989 and 1992, adverse weather caused poor caribou calf survival. At the same time, wolf predation on adult caribou increased and the caribou population declined from 10,700 caribou in 1989 to 5700 caribou in 1992. The wolf population has been increasing in recent years in Unit 20A and has fully recovered from wolf control programs which ended in 1982. There are presently 220-300 wolves in Unit 20A.237

Just as Gordon Haber has pointed out in other examples (please see chapter 3), ADF&G has painted a neat, tidy package of cause and effect between wolves and prey species; however, these wolf/ungulate relationships are oversimplifications. While adverse weather is mentioned as a factor impacting caribou calf survival, the primary cause for ungulate decline

236Ibid., p. 42-43.
outlined by ADF&G above is wolf predation. Assumptions are made here by
the Department which many scientists, environmentalists and others
involved in the debate do not believe are fully accurate.

Through ADF&G's singular approach in the Area Specific Plan and
other publications, strong, "anti-wolf" messages go out to the public. For
many, this type of information is too close to "anti-wolf" propaganda for
comfort.

The challenges ahead for the scientific community and specifically
ADF&G will be to: 1) recognize the cultural biases associated with research
and management actions regarding wolves; and 2) begin to incorporate
differing value systems within those approaches. In Alaska, this should start
with ADF&G changing its research focus so as to include the positive aspects
of wolves within ecosystems and the myriad of other factors outlined in
chapter three which influence ungulate species.

Failure #4: Almost all value discussions within environmental debates are
limited to some variant of utilitarian approach which is incapable of
adequately processing all ethical questions surrounding those debates, such as
individual rights issues or values which are not quantifiable.

When value questions are recognized within the environmental policy-
making arena, Brown critiques technical analysts for discussing values in
quantitative, economic terms. He outlines that almost all value discussions
within environmental debates are limited to some variant of utilitarianism,
an approach that is assumed without clarification or discussion. Brown
asserts that utilitarianism is incapable of adequately processing all ethical
questions surrounding many environmental debates, such as individual rights. He writes:

Many economists, for example, assert that the option that makes the most efficient use of resources ought to be the preferred option. . . . Most contemporary philosophers hold that utilitarian approaches must be supplemented by other ethical approaches, such as a Kantian approach, which stress such concepts as rights, justice, and due process as fundamental. The Kantian would resist many developmental strategies that may be justifiable on utilitarian grounds. More importantly, the utilitarian approach often assumes that various question can be reduced to a quantifiable amount. Quantification of environmental or health benefits, however, is often difficult and sometimes impossible. For instance, what is the value of human life? . . . As a result, most commentators agree that a utilitarian analysis must be supplemented by concepts of distributive justice.238

As Brown discusses, Alaska's wolf issue can and does reach beyond the boundaries utilitarianism provides. Several concepts such as "rights, justice and due process," have played significant roles within the debate, with the inclusion of animal rights perspectives, cultural and biological justice, and representation on the Board of Game with regards to due process. One significant and in many ways unquantifiable question surrounding this issue is: what is the value of the life of a wolf? Utilitarianism cannot adequately assess the true value of a wolf's life which includes intrinsic and spiritual aspects among other non-quantifiable realms. In spite of the shortcomings of utilitarianism, it is relevant to note that had the state utilized a utilitarian approach, the outcome of the 1992 wolf plans may have been viewed as much fairer and more appropriate by the public.

Failure #5: Cost-benefit analyses are used as "paradigmatic decision-making tools," however, many ethical questions are not reducible to economic quantifications.

Brown continues to develop the idea that the traditional approach taken in environmental debates, which attempts to quantify and weigh all values, is inadequate. He suggests that cost-benefit analyses are used as the "paradigmatic decision-making tool" in environmental debates, at the expense of ethical concerns. Brown states:

Although most academic observers agree that cost-benefit analyses as a descriptive tool may initially be helpful to decision-makers, provided that the ethical limitations of this approach are understood, most philosophers agree that mandatory cost-benefit analyses should not be used as a prescriptive decision-making tool.

Pricing mechanisms measuring preferences measure only the intensity of wants; they cannot evaluate which beliefs are morally superior. . . . ethical questions are not reducible to questions of economics understood as efficient markets.

Brown's point here is well taken. Cost-benefit analyses should be used as tools for improved decision-making, however they should not be the ultimate framework for basing decisions.

In the case of Alaska's wildlife debate, a comprehensive cost-benefit analysis has never been completed for Alaska's wolf control programs. Some opposed to wolf control in Alaska have advocated for the state to complete a cost-benefit analysis because they feel confident the results will determine that wolf control is not economically viable. It cannot be argued that economics is the primary impetus motivating wolf control in Alaska, for the cost of wolf control is enormous -- probably significantly greater than the
recently determined $2,000 per wolf\textsuperscript{239} figure suggests when all hidden costs are considered.

The economic and tourism sanctions placed on the state during wolf control programs cannot be economically out-weighed by the benefit of theoretically a few hundred extra caribou and moose for hunters. The Alaska Tourism Marketing Council projected that the overall loss to their industry from the tourism boycott resulting from the state's wolf control plans in 1992-3 was between 100 - 150 million dollars. Tourism is Alaska' third largest industry, and generated approximately 1.1 billion dollars in 1992.\textsuperscript{240} The state revenue generated by hunting , however, equals approximately 67 million dollars per year, which does not counter-balance the losses felt by the tourism industry. Since the economic impacts of Alaska's wolf control programs would deter even the most novice economists from supporting such measures, it appears that a cost-benefit analysis would only help make wolf control obsolete in the state.

When elected in November '95, Governor Tony Knowles instigated a cost-benefit analysis of wolf control in Alaska which has not yet been completed. The results of this cost-benefit analysis will help the state discuss wolf control in quantifiable terms. It will also increase the pool of information from which the state can base decisions. It will not, however, help the state move toward including ethical values which are not quantifiable in the debate. In order for value questions to be included in environmental debates, Brown clarifies that, "persons concerned about environmental ethical issues should vigorously include themselves in

\textsuperscript{240} Wolf Management: Perspectives on the Impact to the Tourism Industry, panel presentations at the Wolf Summit in Fairbanks, 1993.
debates about public policy and refuse to accept a narrow utilitarian calculus as the sole basis for a rational choice."241

Failure # 6: Incomplete technical analyses distort values in environmental policy-making.

Brown focuses on yet another problem related to the use of technical analysis and clarifies how often it is incomplete. This further distorts values in environmental regulation. He states:

The technical community often focuses on those aspects of a problem it knows something about while ignoring others. . . .What the public usually sees, however, is a debate about a narrow range of the technical issues with the participants in the debate acting as though they understand and are dealing with all issues that should be of concern to the public. In this way, the public policy debate is often a language game in which the jargon of the specialty of the analysts sets the allowable limits of where to start and stop the investigation.242

The 1992 Alaskan wolf debate is an example of how an exclusive focus on a small range of the technical issues precluded a comprehensive discussion of all the relevant concerns involved in the debate. For example, chapter three outlines that technical analyses of multi-prey/multi-predator systems in Alaska have focused primarily on the potential negative effects of wolves on ungulate species. Research of this nature has been done at the exclusion of gathering other pertinent biological information regarding these systems, such as critical habitat and climate related factors.

The focus on wolves and their impacts on ungulate populations in research has limited policy debates to a set of narrow parameters at the exclusion of discussing other pertinent technical factors impacting these

242Ibid., p. 341.
systems. In addition, value concerns are not identified or included in the debates. In other words, Alaska's policy discussions have focused on wolf control due to wolf control proposals created by the technical experts. This situation illustrates Brown's point, where the public policy debate is a language game created by the jargon of the specialty of the analysts who set the allowable limits of where to start and stop an investigation.

Not only did technical experts fail to identify and discuss all relevant factors regarding multi-prey/multi-predator systems and how best to manage them, they also failed to provide supporting baseline data for wolf control in the three areas targeted. In all three GMU's proposed for control in 1992, technical information was lacking regarding the effects of wolves on the ungulate species in question, and wolves were not identified as the primary impact on ungulates. Similar circumstances have existed during past studies and control programs.

While this paper has criticized ADF&G wolf research for its approach and narrow focus, it must also identify the failures of those leading public policy debates, namely administrators, department heads and policy-makers. Often researchers and biologists do produce sound information regarding wildlife populations, but the way their information is portrayed to the public and used in policy debates is skewed. For example, field biologists cannot be held responsible for the way Alaska's 1992 Area Specific Plan was written, and how its information was portrayed to the public. This was the job of those involved in public relations and marketing for ADF&G and ultimately its department heads.

Time constraints also affect policy decisions, and often limit available technical information. Limiting available technical information due to
scheduling is a failure at the policy-making level. For example, wildlife policy decisions in Alaska are usually decided during predetermined dates, at times when the benefit of critical and conclusive data needed to make sound decisions is not necessarily available. Again, this is not the responsibility of field biologists and researchers, but of those setting the schedule. Ultimately scheduling in Alaska for wildlife policy decision-making is the responsibility of the Board of Game.

Decision-making without appropriate information will not insure the long-term conservation of wildlife populations. More accurately, making decisions without pertinent information is a way to critically compromise wildlife populations, which in the end serves no entity -- human or animal. If, for example, a census study is in progress but has not been completed, then critical decisions regarding the population in question should wait until the results are completed. ADF&G and the state have already learned this from past mistakes, a few of which are outlined in Chapter 3. However, decisions continue to be made at times without critical information.

For example, during its March, 1995 meeting, the Game Board decided to further liberalize grizzly bear hunts in GMU 13 even though the results of a recent and ongoing census of the bear population is not complete. The last completed population census for bears in this area occurred in 1987. ADF&G biologists suspect the bear population has declined significantly in GMU 13, due to hunting beyond calculated sustainable levels in all five sub-units of GMU 13 for the past fifteen years. In spite of this, the Board of Game voted to lengthen the bear season so that it also takes place during moose and caribou hunting season, when more hunters will be in the field. In addition, the Board's action increases bear harvests five-fold, from a possible 1 bear per 4
years per hunter to potentially 5 bears per four years per hunter. Such a significant increase in bear harvests in GMU 13 is not biologically justifiable at this time, and it is not the desire nor the fault of the field biologists that this decision occurred. This is the result of the Board of Game making a decision prematurely, without the information necessary to make a sound decision. This is a common scenario in Alaska's wildlife policy arena. The state of Alaska must start to make responsible decisions for its wildlife by including all necessary technical information needed to make appropriate decisions, and other pertinent concerns such as value-related questions.

Failure # 7: Value questions are distorted through the improper placement of the burden of proof.

Lastly, Brown discusses the distortions caused by improper placement of burden of proof. He outlines how problematic it is to repeatedly shift the burden of proof to the analyst and writes:

Because most environmental impact analysis is discussed in "science-like" terminology, notwithstanding the fact that the scientific predictive basis is sometimes so weak that prediction is not much better than untutored intuitive speculation, there is, nevertheless, nearly always a strong, but unfounded, belief in the credibility of the analysis that shifts burden of proof to the analyst. Since scientists in environmental agencies are usually not in a position to suspend judgment until all of the proof is in, nor to wait out the long latency periods that may be necessary to determine whether the project will create the expected outcomes, the "scientific-like" jargon of the analysis is misleading. Environmental impact analysis should be distinguished from other areas of science in which the scientist can selectively focus on problems that can be settled by verifiable scientific procedures.243

The "scientific-like jargon" which is misleading in the Alaskan wolf debate is the perpetuation of the notion that if Alaska kills wolves, ungulate

243Ibid., p. 346.
numbers will automatically increase. That is the message sent in ADF&G's description in the Area Specific Plan of GMU 20A quoted earlier in this chapter. Because necessary research on wildlife-related ecological relationships other than wolf/ungulate relationships has yet to be conducted in many areas in Alaska, including those charted for wolf control in 1992, substantiating evidence for this hypothesis is lacking. Since the burden of proof is delegated to the technical analysts, in this case ADF&G biologists, and ADF&G has perpetuated the myth that by removing wolves ungulate numbers will increase, this notion has become part of an Alaskan belief system surrounding wolves. Advocates of wolf control honestly believe that by removing wolves there will be more caribou and moose for them to hunt, and it is a perpetuation of this belief system which has brought the state to its present impasse. As soon as ungulate numbers are down, or hunters are frustrated by inaccessibility to ungulates, there comes a cry for wolf control. Questioning other factors potentially inhibiting ungulate populations is not a part of the question. This brings us back full circle to the realization that the 1992 wolf control proposals were a function of value-based as opposed to scientifically-based decisions.

GENERAL VALUE-RELATED CONSIDERATIONS SURROUNDING WILDLIFE MANAGEMENT IN ALASKA:

Predator reduction has been a commonly used wildlife management tool throughout the United States since the early 1600's, and only within the last few decades has scrutiny of this management technique gained significant momentum. In Alaska, not only has wolf control been used as a management tool, but it has become, some would argue, part of a "cultural
"tradition" for a portion of public hunters. In Alaska, private and state sponsored aerial wolf control is considered a traditional, acceptable practice to several groups involved in the debate. However, in reviewing both the Dittman and AVA (Alaska Visitor Association) polls, it is evident that those favoring such traditional wolf control programs comprise a small minority of the Alaskan public.

In agreement with Brown's first point, which suggests that technical experts and environmental policy-makers must expand environmental policy discussions beyond technical, scientific jargon and openly discuss the value-based decisions inherent within their work, it is evident that Alaska must begin to discuss the ethical choices involved in wildlife and wolf management. Wildlife management in Alaska involves complex and diverse interests. Sifting through these layers to establish the best options for the state begs for the involvement and insights of ethical considerations. Ethical discussions regarding predator management incorporate a wide spectrum of values, including the value of wolves, the rights of wolves, the value and rights of caribou and moose, sport and subsistence hunting ethics, cultural traditions and more. Environmental ethicist Paul Taylor writes regarding complex situations such as Alaska's:

These are the cases where the competing claims are so complex and so powerful on both sides that no solution by reference to the principles alone can be reached. These inevitable gaps in our decision-making procedure, however, need not mean that we must then become arbitrary in our choice of what to do. We must take another step in seeking a fair resolution of the conflict. This step involves appealing to the ethical ideal that underlies and inspires (defines the "spirit" of) the whole structure of priority relations . . . . 244
The "spirit" or essence of Alaska's wildlife situation is not about whether or not citizens should be able to hunt, but rather it is about when and to what ends can they hunt. The Alaskan wolf controversy is primarily a conflict of values surrounding what some understand to be extreme measures taken to allow for increased hunting opportunity. If Alaska can come to agreement about when and to what ends people are allowed to hunt, the structure of priority relations which Taylor discusses would unfold from this point of reference, or ethical ideal. As Taylor suggests, Alaska must appeal to an "ethical ideal" to prioritize relations if positive dialogue and change is to occur.

**Instrumental and Intrinsic Value Systems Regarding Wildlife**

There are many approaches to valuing wildlife. Two wildlife value-systems that have been described in the field of environmental ethics, by Eugene C. Hargrove, help inform the Alaskan wolf controversy. In *Foundations of Environmental Ethics*, Hargrove distinguishes these value systems as the "instrumental" and "intrinsic" approaches. He writes regarding wildlife:

Two kinds of value must be considered. The first is instrumental value. An entity is instrumentally valuable if its existence or use benefits another entity, usually a human being. The second is intrinsic value. An entity has intrinsic value if it is (1) valuable for its own sake or (2) valuable without regard to its use. These kinds of value may, moreover, be either anthropocentric or nonanthropocentric. An anthropocentric value is basically a human value. It is often customary to assume that all anthropocentric values are also instrumental, that is, valuable because they benefit human beings. It is nevertheless possible for values to be anthropocentric and intrinsic. An art object, for example, is appreciated and preserved in terms of human aesthetic values but is not regarded as being valuable instrumentally. Most environmental ethicists, however, have been critical of
anthropocentric values of any kind and have attempted to develop some kind of nonanthropocentric value theory that can be used to establish environmental or ecological value independent of human judgment. It is within this framework — instrumental versus intrinsic and anthropocentric versus nonanthropocentric — that the value of wildlife must be sought.

Hargrove's definitions appear similar to the systems in conflict in the Alaskan wolf issue. In Alaska, those involved in a value system similar to the instrumental approach are a group which often places the worth of prey — moose, caribou and sheep in most cases in Alaska — above wolves and other predators because of their benefit to humans when hunted. This group includes those who support state sponsored predator control programs which kill wolves and perhaps other predators in order to boost available prey numbers for the benefit of human hunters. Those advocating for this approach in Alaska seem to believe it is not their privilege, but rather their right to hunt. Their interests lie in manipulating game populations so as to attempt to produce abundant numbers available for human hunting. This is an anthropocentric, speciesist and hierarchical approach; humans and their needs and desires are positioned above those of other animals.

Positioned on the other side of the conflict is a group with a value system similar to the intrinsic system described by Hargrove. This group recognizes a critical relationship and interconnection between predators and prey, and elevates the wolf and other predators from creatures lacking in relative worth to those that are equally respected for their significant role within ecosystems. This group recognizes a circular or balanced relationship

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* This is not to be confused with predator control implemented to remedy the potential collapse of an ungulate population which is threatened with local extinction. In this latter case, predator control is used in a true conservation effort, where the ungulate population ideally benefits. In the former case, it is human hunters who benefit.
between predators and prey. As Hargrove points out above, this approach can be either anthropocentric or non-anthropocentric. In Alaska's situation, the group closest to the intrinsic value system approach includes individuals who do not support state sponsored predator control programs which kill wolves and other predators in order to boost available prey numbers for the benefit of human hunters. This group includes the majority of people commenting on the wolf plans who have made their position known that killing wolves in order to benefit human hunting is not an ethically acceptable alternative.

The state of Alaska's wildlife management system has traditionally been biased toward an orientation similar to the "instrumental" wildlife value approach identified by Hargrove. The Hickel administration has not strayed from this trend. During Hickel's governorship, wildlife management has primarily benefited "sport" hunters. Sport hunters are represented by hunting advocates through local Fish and Game advisory committees and, among others, a group called the Alaska Outdoor Council (AOC). The AOC is the largest and most effective hunting advocate group in the state, which also represents the Alaska chapter of The National Rifle Association. The AOC supported all three wolf control proposals in 1992, and key members of this group helped influence these proposals.

Sport hunting advocates, who ascribe to an approach similar to the "instrumental" wildlife value system, testify at Board of Game meetings and during legislative hearings. Their words fall on sympathetic ears, especially at Board of Game meetings where many seated on the Board and within the ADF&G, including David Kelleyhouse, former Director of Wildlife Conservation, ascribe to parallel value systems. For example, the last Board
of Game Governor Hickel seated included four "life" members and past officers of the AOC: Dick Burley, Chairman, Sue Entsminger, Ernie Polley and Al Franzman. Out of seven seats, these four represented the majority of the Board. It is likely that, under the Hickel administration, virtually any proposed wolf control plan had a good chance of passing due to the make-up of the Board of Game, ADF&G's Wildlife Conservation Department and the majority of the Advisory Committees.

Testimony from the Executive Director of the Alaska Outdoor Council at the November 1992 Board of Game meeting provides a good representation of the values system and approach taken by the Alaska Outdoor Council. The statements made were as follows:

Mr. Chairman and members of the Board thank you for the opportunity to testify. . . . My name is Dick Bishop. I live at . . . Fairbanks, Alaska. . . . I'm testifying on behalf of the Alaska Outdoor Council and the Tanana Valley Sportsmen's Association. The Outdoor Council is a statewide coalition of outdoor oriented individuals and groups. It's dedicated to promoting sound scientific management and use of fish, wildlife and other renewable resources, and public access to public resources consistent with the Alaska state constitution. And obviously our membership is very diverse. It's open to virtually everyone. The Tanana Valley Sportsmen's Association is a local outdoor group with similar goals. The Association is a member club of the Alaska Outdoor Council. It was formed in 1937, from local hunting and shooting groups dating back to 1911. TVSA has actively promoted sound management and ethical use of resources throughout its history. I'd like to make some general comments and then go on to some specific areas.

We support the management planning effort, and we have supported it since its inception. We think it does offer the possibility of success in overcoming chronic impasses that have precluded good management for a long time. . . . One myth that I'd like to address is the myth that there is an inherent conflict between hunting and non-consumptive uses. There is no inherent conflict between consumptive uses and non-consumptive uses. One does not preclude or necessarily diminish the other. Finally, as far as general comments overall, people kill a very small percentage of the big game of the state, whereas
predators -- other predators -- kill a substantial percentage. We believe that this is unacceptable in a state with a tradition of hunting as an integral part of Alaskan lifestyles. And where sweeping accommodations of non-consumptive uses have been made by federal law. There is no justification for further restraints such as closed areas or buffer zones.

With regard to Game Management Units 13 and 20, those are areas that historically have provided a major portion of moose and caribou hunting opportunities for a substantial number of a large proportion of Alaskans and to non-residents. Intensive management should be applied in Game Management Units 13 and 20 to substantially increase moose and caribou allocations for people's consumptive uses. With intensive management it is biologically feasible to increase most moose and caribou populations and increase harvests by people five to ten fold, and maintain viable populations of wolves and grizzly bears, and other bears. We support a human use consumption allocation goal of thirty to thirty-five percent of the annual moose and caribou production available after mortalities due to weather and other non-predation type factors.

We are pleased to see that today the department brought out intensive management options and data related to them and numbers related to goals and potential harvests, etc.. It's absolutely essential that the board and the public be aware that those are biologically feasible alternatives. And, we support those. There is an extensive historic public record documenting the high degree of public interest in and support for higher prey populations and harvest opportunities for people, and the background of biological information from ADF&G management plans illustrating the feasibility of intensive management.

We urge the board to approve intensive management in the geographic areas proposed as zone 6 and 7 in GMU's 13 and 20. Intensive management should include, as necessary, reduction and regulation of bear and wolf populations, habitat improvement and prey population management. Methods authorized should include necessary wolf hunting and trapping, public land-and-shoot, and public aerial shooting of wolves, ADF&G wolf shooting and trapping, liberal brown and black bear seasons and bag limits, fire and mechanical habitat manipulation and prey population manipulation. Management of the Delta caribou herd is critical and should be declared an emergency to enable timely population recovery.

In his testimony, Mr. Bishop has outlined the conflict between predator and human hunter as perceived by some individuals in the debate who
incorporate a value system similar to the instrumental approach. From the perspective outlined in Mr. Bishop's testimony, predators are viewed as competitors for game meat. Individuals incorporating this approach often do not accept the disproportionate amount of game which goes to feeding predators. In their eyes, if hunter demand is not satisfied, then predator populations should be depleted to allow for greater human hunting opportunity. The value system as outlined here places the rights of humans above those of other living creatures, and positions the value of prey over predators. Predators are devalued to the extent that they are worth little other than to be disposed of if human hunting desires are not fulfilled.

The AOC's approach, outlined above by Dick Bishop, is significant and deeply intertwined in Alaska's wolf debate. The AOC recently has gone beyond the realm of the Board of Game and increased pressure on the state by influencing legislation which will benefit their interests. The suggestions in the final paragraph of Mr. Bishop's testimony are the tenets of a bill that was introduced in '92 to the Alaska state legislature. Members of the AOC and others helped to inspire the creation of this bill, introduced by Senator Bert Sharp, R. Fairbanks, called the "Intensive Management" bill. The Intensive Management bill mandates that the state of Alaska manage its wildlife and habitat intensively through predator control, habitat manipulation (including mechanical crushing of river banks and other potential prime moose habitat), and other aspects mentioned in the final paragraph of the above testimony. While ADF&G and the Board of Game initially opposed the bill because it removed their discretionary abilities regarding decision-making and intensive management, the bill became law in the spring of '94. Right now, the state of Alaska is grappling with the consequences of the Intensive
Management bill, and during its spring '95 meeting, the Board of Game will be reviewing proposals which recommend intensive management for a host of areas in the state. This ardent and aggressive approach on the part of members of the AOC and other hunting advocates is quite extreme. This group has taken it upon themselves to force the state to pursue predator control in order to benefit a hunting minority. So far, they have been successful. Clearly their allegiance is to themselves, and to creating high prey numbers at the expense of predators and people with differing value systems.

Alaska's minority group of hunting advocates, who traditionally have advocated for wolf control in order to provide a greater hunting opportunity, need to begin to accept that traditional hierarchical and instrumental approaches to wildlife management are no longer necessarily accepted by the majority of the public. If wolf control is to occur, the public wants to be assured that there are valid reasons for it. There is at present plenty of caribou and moose potentially available to hunters in the state (the Western Arctic Caribou Herd, population estimate ~ 415,592, Porcupine Caribou Herd, population estimate ~ 160,000, and the Mulchatna Caribou Herd, population estimate ~ 110,000; herds are currently close to peak numbers), and hunters from Fairbanks and Anchorage may have to travel further to obtain caribou and moose if the ungulate populations adjacent to these urban areas are insufficient to meet hunting demands.

**The Role of Ethics in Wildlife Science**

The Board of Game claimed their decisions to support wolf control in the three areas discussed were based on science. From a purely scientific, "objective" perspective, which theoretically does not include ethical
considerations, the argument could be made that ADF&G's proposals were "scientifically sound." In support of this view, one could argue that the plans did not intend to completely exterminate wolves in Alaska, and, therefore, manipulating wildlife populations without intending to cause irreversible damage, is scientifically valid. However, this perspective evades the fact that cultural values and ethical parameters do influence and limit science. If cultural values did not limit science, then, for example, scientific experiments would often involve human subjects. John Theberge clarified this point when addressing Alaska's wolf control plans:

Values set the broad parameters for environmental management, a fact I believe you have not adequately assessed. For example, to anyone who subscribes to the idea of sustainability in environmental management, in any country where demand for food exceeds production, the world would be better off if you shot the population down to a sustainable relationship with resources. But we don't do it. We don't keep slaves either, which would have obvious economic benefits in times of worldwide recession. I would like to think that we don't mass-slaughter wolves, either.246

As Theberge suggests, the deliberations of the Board of Game were limited to technical language and discussion, which did not allow for any discussion of the ethics involved. However, the decision to move forward with wolf control was not simply a scientific decision; rather it appears it was an attempt to apply technical, scientific information to a value-based and politically driven goal. By omitting any mention of this or a similar intent, ADF&G and the Board were deluding themselves and the public. Theberge discusses how management actions express values:

I like to insist that there are two issues here. One is biologically trying to understand the role of the wolf and the other is an

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ethical issue. I still do objective research. But to people who question my taking a stance of values, I come back with the opinion that if they work for a management agency that is killing wolves, then by virtue of their actions they too are making an explicit statement of values.\textsuperscript{247}

\textbf{Alaska's Web of Value Systems Related to Wildlife:}

Additional complexities associated with Alaska's wildlife management complicate the suggestion that primarily two value systems are in conflict in the Alaskan wolf debate. In truth, many more value-related concerns are involved in the this issue. If Alaska is to responsibly address the ethical dilemmas within the wolf controversy in order to find appropriate solutions, some of these other broad, value-related issues will also have to be considered. It is necessary for the state to address these issues in order to build an "ethical ideal" which will help define a structure of priority relations, as Taylor suggests needs doing above. Wolf control is only one, small piece of a much larger wildlife management puzzle. The following list outlines some of the value-related concerns facing future policy-makers:

\textit{The value of a wolf:} Perhaps the best place for Alaska to start is to determine the value of a wolf to the state. Questions such as the following should be addressed: How significant are the spiritual and symbolic aspects of having wolves in Alaska? Do wolves have intrinsic value? How are wolves valued compared to other wildlife? How much does the public at large value wolves? How much does the tourism industry value wolves? How much do hunters and trappers value wolves? Is it possible to determine the value of wolves on any scale?

\textsuperscript{247}John B. Theberge, quoted from film interview with David Suzuki, "The Nature of Things -- Crying Wolf."
Some of the above questions are quantitative, some are not. As Brown suggests, quantitative analysis is often good for informing debates, but reducing all values to quantitative measures is not necessarily the most productive way of determining solutions. Non-quantitative aspects, such as the spiritual aspects or rights of wolves, play a significant role; yet to be included in the debate an agreement must be forged, or system developed, for how to incorporate non-quantitative aspects of wolves and wolf control. Once these fundamental questions become clearer, and some sort of agreement is reached regarding the value of wolves in Alaska, the state can move on to the myriad of related subjects with an informed perspective. How wolves are valued by Alaskans and others outside of the state can and should be a primary reference point and measuring stick to inform other decisions related to wolves in Alaska.

**Values related to hunting:** Value considerations related to hunting are also part of this debate. Paul Taylor discusses hunting in *Respect for Nature*, and highlights the notion that in order to hunt and trap ethically, one must first consider the weight of responsibilities related to entrapment. He underlines that breaking trusts with animals by luring them closer with the intent of killing them is an action which often betrays a respect for nature. He argues there must be significant moral reason driving this activity in order for it to be done in an ethical manner. Further he states recreational hunting cannot be done compatibly with the attitude of respect for nature. He writes:

*The Rule of Fidelity.* Under this rule fall the duties not to break a trust that a wild animal places in us (as shown by its behavior), not to deceive or mislead any animal capable of being deceived or misled, to uphold an animal's expectations, which it has formed on the basis of one's past actions with it, and to be true to one's intentions as made known to an animal when it has come to rely on one. Although we cannot make mutual agreements with wild animals, we can act in such
a manner as to call forth their trust in us. The basic moral requirements imposed by the Rule of Fidelity is that we remain faithful to that trust.

The clearest and commonest examples of transgressions of the rule occur in hunting, trapping, and fishing. Indeed, the breaking of a trust is a key to good (that is, successful) hunting, trapping, and fishing. Deception with intent to harm is of the essence. Therefore, unless there is a weighty moral reason for engaging in these activities, they must be condemned by the ethics of respect for nature. The weighty reason in question must itself be grounded on disinterested principle, since the action remains wrong in itself in virtue of its constituting a violation of a valid moral rule. Like all such violations, it can be justified only by appeal to a higher, more stringent duty whose priority over the duty of fidelity is established by a morally valid priority principle.

. . . It may be the case that in circumstances where the only means for obtaining food or clothing essential to human survival is by hunting, trapping, or fishing, these actions are morally permissible. The ethical principles that justify them could stem from a system of human ethics based on respect for persons plus a priority principle that makes the duty to provide for human survival outweigh those duties of nonmaleficence, noninterference, and fidelity that are owed to nonhumans. But when hunting and fishing are done for sport or recreation, they cannot be justified on the same grounds.248

Taylor clarifies that without a weighty moral reason, hunting should be condemned by the ethics of respect for nature. While Taylor's ethical approach to hunting may be questionable to many hunters, he raises a central issue in the debate currently underway over hunting in America. That question is: when is it ethically and morally permissible to hunt? Alaska is struggling with this very question. This question is deeply entwined in the debate over predator control.

Alaska does include what Taylor would describe as legitimate subsistence hunting, trapping and fishing pursuits, whereby these activities allow for human survival, are millenia-old "rights," and are thus morally

permissible. But there are also cases in Alaska where this distinction is less clear. In some situations these activities are perhaps not needed for survival, but are done to maintain significant cultural traditions. Examples of this include natives and/or non-natives who live in towns, perhaps accessible by road or boat (such as the towns in Southeast Alaska), which have functioning economies and provide many or all modern comforts, such as grocery stores. Other examples might include urban Alaskan natives and non-natives, living in Fairbanks or Anchorage, for example, but who continue to depend on fish and ungulate meat to feed themselves and their families throughout the year.

Author Ted Kerasote develops a thoughtful and ethically concerned argument which supports what he describes as the "privilege" of hunting in America. The issues raised in Kerasote's thesis regarding hunting are extremely relevant to Alaska's situation. He discusses the energy costs and animal lives lost in producing food without hunting. He determines that, if managed properly, hunting produces no greater harm to wildlife than other forms of food production. Additionally he determines that the experience, attachment and knowledge gained from hunting in his bioregion is not only ethically and environmentally justifiable, but perhaps bears a greater moral responsibility than obtaining food in other ways. This is so because the hunter is directly involved, must realize and take ownership in the cycle of deaths that occur in order for each life form to survive. Kerasote describes why, after a long search which included seeking information and advice from Buddhist spiritual leaders, he has chosen to go back to hunting:

Once in an attempt to outwit this pain, I became a vegetarian, and stayed one for quite a while. But when I inquired about the lives lost on a mechanized farm, I realized what costs we pay at the supermarket.
One Oregon farmer told me that half the cottontail rabbits went into his combine when he cut a wheat field, that virtually all of the small mammals, ground birds and reptiles were killed when he harvested windrow crops like rye and sugar beets, and that when the leaves were stripped from bush beans all the mice and the snakes who were living among them were destroyed as well. . . . Because most of these mammals have been seen as expendable, or not seen at all, few scientific studies have been done measuring agriculture’s effects on their populations. Those that have been done demonstrate that agricultural lands often act as "ecological traps," attracting birds, for instance, who begin their nesting only to have machinery pass over the land, destroying their nests and often the birds themselves. . . . When one factors in the lives lost to pesticides, the toll is enormous. . . .

Raised on a farm in Iowa, he went on to say that current agricultural practices, particularly combining, left the earth a "biological desert." Our fields might be brimming over with wheat and corn and soybeans, but unless we begin to leave habitat for wildlife -- stubble, hedgerows, and ditches -- we were going to find our selves in an austerely quiet world, as silent as the silent spring about which Rachel Carson warned...

Such data, scanty as it is, addresses only the lives lost on the farm itself. When our produce is transported along the interstate highway system, birds . . . deer . . . skunks . . . raccoons all get flattened. . . . And this doesn’t even begin to count the animals lost to the development of the oil fields themselves, the transportation of petroleum across tundra, mountain ranges, and the oceans, and in the wars fought over that oil. In short, being a supermarket vegetarian didn’t take me out of the web in which animals are constantly dying to feed humans, it merely put their deaths over the horizon, making them, in the bloodless jargon of cost-accounting, externalities.

When I looked into that web, so full of pain, I came to see that killing an elk each year did less harm, expressed in animal lives who I believe count equally, than importing the same amount of vegetable food to my bioregion. That didn’t ease my conscience; but it did make the choices clearer.

. . . I would argue that making clearer, more compassionate choices from such a multitude of daily options is the most important task of our lives . . . . The elk in the forest, the tuna at sea, the myriad of small creatures lost as the combines turn the fields, even the Douglas fir hidden in the walls of our homes -- every day we foreclose one life over another, a never-ending triage, a constant choice of who will suffer so that we may live, bending a blue note into the neatness of morality. It is this tender pain between species that is the plasma bearing us all along.
Given this condition and my final inability to escape from it, I decided to go back to hunting . . . hunting because it attaches me to this place and the animals I love, asking me to own what each of us ought to own in some personal way -- the pain that runs the world. And hunting elk in particular because they are the loved totem of my home. . . because this home makes them and leaves them free . . . and because eating them does nothing to increase the aggregate pain of the world. In fact, by attaching me lovingly here, the relationship between elk and me decreases it.249

Kerasote has made a strong case for a weighty moral reason to hunt, and his information about energy and animal costs can be directly correlated to Alaska's situation. As will be discussed later in this chapter, because of Alaska's distant location, the energy costs related to obtaining food which is not produced within Alaska's bioregions are perhaps even more draining than those spent to produce and ship food to other portions of the United States. So while entrapment of fish and animals may be, in Taylor's words, a "violation of a valid moral rule," the harm done to wildlife in these pursuits within one's bioregion may be less significant, as Kerasote suggests, than obtaining food in other ways. Kerasote's position, of course, assumes that certain items are in place, such as a huntable population within one's bioregion which is managed for hunting on a sustainable level.

There are many Alaskans who hunt, fish and trap recreationally. Taylor contends that the pursuit of hunting or fishing for recreation cannot be justified. Kerasote appears to agree with this. He is arguing for a change in the approach to hunting across America, so that hunting may survive the intense scrutiny it appears to be undergoing. In a recently published article, Kerasote suggests that hunters are in part to blame for the current backlash against hunting. He writes regarding the term "recreational hunter":

... managers and communicators need to reshape their terminology. Sport and recreation, the terms that distinguished conservationist hunters like Roosevelt from the market hunters who participated in the decimation of buffalo and waterfowl, have become pejorative terms when used with reference to killing animals. They are unacceptable to many in the environmental movement, who are not opposed to hunting if it is done with care, and many nonhunters, including vegetarians, who have been ambivalent about hunting but who can understand the activity as a "least harm option" when compared to agribusiness and the domestic meat industry. Perhaps hunters can call themselves simply *hunters*.^^^

Terminology aside, Taylor and Kerasote may agree on a basic tenet, which is that hunting should be pursued in an ethical, respectful and meaningful way. As Taylor delineates, morally permissible hunting and the ethical principles which justifies it can stem from a system of human ethics based on respect for persons. Creating a system of human ethics related to hunting is the challenge that Alaskan policy-makers need to pursue. Alaskan policy-makers need to address from a broader ethical spectrum how they hope to accommodate all of those interested in hunting in Alaska. In addition, they need to determine what the limits are to these accommodations, because wildlife is a renewable but also limited resource. If the state chooses to distinguish between subsistence and recreational/sport needs, for example, the state will have to determine limitations for providing for subsistence vs. recreational hunting.

Questions that Alaskan policy-makers need to address include: Can the state justify predator control in order to provide for subsistence hunting purposes when there is biological evidence that predators are limiting prey numbers? Can the state justify this when there is no biological evidence? Can the state justify predator control for recreational hunting needs when

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there is biological evidence that predators are limiting prey numbers? Can the state justify this when there is no biological evidence?

Values related to native subsistence, cultural traditions: Another related value-based concern focuses on the indigenous, human populations in Alaska. Approximately one third of Alaska's population is native -- either Eskimo or Indian -- whose culture, history and survival has been and, in many cases, still is dependent upon hunting, trapping and fishing. Questions such as the following need to be addressed: Can the state continue to provide fish and wildlife for traditional and customary uses for a rapidly growing native population? Should it? How will limits to this be determined? How far is the state willing to go in order to provide for subsistence uses of wildlife? If the state is willing to manipulate wildlife populations in an attempt to provide for customary and traditional uses, how much is it willing to manipulate those populations? How will it address long-term solutions in the face of increasing human populations? What kind of limits will be placed on wildlife habitat encroachment, given the increase in both native and non-native populations in Alaska? What is the value of "tradition?" Of belief systems? How can they be weighed against the power of acculturation?

These and many other related questions are very sensitive and central issues facing Alaska's wildlife policy makers. Critics of Alaska's policy-makers have suggested that Alaska has not fairly included or made a priority of native subsistence concerns. If this is true, it must be rectified. Careful, ethical attention needs to be given to questions regarding subsistence and cultural wildlife uses in future policy-making efforts.

Values related to rural vs. urban hunters: A second, but related issue involves a conflict in the state between urban and rural hunters. Since 1978,
when an Alaska statute (chapter 151, section 4 SLA 1978) was passed giving preference to subsistence hunting and fishing over sport or commercial fishing or sport hunting, the state has provided a rural preference for access to fish and wildlife. In 1986 the Alaska House of Representatives adopted a subsistence act, which was introduced by a letter of intent which identified the following:

This limitation of the definition of "subsistence uses" recognizes that Alaska is unique, and unlike any of the other forty-nine states, the economy of many rural communities in rural areas in Alaska is significantly dependent upon participation by the residents of these communities in the taking of fish stocks and game populations for personal and family consumption. Further, the legislature finds that the general health and welfare of these citizens is significantly tied to their participation in these activities.²⁵¹

Both the 1978 and 1986 subsistence statutes distinguish two tiers of subsistence users. They delineate that when fish or game populations are adequate to meet the demand of all subsistence users, then hunters falling under the first tier category, which presently includes hunters from both urban and rural areas, can hunt. In a situation where fish and game populations are inadequate to meet the demands of all subsistence hunters, then only a restricted group falling under the second tier category can hunt. Criteria for the second tier considers the needs of local, rural, human populations over those of non-local and urban hunters. The 1980 federal Alaska Interest Lands Conservation Act (ANILCA) also recognizes the importance of subsistence activities and uses to the rural people of Alaska, and echoes the need for a rural preference regarding fish and wildlife. When ANILCA was enacted, the House Committee on Interior and Insular Affairs determined that:

After consideration of the testimony at the subcommittee's hearings and town meetings throughout Alaska and review of studies done by a variety of federal, state, academic, and other agencies and groups, the Committee has no doubt about the importance of subsistence uses to the rural people of Alaska. Reliable evidence was given to the Committee demonstrating that fifty percent of the food for three-quarters of the Native families in Alaska's small and medium villages is acquired through subsistence uses, and 40 percent of such families spend an average of 6 to 7 months of the year in subsistence activities . . . (H.R. Rep. NO. 1045, 95th Cong., 2d Sess., at 181 (1978))

While none of these statutes are limited to only natives as beneficiaries of these actions, native cultural and traditional uses have been to a large extent protected under these laws. In 1989, a group representing non-native sport hunter interests (Sam E. McDowell, Dale E. Bondurant, Ronald Mahle and Harold Eastwood) sued the state for providing a rural preference. In this landmark case, the Alaska Supreme Court determined that, "granting preference to rural residents to take fish and game for subsistence purposes violates Alaska constitutional provisions prohibiting exclusive or special privileges in the taking of fish and wildlife." This decision undermined the premise that rural residents should receive preferential access to fish and wildlife. It eliminated the vitally important distinction between sport and subsistence hunter. As a result, any resident of Alaska is potentially a subsistence hunter -- even someone who resides in Anchorage, Alaska's largest urban center. Needless to say, this decision has threatened the protection of cultural traditions of native Alaskans and non-natives living in rural areas who depend on local fish and wildlife for their subsistence. Since the 1989 McDowell vs. State case, the federal government has taken control of wildlife management on federal lands in order to comply with ANILCA and insure a rural, subsistence preference. The McDowell case decision therefore

affects only state and private lands. A final twist to the current situation is that there is presently an influx of natives to urban centers, and by providing a rural preference, natives could theoretically be denied privileges to hunt or fish in certain areas, depending on availability of wildlife populations.

Within the framework of rural and urban, native and non-native, and increasing populations concerns, two significant aspects of the 1992-'93 wolf controversy rise to the surface. The first is that wolf control was proposed in areas which would primarily benefit urban hunters from Anchorage and Fairbanks, the majority of which would have been considered "sport hunters" prior to the McDowell case. The second is that three caribou populations in Alaska -- the Western Arctic, Porcupine and Mulchatna herds are currently close to peak numbers and potentially offer plenty of caribou for hunting. These large populations of caribou, however, are not adjacent to Fairbanks and Anchorage, and are for the most part in areas which are inaccessible by road. Knowledge of this further crystallizes another subset of value-based questions facing Alaska, which includes questions such as: During times when there exists enormous numbers of prey in the state, is Alaska willing to kill wolves and other predators in order to boost prey populations close to urban centers to benefit primarily urban hunters? Is Alaska willing to do this when there is no apparent biological justification?

Values related to farming vs. wild stocks: In addition, agriculture in Alaska is not prevalent, and overall has not been tremendously successful due to short growing seasons, extreme cold temperatures and soil types. Most of Alaska's land is untamed, wild land which often is not suitable for cultivating food crops. Thus producing alternative foods, such as vegetable, fruit or grain crops, at sustainable levels statewide in Alaska does not appear
to be feasible. Because of Alaska's distance from major food producing areas in the world, the energy needed to ship food, such as grains, vegetables and fruits, to Alaska is considerable and takes an environmental toll. From an energy conservation perspective, the argument exists that eating indigenous food, namely fish and game, is ultimately less impacting.²⁵³

Again, Alaska must determine how far it is willing to go to provide fish and game for its residents by addressing difficult, ethical questions such as: What are the intrinsic values of moose and caribou? Do they have rights to live wild and free lives? Is the same true for predators? Is moose and caribou farming a direction the state wants to move toward? If so, will ungulate farming ever be able to meet the demands of its meat consuming population? How far would predator manipulation go? If ungulate farming is not a direction the state wants to move toward, how will Alaska determine who can obtain available prey and be in compliance with the state constitution? Thus far, the state has made it clear that it is not supportive of farming moose and caribou. However, they have implemented policies related to wolf control which are perceived by some critics as defacto ungulate farming.

Because of Alaska's large native population, its many rural-based communities which are inaccessible by road, its relatively large percentage of individuals who continue to live a subsistence-oriented lifestyle, and its low agricultural production, Alaska's wildlife management incorporates many complexities. It also includes many ethical considerations which have yet to be discussed in wildlife management policy forums. As Alaska's population continues to grow, some new and creative methods of accommodating people

will have to surface. Former Commissioner of Fish and Game, James Brooks, lent some perspective to this situation when he stated at the January, 1993 wolf summit:

I want to point out to you that when I came to this country some 53 years ago, there were 32,000 native people. There are now 86,000. There were 64,000 residents in Alaska; there are now 500,000 more than that. I think it's futile to expect that new Alaskans, be they immigrants or home-grown, can expect to find the same wilderness experience and bounty off the land that was available just a few decades ago. I think the expectations have to be toned down a little bit.

Brooks's statement regarding hunting opportunity is especially convincing when one considers the future management of areas adjacent to urban centers. Alaska is going to have to face that at some point in the future it will no longer contain sufficient ungulate numbers to provide for the increasing numbers of hunters -- subsistence and/or sport -- and hunting will have to be restricted. Without a recognition of the ethical conflicts existent within the Alaskan hunting allocation and wolf management debates, predator management will continue to endure controversy at the expense of wildlife, habitat and the state of Alaska.

**Conclusion:**

Wildlife policy-makers in Alaska must address many difficult, ethical questions regarding wildlife and people management as the state faces the future. Alaska needs to search for long-term, sustainable solutions which are sensitive to cultural values and address the population increases occurring in the state. It is time for the state to begin a process regarding wolf management which is understood to be credible by all those involved. A system needs to be developed through which various value concerns can be meaningfully
addressed regarding wolf management. One challenge will be to determine if wolf control is still an acceptable wildlife management tool under any circumstance, and if the value systems of the majority of Alaskans can support wolf control.

If the public decides wolf control is still acceptable under certain situations, then those instances will have to be clearly delineated. Biological and operational guidelines must be created for when predator control may be considered and implemented. Also, acceptable methods of control must be determined as well. Will the public accept aerial gunning, land and shoot hunting, poisoning or bounties during any control circumstances? If so, which? Questions surrounding these activities will be difficult to answer. However, only through an honest attempt at finding and creating solutions will the state of Alaska redeem itself in the public's eye and be able to manage wildlife in a credible manner that is agreeable to the public.

Finally, the minority hunting advocates who insist that wolf control is necessary to provide for greater hunting opportunity must begin to accept that the traditional hierarchical and instrumental approaches to wildlife management are no longer necessarily accepted by the majority of the public. If wolf control is to occur, the public wants to be assured there are valid reasons for it. Plenty of caribou and moose are available to hunters in the state, including the Mulchatna, Western Arctic and Porcupine caribou herds. Hunters from Fairbanks and Anchorage may have to travel further to obtain caribou and moose, if the ungulate populations adjacent to these urban areas are insufficient to meet hunting demands. As Alaska's population continues to grow, some new and creative solutions for wildlife management will have to surface.
RECOMMENDATIONS

The following is a list of recommendations to the state of Alaska for how to proceed in future wildlife management decisions. While these recommendations do not cover every aspect discussed in the preceding chapters, these recommendations are intended to be a starting point for future policy makers. Wildlife management in Alaska needs some fundamental reform. The recommendations below are intended to help bridge the path toward a new and fairer system:

**Ethical Concerns:**

1) The state should begin to acknowledge that choosing to implement wolf control is foremost an ethical choice. Discussion of the values involved in the debate needs to begin to meaningfully incorporate differing values in decision-making. This will encourage informed discussions where actual conflicts are honestly disclosed, rather than continuing to misrepresent the debate as solely scientific.

2) The state should initially commit to a consensus decision-making process, and fully review the use of predator control. This process must determine when, if ever, predator control is ethically acceptable to the public. Questions such as the following must be asked:

   - Is predator control acceptable when:
     -- predators are found to be the limiting factor of an ungulate population and the population is decreasing enough to warrant management action?
     -- an ungulate population is threatened with local extinction and predators are found to be the limiting factor?
     -- subsistence hunting needs are not being met?
     -- cultural and traditional uses are not being met?
     -- recreational hunting needs are not being met?
     -- the public is conducting defacto predator control through regular hunting and trapping methods?

3) If it is determined that predator control is acceptable under certain circumstances, then the state needs to determine ethically acceptable methods used in control. Will aerial gunning, land-and-shoot hunting, aerial assisted
trapping, ground hunting or trapping, poisoning, bounties, or denning be acceptable? If so which method? Should these techniques be used by ADF&G only, the public only, or a combination of ADF&G and the public for control programs?

**Alaska's Wildlife Management Structural System:**
1) Alaska Board of Game members should fairly represent all public user groups, and their must be a balance between non-consumptive and consumptive users of wildlife on the Board.

2) The Alaska Department of Fish and Game (ADF&G) needs to work to restore the public's confidence. The Governor should appoint a balanced candidate to head the Department of Wildlife Conservation — one whose strengths include consensus building and mitigation among interest groups. Research and projects should be refocused so as to look beyond the traditional predator/prey studies and include: habitat conservation as a primary goal; researching habitat, climate and nutritional conditions of wildlife within multi-prey/multi-predator systems and how these conditions affect these systems; consideration of biodiversity and ecosystems management plans; determining biological thresholds which indicate compromised wildlife populations for both predators and prey; establishing research and information standards before, during and after management actions; representing all "user" groups within staff expertise and programs; giving non-consumptive wildlife use a strong position; improving enforcement.

3) Local Fish and Game Advisory Committees need to be restructured so as to better represent diverse interests such as non-consumptive, native subsistence, tourism and other interested user-groups.

**Biology and Research:**
1) Future efforts of the state should move away from single species management and develop sound, comprehensive guidelines for ecosystem management, which in Alaska includes multi-prey/multi-predator systems, habitat and climactic factors. This is the best way to approach management and assure the long-term conservation of wildlife in Alaska. Some of the aspects of the Strategic Wolf Management Plan (i.e. zones, hunting guidelines, etc.) could be incorporated into a multi-prey/multi-predator management plan. Also a discussion of how the public wants its ungulate populations managed — i.e., attaining certain population objectives and trying to maintain them (static herd management), as ADF&G has tried to do, or allowing natural population fluctuations to occur and adapting human use to areas with high ungulate numbers (fluctuating herd management) — should ensue.
2) The state must put a stop to implementing wolf control when biological information indicates that wolves are not the limiting factor of a targeted ungulate population. In none of the three control programs proposed in 1992 were wolves found to be limiting ungulate populations. That the state would vote to eliminate relatively high percentages of wolves and wolf packs in the target areas without any substantive biological justifications indicates that Alaska -- specifically the Alaska Department of Fish and Game and those who guide this agency, who are charged with ensuring, "the long-term conservation of wolves throughout their historic range in Alaska in relation to their prey and habitat," -- is willing to kill wolves arbitrarily. Arbitrary and capricious killing of wolves is an inappropriate management approach, especially when wolves are highly valued as they are today.

3) Technical information should be comprehensive and complete before intrusive management discussions even begin. The following areas must be researched:

a. The state needs to compile sound wolf and bear population statistics. Statewide predator population estimates are based primarily on hunter trapper reports, sealing records, track counts, and sightings. Statewide radio telemetry studies and comprehensive stratified random sampling surveys from aircraft need to be completed for all of Alaska. Implementing wolf and bear control programs on weak population estimates is not responsible wildlife management.

b. The state needs to map out geographic areas where wolf populations have been either significantly reduced without recovery or eliminated. ADF&G promotes the notion that wolf populations are healthy and thriving throughout Alaska, however information exists that suggests otherwise. For example, reindeer herding areas, much of the north slope, northern Bristol Bay, Denali State Park, and some areas of the interior including eastern regions where the Fortymile caribou herd range exists, among others, have been highlighted as areas with significantly reduced wolf populations. The public needs to be made aware of these population statuses and trends in order to help make better informed decisions regarding wolf management.

c. Information needs to be gathered regarding spatial, functional, and behavioral aspects of predator-prey relationships, and less emphasis should be placed on simple predator/prey ratios. The amount of predators per ungulate population does not necessarily determine whether or not predators are adversely affecting prey. Spatial, functional and behavioral information is critical to future predator management debates in Alaska.
Also, the state should work to determine if the situation termed "predator pit" is relevant to caribou populations.

4) All other socially, ethically and biologically acceptable options should be exhausted before predator control is discussed as an option, including transporting hunters to areas where there are abundant numbers of ungulates and diversionary feeding techniques. Human hunting of the ungulate population in question should stop for two years prior to initiating predator control, while pertinent biological information is gathered. Subsistence hunting from local residents could be allowed at a reduced level under certain circumstances if alternatives to providing meat sources can not be found. Predator control should be a last resort, and different areas should be treated carefully and individually, taking special interests into consideration (i.e. subsistence needs, tourism, non-consumptive uses, sport hunting, etc.). If in the event predator control is chosen, the following items must be in place:

   a. establish a biological trigger for each ungulate species within a habitat type which may catalyze the consideration of predator control as a management option if predators are the primary limiting factor;

   b. determine if predator control should be initiated when a population of ungulates is threatened with local extinction, and predation is limiting herd growth;

   c. predator control should be limited to predetermined discrete, distinct areas with specific wolf packs targeted in the case of wolves, so that wolves are not killed randomly or indiscriminately;

   d. prior to implementing predator control, biological and local information about the ungulate species to benefit from predator control should be collected for two years. Information concerning the ungulate species that will benefit from a proposed wolf control program will include:

      (i) the status of the habitat
      (ii) annual calf recruitment rates for ungulate populations
      (iii) annual yearling birth rate for ungulates
      (iv) annual calf survival for ungulate populations
      (v) annual twinning rates for moose
      (vi) health of other wildlife populations
      (vii) positive identification that predators are limiting ungulate populations, and specifically which species of predator
(viii) status of predator populations and annual harvest rates of predators
(ix) climactic effects on wildlife populations
(x) condition of habitat as a food resource for ungulates

5) When predator control is in progress, ungulate populations identified as beneficiaries of the control should be monitored for:
   (i) annual calf recruitment
   (ii) annual calf and yearling survival
   (iii) nutritional status indices (i.e., pregnancy rates, body weights of adults and calves, etc.)
   (iv) climactic effects on population
   (v) behavioral indices (i.e., movement out of traditional range, etc.)

6) Following a control program, studies should be conducted for at least two years after the program is terminated to determine if the program met desired objectives. These should include:
   (i) all indicators outlined in # 5 (above) for ungulates
   (ii) status and recovery of predator control
   (iii) population censuses for all predators and prey involved
   (iv) effects of predator control on social behavior of predators (i.e. wolf pack dynamics, reproductive rates, etc.)

Geographic and Demographic Related Concerns:
1) The state should work with a consensus-based group to develop non-hunting corridors and zones in appropriate places, such as highways, roads, waterways, areas within and buffers surrounding national, and state parks, and other designated conservation areas. ADF&G and the Board of Game should treat management of wildlife within state parks with particular care to improve stewardship and better conserve wildlife in designated park areas. The state must develop wildlife viewing opportunities as part of the ADF&G management strategy.

2) Policy-makers will have to address wildlife management problems related to increasing native and non-native populations in Alaska, and identify ways to determine limits regarding providing opportunity for consumptive uses. Wildlife populations have a finite ability to sustain consumptive uses, and the state will eventually have to make some potentially unpopular decisions regarding limiting consumptive use for the benefit and conservation of these species.

3) Alaska’s wildlife policy-makers should broaden the scope of their work to ensure that policy is not created to benefit primarily one interest group. In
addition, the state must begin to look at the big picture, including demographic changes, hunting near urban areas and how these and other aspects will affect future wildlife management.

Cost Benefit Analysis:
1) The state should complete its comprehensive cost-benefit analysis of wolf control, and include its findings in future predator control debates. This analysis should review the cost of predator control programs including related costs such as tourism boycotts, etc., the achieved results of past programs, the economic benefits of past programs, an estimated value of wolf and bear viewing to the tourist industry and the public, and the collective losses incurred as a result of wolf control. Information gleaned from this analysis should be used to better inform the discussion, but should not necessarily be used as the primary decision-making tool.
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