

Fortymile Caribou Herd

Management Plan

Sponsored by:

U.S. Bureau of Land Management

U.S. Fish & Wildlife Service

U.S. National Park Service

AK Dept. of Fish & Game

October 1995



Table of Contents

Summary of Plan Recommendations	1-2
Goals and Objectives	3
Increase Caribou and Range Productivity	4
Decrease Caribou Mortality	5-8
Provide Viewing Opportunities	10
Public Involvement and Awareness	10
Implementation	11
Other Recommendations	12
Planning Team	13
Appendices	14-21

Summary of Plan Recommendations

The idea for producing a plan to recover the Fortymile Caribou Herd originated in the Yukon, which was once a major part of the herd's range. For Yukoners, there were three primary reasons to recover the herd. First and foremost, they wanted to restore the biodiversity of this ecosystem, which once supported wildlife species in far higher numbers than it does now. Second, they wanted people to once again have an opportunity to witness the migration of thousands of caribou crossing the Taylor, Steese, and Top of the World Highways. Lastly, they wanted to restore the traditional subsistence resource of this area.

The Yukoners inspired several Alaskans to join in the effort and together they created the Fortymile Caribou Herd Planning Team—a diverse group of Alaskan and Yukon residents and representatives from state, federal, and territorial wildlife managing agencies. These agencies sponsored the effort and provided logistical support.

This team developed recommendations for recovering the Fortymile Caribou Herd and the ecosystem that depends upon it. Their recommendations are presented in this plan and summarized below.

Maintain Habitat Quality

- Maintain Fortymile caribou range quality by minimizing development of critical habitat areas and allowing a natural fire regime.
- Encourage the state, BLM, and Yukon government to designate wildlife habitat as the major use, under multiple use management, within the Fortymile caribou range.
- Work with the military to raise flight floors and reduce the number of overflights to minimize disturbance in sensitive calving and postcalving areas.

Limit the Effects of Harvest on the Fortymile Herd

- Reduce the annual Fortymile caribou harvest quota to 150 bulls during the five year plan.
- Upon completion of the plan, increase the harvest quota to at least the current level (less than 2% of the herd).

Decrease Predation on the Fortymile Herd

- Attempt to reduce predation rates on caribou calves by lowering the number of wolves and possibly grizzly bears on the calving and summer ranges using non-lethal techniques.
- Reduce wolf pack size by relocating subordinate wolves and by temporarily reducing reproduction by implementing fertility control on wolf packs whose territory includes the Fortymile herd's summer range.

- Implement monitoring methods that will ensure wolves whose range primarily includes Yukon-Charley Rivers National Preserve are protected from sterilization and relocation actions even when these packs range outside the preserve.
- Ensure that no predator management activities, excluding legal hunting and trapping, occur on NPS and BLM lands.
- Relocate grizzly bears from the Fortymile herd's calving grounds if bear predation is shown to be strongly limiting calf recruitment following two years of reduced wolf predation.

Monitor the Plan's Effectiveness

- Develop a carefully monitored research project designed by the Alaska Department of Fish and Game and world experts in the fields of ecology, wildlife veterinarian medicine, and wildlife contraception research.
- Publish results in the biannual Fortymile Caribou Comeback Trail newsletter.

Public Awareness

- Provide for increased viewing opportunities and wildlife interpretive information displays along the Taylor Highway.
- Continue to involve the public in Fortymile caribou management by arranging opportunities for individuals to participate in field activities and by soliciting comments on future management direction.
- Increase public awareness on the herd's annual population trend and range use by presenting results from the management and research studies in the Fortymile Caribou Comeback Trail newsletter.

Future Public Process

- Use a similar public planning process to resolve other statewide wildlife management issues.

For more information or additional copies of the plan, contact:

Craig Gardner
Area Biologist, ADFG
Box 355
Tok, AK 99780
Telephone: 883-2971
Fax: 883-2970

*"We have abused both the herd and the land.
The land is waiting for an apology.
Until then, the herd will not be productive and give itself to people."
—elder Alex Van Bibber, Yukon—*

*We, the Planning Team,
offer the Fortymile Caribou Herd Management Plan
as an apology to the caribou and the land.*

I. Goals and Objectives

A. Our vision for the Fortymile herd and its ecosystem.

To restore the abundance and diversity of wildlife in this ecosystem, of which the Fortymile herd is the most important indicator species.

To promote healthy wildlife populations for their intrinsic value, as well as consumptive and nonconsumptive uses.

B. Reasons for developing a Management Plan for the Fortymile herd.

- 1) For the long term benefit of the Fortymile ecosystem;
- 2) To help recover the Fortymile caribou herd to its traditional range and to benefit the people who value the herd and its ecosystem;
- 3) To promote viewing opportunities of the Fortymile herd during its spring and fall migrations;
- 4) To provide an opportunity for the caribou population to increase and expand into its historic range;
- 5) To promote similar goals between the agencies involved in management of the Fortymile caribou herd;
- 6) To resolve conflicts among interest groups;
- 7) To encourage sound wildlife management decisions that consider diverse values.

C. Should the herd increase?

Yes—for the reasons listed above, actions should be taken to increase the herd. Management should follow a stepwise progression of actions that is respectful of all wildlife and which increases the herd at a moderate rate (5 to 10% per year, 28,000 to 36,000 caribou).

There are two basic ways to increase the herd: 1) increase productivity and/or 2) decrease mortality. The Planning Team considered both.

II. Increase Caribou and Range Productivity



A. Are sufficient calves born each year?

Yes. Annual herd calving rates are average to high and are not limiting herd growth. Calf survival, however, is definitely a limiting factor. In 1994, about 8200 calves were born, but more than 70% of them died within a year (this and other statistics cited in the plan are discussed in a research report by Boertje, R. D., Gardner, C., and Valkenburg, P.V. 1995. *Factors Limiting the Fortymile Caribou Herd*. Published by the Alaska Department of Fish and Game).

B. Is weather limiting population growth?

Not to our knowledge. The 1980s were favorable for herd growth and in the past 6 years, only the record early snowfall of 1992 was severe enough to result in a major decline in herd productivity.

C. Is range quality limiting herd growth?

Can the range support a larger herd?

The current range is in good condition, and there are thousands of miles of traditional range which have not been used for 20 to 30 years. Research has shown that the range can support increased caribou numbers, with plentiful lichens available on the currently-used range and vast expanses of untouched former range available. Thus, protecting critical caribou range from development is of greater concern than improving range quality.

D. What can be done to maintain the productivity of the caribou range?

1. Designate wildlife habitat as a major use under multiple use management within the Fortymile caribou range. Conservation of caribou habitat should take priority over conflicting uses in areas vital to caribou.
2. We recommend a five year pause on developments that might adversely affect critical caribou habitat.
3. Work with the military to prohibit sonic booms and to raise flight floors to minimize disturbance in sensitive calving and postcalving areas.
4. Allow a natural fire regime.
5. Continue to evaluate range quality and manage accordingly. If the herd increases but does not expand its range, the team will reevaluate the plan.
6. Continue to investigate other ways to improve the range.

E. Should caribou be transplanted to this area?

Transplanting caribou was considered but not found to be a feasible way of restoring the Fortymile caribou herd throughout its historic range.

III. Decrease caribou mortality



A. Decrease Harvest

1. Is hunting pressure limiting the herd?

No. The harvest has been at low levels for several years. In 1994, for example, an estimated 8200 Fortymile caribou died, and of these, only 309 bulls were taken by hunters. Because this is less than 1.5 % of the herd and because bulls are plentiful and not as critical to the herd's growth as cows, hunting at this level is not a factor limiting the herd's growth.

2. Should the harvest be reduced? If so, why?

Yes, for three reasons:

First, although it is not a limiting factor, reducing the harvest shows respect for the declined herd and to all of the interest groups who participated in the planning process.

Second, this team believes that before any actions are taken to decrease predation, harvest should be minimized.

Third, reducing the harvest helps to isolate the effects of other management actions and is one of the few factors that can be controlled and measured.

a) **If the harvest should be reduced, what actions should be taken to do so?**

We recommend the following actions:

- 1) Reduce the Fortymile caribou harvest quota from 450 to 150 bulls; and
- 2) Encourage those who are not dependent on this herd to hunt elsewhere;
- 3) Change the state fall season to open after Labor Day weekend and to close the 30th of September;
- 4) Extend the Glacier Mountain Controlled Use Area nonmotorized restriction from the 20th to the 30th of September;
- 5) Close the Chicken Trail to motorized access for fall caribou hunting; and
- 6) Issue hunting permits only at Central, Eagle and the ADFG office in Tok;
- 7) Following termination of the plan, harvest quota will increase to less than or equal to 2% of the herd (which is the current level and does not limit the herd's ability to grow).

B. Decrease Predation

1. Should this plan consider ways to reduce predation? If so, why?

Yes. Research has shown that predation on calves is one of the leading factors preventing the herd from growing.

Low calf survival is the primary reason why the Fortymile caribou herd has been stable since 1989, ranging from 22,766 in 1990 to 22,558 in 1995. Out of over 8,000 calves born in 1994, an estimated 5,000 were killed by predators within a year. Born in May, two-thirds of these calves will die before September, due mostly to predation by wolves and grizzly

bears. For the herd to grow at a moderate rate, we believe predation on caribou calves must be reduced. We looked at all the options available to us and tried to find a combination that would benefit calf survival while minimizing the number of predators affected.

Some biologists believe that by reducing the effects of predation on the Fortymile herd, the herd could increase and then fluctuate naturally at a higher level. Once the herd is larger, the number of wolves will increase because of the higher prey base, but they may not have as great an impact as they now have on this herd. Therefore, further predator management is not expected.

1. Wolf Predation

a) **Should any actions be taken to reduce wolf predation? If so, why?**

Yes. Low calf survival has been the primary reason the Fortymile Caribou Herd has been stable since 1989. The majority of the calves die prior to September; ongoing research has found that wolf predation is a main cause. Far fewer calves will die in the winter. In fact, calf mortality decreases to about 12% once calves reach 5 months of age. If we want to increase calf survival, reducing summer predation is critical.

During the summer, wolves normally do not hunt as a pack but tend to hunt alone or in pairs. Individual wolves have been found to be efficient predators on caribou calves and multiple kills of calves are commonly reported. Therefore, removing individual wolves could increase calf survival.

Caribou calf survival has increased in areas where wolves were reduced but grizzly bear numbers remained the same (including the Finlayson and Delta Caribou Herds).

b) **If so, how should wolf predation be reduced?**

1) No aerial predator control and no state-sponsored trapping of wolves.

We recommend no lethal predator control for three reasons. First, lethal control clearly means that wolves would be killed and some people (although certainly not all) consider killing the animals to be less humane than using non-lethal methods. Second, more wolves would be affected under lethal control than under non-lethal. In 1992, for example, the lethal control proposal would have killed as many as 450 wolves in the Fortymile.

But if surgical sterilization (only one of the non-lethal methods to be considered here) were used, not more than 30 males and/or 15 females in the 13 packs whose territory includes the summer range would be sterilized (see maps, Appendix A). The majority of the team considered the sterilization of up to 45 wolves to be far less objectionable than lethal control and preferable to continuing the current management that has not increased calf survival. Third, we all agreed that lethal methods are also deeply divisive—they tend to make adversaries of the very people who have a common commitment to the long-term health of all wildlife populations.

c) **We recommend that wolf predation on caribou calves be temporarily reduced within the calving and summer range by reducing reproduction and by moving young adults.**

1) Temporarily reduce reproduction.

Investigate and implement a method of non-lethal fertility control of a maximum of 30 adult males and/or 15 adult females wolves whose territory includes the summer range. Worldwide, fertility control is being actively explored as a more humane approach to predator management and new research indicates that some non-lethal methods have more potential to be effective than previously thought.

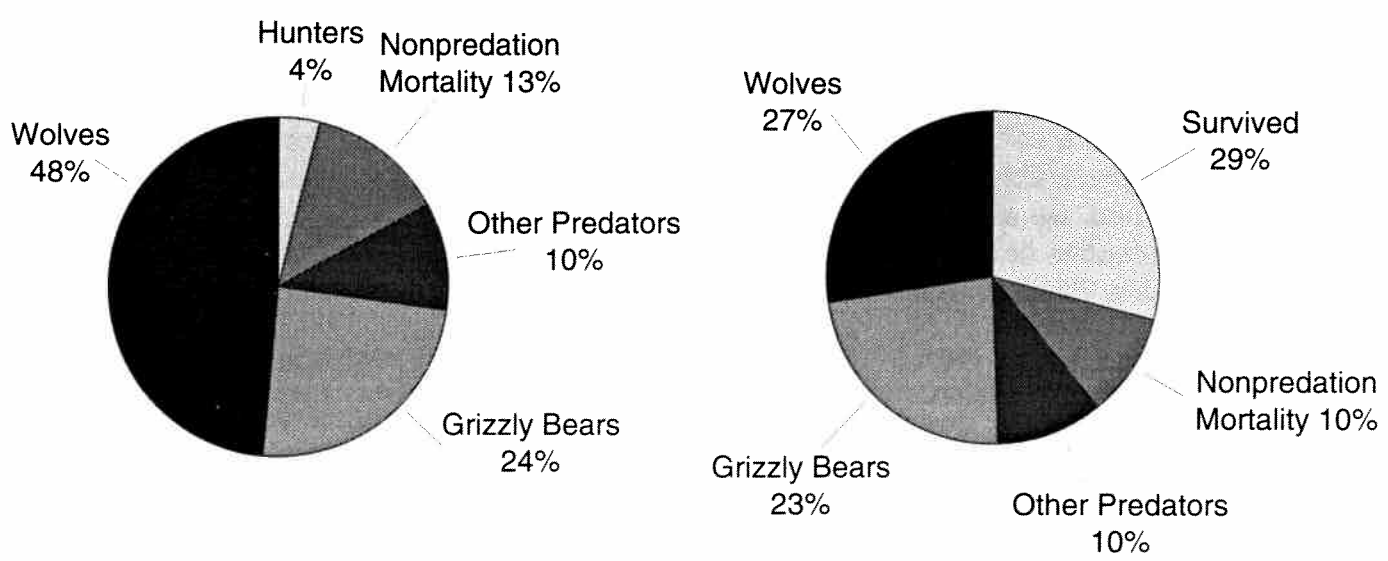
Several methods of fertility control should be considered, including surgical sterilization, which are not likely to affect the sexual behavior of the animals. But before a decision is made to use surgery or any other method, additional research is needed to determine which non-lethal method involves the least human intrusion, has the least impact on the animals and the environment, and yet is still effective at decreasing calf predation. The final decision will be made by a research design team and approved by the Fortymile planning team (see Implementation section, below).

Several team members and a segment of the public were concerned that sterilization indicates disrespect for the individual wolf and takes away its wildness. The team took this concern very seriously and sought other methods, but no other method seemed to be as effective at decreasing predation on calves without also impacting many more wolves.

These methods are experimental. Therefore, we recommend a methodical, step-by-step approach to ensure that biologists can learn from each step and change the methods if they do not work or if a better approach is discovered. We recommend the Alaska Department of Fish and Game develop this as a carefully monitored research project. Because several of the methods are new, independent scientists who have experience with the techniques should review the research design.

2) Relocate young adults away from the summer range. Dispersal of young wolves is common and relocations would mimic this behavior.

Total Herd Mortality May 1994 to May 1995 **Calf Mortality** May 1994 to May 1995



By moving young adults and by reducing reproduction, the wolf population of approximately 80 to 110 wolves in the summer range is expected to be reduced by 60% during the course of this plan (outside of the Yukon-Charley Rivers National Preserve). Reduced packs have been found to maintain their territory. This is important, because it limits the number of new wolves moving into the area.

Local trappers could assist this plan by shifting their efforts to wolves whose territories encompass the calving and summer range, where little or no trapping currently occurs. This would help reduce pack size, but would not eliminate packs. The area-wide wolf harvest in the Fortymile is not expected to increase since trappers will be shifting their efforts, not increasing them.

d) **New non-lethal methods will be considered as they become available.**

e) **Where would wolf predation be decreased?**

The program would take place only within the territories of packs which impact the herd's summer range, excluding Yukon-Charley Rivers National Preserve. Current packs inhabiting the preserve (Cottonwood, Godge, and Threefinger packs) as well as any new packs will be excluded from sterilization and relocation actions even if these packs range outside the preserve. No predator management activities will occur on lands administered by the NPS and BLM.

2. Grizzly Bear Predation

a) **Should any changes be made to current bear hunting regulations?**

No. Maintain current bear hunting regulations.

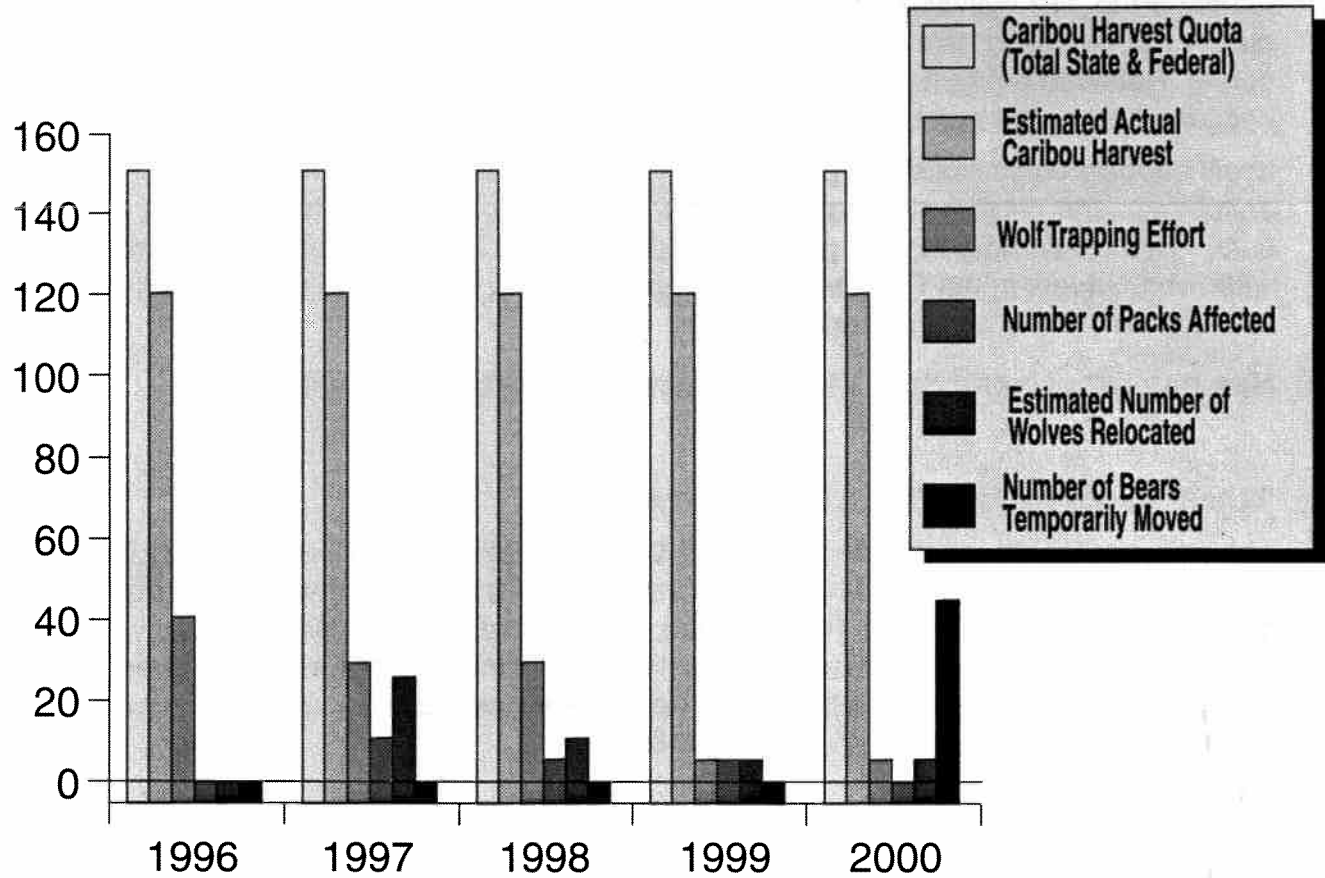
b) **Should additional steps be taken to reduce grizzly bear predation?**

Perhaps. There are two principal reasons why we should be more cautious about reducing bear predation compared to wolf predation. First, unlike wolf predation which occurs year-round, most bear predation on caribou calves occurs in just the first 2 weeks of the calves' lives. By the end of the summer, wolves will kill more calves than bears. Secondly, unlike wolves, bears have very low reproductive rates, making them vulnerable to overharvest and much slower to recover. Thus, we should reduce bear predation only if decreasing predation by wolves does not increase calf survival.

c) **What steps do you recommend for reducing bear predation?**

If bear predation is shown to strongly limit calf recruitment after wolf predation has been reduced, we recommend that bears be temporarily moved from the calving area (excluding Yukon-Charley Rivers National Preserve) up to a maximum of 150 miles (or across the Yukon River) so that bears do not return until 2 weeks after peak calving. Bears inhabiting the preserve will not be relocated and bears will not be relocated into the preserve. This action would not occur until the final year of this plan. The objective is for all the bears that were moved to return to the area.

Possible Plan Implementation Schedule



Year	Currently	Over the Planning Period				
	1995	1996	1997	1998	1999	2000
Total State & Federal Quota	450	150	150	150	150	150
Estimated Actual Caribou Harvest	350	100-120	100-120	100-120	100-120	100-120
Wolf Trapping Effort	30-40	30-40	30	30	0-5	0-5
Number of Packs Affected by Fertility Control	0	0	5-10	2-5	0-5	0
Estimated Number of Wolves Relocated	0	0	10-25	5-10	0-5	0-5
Number of Bears Temp. Moved	0	0	0	0	0	30-45

IV. Provide Viewing Opportunities



Notify the public when the herd is expected to cross the Taylor Highway in early October. Everyone can enjoy the spectacular fall crossing. During that time, the weather can be glorious and the tundra in full color. The caribou are robust, with full manes and shiny antlers, and people can witness bulls fighting for dominance.

V. Public Involvement and Awareness



A. What should be done to increase public awareness of Fortymile wildlife issues?

Public input is a vital part of this plan; we believe public support is essential for the plan to work. The public has been and will continue to be involved in developing this plan through this Planning Team, public meetings, written comments, the Board of Game, the Eastern Interior Subsistence Regional Advisory Council and the Federal Subsistence Board. The team should take the following steps to increase awareness of and support for this recovery effort:

- a) Develop a communication and education strategy for Fortymile caribou management;
- b) Identify viewing areas where people have the best chance of observing wildlife and/or hearing wolves;
- c) During the planning period, increase awareness of hunting opportunities away from the Fortymile caribou herd;
- d) Continue to involve the public in the direction of the program. The planning team should work with agencies to arrange opportunities for citizens to participate in field work such as habitat monitoring and caribou and wolf observations.
- e) Increase awareness of the contributions hunters and trappers are making to the recovery effort. All funds for the effort are expected to come from hunting and trapping licenses and from big game tags; not from the general fund. Hunters and trappers are minimizing the caribou harvest and shifting trapping efforts to packs whose territory includes the caribou herd's summer range.

VI. Implementation



A. Future Team Responsibilities

The Fortymile Planning Team will continue to monitor implementation of the plan and to meet regularly to evaluate results and advise.

B. Research Design

A research design will be developed by ADFG in consultation with an independent team of scientists including ecologists, veterinarians and experts in fertility control. The design will be approved by the Fortymile Team. The design should focus on the most effective, timely and scientifically defensible non-lethal techniques and must include provisions to evaluate the effects on wolves and on calf survival. It must also include criteria for terminating the program if it is found to be ineffective.

C. Monitor the plan's effectiveness

1. Determine the effects of a minimal harvest on herd growth.
2. Determine effects of non-lethal fertility control of wolves on herd growth and on the area's wolf population.
3. Determine herd movement and range expansion during the life of the plan.
4. Evaluate the quality of the adjacent unoccupied range conditions.
5. Publish results in the biannual Comeback Trail newsletter.

D. Potential results

Using non-lethal fertility control as the primary action to reduce calf mortality is a new and largely untested technique and should be viewed as experimental. We do not know how well it will work. However, the team agrees we need to find alternate management methods that are more publicly acceptable that are biologically sound.

We believe these provisions will lead to a moderate increase, about 5 to 10 % per year, in herd size. At these growth rates, we expect the herd to number between 28,000 and 36,000 by the end of the 5-year plan. We do not, however, recommend a specific herd size objective. Instead, we have attempted to specify acceptable means that will allow the herd to increase and expand its range with the fewest environmental, economic and social costs.

b) What happens at the end of the five year planning period?

Our intent is that at the end of five years, the actions recommended in this plan cease. At that point, the actions taken will be evaluated to determine their cost, impacts, effectiveness in reaching the plan's objectives, and public acceptance. Following the evaluation, the plan will be revised using a public process.

VII. Other Recommendations



The recommendations included in this plan have been developed specifically for recovery of the Fortymile caribou herd and may or may not be applicable to other situations.

We request that the recommendations included in the final Fortymile Caribou Herd Management Plan be taken in their entirety—they represent a package and cannot be easily separated without compromising the integrity of the agreement. If the Alaska Board of Game or the Federal Subsistence Board desires changes in the plan, the team would like an opportunity to comment.

We strongly recommend that a similar public planning process be used for resolving other wildlife management issues.

The National Park Service (NPS) believes this plan is consistent with the Department of Interior's directive for ecosystem based management. The NPS supports this plan and the process used to develop it. All State and Federal Agencies respected the different agency mandates and policies. Under this plan, no predator control or relocations will occur on the Preserve lands administered by the NPS nor will Preserve predators be sterilized or moved while outside the Preserve. It is NPS policy to advocate predator control on NPS administered lands only as a part of an endangered species management plan. Within Yukon-Charley Rivers National Preserve, the NPS will continue to protect wildlife and their habitat while allowing sport hunting, subsistence hunting, and trapping as mandated by the Alaska National Interest Lands Conservation Act.

The U.S. Fish and Wildlife Service does not have any lands under its jurisdiction within the existing Fortymile caribou range as considered in this plan. Therefore the U.S. Fish and Wildlife Service does not have a position on the predator (wolf) control issue as presented in the Fortymile caribou plan, and neither approves nor disapproves of the predator control options as presented in the plan.

Fortymile Caribou Herd Planning Team

Environmental Concerns

1. Nicole Whittington-Evans _____ Alaska Wilderness Recreation _____ Supports the plan
& Tourism Association
2. Matt Singer _____ Alaska Wildlife Alliance _____ Does not support plan
3. Dave van den Burg _____ Northern Alaska Environmental Ctr _____ Supports the plan
4. Katharine Richardson _____ Former Taylor Hwy. resident concerned _____ Does not support plan
about the welfare of wolves Resigned from team
after the draft plan

Hunting Concerns

1. Bud Burris _____ Alaska Outdoor Council, _____ Supports the plan
Tanana Valley Sportsmen's Association
2. Dean Cummings _____ Delta advisory committee _____ Does not support plan
3. Isaac Juneby _____ Eagle Advisory Committee _____ Supports the plan
4. Mike Tinker _____ Fairbanks Advisory Committee _____ Supports the plan
and Alaska Wildlife Conservation Association
5. Frank Entsminger _____ Upper Tanana/40 mile Advisory Committee _____ Supports the plan

Native and Subsistence Concerns

1. Ed Kormendy _____ Dawson First Nation, Yukon _____ Supports the plan
2. Jeff Roach _____ Eastern Interior Subsistence Council _____ Supports the plan
3. George Yaska _____ Tanana Chiefs Conference _____ Supports the plan
4. Keith Jonathan _____ Tanana Chiefs Conference _____ Supports the plan
5. Kenny Thomas, Jr. _____ Tanacross Village Council _____ Supports the plan

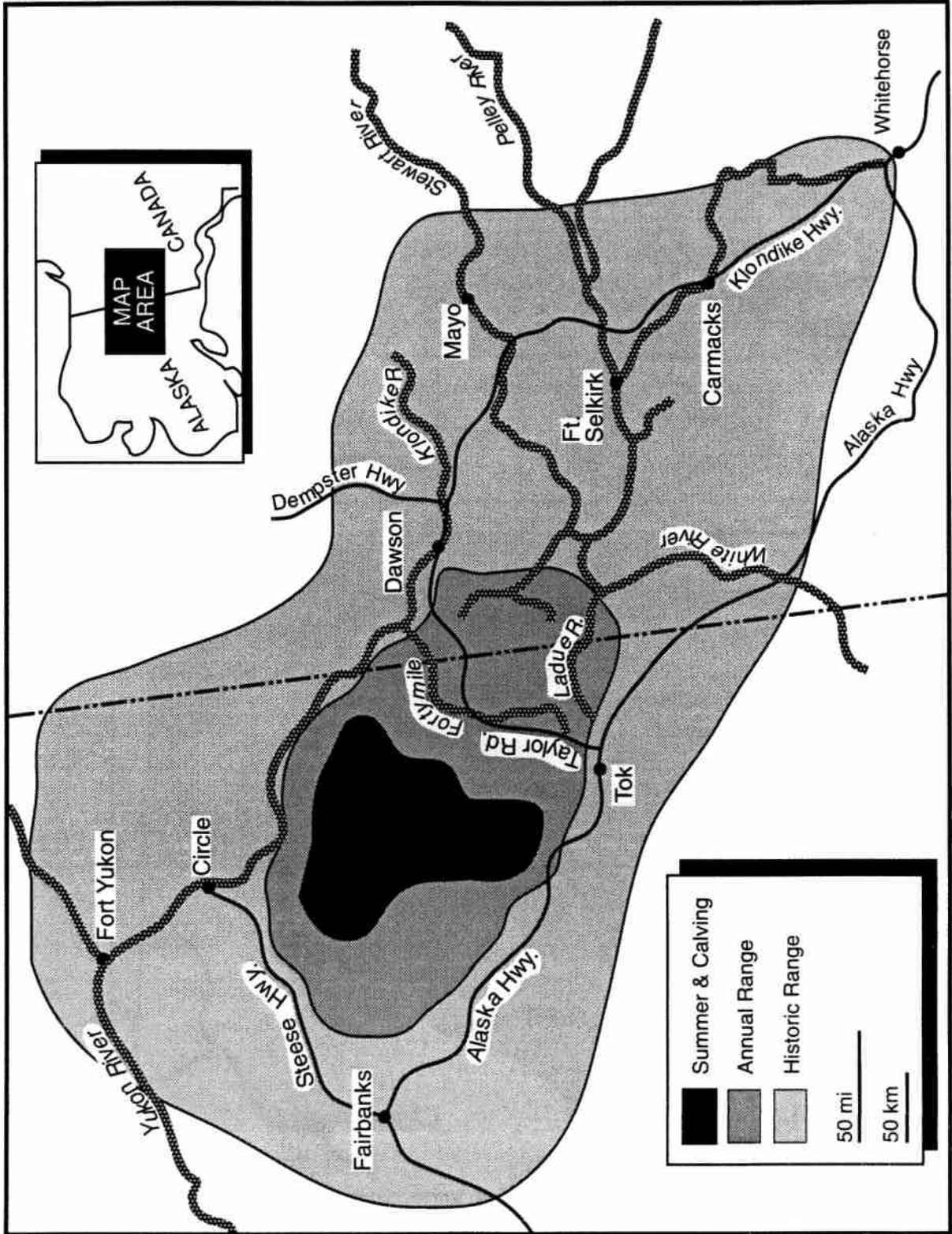
Agency Representatives

1. Ruth Gronquist _____ Bureau of Land Management _____ Supports the plan
2. Conrad Guenther _____ Fish & Wildlife Service _____ No position
3. Kevin Fox _____ National Park Service _____ Supports the plan
4. Terry Haynes _____ Subsistence Division _____ Supports the plan
Alaska Dept. of Fish and Game
5. Craig Gardner _____ Wildlife Conservation Division _____ Supports the plan
Alaska Dept. of Fish & Game
6. Dorothy Cooley _____ Yukon Renewable Resources Dept. _____ Supports the plan

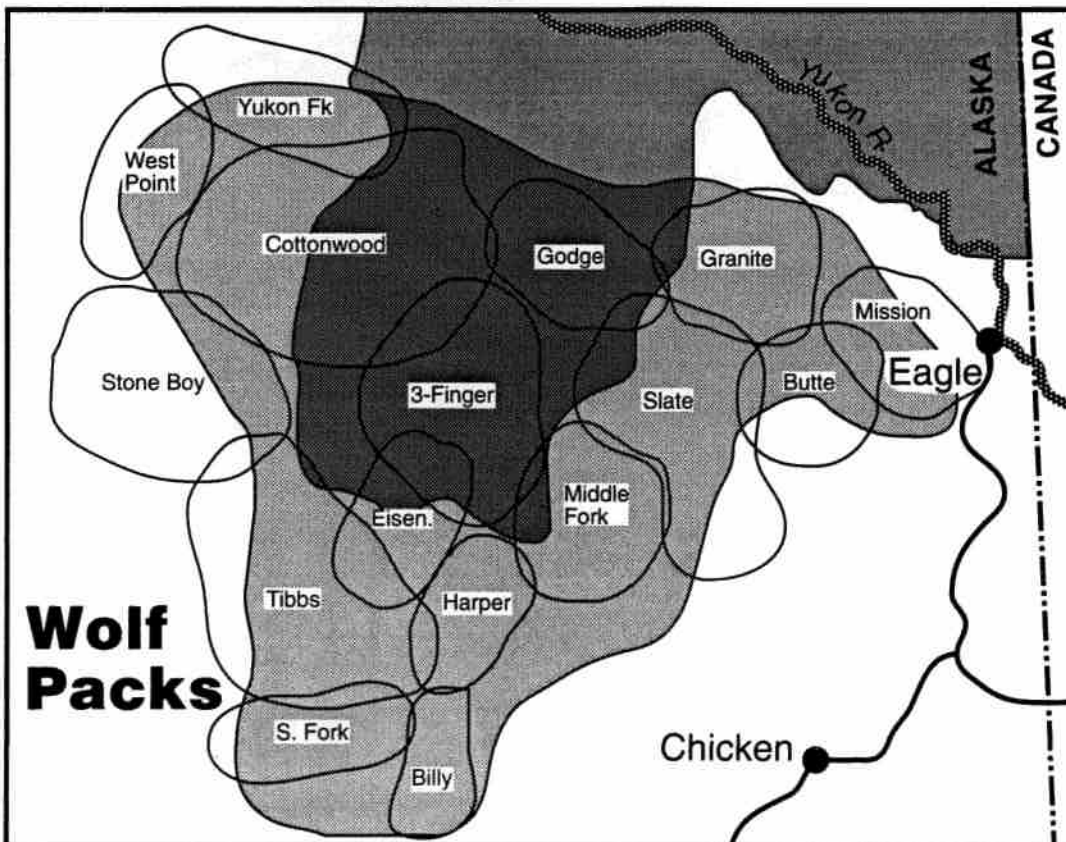
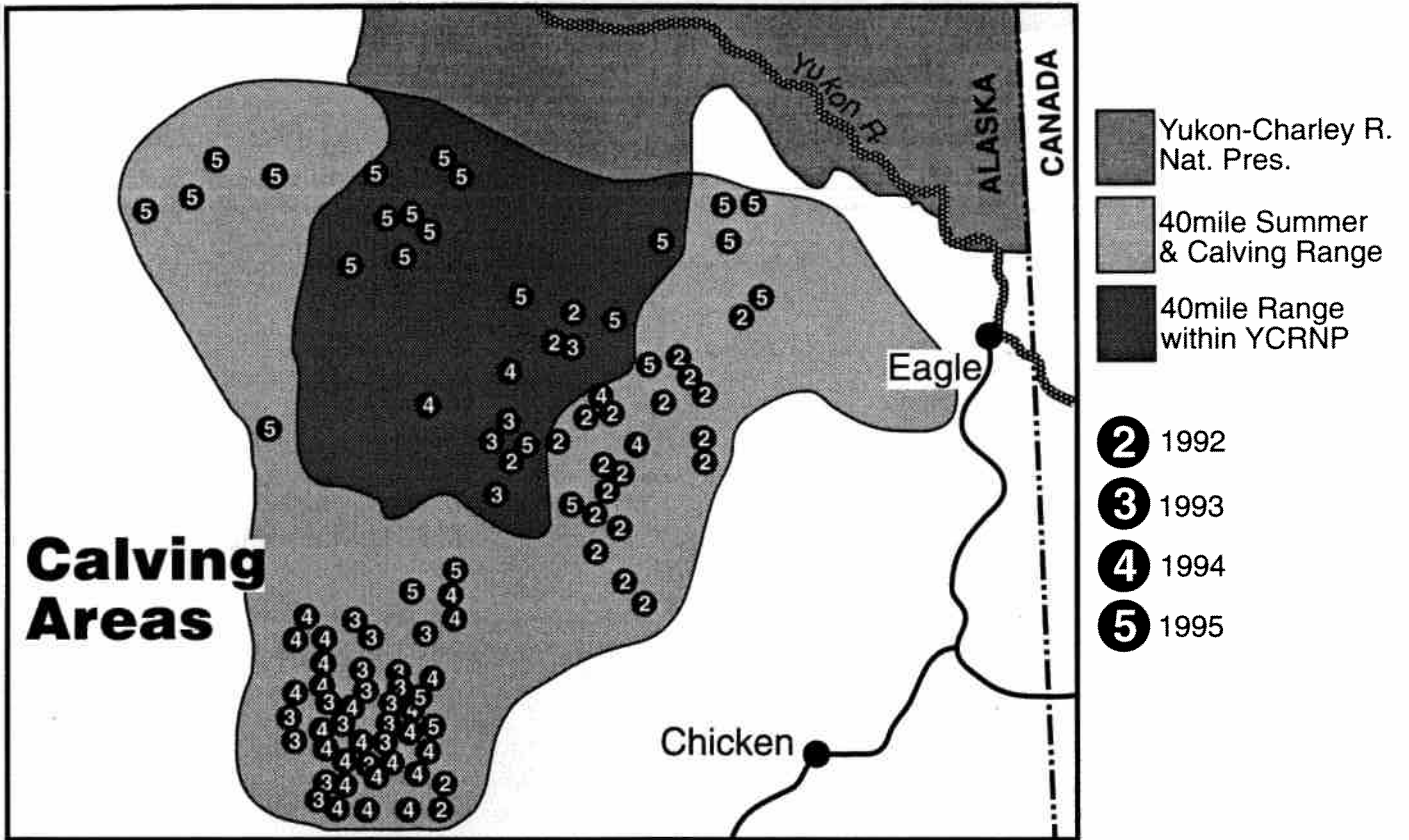
Mediator

- Susan Todd _____ University of Alaska Fairbanks

Fortymile Ranges



40mile Calving Areas & Wolf Packs



Appendix B. History of the Fortymile Herd

During this century, the Fortymile Caribou Herd has undergone a major decline in abundance and distribution. During the early 1900s, the herd was the largest in Alaska and one of the largest in the world. In 1920, renowned biologist Olaus Murie estimated the herd to number 568,000 caribou. At that time, the herd ranged from Whitehorse, Yukon, to the White Mountains, north of Fairbanks, Alaska—some 85,000 square miles.

In the 1930s, the herd fell to an estimated 10,000 to 20,000 caribou. The cause of the decline is unknown, but possible contributing factors were loss of winter habitat due to fires, food limitation and overharvest. If Murie's population estimate was accurate, density would have been much higher than the range could have supported, making food limitation a distinct possibility. Following the decline, the herd rarely used the eastern half of its range in the Yukon.

During the 1950s, the Fortymile herd increased and may have reached 60,000 caribou by 1956. Herd size was estimated to remain between 40,000 and 60,000 until 1963. This was much lower than expected based on the high calf survival during that period and the amount of range the herd used annually. Other evidence of the herd's size at the time is biologist Ron Skoog's report that during its fall migration, this herd spanned an area 20 miles wide and 130 miles long, stretching from the Taylor Highway to the Steese Highway. The herd also used areas east of Dawson and, during some years, the entire herd wintered in the Yukon.

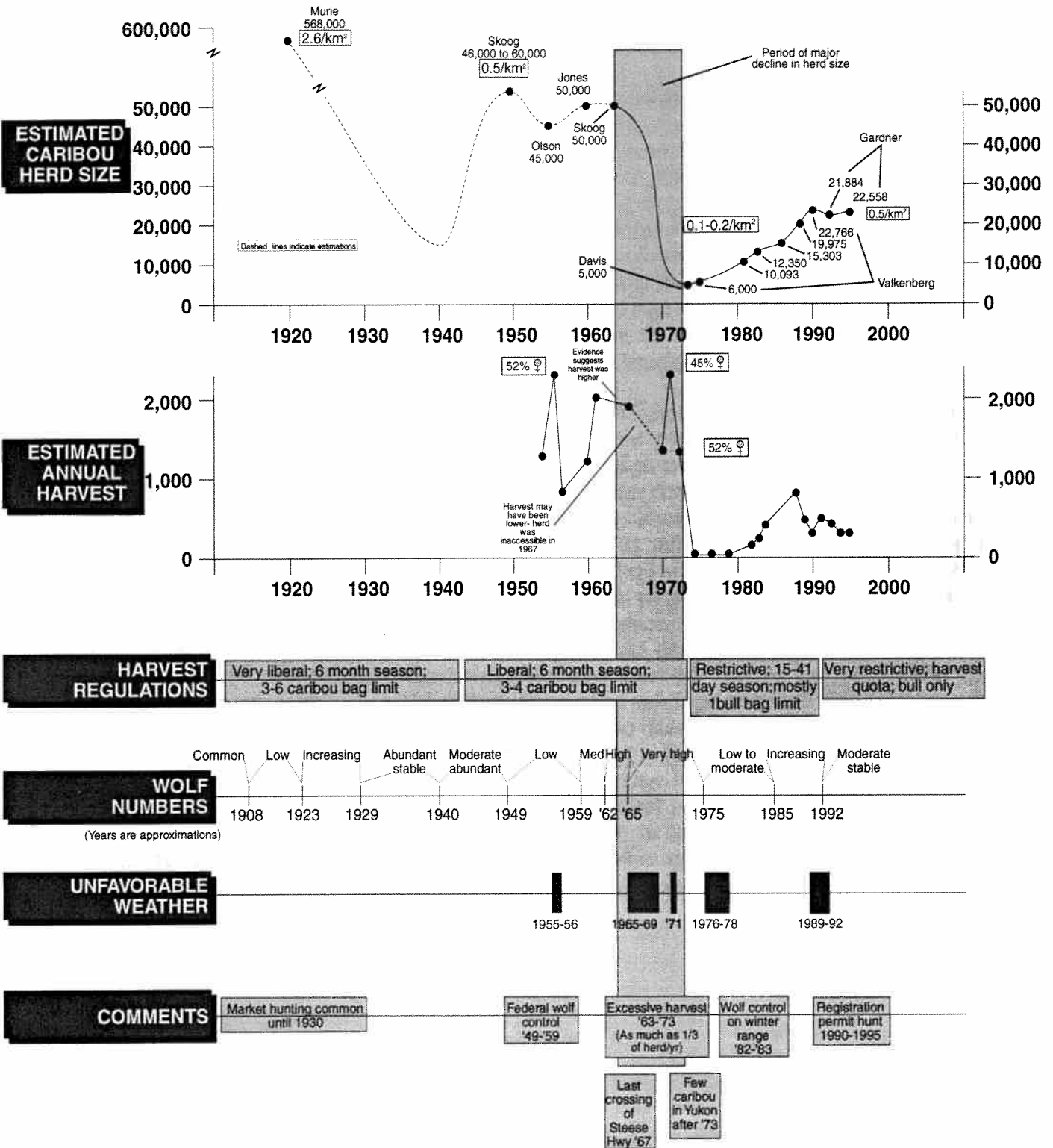
But then the population plummeted. From an estimated 50,000 animals in 1963, the herd fell to just over 6,500 in 1973. A combination of factors was to blame. Humans were definitely overharvesting the herd between 1964 and 1967 and again during 1971 and 1972. Unfavorable weather probably took a toll between 1966 and 1969 and again during 1971. In addition, high wolf numbers between 1963 and 1975 contributed to herd mortality. In 1967, the herd ceased crossing the Steese Highway and rarely crossed into the Yukon after 1973. Once called the Steese-Fortymile Caribou Herd, the herd's name has been shortened to the Fortymile Caribou Herd, since few people remember the days when the Steese Highway was closed for days during the herd's migration.

Possibly none of these factors acting alone would have led to the decline. However, poor management decisions allowed these factors to act in concert. The caribou herd was grossly overestimated during this period. The result was that high harvests were allowed. Also, the impact of wolves and bears on a declining herd was believed to be minor. If we had the census techniques we do now, these mistakes could have been prevented.

The herd began increasing again in 1976 and continued to grow until 1990. During this period, weather was generally favorable, wolf numbers were low to moderate, and harvest was relatively low. However, the herd stopped growing in 1990, coincident with unfavorable weather and increasing wolf numbers. It has since remained stable at about 22,000 caribou.

Virtually extinct in its former range in the Yukon, the vast herd that Murie watched for *20 days* as it migrated across the Steese Highway now crosses the Taylor Highway in a matter of hours.

History of the 40 Mile Herd



Appendix C. Will non-lethal management actions work?

How will the non-lethal management actions work to reduce predation on caribou calves?

- Wolf numbers will be reduced and maintained at a lower level within the Fortymile herd's calving and summer ranges.
- Wolf numbers will be reduced primarily by relocating the subordinate wolves from each pack that uses the herd's summer range but does not primarily reside within Yukon-Charley Rivers National Preserve.
- Lower wolf numbers and pack sizes will be maintained by sterilizing the alpha pair.

What needs to happen for these actions to work?

- Sterilized alpha pairs must retain their status and territories and keep new wolves from establishing territories within the herd's calving and summer ranges.
- Return rate of the relocated wolves must be low. If these wolves returned, pack size and pup production might not be adequately reduced.
- Compensatory predation by single wolves not associated with packs or by the alpha pair must not become excessive.
- The kill rate by grizzly bears must remain comparable to current levels.
- Mortality rates of relocated wolves must be comparable or lower than mortality rates for naturally dispersing wolves.

What evidence indicates the management actions might work?

- Individual wolves kill many calves. It has been documented that during 1994 and 1995 individual wolves killed between 25 and 40 Fortymile calves during the first 15 days of calving. By reducing the number of wolves, the actual number of calves killed by wolves may decline.
- Wolf pups increase the pack's food requirements. Pack nutritional requirements increase up to 60-70% during pup rearing.
- Limited evidence collected in the Yukon (1 pack) and in Minnesota (6 packs) indicates that sterilized alpha wolves will maintain their status in the pack and the reduced packs will maintain their territories.

- Subordinate wolves commonly disperse. Most wolves disperse as yearlings or 2-year-olds but some disperse as pups or even when they are 3 years and older. Average distances moved by dispersing wolves in Alaska are 50-70 miles.

Wolves relocated greater than 40 miles away from their home territories in Minnesota did not return. The survival rate for the relocated wolves, including pups, was comparable to resident wolves. There are areas of state land in Alaska that support few people, few wolves and high ungulate populations that could be used as relocation sites.

- By relocating subordinate wolves and restricting reproduction by the alpha wolves, the wolf population with the herd's calving and summer range will be reduced by about 60%. The population may be reduced further if additional wolves are removed by subsistence trappers.
- The benefits of the program will continue as long as the alpha pair retains its territory.
- Studies in Denali National Park found the large majority of the alpha male and female wolves were not genetically related. These data indicate that even in areas without hunting and trapping, unrelated wolves are accepted into existing packs or form new packs and the family pack structure is continually changing. Therefore, dispersal plays a large part in wolf ecology in Alaska.
- Grizzly bear predation rates on caribou calves decline substantially once the calves are two weeks old.
- Grizzly bears are not species-specific predators and select other food sources, especially once the plant growing season begins.

Information sources used by the team in developing their recommendations concerning predator management:

Adams, L.G., F.J. Singer, and B.W. Dale. 1995. Caribou calf mortality in Denali National Park, Alaska. *J. Wildl. Manage.* 59:584-594.

Ballard, W.B., J.S. Whitman, and C.L. Gardner. 1987. Ecology of an exploited wolf population in south-central Alaska. *Wildl. Monogr.* 98. 54pp.

Boertje, R.D., C.L. Gardner, and P.V. Valkenburg. 1995. Factors limiting the Fortymile caribou herd. Alaska Dept. Fish and Game. Fed. Aid in Wildl Restor. Prog. Rep. Proj. W-24-3.

Fritz, S.H., W.J. Paul, and L.D. Mech. 1984. Movements of translocated wolves in Minnesota. *J. Wildl. Manage.* 48(3). pp. 709-721.

Fritz, S.H., W.J. Paul, and L.D. Mech. 1985. Can relocated wolves survive? *Wildl. Soc. Bull.* 13:459-463.

Fuller, T.K. 1989. Population dynamics of wolves in north-central Minnesota. *Wildl. Monogr.* 105. 41pp.

Gasaway, W.C., Boertje, R.D., Grangaard, D.V., Kelleyhouse, D.G., Stephenson, R.O., and Larsen, D.G. 1992. The role of predation in limiting moose at low densities in Alaska and Yukon and implications for conservation. *Wildl. Monogr.* 120. 59pp.

Hayes, R.D. 1995. Numerical and functional response of wolves, and regulation of moose in the Yukon. McS. Thesis. Simon Frasier Univ. 132pp.

Peterson, R.O., J.D. Woolington, and T.N. Bailey. 1984. Wolves of the Kenai Peninsula, Alaska. *Wildl. Monogr.* 88. 52pp.

Consultants:

Dr. L.D. Mech, National Biological Survey, St. Paul, Minnesota.

Rick Farnell, Yukon Department of Renewable Resources, Whitehorse, Yukon.

Robert Hayes, Yukon Department of Renewable Resources, Haines Junction, Yukon.

Dr. Terry Boyer, University of Alaska Fairbanks, Fairbanks, Alaska.

Dr. Tanya Bubela, University of Sydney, Sydney, Australia

Rodney Boertje, Alaska Department of Fish and Game, Fairbanks, Alaska.

Bruce Dale, Alaska Department of Fish and Game, Fairbanks, Alaska.

Appendix D. Comparison of Operating Costs

Estimated Operating Costs by Year and Activity

(Dollars x 1000)

ACTIVITY	Alternative 1 (No Change)					Alternative 2 (Team Proposal)					Alternative 3 (Aggressive Action)				
	1996	1997	1998	1999	2000	1996	1997	1998	1999	2000	1996	1997	1998	1999	2000
Monitor Caribou Harvest	6.5	6.6	6.7	6.8	6.9	5.6	5.7	5.8	5.9	6.0	5.6	5.7	5.8	5.9	6.0
Wolf Population Estimate	3	3.1	3.2	3.3	3.4	5.0	5.1	3.2	3.3	3.4	5.0	3.1	3.2	3.3	3.4
Wolf Sterilization	0	0	0	0	0	0	0	26.5	3.5	3.5	0	0	0	0	0
Wolf Relocation	0	0	0	0	0	0	0	70.0	12.0	11.1	0	0	0	0	0
Wolf Radio Surveys	0	0	0	0	0	0	0	2.5	2.6	2.7	0	0	0	0	0
Caribou Surveys	8.5	8.5	8.6	8.7	8.8	8.5	8.5	8.6	8.7	8.8	8.5	8.5	8.6	8.7	8.8
Caribou Research	63.0	37.0	37.0	37.0	37.0	63.0	37.0	63.0	63.0	63.0	63.0	37.0	63.0	63.0	63.0
Informational Newsletters	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Team Meetings	0	0	0	0	0	5.0	5.0	5.0	5.0	5.0	0	0	0	0	0
Lethal Wolf Removal	0	0	0	0	0	0	0	0	0	0	98.0	38.5	38.5	38.5	38.5
Grizzly Bear Relocation	0	0	0	0	0	0	0	0	0	73*	0	0	0	0	0
TOTAL ANNUAL COST	84.0	58.2	58.5	58.8	59.1	90.1	64.3	187.6	107.0	179.5	183.1	95.8	122.1	122.4	122.7

* If required

Additional Cost over 5 years, Compared to the No Change Alternative	318.6	309.9	327.5
Estimated Number of Caribou in 5 years	22,000 to 28,000	28,000 to 36,000	35,000 to 45,000