

***DRAFT***

**WYOMING GRAY WOLF  
MANAGEMENT PLAN**



**November, 2002**

**WYOMING GAME AND FISH DEPARTMENT**

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## ***INTRODUCTION***

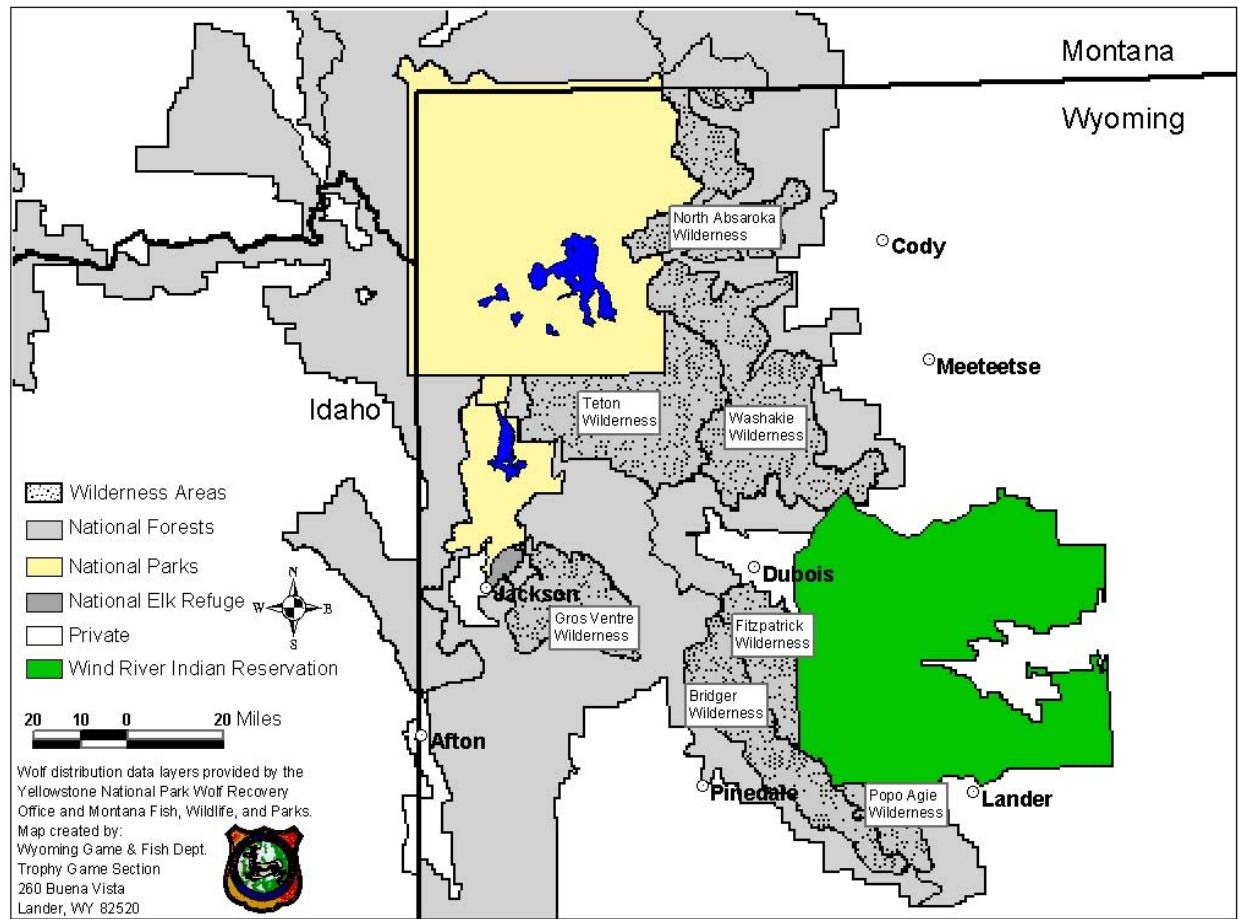
The gray wolf (*Canis lupus*) was extirpated from Wyoming by the 1930s. From that time through the early 1990s, there were occasional wolf sightings in Wyoming, but no reproduction was documented. With changing public attitudes through the 1960s, and implementation of the Endangered Species Act (ESA) in 1973, wolves were protected by the federal government. Public attitudes toward the wolf continued to change through the 1980s and 1990s, with the majority of United States citizens viewing the wolf as a valuable natural resource and an integral part of natural ecosystems (McNaught 1987, Bath 1991). As attitudes toward the wolf changed, a national movement began that would bring wolves back to the western United States, including Wyoming. Wyoming residents were split on their views towards wolves prior to reintroduction, with 49% in favor and 39% opposed to wolf restoration into Yellowstone National Park (Bath 1991).

With the goal of reestablishing a sustainable gray wolf population in the northern Rocky Mountains (Wyoming, Idaho and Montana), the U.S. Fish and Wildlife Service (USFWS) reintroduced 31 wolves to Yellowstone National Park, and 35 wolves to central Idaho in 1995 and 1996 (Bangs et al. 1998). The northern Rocky Mountain wolf population is comprised of three recovery areas: Northwest Montana, Central Idaho, and the Greater Yellowstone Area. The Greater Yellowstone recovery area (GYA) includes all of Wyoming, including Yellowstone National Park (YNP), Grand Teton National Park (GTNP), the National Elk Refuge (NER), and adjacent parts of Idaho and Montana.

The USFWS has defined a viable and recovered wolf population in the northern Rocky Mountains as one containing at least 30 breeding pairs of wolves (breeding pair: an adult male and female raising two or more pups-of-the-year until December 31), with an equitable and uniform distribution throughout the three states for three consecutive years (USFWS 2002). Before the wolf will be considered for delisting from protection of the ESA by the USFWS, states must also have adequate regulatory mechanisms, including state wolf management plans in place. These requirements are intended to assure the gray wolf will not become threatened or endangered again. The USFWS determined that 2001 was the second year in which at least 30 breeding pairs of wolves inhabited the northern Rocky Mountain recovery area. If the wolf population remains at current levels or increase in number and distribution, and state management plans are in place, delisting may be proposed as soon as 2003. The purpose of this plan is to establish guidelines for wolf management in Wyoming that will provide for a viable wolf population, while minimizing wolf/human conflicts once the wolf is removed from federal protection under the Endangered Species Act.

Upon delisting, management authority for wolves will return to the states in which wolves reside. The Wyoming Game and Fish Department (Department) is the agency charged with the management of wildlife species within Wyoming. Therefore, the Department will accept the responsibility and challenges of maintaining and managing Wyoming's portion of the northern Rocky Mountain wolf population residing outside Yellowstone National Park (YNP), Grand Teton National Park (GTNP), and the National Elk Refuge (NER). Currently, the gray wolf is classified by Wyoming Statute (W.S.) 23-1-101(a)(VIII) as a predatory animal. The Department will seek Legislation in the 2003 legislative session to change this classification to a dual status of trophy game animal in all of the wilderness areas on the Shoshone and Bridger Teton –

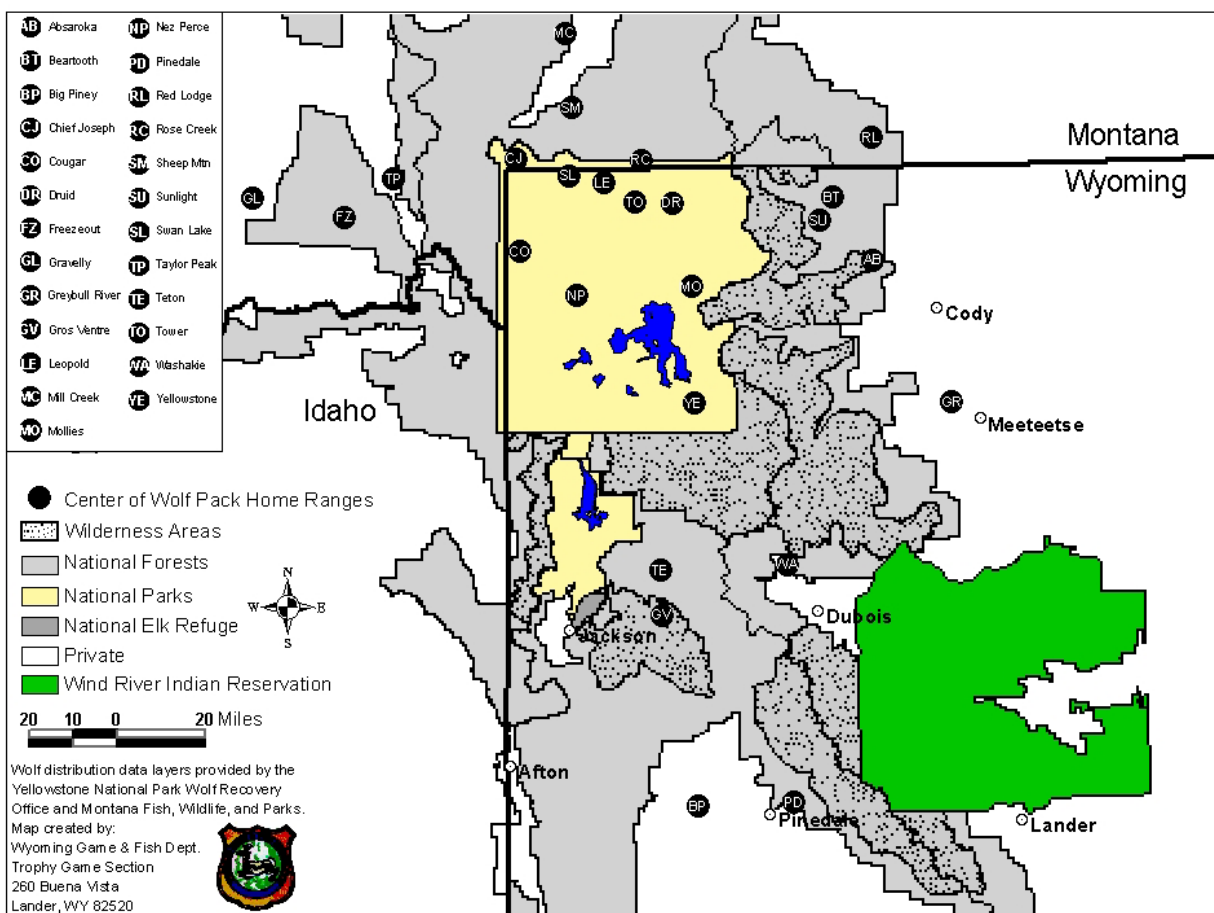
National Forests (Figure 1). Outside of these designated wilderness areas, wolves would, statutorily, be classified as a predatory animal and not subject to Department management authority. The Wyoming Game and Fish Commission (Commission) will only have the ability to establish regulations pertaining to wolf management in the described wilderness areas. By providing the Commission authority to promulgate regulations within the described wilderness areas regarding take, Wyoming should satisfy the adequate regulatory mechanisms requirement necessary for delisting.



*Figure 1. Wilderness areas where wolves will be classified as a trophy game animal.*

One requirement for delisting is a minimum of 30 breeding pairs of wolves be maintained with an equitable and uniform distribution between the states of Wyoming, Idaho, and Montana. As of January 2002, there were 18 documented wolf packs residing predominantly in Wyoming. Ten of these packs (including eight breeding pairs) were present in YNP. Eight packs (including 5-6 breeding pairs) were present outside YNP. Packs outside YNP included the Teton, Gros Ventre, Washakie, Sunlight Basin, Absaroka, Beartooth, Greybull River, and Pinedale packs (Figure 2). It

will be necessary to maintain some wolf packs outside YNP, GTNP, and the NER in order to meet federal recovery criteria.



*Figure 2. Location of the centers of wolf pack territories in the Greater Yellowstone Area (GYA) as of December, 2001 (USFWS 2002). The Big Piney wolves (BP) have not established a pack and so they are not included in pack calculations for the GYA (USFWS personal communication).*

Wolves are of national interest, and the national public, not just the license-buying public of Wyoming, should share funding the management of the species. Supplemental funding will be sought through special federal or state appropriations, public/private foundations, and other sources. Full implementation of this management plan is contingent on obtaining federal funding to fund at least a portion of the costs to manage this species.

The success of any management program depends, at some level, upon successful coordination with other agencies and the public. A successful wolf management program for the State of Wyoming should be similar to management programs for the states of Idaho and Montana, because the three states will share management of this wolf population. However, because of unique circumstances in Wyoming, this plan will deviate from the Idaho and Montana management plans. Idaho has finalized its wolf management plan. Montana has just completed public scoping on their plan and is

in the process of an internal review and revision of their draft plan. Appendix 1 illustrates the similarities and differences between the three state management plans.

## **WOLF LIFE HISTORY**<sup>1</sup>

**Physical Characteristics:** The wolf is the largest member of the dog family *Canidae*. Pelt color can be highly variable ranging from white to black, with grizzled gray or black being most common in the northern Rocky Mountains. Weight typically ranges from 80 - 90 pounds (36 - 41 kg) for females and 90 - 110 pounds (41 - 50 kg) for males. Height averages 26 - 32 inches (65 - 80 cm) at the shoulder, and length typically measures 4.5 - 6.5 feet (1.4 - 2.0 m) from nose to tail tip. Approximate track size is 4 inches wide by 5 inches long (9.5 x 12.1 cm), and can be difficult to differentiate from tracks of large domestic dogs.

**Reproduction and Social Behavior:** Wolves form family groups referred to as packs. A pack consists of at least two individuals of the opposite sex that breed and produce pups. Wolves are sexually mature at 22 months of age (Mech 1970). The dominant male and female in the pack (alpha pair) produce most of the young, however, 20 - 40% of packs containing two or more adult females produce two litters/year (Mech 1991). Breeding occurs during February or March, and pups are born after a 63-day gestation period in April or May. Litter sizes in Wyoming have averaged approximately five pups from 1997-2001 (USFWS 2002). Pups remain at a den site for about 6 weeks until they are weaned. The pack then moves to rendezvous sites (home sites) until the pups are old enough to hunt with the pack (e.g., September, October). Once pups begin hunting, these rendezvous sites are no longer used and packs range throughout their territory.

Yearlings tend to leave the pack during fall to find a mate and develop a new territory and pack (Fritts and Mech 1981); however, some individuals stay with the pack longer. Pack territories are defended against other wolves. Territory location is advertised to other wolves through scent marking and howling. Territory size appears related to prey density (Ballard et al. 1987, Fuller 1989). Territory sizes of wolves recolonizing northwest Montana average 300-400 mi<sup>2</sup> (777-1036 km<sup>2</sup>). Territories of wolves in the GYA are averaging 200 mi<sup>2</sup> (535 km<sup>2</sup>). Pack sizes typically range from 2-16 wolves, but it appears pack size may be related to size of prey species. For example, wolf packs in Minnesota that preyed primarily on white-tailed deer (*Odocoileus virginianus*) averaged 6.7 wolves (Fuller 1989), whereas wolf packs in Alaska averaged 11.2 wolves where moose (*Alces*) were the primary prey species (Peterson et al. 1984). The average size of the eight packs in Wyoming outside of YNP in 2001 was 8.7 wolves (range 2-12) and 13.3 wolves (range 2-37) inside YNP (USFWS 2002).

**Population Growth:** Wolves have a high reproductive potential and populations can sustain moderate levels of mortality. Keith (1983) reported an average annual population increase of 29% from seven wolf populations in the United States and Canada. Three populations were exploited, and four were unexploited, but yielded similar rates of increase. Unexploited wolf populations may increase 28-35% annually. Wolves recolonizing northwest Montana increased an average of 22%/yr since 1986 (Fritts et al. 1994). Since 1998, the wolf population in the GYA has increased an

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<sup>1</sup>From USFWS 1994:Appendix 2, unless direct reference is provided.



average of 22%/yr (Figure 3). In unexploited populations, wolf density is ultimately limited by prey abundance (Fuller 1989).

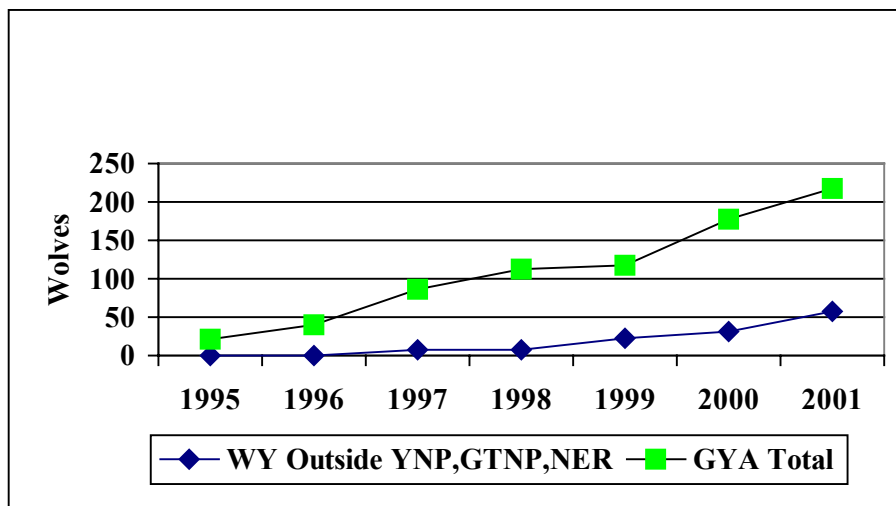


Figure 3. Wolf population size in Wyoming and Greater Yellowstone Area (GYA) 1995-2001. YNP=Yellowstone National Park, GTNP=Grand Teton National Park, NER=National Elk Refuge.

**Mortality Factors:** In areas where human exploitation is low, disease, starvation, and killing by other wolves are the primary causes of wolf mortality. Mortality rates in unexploited wolf populations average 45% for yearlings and 10% for adults. Human exploitation, however, tends to be the highest form of mortality in most wolf populations. In northwest Montana and adjacent Canada, 77% of documented wolf mortalities were human-caused (33 of 44; USFWS 1993). Since 1995, 53% of documented wolf mortalities in the GYA have been human-caused (Smith and Guernsey 2002). Of the documented 95 total wolf mortalities in the GYA since 1995, 27 were natural mortalities, 12 were from vehicle collisions, 27 were from control actions for livestock depredations, 7 were illegally taken, 3 were other human-caused and 19 were unknown. Annual mortality rates of 30-40% may suppress wolf population growth (Keith 1983, Ballard et al. 1987, Fuller 1989).

**Feeding Habits:** Wolves are efficient predators and feed primarily on large ungulates, although beaver (*Castor canadensis*) and other small mammals may also be utilized at certain times of the year. Prey preference appears related to prey size and availability. Order of preference by wolves tends to be deer (*O. spp.*), elk (*Cervus elaphus*), and bighorn sheep (*Ovis canadensis*) where they coexist, and wolves tend to select elk over moose, and bison (*Bison bison*) (Singer 1991). Based on preference and prey availability in the GYA, wolves reintroduced into YNP were expected to select elk most often followed by mule deer (*O. hemionus*) and bison (Singer 1991). Recent studies of wolf-prey relationships in and adjacent to YNP have documented >85% of wolf kills to be elk, followed by bison, moose, deer, and pronghorn (*Antilocapra americana*) (Smith et al. 2002, USFWS 2002, Jaffe 2001, Mech et al. 2001).

Wolves are largely opportunistic, generally taking young-of-the-year and old animals (Peterson et al. 1984, Fuller 1989, Boyd et al. 1994). However, wolves may feed on prime age animals when prey becomes scarce (Potvin et al. 1988). Wolf consumption rates can vary from 6-14 pounds/wolf/day (2.7-6.4 kg/wolf/day; Boyce and Gaillard 1992). Singer (1991) speculated that each wolf on the northern range of the GYA would consume an average of 9.9 elk, 2.4 mule deer, 0.2 each of bison, moose, and pronghorns, and 0.03 bighorn sheep annually based on preference of prey and availability. At the 2001 population level, wolves in Wyoming would consume an estimated 2048 elk, 523 mule deer, and 44 each of bison, moose and pronghorn antelope. Smith et al. (2002) documented a kill rate of 1.9 kills/wolf/month during winter months (November – March) in YNP (1995 – 2000), kills were 90% elk. Anticipated impacts of wolf predation on ungulate populations in the GYA indicate population reductions of 5-20% for elk, 3-19% for deer, up to 15% for bison, and up to 7% for moose may occur once the wolf population is at the recovery level. Impacts on other ungulate populations are expected to be minimal (Boyce and Gaillard 1992). By the end of 2001, there were 218 wolves in the GYA recovery area. There has been a decline in cow/calf elk ratios in herd units adjacent to YNP in Wyoming, but it is unknown at this time to what extent wolf predation has contributed to the lower calf numbers. Undoubtedly, wolf predation is responsible for a portion of this decline, but other factors such as the extended drought and other environmental factors may also be influencing these ratios. Cow/calf ratios are also depressed in areas of Wyoming without wolves, such as the South Bighorns, Rattlesnake, Iron Mountain, and Sierra Madre herd units. More research on wolf/wildlife interaction is needed before any definitive conclusions can be drawn about the effects of wolves on their prey. Ungulate monitoring efforts will be enhanced in those areas with established wolf packs until the effects of wolf predation are better understood.

**Livestock Depredation:** In the western United States, wolves gained a notorious reputation as livestock killers by the early 1900s, as livestock replaced native ungulates on western rangelands. The impact of wolf predation on livestock during this time contributed to extermination of the gray wolf from the western United States (Young and Goldman 1944). From 1897-1907 bounties were paid on 20,819 wolves in Wyoming alone [Seton 1929:261; coyotes (*Canis latrans*) were likely mistaken for wolves in some cases]. Wolf depredation on livestock undoubtedly intensified due to the depletion of natural prey and expanding livestock presence.

While livestock losses to wolves are minimal industry-wide, losses to individual operators can be significant (Fritts et al. 1992, Mack et al. 1992). Wolf depredation rates on cattle were 0.12, 0.37, and 0.87/1000 available in Minnesota, British Columbia, and Alberta, respectively (Mack et al. 1992). Depredation rates on sheep were 2.37 and 0.54/1000 available in Minnesota and British Columbia, and annual losses to wolves averaged 33 sheep/year in Alberta (number of sheep available to wolves in Alberta was not documented; Mack et al. 1992). A recovered wolf population in the GYA was expected to account for an average of 19 cattle (range: 1-32) and 68 sheep (range: 17-110) depredations annually (USFWS 1994). In 2001, 22 cattle and 117 sheep were confirmed killed by wolves in the GYA; losses in Wyoming included 20 cattle, 37 sheep and 4 dogs (Table 1). Control of offending wolves, improved livestock management practices (e.g., carcass management, fencing, etc.), compensation for losses, and communication with the public have been suggested as means to enhance wolf recovery where wolf-livestock conflicts exist (Fritts et al. 1992, Mack et al. 1992, Niemeyer et al. 1994).



*Table 1. Confirmed wolf-caused livestock/dog depredations in Wyoming and the Greater Yellowstone Area (GYA) 1999 – 2001 (USFWS 2002) and 2002 (Mike Jimenez, personal communication).*

Year	Sheep		Cattle		Horses		Dogs	
	WY	GYA	WY	GYA	WY	GYA	WY	GYA
1999	0	13	1	4	1	1	4	6
2000	25	39	3	7	0	0	5	8
2001	37	117	20	22	0	0	4	4
2002*	0	36	25	30	0	0	0	0

\* through November 1, 2002.

## ***ISSUES AND STRATEGIES***

### **LEGAL STATUS**

The ESA was enacted in 1973, mandating recovery and full protection of the gray wolf as an endangered species in most of the contiguous United States. Existing wolves in Minnesota were designated as threatened. A wolf recovery team for the northern Rocky Mountains, consisting of individuals from federal and state agencies and conservation groups, was appointed in 1974. The recovery team was assigned development of the Northern Rocky Mountain Wolf Recovery Plan. A draft of this plan was completed in 1980 (USFWS 1980) and subsequently reviewed by government agencies, livestock and environmental groups, and wolf experts. Following review and revision, the Northern Rocky Mountain Wolf Recovery Plan was approved in 1987 (USFWS 1987). The Recovery Plan called for natural migration of wolves into central Idaho and northwest Montana from existing packs in Canada, but authorized reintroduction of wolves into the GYA due to geographical isolation and the low probability of natural establishment.

During this process, recovery areas in northwest Montana, central Idaho, and the GYA were identified (Appendix I; USFWS 1987:23). The following criteria were used to select the three recovery areas: presence of an adequate year-round prey base; at least 3000 mi<sup>2</sup> (7770 km<sup>2</sup>) of contiguous wilderness, national parks, and adjacent public lands; a maximum of 10% private land; the absence, if possible, of livestock grazing; and isolation from populated and heavily used recreation areas allowing protection of 10 breeding pairs of wolves from human disturbance (USFWS 1987).

Wolves were re-introduced into YNP and central Idaho in 1995 and 1996 as nonessential, experimental populations under Section 10j of the ESA. Section 10j provides much more management flexibility than the strict “threatened” or “endangered” classification. In populations designated as nonessential experimental, only those wolves within national parks or preserves receive the fully protected, endangered status (ESA, sect. 7). Wolves in northwest Montana are present due to natural emigration from the Canadian population to the north, thus are classified as endangered, the most protected classification under the ESA.

Currently, wolves are listed as predatory animals by Wyoming state statute (W.S.) 23-1-101(a)(VIII). Predatory animals under W.S. 23-1-101(a) may be taken any time of year without limit. This classification will need to be changed prior to delisting in order for the State to regulate take of wolves. The Commission recommends the wolf be reclassified by statute under a dual status proposal. Wolves would be classified as a trophy game animal in designated wilderness areas on the Shoshone and Bridger-Teton national forests. They will be classified as predatory animals in the remainder of the state. This classification will allow the Commission to formulate rules and regulations pertaining to wolf management, including setting seasons and public take quotas, and addressing nuisance wolf issues, including compensation, for livestock lost to wolves only in the described wilderness areas. The Department will seek such changes in the 2003 legislative session.

### **DISTRIBUTION**

The reintroduction of wolves into the GYA focused on the large tracts of public lands in the region, especially YNP and the surrounding U.S. Forest Service wilderness areas. This area was considered more suitable for reintroduction because of the large populations of natural prey species and the lower potential for wolf/human conflicts. Wolf management in Wyoming will continue to focus on this area of the state once wolves are delisted.

Under this document, wolves will be classified as trophy game animals in Yellowstone and Grand Teton national parks, the John D. Rockefeller Jr. Memorial Parkway and the wilderness areas of the Shoshone and Bridger-Teton national forests (Figure 1) and predatory animals elsewhere in the state. At present, all wolves outside of the national parks in Wyoming spend much of their time outside of these wilderness areas (Figure 4).

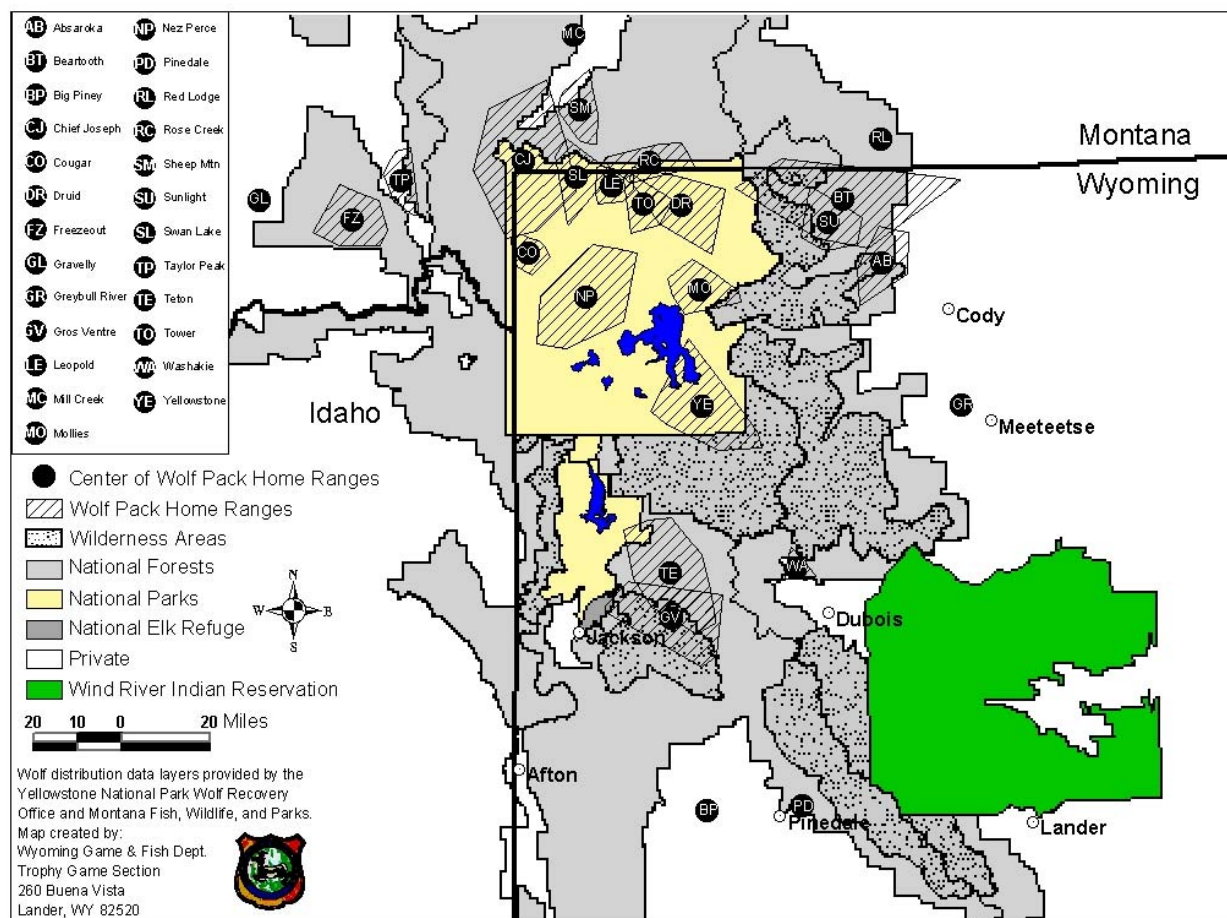


Figure 4. Wolf pack territories in the Greater Yellowstone Ecosystem. Black dots indicate the centers of wolf pack territories. Packs with no territories drawn (GR, PD, BP, etc...) had insufficient location data to map territories.

## **POPULATION MANAGEMENT**

**Population Objectives:** In those portions of the state where wolves will be classified as trophy game, designated wilderness areas within the Shoshone and Bridger-Teton National Forests, they will be managed in much the same way mountain lions and black bears are managed, where no upper or lower thresholds are set. Traditional population objective management does not work very well in managing large carnivores, especially species like the wolf, which are very mobile. Additionally, any specific population or pack threshold for these confined regions will be difficult to maintain as wolves are subject to unlimited take in all other portions of the state.

Montana and Idaho will manage for at least 15 packs in each state. Wyoming is not committing to maintain any specific number of packs. There are currently 14 packs in YNP, and 7 packs residing predominantly in Wyoming outside YNP, GTNP, and the NER (Mike Jimenez, personal communication). Only packs outside YNP, GTNP, and the NER and within the defined wilderness areas will fall under the jurisdiction of the Department after delisting. Should the number of packs in Wyoming be reduced to 10 or less, management strategies would revert to the same provisions used to recover the wolf population prior to delisting. By using this adaptive management approach, wolf numbers and distribution can be managed and wolf/human conflicts minimized, while maintaining a viable wolf population.

The USFWS is proposing to modify the recovery criteria related to what constitutes a successfully reproducing pack of wolves. The current criterion equates to a breeding pair successfully rearing at least two pups through December 31<sup>st</sup>. One proposal being evaluated would change the definition of a pack to at least five wolves, while eliminating the successful rearing criteria. This modification assumes that maintaining at least five wolves per pack will include one pair of successful breeding adults.

**Population Monitoring:** When wolves are removed from federal protection under ESA, it will be necessary for the State to monitor the number of packs residing in Wyoming and document their distribution, reproduction, and mortality. The Department will be responsible for monitoring these parameters outside YNP, GTNP, and the NER. The National Park Service will monitor wolves inside YNP (D. Smith personal communication) and GTNP (S. Cain personal communication), and USFWS will monitor wolves on the NER (B. Smith personal communication). The Department recognizes the efforts and commitment these agencies have made toward the wolf recovery program, and urges continued federal funding at or above current levels, so their wolf programs can continue after wolves are delisted. The Department may use a variety of techniques to document wolf abundance, distribution, and pack breeding success, and it will coordinate with other state and federal agencies to assure similar data is being collected so the population's status can be assessed.

A complete census of wolves in Wyoming would be cost prohibitive and very difficult, if not impossible to achieve. Wolf populations in Wyoming will be estimated using whatever techniques are applicable. By monitoring pack numbers, distribution, breeding success, and mortality, population trends can be tracked over time, and appropriate management actions taken.

Upon delisting, wolves with active radio collars will continue to be monitored, and other wolves may be radio collared if the opportunity arises. Radio collars may also be deployed in depredation situations. Emphasis will be placed on deployment of radio collars in newly identified packs and in packs without any radioed animals. Radio telemetry data will be very useful in documenting the number of packs present, reproduction, distribution, and movements following delisting. Additionally, emphasis will be put on non-invasive techniques such as track counts, hair sampling, howling surveys, and observations by field personnel for basic survey and inventory data collection.

During periods of snow cover, track counts may be used to document wolf presence or absence. Track counts may be used to estimate pack size, but they must be done repeatedly to provide accurate information, as wolves will step in each other's tracks while traveling in groups. Currently,

the Department conducts winter ground track surveys for lynx (*Lynx canadensis*), and wolverine (*Gulo gulo*) using snowmobiles. Some of these routes may be utilized in areas known to have wolves. Separate routes specifically intended for wolves may be established within pack territories, as they become known. Aerial track surveys may also be used.

Hair samples from wolves can be obtained from setting up rubbing posts, or hair capture corrals. Hair can be analyzed and wolf presence can be documented. Genetic profiling may be done from hair, blood, or tissue samples, in which maternity, paternity, dispersal, or overall genetic diversity can be analyzed. A reservoir of genetic samples obtained from wolves in Montana, central Idaho, Wyoming, and an adjacent Canadian source population already exists. Genetic samples will be added to this library as samples become available.

Observation reports have been very useful to the federal recovery program. Numerous observations of wolves or sign in an area have led to the discovery of new packs. Observation reports may confirm pack persistence. The Department will incorporate wolf sightings into its current Wildlife Observation System. Information will also be solicited from the public, and used in any long-term monitoring program.

In the late spring and summer months, howling surveys at rendezvous sites can help biologists determine whether a pack is raising pups. Pup vocalizations can easily be distinguished from adults'. Although a precise count is usually not possible, wolf responses can indicate relative pack size. Since different packs react to artificial howls differently, howling surveys may not work in all cases.

Each monitoring protocol has its own advantages and disadvantages. While no single method will be suited to all packs, the Department will consider all methods, including new methods as they are developed. Corroborating evidence will be gathered using multiple methods, but specific protocols will be tailored to the pack, setting, and appropriate season for collecting that type of data. This will facilitate a balance between monitoring responsibilities, information needs, cost effectiveness, and scientific rigor.

**Wolf Mortality:** Disease, starvation, and intraspecific strife are some of the primary causes of wolf mortality in unexploited populations. Average annual mortality rates in unexploited populations are 45% for yearlings, and 10% for adults (USFWS 1994). However, human-caused mortality is a major factor in most wolf populations. Human-caused mortality includes legal and illegal harvest, agency control, and vehicle accidents. Managing human-caused mortality will be an important component to Wyoming's wolf management. Annual mortality rates of 30-40% may suppress wolf population growth (Keith 1983, Ballard et al. 1987, Fuller 1989). All forms of wolf mortality will be considered when making management decisions.

Legal Wolf Mortality: Upon delisting, legal wolf mortality may result from such things as agency removals, public take (i.e., hunting and trapping), or defense of private property. The Department or its authorized agent may lethally remove wolves, when deemed necessary, to mitigate wolf conflicts with wildlife, livestock, or humans (see "Nuisance Wolf Management" section of this plan).

When the wolf is reclassified under state statute, the Department will recommend the gray wolf be added to the list of animals in W.S. 23-3-115, which would allow a landowner or their agent to legally take a wolf in the act of damaging personal property. Other species included in this statute are black bears, mountain lions, and bobcats. Additionally, the Department may also issue special “kill permits” to property owners experiencing chronic wolf conflicts. The taking of any wolf in defense of property or by special permit must be reported to the Department immediately. The owner, employee, or lessee shall save and care for the skin and procure a Wyoming game tag for the skin.

Unregulated Public Take: In areas of Wyoming where the wolf is classified as a predatory animal, take will not be regulated.

Regulated Public Take: Regulated public take (i.e., hunting and trapping) will be used for wolf population management in areas where wolves are classified as trophy game. Hunting and trapping regulations will be implemented through the same rule making process used for other trophy game species in Wyoming, including public input. Harvest quotas will be established at the appropriate time. Seasons will be closed when the mortality quota has been reached. As with mountain lion and black bears, license sales will not be restricted (general license). Wolf mortality quotas will be based on desired wolf densities for each WMU. Agency control actions may be implemented if public take methods are not meeting desired harvest levels.

All management recommendations for wolves will be formulated with input from the public. At the appropriate time, Department personnel will propose management options that will be reviewed internally within the Wildlife Division. Once the recommendations have been approved at this level, they will be taken to the public, through traditional input processes, for comment. Public comments will be summarized and presented to the Commission, along with the Department’s recommendations for final approval.

The Department is not proposing to establish wolf management units and associated objectives at this time. This aspect of management will be finalized at some point in the future depending on the pace of delisting. It is not prudent to formulate management recommendations at this time using current information. Delisting is expected to take at least one year from the time state wolf management plans are approved by USFWS. The Department will begin formulating final management recommendations during this time frame.

Currently it is unlawful to take trophy game animals by trapping in Wyoming. The Department will recommend the necessary statutory changes making it legal to take wolves using approved trapping devices.

Mandatory Reporting: The harvest of each wolf where they are classified as trophy game must be reported to the Department, and Department personnel will record sex, age, and other data for each harvest. Hunters and trappers will have 72 hours from time of harvest to present the pelt and skull of harvested wolves to a district game warden, district wildlife biologist, or Department personnel at one of the regional offices.

Since the Department will not have any control of take in portions of the state where wolves are classified as predators, total take may be difficult to document. It is recommended that some mechanism be implemented to attempt to document take on a statewide basis.

**Illegal wolf mortality:** Wolves taken outside the framework established by Wyoming statute and Commission rules and regulations in areas where they are classified as trophy game, will be considered taken illegally. This includes poaching, malicious killing, and mistaken identity. Department law enforcement personnel will investigate all violations of the illegal killing of wolves in the same manner as with other wildlife species.

**Incidental Mortality:** Occasionally wolf mortalities may occur accidentally (i.e., capture myopathy, vehicle accidents, or from public trapping in the process of legally trapping for other species). These types of mortalities are not expected to occur often and will likely have little affect on wolf populations. The Department will formulate criteria to address which types of mortality will count against the quotas. However, all incidental mortalities in areas that are under Commission jurisdiction will be recorded, and wolf carcasses will become the property of the Department.

**Research Needs:** When funding is available, research conducted by the Department will focus on attaining information that will help meet wolf management objectives, address wolf/ungulate concerns, and manage wolf-related conflicts. Priority will be placed on improving techniques to assess population status. Additional information obtained from future research should investigate wolf habitat use patterns, prey species composition and consumption rates, pack and territory sizes, age and rate of dispersal, population growth rate, and mortality factors. Research on wolf/wildlife interactions will be focused in areas of the state where wildlife may be most impacted by wolf predation, such as elk feedgrounds and crucial wintering areas for ungulates. The Department will promote these information needs primarily to non-Department wolf researchers.

Currently, the Department is a cooperating agency with the USFWS in an ongoing research project involving the elk feedgrounds in the Gros Ventre drainage of western Wyoming. Goals of this research include documenting wolf depredation rates, consumption rates, and wolf/elk interactions including elk movements and displacement. Information gained will be used to manage elk and wolves in this area.

**Genetics/Connectivity:** Connectivity implies that wolves in each of the three states are functionally connected through emigration and immigration events, resulting in the exchange of genetic material between sub-populations. This functional relationship is consistent with the biological intent of the recovery plan and is an underlying prerequisite for successful wolf recovery in the northern Rockies.

Designation of habitat linkage zones or migration corridors is impractical for a habitat generalist and highly mobile species like the gray wolf. Outside refuges such as national parks, legal protection across broad landscapes and public education will facilitate those functional connections across the region (Forbes and Boyd 1997). Yellowstone, Grand Teton, and Glacier National Parks function as refuges at opposite ends of the geographic extent of wolf distribution



in the northern Rockies. The network of public lands in western Montana, central Idaho and northwest Wyoming facilitates connectivity between the sub-populations. The legal protections and public outreach described in this plan will help ensure the integrity of wolf movement between these two refuges. No specific linkage corridors are proposed in Wyoming.

Sufficient dispersal and exchange of wolves between the three sub-populations will be necessary to maintain genetic variation in the northern Rocky Mountain wolf population. In isolation, none of the three recovered sub-populations could maintain its genetic viability over the long-term (USFWS 1994). Isolation is unlikely if populations remain at or above recovery levels and regulatory mechanisms prevent chronically low wolf numbers or minimal dispersal (Forbes and Boyd 1997).

The Department recognizes that wolves move within and between islands of occupied habitats. Dispersing wolves will travel through some habitats unsuitable for long-term occupancy, because of the potential for conflict. Lone wolves in these areas may not be immediately removed through agency actions, unless conflicts arise. Wolves in these areas may however, be subject to liberal public take regulations. Public education efforts will emphasize lone wolf sightings do not necessarily mean a pack is forming in the area.

The interagency effort to maintain linkage zones and movement corridors in the northern Rockies for grizzly bears, forest carnivores, and big game also will benefit wolves. A major emphasis of this cooperative effort is to create areas of safe passage for wildlife across highways, railroad lines, and through areas of intense human development (R. Rothwell, personal communication).

Connectivity between the central Idaho sub-population and the GYA sub-population has been documented. In the spring of 2002, wolf # B58, an adult male originally from the central Idaho population, was captured in the Greybull river drainage west of Meeteetsee, Wyoming. Wolf B58 traveled about 330 miles from Idaho to start what is now known as the Greybull River pack. It is assumed the alpha female is a disperser from the Yellowstone population (M. Jimenez, personal communication). At least two pups in this pack were observed in July 2002.

## **HABITAT MANAGEMENT**

The GYA was chosen for wolf reintroduction because of its high prey densities (i.e. ungulates) and the relatively low potential for human disturbance (USFWS 1994). These two factors, in conjunction with the abundance of federal lands connecting central Idaho, western Montana, and northwestern Wyoming, should provide sufficient wolf habitat and preclude the need for any land use restrictions.

Wolves are considered habitat generalists, which do not require a specific habitat type for survival. Wolf habitat is based largely on the density of prey species found in a given habitat. In order for the Department to manage wolf habitat, it must continue to manage for viable, robust ungulate populations. The Department manages ungulate populations by balancing natural

population fluctuations and public hunting. This adaptive management approach will assure adequate prey abundance to sustain a wolf population, as well as the hunting tradition enjoyed by many in Wyoming. Wolf/prey interactions are discussed further in the “Wolf/Wildlife Interactions” section of this document.

Wolves have not been known to demonstrate any particular behavioral aversion to roads. In fact, they readily travel on roads, frequently leaving visible tracks and scat (Singleton 1995). In Minnesota and Wisconsin, wolves have been known to occupy den and rendezvous sites located near logging operations, road construction work, and military maneuvers with no adverse effects (Minnesota Department of Natural Resources 2001). The underlying concern about road densities stems from the potential for increased accidental human-caused mortalities and illegal killings (Mech et al. 1988, Mech 1989, Boyd-Heger 1997, Pletscher et al. 1997). Although some of the areas within the GYA are administered by the USFS for multiple use purposes and have high road densities, much of the GYA includes national parks or wilderness areas that have limited road access and minimal human activity.

High prey densities and the relatively low potential for human disturbance throughout the GYA should provide suitable wolf habitat and preclude the need for land use restrictions. The Department will not recommend any land use restrictions within Wyoming based solely on the presence of wolves, providing federal recovery criteria are being met.

## **NUISANCE WOLF MANAGEMENT**

Managing human/wolf conflicts will be an integral part of the wolf management program in Wyoming. Emphasis will be placed on avoiding or minimizing wolf conflicts by incorporating wolf conflict avoidance into the information and education program. When wolf conflicts occur, they will be dealt with in a prompt, appropriate manner.

**Wolf-livestock Conflicts:** How wolf-livestock conflicts will be handled, and what kind of compensation program will be implemented after the wolf is delisted, are two issues of major concern. Since wolves were reintroduced into YNP in 1995, USDA/APHIS Wildlife Services (WS), in cooperation with USFWS, has taken the lead in dealing with wolf-livestock conflicts. WS personnel, with assistance from USFWS, have investigated reports of livestock depredations by wolves in Wyoming and have determined, based on the evidence available, whether wolves were responsible. If it was determined wolves were responsible for the depredation, WS in consultation with USFWS decided what management action should be taken. Management actions were taken based on all available data and evidence from the incident(s), on a case-by-case basis.

In portions of the state where wolves are classified as trophy game, the Department will be the lead agency in responding to wolf-livestock conflicts after delisting. However, the Department will enter into a Memorandum Of Understanding (MOU) with WS, in which WS will assist in wolf-livestock conflict investigations and implement management actions to resolve conflicts. In joint consultation, the Department and WS will decide on an appropriate management action, based on the specific circumstances of each conflict. The Department recommends continued federal funding

of WS in Wyoming for wolf-human conflict resolution. Management actions could include a variety of responses, and will be determined on a case-by-case basis. Management actions are discussed in detail later in this section.

The Department will not manage nuisance activities in the portion of the state where wolves are classified as a predator. Nor will the Department compensate livestock producers for livestock that are killed by wolves.

When the gray wolf is classified as a trophy game animal, the Department will recommend the gray wolf be added to the list of animals in W.S. 23-3-115, which would allow for a property owner or their agent to legally take a wolf in the act of damaging personal property, including livestock.

The Department and WS will work with livestock producers and non-governmental organizations to minimize wolf-livestock conflicts. Technical assistance may take the form of guidance on carcass disposal, fencing, scare devices, and other non-lethal or lethal control methods.

**Compensation for Livestock Losses:** The Department recognizes the importance of financial compensation to livestock producers that sustain losses due to wolf depredation. Defenders of Wildlife (Defenders), a non-profit wildlife conservation organization, currently administer a compensation program for wolf-killed livestock in the GYA. Defenders reimburse livestock producers current market value for confirmed wolf depredations. The Department recommends Defenders continue its compensation program after delisting. When the wolf is reclassified as a trophy game animal in portions of Wyoming, the Department will become responsible by state statute for compensation of livestock lost to wolf depredations in those portions of Wyoming. The Department will not be liable for compensation of livestock lost to wolves in any portion of the state where wolves are classified as a predatory animal.

A scientific evaluation of state government predator compensation programs in Idaho and Wyoming, and of the Defenders programs in Montana, Idaho, and Wyoming for grizzly bears (only in Idaho and Montana) and wolves has recently been initiated. The objectives are to evaluate the effectiveness of various compensation programs, examine the role compensation programs play in predator conservation efforts within agricultural settings, determine how compensation programs can be structured and administered to meet the needs of livestock producers, and assess the impact that compensation programs have on public opinions and attitudes towards predator conservation and management. This effort is known as the Predator Compensation Research Study. The findings of this research effort will have important implications for future wolf compensation programs. A final report is anticipated in spring of 2003. Results of the study may provide the Department with information to aid in development of compensation programs.

The Department will pursue all possible funding sources for the livestock compensation program, including federal or state appropriations, public/private foundations, and other sources. The Department will work diligently to try to ensure that revenue from license fees are not the only source of funding for a livestock compensation program.

**Other Wolf-Human Conflicts:** Reviews of wolf-human interactions concluded that wild, healthy wolves in North America present little threat to human safety (Young 1944, Mech 1970, 1990). However, on occasion, wolves will be aggressive toward humans. McNay (2002) concluded the vast majority of wolf-human interactions in Alaska and Canada resulting in human injury was from wolves habituated to humans or conditioned to human foods. The Department will incorporate the importance of preventing wolves from obtaining human foods and becoming habituated to humans in its information and education program. Incidents involving aggressive behavior of wolves toward humans will be investigated immediately, and appropriate management actions will be implemented.

**Management Actions:** Management actions will be implemented by the Department only in areas where wolves are designated as trophy game animals. These actions will be based on the unique set of circumstances surrounding each wolf conflict. Possible management actions include:

No Action: No action may be taken after the initial investigation, if the circumstances of the conflict do not warrant control, or the opportunity for control is minimal.

Aversive Conditioning or Deterrence: Various methods may be used to deter or preclude wolf depredation of livestock, or other nuisance behavior (i.e., scare devices-visual and auditory, shock-collars, electric fences, non-lethal projectiles, etc.). Actively deterring or aversive conditioning wolves may prevent nuisance behavior in some cases (Bangs and Schivik 2001).

Relocation: Capture and relocation operations may be initiated when other options are not applicable.

Removal: Lethal control may be used when other options are not practical or feasible. Removal is often the most effective management option for wolves that kill livestock.

Property Owner Take Permit: If livestock depredation is experienced, the Department could issue the property owner or property owner-representative a permit to lethally take one or more wolves in areas where wolves are classified as trophy game animals, in addition to the provisions in W.S. 23-3-115 which, if approved by the legislature, will allow property owners or their agents to legally take wolves attacking livestock.

## **WOLF/WILDLIFE INTERACTIONS**

**Predator/Prey Interactions:** Wildlife populations are affected by various factors such as weather, disease, habitat availability and condition, human impacts, and predation, to name a few. These factors often combine to form complex interactions that make it very difficult to determine the cause of population fluctuations.

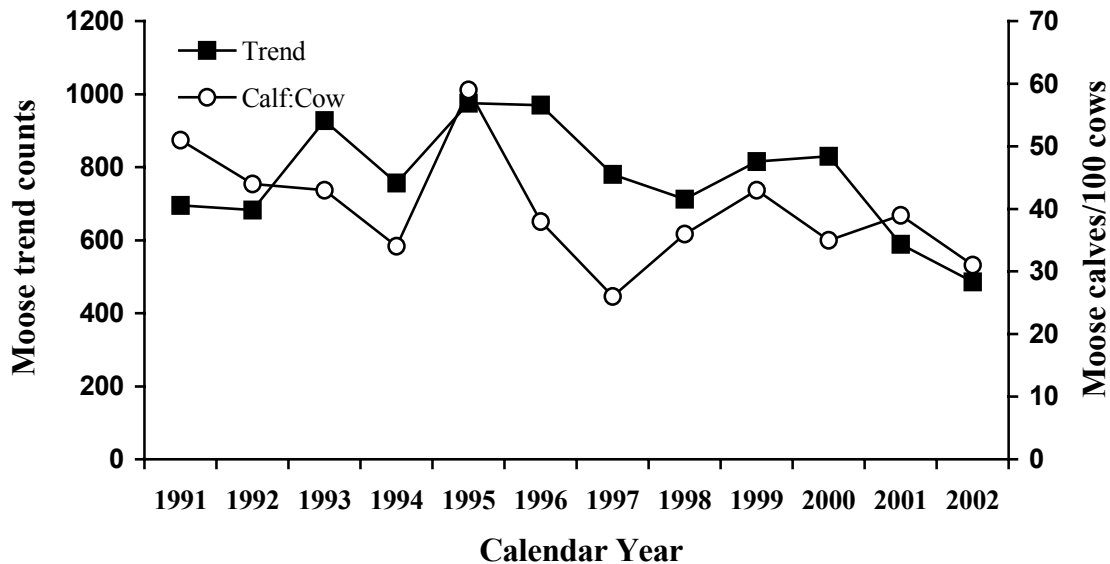
Thus, the influence predators have on their prey may be variable not only between, but within regions as conditions change over time and space. Predation may affect prey populations through juvenile mortality, adult mortality, or a combination of both (Gasaway et al. 1992,

Ballard et al. 1997, Kunkel and Pletscher 1999, National Research Council 1997, Mackie et al. 1998, Ballard et al. 2001). Wolves in Minnesota do not appear to impact white-tailed deer populations overall, but there may be some localized effects of wolf predation in the poorest quality deer habitat (Mech and Nelson 2000, Minnesota Department of Natural Resources 2001). Biologists in Wisconsin have reported that habitat and climate influenced deer populations more than wolf predation (Wisconsin Department of Natural Resources 1999). Studies in YNP identified winter severity as a major influence on the level of wolf predation on elk, with wolf predation higher in more severe winters (Mech et al. 2001, Jaffe 2001). This information suggests that, while wolf predation will likely have little overall impact on most prey species in the state, it may have a significant impact on selected areas.

**Sensitive Big Game Ranges:** Localized impacts of wolves on prey may be greatest on crucial ungulate winter ranges and on elk winter feedgrounds in western Wyoming. The Whiskey Mountain bighorn sheep winter range near Dubois and crucial bighorn ranges on the Shoshone River and near Jackson are very important to the conservation of bighorn sheep populations in these areas. A review of the literature on predation on bighorn sheep by Sawyer and Lindzey (2002) found the terrain bighorn sheep frequent prevents predators such as wolves from significantly impacting bighorn populations in most situations. However, when bighorns seek forage away from escape terrain or in timbered areas where predators can approach undetected, wolves can inflict considerable mortality (Sawyer and Lindzey 2002). Sheep populations on these important winter ranges are currently monitored for population fluctuations. This monitoring will continue and will help ascertain possible wolf predation impacts.

Potential impacts to specific populations of moose are a concern. There is crucial moose winter range in the Buffalo Valley/Spread Creek portion of the Jackson Herd Unit. Population trend counts for the Jackson Herd Unit have been relatively stable since 1991 (Figure 5). The ratio of calves per 100 cows in the population is used as an indicator of recruitment of young into the population. These ratios have been fluctuating around the same level since the early 1990s (Figure 5). Both the trend counts and calf:cow ratios indicate a moose population that is stable or trending slightly downward. Research done by Berger (personal communication) on the Jackson moose herd points to several factors that likely contribute to this decline. Recent pregnancy rates of adult cow moose in the area have been fluctuating between 70-80% since 1994. These rates are in the bottom 10% of all moose populations in North America and significantly lower than pregnancy rates reported by Houston (1968) for the Jackson moose herd in the 1960s, which averaged over 95%. Starvation has been the primary source of adult female moose mortality in this study from 1994-2001, accounting for 57% of all known mortality. Wolf predation accounted for 3%. Starvation was also a significant factor in reducing moose calf survival from an average of about 90% to near 10% in 2001 (Berger, personal communication). These data indicate a population under the influence of larger environmental and/or density dependent factors. However, wolf predation can be a major factor in moose calf survival. In 1998 calf survival decreased to near 40% due mostly to wolf predation (Berger, personal communication). The large amount of elk prey available in the Jackson area may cause wolf numbers to increase and remain high, possibly resulting in impacts to the moose numbers in the area. Current research into the effects of predators on the Jackson moose population will

continue. This, along with the current monitoring of the population by the Department, will aid in the determination of any wolf predation effects.



*Figure 5. Annual Jackson moose herd trend counts and calf:cow ratios. Trend counts are conducted in January or February of each calendar year. Factors such as snow cover and other environmental conditions can influence the way animals concentrate on winter ranges or their visibility from the air and thus affect the results of trend counts from year to year. Data from Wyoming Game and Fish Department.*

Potential impacts may also exist in the Cody and Clark's Fork Moose Herd Units. These two herds are currently below management objectives and appear to be in a downward trend with low recruitment. Wolf predation on these herds has been documented but it is not known if this predation is the only reason for this downward trend. These herds could also be experiencing some of the other environmental effects as those documented in the Jackson moose herd or impacts from grizzly bear predation. This situation will be monitored

Wyoming has the largest elk feeding program in the United States, feeding over 23,000 elk annually (Smith 2001). The Department operates 22 state elk feedgrounds in the Jackson, Pinedale, Big Piney, and Afton areas of western Wyoming. The USFWS also operates the NER outside of Jackson. These feedgrounds concentrate elk on agency lands in lower elevation areas during the midwinter months with the intent of mitigating habitat loss, minimizing damage done by elk to private lands in the area, preventing vehicle/elk collisions, and preventing the spread of brucellosis from elk to cattle on winter feedlines.

Wolves were first observed in the Jackson area in small numbers in the winter of 1997-98. In the winter of 1998-99, two separate packs killed an estimated 60 elk on the NER (Table 2) (B. Smith, NER, personal communication). Over the next few years wolves killed fewer elk on the

NER, but began killing more elk on and around the Department feedgrounds in the Gros Ventre drainage. To date, the total number of elk killed by wolves each winter in this area represents less than 1% of the total Jackson elk herd. In contrast, the average annual winter mortality due to all causes on the NER is 1.4% of the NER herd (B. Smith, NER, personal communication). The 2002 calf:cow ratios for both the Gros Ventre feedgrounds and the NER decreased from 2001 numbers (Table 2). While there has been a significant wolf presence on the Gros Ventre feedgrounds in the past several years (USFWS 2002), wolf presence on the NER has been minimal or nonexistent during that time (B. Smith, personal communication). The decline in calf:cow ratios in both areas indicates that while wolf predation likely played a role in the decrease of the Gros Ventre feedground ratios, factors such as other predators and the prolonged regional drought were also influential.



*Table 2. Elk calves per 100 cows and the number of wolf-killed elk found on feedgrounds in the Jackson area administered by the Department (Gros Ventre) and USFWS (NER). Wolves first occupied the area in the winter of 1998-99. Data are from USFWS (2002), Bruce Smith, NER (personal communication), and Wyoming Game and Fish Department. Numbers of wolf-killed elk from the Gros Ventre were tallied from the entire drainage, not just the Department feedgrounds.*

Calendar year	<b>Gros Ventre Feedgrounds</b>		<b>National Elk Refuge</b>	
	Calf:Cow	Wolf-killed elk	Calf:Cow	Wolf-killed elk
1990	32.3		23.2	
1991	31.7		22.8	
1992	27.2		23.7	
1993	34.1		24.3	
1994	28.1		17.5	
1995	32.4		23.6	
1996	23.1		18.6	
1997	26.1		17.9	
1998	22.8		16.7	
1999	24.8		18.8	~60
2000	26.5	48	24.8	11
2001	31.2	18*	24.1	2
2002	17.5	52	20.1	0

\*Poor snow cover created difficult access for researchers to areas where wolves hunted in Gros Ventre in 2001.

Wolves can cause wintering elk to be displaced from native winter ranges onto adjacent private property, which may increase the potential for damage. This has been documented on Baldridge and along the face of the Beartooths in the Cody region.

Another concern is wolves displacing elk off feedgrounds. Wolf presence was documented on 14 of the Department's 22 elk feedgrounds during the winter of 2001-02. Wolf predation was documented on 12 feedgrounds in 2001-02 with a total of 74 elk killed and/or fed on by wolves. A study of collared elk on the Gros Ventre feedgrounds has found that elk displaced by wolves in that area often return within a day of being displaced (M. Jimenez, USFWS, personal communication). However, there is still potential for conflicts on feedgrounds in several ways (Table 3). These include elk causing damage to stored hay and elk feeding on livestock feedlines, which causes hay

loss and increases risk of brucellosis transmission from elk to cattle. Another potential conflict occurs where feedgrounds are near to highway rights-of-way. Elk presence near highways frequently forces the Department to initiate feeding in response to public concerns over vehicle/elk collisions. Elk crowding can also have negative management consequences when elk move from one feedground to another. Crowding aggravates the risk of brucellosis transmission between elk. It is also more difficult to implement the vaccination program with crowding and with elk reacting to ongoing wolf predation. Hay supplies to feedgrounds are delivered during summer and fall, and are based on elk numbers from previous years. When elk redistribute among feedgrounds, the Department must react to hay shortages. This work is difficult in winter conditions because routes the Department must use are sometimes shared with recreationists, and because of equipment and manpower limitations. Wolf management actions may be desirable if a given conflict could be prevented.

**Big Game Management:** Successful wolf conservation in Wyoming will depend, in part, on the availability of natural prey populations. Ungulate populations are important not only to wolves and other carnivores, but to human hunters and others in the state whose income depends upon hunting and other wildlife-related activities. Hunting licenses fund the majority of wildlife conservation efforts in Wyoming. This investment has produced abundant ungulate populations throughout the state. Thus, it is important that the Department balance the wolves' need for prey species with the public's investment in these populations and their opportunity to hunt and otherwise enjoy them in a sustainable and responsible manner.

Data from studies conducted in YNP have given insight into the rate at which wolves kill prey in the GYE. Jaffe (2001) estimated winterkill rates in the Madison/Firehole area of YNP. Kill rates in this area of YNP ranged from 2.04 kills/wolf/30 days in the winter of 1998-99 to 1.47 kills/wolf/30 days in 1999-2000. Similar rates were reported by Smith et al. (*in review*) for the northern range of YNP. This study estimated wolf kill rates for two 30-day periods in early (mid November to mid December) and late (March) winter in the northern range of YNP from November 1997 to March 2000. Kill rates were 1.6 kills/wolf/30 days in early winter to 2.2 kills/wolf/30 days in late winter, with an overall three-year average of 1.8 kills/wolf/30 days. These numbers demonstrate that kill rates are variable not only between, but within winter seasons. YNP kill rates are generally higher than most other wolf/ungulate systems, which is characteristic of a re-establishing and expanding wolf population (Jaffe 2001). Because these studies were conducted during winter, they should not be used to estimate annual kill rates for GYE wolf populations. Very little is known about summer kill rates of wolves in the GYE or any ecosystem.

It is reasonable to assume that in the future, wolf predation may have an effect on some northwestern Wyoming elk and mule deer herds and, thus, hunter harvest. However, since most of the packs that reside outside YNP and the NER are subject to take under the dual status classification, impacts to big game are expected to be minimal. The effect of wolves on elk numbers in the GYE has been found to be directly related to winter severity (Mech et al. 2001). Mech and Nelson (2000) found that wolf predation did impact hunter harvest of white-tailed deer in areas of lower deer densities. Data from many elk herds in northwestern Wyoming show populations that have been above herd objectives for several years. Liberal issue of antlerless

hunting permits and extended seasons, along with drought and predation, have reduced some of these herds to near objective. In the future, it is possible that severe environmental conditions may reduce some elk populations in the GYE to the point where wolf predation may have a strong influence on them. However, it has been demonstrated that large elk populations, such as the northern YNP herd, can persist in the face of wolf predation. The northern YNP elk herd is one of the two largest elk herds in North America, with the other being the Jackson elk herd. The northern YNP herd has increased and remained relatively stable since the severe winter of 1996-97, despite the fact that the herd has coexisted with the highest wolf densities in the GYE during that time (Smith et al. *in review*).

Currently, Department biologists consider factors such as population objectives, drought, winter severity, juvenile to adult ratios, and natural and human causes of mortality in setting big game harvest quotas. As a natural cause of mortality, wolf predation will be included in these decisions. As with any other source of mortality such as severe winterkill, hunter harvest may be altered in response to wolf predation in order to ensure the health of the ungulate populations in question. If wolf predation negatively affects the maintenance of management objectives for specific ungulate populations, the department may recommend that the population objectives be modified to account for wolf predation. In the event that wolves begin to significantly affect ungulate population levels in localized areas such as feedgrounds or crucial winter ranges, management actions will be taken to resolve the situation.

Table 3. Potential conflicts anticipated in managing elk at feedgrounds in Wyoming.

<b><u>Feedground</u></b>	<b>Elk Damage to Stored Hay or Cattle Feedlines and Brucellosis Transmission to Livestock</b>	<b>Elk on Highway Rights-of-Way</b>	<b>Elk Crowding, Brucellosis, Hay Supply</b>	<b>No Apparent/ Identified Conflicts</b>
Alkali	X		X	
Alpine	X(1)	X(1)		
Bench Corral	X		X(2)	
Black Butte	X	X(3)	X	
Cabin			X	
Camp Creek		X	X	
Dell Creek	X			
Dog Creek		X		
Fall Creek	X			
Finnegan	X			
Fish Creek			X	
Forest Park				X
Franz	X		X	
Green River Lakes				X
Horse Creek	X(1)	X(3)	X	
Jewett	X			
McNeel	X		X	
Muddy Creek	X			
North Piney	X(2)		X(2)	
Scab Creek	X			
Soda Lake	X(1)		X	
South Park	X	X(3)		
<b>Total 22</b>	<b>16</b>	<b>6</b>	<b>11</b>	<b>2</b>

(1) Risk partially mitigated by elk fence

(2) Risk considered and management options are tested viable.

(3) Conflict has never matured to be a public issue, but elk have been on highway as a result of management.

**Management Actions:** In the final nonessential, experimental population rule for the GYA (Federal Register 1994:60260), USFWS encouraged states and tribes to define unacceptable wolf impacts to ungulate populations. Upon approval of this state wolf management plan by the USFWS, the Department will have the option to translocate or lethally take wolves from areas where ungulates are negatively impacted. It is not anticipated that wolves will cause excessive depredation on ungulates in most circumstances. However, some wintering elk, moose and bighorn sheep sub-populations on native winter range and elk on winter feedgrounds or near cattle feed lines could be susceptible to negative impacts from wolf predation and management action may be necessary under specific conditions.

The Department does not propose to set any thresholds of loss or disturbance of wildlife species that, once met, will precipitate wolf management actions. Each situation will be handled on a case-by-case basis through consultation between regional Department personnel and the Trophy Game Section. Most management actions taken to reduce impacts will involve removing individual wolves at an early stage before it is necessary to remove multiple individuals or entire packs if problems continue. In the event that non-pack individuals create unacceptable conflict, offending animals will be removed. In all cases, legitimate rationale will be needed before actions will be taken. All management actions will be documented, summarized, and made available to the public annually.

## **PUBLIC INFORMATION & EDUCATION**

In 1993, the National Wildlife Federation loaned the Department two wolf education trunks. The trunks were to be loaned to schools, civic groups and others upon request. Initially the trunks were very popular, being checked out in the school systems for weeks at a time. The trunks continue to be used on a frequent basis.

In 1995, the Department collaborated with the Bureau of Land Management, USDA Wildlife Services, USFWS, and USFS to develop an 11"x 16", one-color wolf identification poster. Newspaper articles and radio spots focused on wolf-coyote identification in an attempt to prevent mistaken identity killings.

In late 1997, Department personnel were directed by the Commission not to engage in wolf information and education outreach and all information and education efforts ceased.

The objectives of the information and education section of this plan include:

1. Increasing public awareness of the gray wolf and its recovery in Wyoming and increase awareness that once delisted, the gray wolf will come under state management.
2. Increase awareness of the status of the gray wolf in Wyoming, the delisting process and delisting milestones.
3. Increase awareness of the array of management tools the Department will employ once the gray wolf is delisted in Wyoming.

As the Department prepares to assume management of wolves after delisting, it will be necessary to identify and address the broad array of questions concerning wolves and their impact on wildlife. The Department is preparing now to answer questions that will emerge as the state moves toward developing a balanced wolf management plan for Wyoming. Because wolf management procedures will be closely examined and arouse controversy, the Department seeks to build a balanced management approach that acknowledges the complexity of the political, social and environmental factors associated with wolves and their management.

This section will serve as the Department's guide as it prepares to inform its constituents about gray wolf management in Wyoming.

Through the print and electronic media, the appropriate Branches of the Services Division will produce news releases, television-ready video productions and radio spots for statewide distribution. These productions will be used to convey factual information regarding wolf management, policy, actions and issues of public concern, and answers to questions most likely to be asked about wolf management. The wolf management plan will be posted on the Department's website for hunters and others to review.

Informative articles will be published in the Department's Wyoming Wildlife News, Wyoming Wildlife Magazine, and the Hunter Education Newsletter. These articles will focus on wolf biology, identification, behavior, population status, and management as it relates to the audience of these publications.

Wolf education will be integrated into the Department's ongoing education outreach. Three "target audience" categories are a high priority:

1. Resident and non-resident hunters.
2. Schools, teachers and youth organizations.
3. The general populace of Wyoming with emphasis on residents of, and visitors to, the Greater Yellowstone Area.

The Department will include in its annual "Living in Bear and Mountain Lion Country" workshops, a discussion of wolves. The discussion will focus on learning to co-exist with wolves, and will include wolf biology, the relationship between wolves and their prey, food habituation, and ways to reduce human-wolf conflicts.

Volunteer hunter education instructors will be given presentations at annual instructor workshops. Each presentation will include information on wolf biology, wolf identification, wolf management and conflict prevention.

1. A pocket identification card, similar to that used in bear identification, will be developed.
2. A one-page handout will be developed for use in the hunter education "classroom".

In Project WILD workshops, teachers will be introduced to wolf education materials and wolf education materials will be acquired and used to the extent practicable and appropriate.

## **FUNDING**

In accordance with the Commission's 1992 Wolf Position Statement, Department participation in wolf management is predicated upon securing a stable, long-term source of funding. Consistent with that position, the Commission has taken action since that time to address funding. For example, as early as 1997, the Commission began consulting with Congress and the federal Administration to provide annual federal appropriations for the U. S. Department of Agriculture's Wildlife Services (WS) to help address wolf-related depredation issues in Wyoming. It was successful in those efforts. Likewise, the Commission also took steps internally to limit Department expenditures on wolf management. It did so in October 1997, by Commission motion, by issuing clarifying guidelines to Department personnel on how to handle depredation and law enforcement matters involving wolves, during the period between re-introduction of wolves into YNP and federal delisting of the species. With delisting close at hand, the issue of funding is of major importance in the context of the State assuming management responsibility for a recovered wolf population.

Currently, WS receives an annual appropriation from Congress for predator control and currently utilizes portions of this appropriation for nuisance wolf management in Wyoming. When the wolf is delisted, WS may not have sufficient funding to deal with wolf conflicts. The Department will promote the continuation of this allocation, as it intends to enter into an MOU with WS for their continued assistance in managing nuisance wolves. If this allocation can be maintained, in the short term it should cover the majority of costs associated with on-the-ground management of conflicts between wolves and livestock. As wolves increase in abundance and distribution, the current level of federal funding, if maintained, may not be sufficient. Continuation of and increases in WS federal funding would result in significant fiscal savings for the Department.

Based on Wyoming's experiences with annual federal appropriations for endangered species management by States through Section 6 funding of the ESA, funding assistance is available only until a species is delisted. At that point, federal ESA funds are expected to end. That realization has resulted in increased efforts in the past several years by the Commission and Department to keep funding at the forefront of concerns, with concurrent attempts to aggressively pursue funding sources that could assist Wyoming, Montana, and Idaho with state wolf management efforts once delisting occurs.

The Department has coordinated, and will continue to coordinate, with appropriate agencies, organizations and interest groups, and political leaders to secure stable funding for its wolf management program. Initially, that effort will focus on annual Congressional appropriations for the three states; based on demonstrated need and ongoing success by the states to manage this shared wolf population. This approach was initiated by Idaho in a FY 2003 federal budget request, and will be expanded into requests for all three states in FY 2004.



The three states will continue to advocate for the longer-term concept of Congress establishing and funding the proposed Northern Rocky Mountain Grizzly Bear and Gray Wolf Management Trust. The Trust concept was developed by Wyoming several years ago and has since gained the support of Idaho and Montana. The Trust concept was roundly endorsed by the Wyoming Legislature in a joint resolution adopted during its 2001 session.

As envisioned, the Trust would originate from a one time Congressional appropriation and form the basis of an inviolate corpus, upon which the available annual interest would be sufficient to offset most of the three state's cost of managing grizzly bears and wolves. Since both of these species are considered species of national significance, this would be an appropriate funding mechanism once federal oversight is removed. This approach would allow the American public to share in the cost of these management programs, rather than having it fall entirely to the states which rely almost exclusively on license fees and excise taxes on sporting equipment to support agency programs. It would have the added benefit of providing dependable funding, upon which an adequate management program could be maintained over time.

The Department will also continue to seek expanded contributions from other potential federal sources, such as legislative measures similar to Title III of the Conservation and Reinvestment Act, and the state Wildlife Grant Program to assist with management costs for wolves in Wyoming. Out of necessity, if for no other reason than to provide the state's match for federal funds, the Department will need to annually allocate some money from the Game and Fish Fund toward wolf management efforts. The Department will also examine other potential sources of funding at the state level, beyond license revenue, to assist financially with managing wolves once they are delisted.

Projected costs for a wolf program once the Department assumes management responsibility are difficult to estimate at this time. The estimates in Table 4 assume that the Department will assume management authority in 2004 and that wolf abundance and distribution will be similar to existing conditions. Projected costs are only for that portion of the population that resides outside YNP, GTNP, and NER. It should also be noted that these estimates may decrease slightly after the first year or two of the program and will vary annually, especially for operations and equipment.

Table 4. Projected Management Costs, which include WGFD and USDA Wildlife Services.

<b>Program/Activity</b>	<b>Estimated Costs</b>
<b>Trophy Game (Management/Research)</b>	
Staff (1Permanent + 2 Six month Contract)	\$65,000
Operations/Equipment	\$95,000
Monitoring	\$70,000
Enhanced Ungulate Monitoring	\$15,000
<b>Trophy Game (Nuisance Management)</b>	
Investigation, Administration of Damage Claims, Wolf Nuisance Management (Coordination w/ WS And Operations)	\$95,000
Damage Claim Payments	\$30,000
<b>Information &amp; Education</b>	
Materials/Programs	\$25,000
<b>Wyoming Game and Fish Dept. Total</b>	<b>\$395,000</b>
<b>USDA Wildlife Services</b>	
Nuisance Wolf/Livestock Management	\$100,000 <sup>1</sup>

1 – May require a state match from the WGFD.

## **ECONOMIC IMPACTS**

A recovered wolf population in Wyoming will bring both positive and negative economic impacts. Positive impacts may be realized in the gateway communities to YNP from increased tourism. Wyoming is well known for its abundant wildlife, scenic mountains, national parks and wildlife refuges. Wildlife viewing is among the top activities for visitors and residents alike. Wolves add to the host of viewable wildlife in Wyoming. Negative impacts include economic losses from livestock depredations, and possibly decreased hunter opportunity due to lower ungulate populations. If hunter opportunity decreases, the Department, in the form of decreased license sales, may see reduced income and local economies may be impacted. The outfitting industry may also be negatively impacted if license sales decrease. However, outfitters may also gain some clientele wanting to view wolves. The economic impacts from wolves are difficult to predict, but may be tracked through time as a viable wolf population is established in the GYA, and wolf management in Wyoming evolves.

Because of the high profile of wolves and the nationwide public interest in them, the presence of wolves in the GYA was expected to increase tourism in the area, however, overall visitation to YNP has decreased for unknown reasons since wolf reintroduction. Economic benefits generated by a recovering wolf population are difficult to gauge. However, while there may be benefits to local

communities from increased interest in viewing wolves, this does not generate income for wolf management by the Department.

Boyce and Gaillard (1992) anticipated wolf recovery in YNP could ultimately result in a 5-10% reduction in hunter harvest of elk in the Jackson Herd (165-330 elk) and a 1-2% reduction in elk harvest for the North Fork Shoshone Herd (6-13 elk). The North Fork Shoshone Herd has recently been combined with the Carter Mountain Herd and now represents part of the Cody Herd. These reductions equate to annual revenue losses between \$232,000-\$465,000 from hunter harvest and between \$207,000-\$414,000 from additional hunter expenditures (USFWS 1994:4-22). There are now wolves using the Clark's Fork Elk Herd, too. To date, there are no data showing decreased hunter harvest or opportunity due to wolf predation on elk, or moose in Wyoming. As more is learned about wolves and their effects on game populations, economic impacts will be evaluated.

At recovery (about 100 wolves), livestock losses to wolves in the GYA were expected to range from 1-32 cattle and 17-110 sheep/year (USFWS 1994:4-16). This depredation rate would result in an annual loss of approximately \$1,900-30,500. In 2001, with 218 wolves in the GYA, there were 117 sheep, 22 cattle, and 4 dogs confirmed killed by wolves, resulting in compensation payments from Defenders of \$43,495 (\$20,175 in Wyoming). As of November 1, 2002, livestock losses totaled 24 cattle in Wyoming's portion of the GYA. The Department is determined to keep economic losses from a recovered wolf population to a minimum.

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**Appendix 1. Comparison of Idaho (Final), Montana (Draft), and Wyoming (Draft) Wolf Management Plans.**

<b>Issue</b>	<b>Idaho</b>	<b>Montana</b>	<b>Wyoming</b>
Population	Maintain >15 packs. No limits on total numbers.	Maintain >15 packs. No limits on total numbers.	Limited wolf numbers outside YNP & GTNP.
Distribution	No boundaries	No boundaries	Limited
State Classification	Big game, furbearer, or special classification of predator.	<15-Species in need of management, >15-Big game or furbearer	Trophy Game in national parks and designated wilderness areas. Predator in the rest of the state.
Livestock Depredation	MOU w/ Wildlife Services.	MOU w/ Wildlife Services	MOU w/ Wildlife Services.
Livestock Compensation	Continue Defenders Program or federal funds for compensation	Continue Defenders Program. Continued use of private funding source	Cover under current state statutes.
Wolf Population Control	<15-depredation control only, emphasizing non-lethal methods. >15-managed like bears & lions using hunting and trapping.	<15-non-lethal control emphasized. >15-allow public take including hunting and trapping.	Regulated take restricted to areas where wolves are classified as trophy game animal. Unlimited take in the rest of the state.
Wolf Population Monitoring	<15-more intensive monitoring including radio collars on every pack. >15-less intensive.	Intensive monitoring for 5 year post-delisting including radio collars on each pack. After 5 years and >15, less intensive	Will use a variety of techniques.
Prey Populations	Collect abundance and sex and age ration data annually. More intensive if excessive predation is documented.	Monitor big game populations as usual and enhance monitoring where wolves occur.	Monitor big game populations as usual and enhance monitoring if excessive predation occurs.
Information & Education	Establish strong public education program that emphasizes biology, management, and conservation and presents balanced view of social impacts and costs.	Provide comprehensive, scientifically based program on ecology, behavior, and management. Create a more informed less emotional public.	Provide comprehensive, scientifically based program on ecology, behavior, and management.
Funding	\$837,325/year full implementation Depends on federal funding.	\$765,296/year full implementation. Depends on federal funding, Bear/wolf trust, & CARA.	\$395,000/year full implementation. Depends on federal or other funding from several sources.