Montana Gray Wolf Conservation and Management 2006 Annual Report

A cooperative effort by Montana Fish, Wildlife & Parks, USDA Wildlife Services, Glacier National Park, Yellowstone National Park, Blackfeet Nation, and The Confederated Salish and Kootenai Tribes

MFWP Photo by Jon Trapp

This report presents information on the status, distribution, and management of wolves in the State of Montana, from January 1, 2006 to December 31, 2006.

It is also available at: www.fwp.mt.gov/wildthings/wolf

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MONTANA EXECUTIVE SUMMARY

Wolf recovery in Montana began in the early 1980's. Gray wolves increased in number and expanded their distribution in Montana because of natural emigration from Canada and a successful federal effort that reintroduced wolves into Yellowstone National Park (YNP) and the wilderness areas of central Idaho. The U.S. Fish and Wildlife Service (USFWS) approved the Montana Gray Wolf Conservation and Management Plan in early 2004, but delisting in the northern Rockies (NRM) was delayed. When federal funding became available later in 2004, Montana Fish, Wildlife & Parks (MFWP) began managing wolves in northwestern Montana under a cooperative agreement with USFWS. In 2005, Montana expanded its responsibility for wolf conservation and management statewide under an interagency cooperative agreement. The agreement allows Montana to implement its federally-approved state plan to the extent possible and within the guidelines of federal regulations.

Using federal funds, MFWP monitors the wolf population, directs problem wolf control and take under certain circumstances, coordinates and authorizes research, and leads wolf information and education programs. MFWP wolf management specialists were hired in 2004 and are based throughout western and central Montana. A program coordinator is based in Helena.

The Montana wolf population increased from 2005 to 2006. The increase is due to a real increase in actual wolf numbers primarily in NWMT and western Montana and the significantly increased monitoring efforts that led to verification of packs that actually existed in 2005 but could not be verified until more information was gathered in 2006.

A total of 60 verified packs of 2 or more wolves yielded a minimum estimate of 316 wolves in Montana. Twenty-one packs qualified as a breeding pair according to the federal recovery definition (an adult male and female with two surviving pups on December 31). Across the southern Montana experimental area (Central Idaho and Greater Yellowstone areas combined), there were 29 packs, 10 of which met the breeding pair criteria. A minimum of 149 wolves were estimated (73 in the GYA and 76 in the CID). Across northwest Montana, there were 31 packs, 11 of which met the breeding pair criteria. A minimum of 167 wolves was estimated in the NWMT endangered area.

Montana Wildlife Services (WS) confirmed 32 cattle, 4 sheep, 4 dogs and 2 llamas were killed by wolves in calendar year 2006. Additional losses (both injured and dead livestock) most certainly occurred, but could not be confirmed. Most depredations occurred on private property. Fifty three wolves were killed to reduce the potential for further depredations. Of the 53, 2 were killed by private citizens under the 2005 10(j) regulations and 2 were killed by private citizens who had been issued a permit in the experimental area of southern Montana.

Wolves in Montana prey primarily on elk, deer, and moose. Numerous research projects are investigating wolf-ungulate relationships. Montana Fish, Wildlife & Parks recently compiled research results of wolf-ungulate interactions in southwest Montana. This report and other information about wolves and the Montana program are available at www.fwp.mt.gov/wildthings/wolf.

INTRODUCTION AND BACKGROUND

Wolf recovery in Montana began in the early 1980's. Gray wolves increased in number and expanded their distribution in Montana because of natural emigration from Canada and a successful federal effort that reintroduced wolves into Yellowstone National Park (YNP) and the wilderness areas of central Idaho. Montana contains portions of all 3 federal recovery areas: the Northwest Montana Endangered Area (NWMT), the Central Idaho Experimental Area (CID), and the Greater Yellowstone Experimental Area (GYA) (Figure 1).

The biological requirements for wolf recovery in the northern Rocky Mountains of Montana, Idaho, and Wyoming were met in December 2002. Before the U.S. Fish and Wildlife Service (USFWS) can propose to delist gray wolves, federal managers must be confident that a secure, viable population of gray wolves will persist if protections of the Endangered Species Act (ESA) were removed. To provide that assurance, the states of Montana, Idaho, and Wyoming developed wolf conservation and management plans and adopted other regulatory mechanisms in state law.

In late 2003, all 3 states submitted wolf management plans to USFWS for review. Based on the USFWS's independent review of the state management plans and state law, analysis of the comments of independent peer reviewers and the states' responses to those reviews, USFWS approved the Montana and Idaho management plans as being adequate to assure maintenance of their state's share of the recovered tri-state wolf population. Wyoming's plan, however, was not approved. USFWS will not propose delisting until the Wyoming plan and associated state laws can be approved.

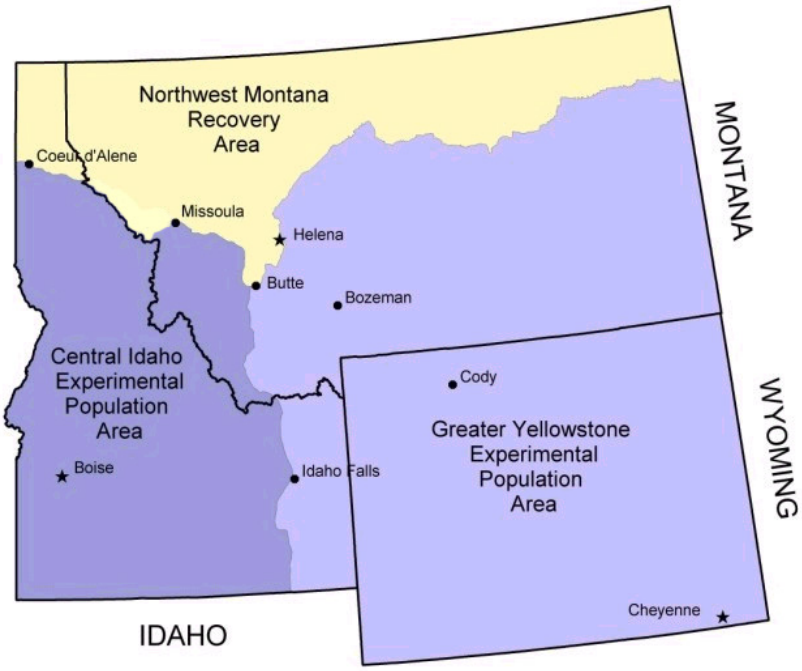

Figure 1. Northern Rockies gray wolf recovery area comprised of the states of Montana, Idaho, and Wyoming

After amending its Record of Decision to comply with the Montana Environmental Policy Act, MFWP increased its role in day-to-day wolf recovery and management in northwest Montana under an interim interagency cooperative agreement even though wolves remain protected under the federal Endangered Species Act. USFWS provided direct funding.

In 2005, MFWP expanded its responsibility for wolf conservation and management statewide. Additional federal funding became available through Congress, beginning in federal fiscal year 2004. A new MFWP-USFWS interagency cooperative agreement was finalized in June 2005. With a clear agreement in place and federal funding to support the work, MFWP became the lead agency for wolf conservation and management statewide in June 2005, though its role and participation gradually increased from spring 2004 to June 2005. The agreement is effective through June 2010, or until the wolf population in Montana is removed from the federal list of threatened or endangered species, or until amended by either party.

The cooperative agreement allows Montana to implement its approved state plan to the extent possible and within the guidelines of federal regulations. The cooperative agreement authorizes Montana to conduct traditional wolf management such as population monitoring, direct problem wolf control, take wolves under certain circumstances, coordinate and authorize research, and coordinate and lead wolf information and education programs. Montana is committed to maintaining the recovered status of its share of the NRM wolf population.

This annual report presents information on the status, distribution, and management of wolves in the State of Montana from January 1 to December 31, 2006.

STATEWIDE PROGRAM OVERVIEW

The Montana Wolf Conservation and Management Plan is based on the work of a citizen's advisory council. Completed in 2003, the foundations of the plan are to recognize gray wolves as a native species and a part of Montana's wildlife heritage, to approach wolf management similar to other wildlife species such as mountain lions, to manage adaptively, and to address and resolve conflicts.

However, because wolves are still listed, some elements of Montana's plan cannot be implemented. The legal classification and federal regulations place wolves into 2 separate categories in Montana – endangered in northern Montana and experimental non-essential across southern Montana (Figure 2). Wolf-livestock conflicts are addressed and resolved using a combination of the statewide adaptive management triggers identified in the Montana plan and the federal regulations. In northwest Montana, the 1999 Interim Control Plan provides less flexibility to agencies and livestock owners. In contrast, more flexibility is provided through the revised 10(j) regulations (finalized in February 2005).

In the early stages of implementation, a core team of experienced individuals led wolf monitoring efforts and worked directly with private landowners. MFWP's wolf team also worked closely with and increasingly involved other MFWP personnel in program activities. As time goes by, Montana wolf conservation and management will transition to a more fully

integrated program, led and implemented at the MFWP Regional level. USDA Wildlife Services (WS) investigates injured and dead livestock, and MFWP works closely with them to resolve conflicts.

Overview of Wolf Ecology in Montana

Wolves were distributed primarily in the NRM region of western Montana east to the Beartooth face near Red Lodge. Montana wolf pack territories average around 200 square miles in size but can be 300 square miles or larger. Montana packs include a combination of public and private lands. The average pack territory in Montana is comprised of about 30% private land. Most Montana packs do not live strictly in back country wilderness areas. Of the 60 packs in Montana, 11-12 (about 20% of all Montana packs) reside most of the year in remote backcountry wilderness areas or Glacier National Park. Many others live in areas of remote public lands. But the majority live in areas where mountainous terrain, intermountain valleys, and public / private lands come together.

Dispersal distances in the northern Rockies average about 60 miles, but dispersals over 500 linear miles have been documented. A 500-mile radius from any wolf pack in YNP, Glacier National Park (GNP), or any pack in western Montana would plausibly reach all the way to Montana's eastern border. Montanans should be aware that wolves are established well enough in the northern Rockies now that a wolf could appear where none has been seen for decades. Wolves are capable of covering long distances in relatively short periods of time and often travel separately or in smaller groups. The travel ability of wolves, combined with the fact that packs split, with sub-groups traveling separately, can give an impression that there are more wolf packs and territories than is actually the case. Pack monitoring efforts, especially when combined with public / agency wolf reports, eventually leads to a conclusion about how many packs exist.

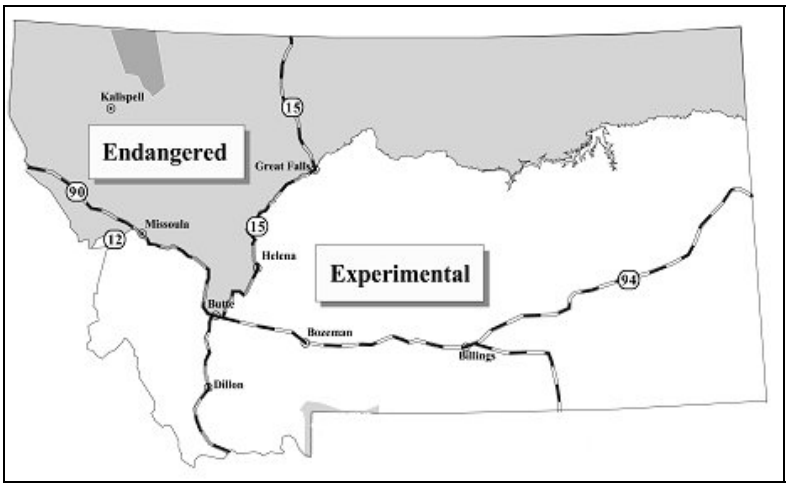

Figure 2. Map of the interim federal wolf management areas showing the endangered area where the 1999 Interim Wolf Control Plan applies and the experimental area where the 10(j) regulations apply. The central Idaho and Greater Yellowstone experimental areas are shown as one since the approved status of Montana's state wolf plan allows the special 10(j) regulations to apply equally in each area.

Wolf packs are family groups that consist of a breeding pair and their offspring of the current year and/or previous years and occasionally unrelated wolves. Offspring usually disperse from the natal pack at 1, 2 or 3 years of age. From, 1995 to 2006, the average pack in Montana was approximately 5.5 animals.

Montana wolves can be black, gray, or nearly white. Wild wolves are sometimes mistaken for coyotes or domestic dogs. But a wolf's large size, long legs, narrow chest, large feet, and wide / blocky head and snout distinguish it from the other canid species. Adult male wolves average about 100 pounds, but can weigh as much as 130 pounds. Females weigh slightly less.

Population Estimation and Monitoring Methods

The statewide Montana wolf population was estimated on a calendar year basis (January to December). A mid-year estimate is completed and made available, usually in September. It was based on preliminary denning and litter information for packs that carried over from the previous calendar year and any "new" packs that were verified by mid-year. A year-end estimate was made on December 31, based upon the best available information.

There can be considerable changes between September and December estimates. Some packs may appear in the mid-year estimate but drop out between the September and the December estimate if it was not verified during the second half of the year. Some "new" packs were verified for the first time between the mid-year and year-end estimates. The mid-year estimate and the final year-end estimate were both considered minimum counts because of the significant logistical challenges associated with monitoring a wide-ranging species with large home ranges. It was not possible to count every wolf in Montana, but MFWP did use all available information that could be verified.

Wolf monitoring is conducted using a variety of tools and techniques in combination, as is the case for other wildlife species. Common wolf monitoring techniques include: radio telemetry, howling and track surveys, reports from the public and other natural resource agency professionals, and reports from private landowners. MFWP made a concerted effort in 2005 to invite the public to help monitor wolves in Montana by sharing information about wolves or wolf sign they observed while afield. The MFWP website now offers a way for the public to report their information electronically (see www.fwp.mt.gov/wildthings/wolf). Public reports were a tremendous help in prioritizing MFWP's field efforts. A wolf pack must be verified by agency personnel to be included in the final statewide population estimate.

A typical sequence is as follows. MFWP and other agency cooperators receive a report of a wolf observation, wolf sign, or injured/dead livestock from the public or an agency colleague. Because it is very difficult to gauge the reliability and validity of the report and it is even more difficult to verify given how much wolves travel and environmental conditions which obliterate tracks or degrade scats, these reports are logged into a database with as much spatially explicit information as is provided. Reports of lone animals or wolf sign must eventually be linked to other reports to build a pattern or cluster, which in turn helps direct and prioritize field efforts. If MFWP receives reports of multiple individuals (group of wolves or multiple sets of tracks), pair bonding and pack territory establishment are highly likely. These eventually can form a pattern as well.

MFWP has and will continue to use volunteers who systematically search areas of current wolf reports, areas of past wolf activity, or noted “gaps” in wolf activity despite adequate prey base. MFWP personnel also conduct systematic searches. Track logs are taken during these “routes” and waypoints recorded when wolf sign is found.

The next step occurs when patterns and field reconnaissance yield enough information to validate wolves were in the area. A decision was made about whether to try and capture a wolf or not. Many factors were considered when prioritizing field efforts across the state. Not all packs needed to have radio collars, while others should have had one or more collars. Regardless, radio telemetry has been the standard technique with other protocols developed and validated based on a sample of collared packs. Project staff spent much of their time throughout the year conducting ground-based trapping operations and helicopter darting in winter. Reliable information about specific packs and the overall statewide population was essential to implement the approved state plan and adhere to the federal regulations.

If a pack was trapped and a radio collar is deployed, MFWP flew 1 to 2 times per month to locate the collared animal. In addition, wolves were ground tracked to determine where they localized throughout the year and the number of wolves traveling together. Den sites and rendezvous sites were visited to determine if reproduction had taken place. Additional information may be collected, such as ungulates killed, identification of private lands used by wolves, identification of public land grazing allotments where conflicts could occur, or common travel patterns.

At the end of the year, MFWP compiled information gathered through field surveys, telemetry, and public reporting. This results in a greater understanding of wolf pack distribution, individual pack sizes, pelage colors, mortality, pup production, home range sizes and patterns of use within the territory, dispersal events, and disease. The information also guided decision-making when livestock depredations were confirmed. MFWP also gained insight into the large area wolves inhabit, the dynamics of pack size, and territory shifts within and between years.

MFWP estimated the number of individual wolves (adults and pups of the year) in each pack having a radio-collared member. Reliable estimates were made for packs without collars, based on public and other agency reports. The number of wolves in radio-collared packs was added to the number of wolves in verified, uncollared packs, resulting in the minimum statewide population total. If lone dispersing animals were accounted for reliably, they are also included.

Through it’s monitoring program, MFWP was required to also tally and report the number of “breeding pairs” according the federal recovery definition of “an adult male and a female wolf that have produced at least 2 pups that survived until December 31.” Montana is required to maintain at least 10 breeding pairs as an absolute minimum. Packs of 2 or more wolves that met the recovery definition are considered “breeding pairs” and noted as such in the summary tables. Not all packs in Montana satisfy the breeding pair criteria. This can be caused by the loss of 1 or both adults because of mortality or dispersal, lack of denning activity, or the loss of pups to the extent the surviving litter consists of less than 2 pups.

The total number of packs was determined by counting the number of packs with 2 or more individual animals that existed on the Montana landscape on December 31. If a pack was removed because of livestock conflicts or otherwise did not exist at the end of the calendar year (e.g. disease, natural/illegal mortality or dispersal), it was not included in the year-end total or displayed on the Montana wolf pack distribution map for that calendar year.

Such comprehensive information allowed Montana to document the maintenance of its share of the recovered NRM tri-state population and that the Montana population was secure in 2005. The Montana wolf population was more intensively monitored on a consistent, year-round basis than any other wildlife species in the state.

In 2006, several wolf pack territories straddled administrative boundaries. NRM wolf program cooperators have agreed that packs will be tallied in the population in the administrative area where the den site was located. If the den site was not known with certainty, amount of time, percent of territory, or the number of wolf reports were the next criteria considered for determining pack residency. One of the project partners generally had the lead for wolf monitoring, but the information was shared equally. This assures that all packs were accounted for, but none were double-counted in population estimates. Transboundary packs were included in Tables 1, 2, 3, and 4 for the administrative region in which the animals were counted.

Montana Statewide Wolf Population and Distribution

The Montana wolf population is secure but very dynamic. Some packs do not persist from year to year for a variety of reasons. The loss of packs in the Montana population could be due to a variety of factors, including mortalities and poor pup production / survival due to parasites and disease, and lethal control to address conflicts with livestock. In some cases, some packs that were either verified or suspected in 2005 no longer existed by the end of 2006.

The Montana minimum wolf population estimate increased about 19% from 256 wolves in 2005 to 316 in 2006 (minimum increase of 60 wolves) (Figure 3). The number of packs (2 or more wolves) increased from 46 in 2005 to 60 to 2006. The number of breeding pairs in Montana at the end of 2006 was 21. Packs for which size was known with confidence at the end of the year averaged 5.5 wolves (range 2-14). The larger packs tended to live in remote backcountry areas, wilderness, or Glacier National Park.

There were a total of 60 packs (2 or more wolves), resulting in an estimated minimum of 316 wolves in Montana at the end of 2006 (Figure 3). The vast majority of the total statewide increase of 60 wolves (14 packs) occurred in the NWMT federal recovery area. In NWMT, the minimum estimate increased from 126 wolves at the end of 2005 to 167 at the end of 2006, or 41 wolves. The majority of new packs verified in 2006 were in NWMT. Eleven of 31 packs met the breeding pair criteria.

In the experimental area across southern Montana at the end of 2006, there were 29 packs, 10 of which met the breeding pair criteria. In the Montana portion of the GYA, there was an estimated minimum of 73 wolves in 13 packs, and 5 of the packs met the breeding pair criteria. In the Montana portion of CID, there was an estimated minimum of 76 wolves in 16 packs, and 5 of the packs met the breeding pair criteria.

Of notable interest for the southern Montana experimental areas was that wolf pack distribution expanded primarily within areas already expected to have wolves (Figure 4). The minimum number of verified packs in NWMT increased from 19 in 2005 to 31 in 2006. Several new packs started from dispersal from within the NWMT area over the last 1-2 years.

The number of wolf packs in the Montana portion of CID increased by five packs from 2005 (11) to 2006 (16) where as the Montana portion of the GYA decreased by 3 packs from 16 to 13. This is probably due to more numerous wolf dispersal events into Montana from Idaho than from the GYA.

The statewide increase from 2005 to 2006 was due to a variety of factors. Some was attributed to a real increase in wolf numbers in 2006, since many new packs formed and produced pups in 2006. A total of 21 new packs were verified in 2006; however, some packs that existed on January 1, 2006 did not make it through the year for a variety of reasons, including human-caused mortality and/or disease. Other 2005 packs did not exist at the end of 2006. By the end of 2006, the dynamic nature of wolf packs was such that the number of packs increased by a net total of 14 from 2005 to 2006.

Of greater importance may be MFWP's increased efforts to monitor wolves compared to previous years. MFWP hired two seasonal conservation technicians and instituted a volunteer program to help with 2006 monitoring efforts. The volunteers contributed 3084 hours (almost 1.5 FTE) to field surveys to investigate public and agency wolf reports and to trapping operations between May and November. Seasonal technician efforts were in addition to volunteers and full time agency personnel.

MFWP's field staff monitored the population year round, using a variety of techniques. In addition, MFWP made a concerted effort to gather wolf reports from the public and other agency professionals. Many of the "new" packs verified in 2006 were likely present in 2005 but were not confirmed and included in the 2005 population estimate. Additionally, several transboundary packs were tallied in the 2006 Montana population estimate.

In conclusion, the Montana wolf population is split roughly equally between the northern Montana endangered area and the southern Montana experimental area. Packs are also roughly distributed equally between northern and southern Montana (Figure 4).

Wolf Health Monitoring and Disease Surveillance

MFWP's Wildlife Research Laboratory (Lab) in Bozeman played an important role in Montana's wolf monitoring program. In 2005, MFWP's wildlife veterinarian drafted a biomedical protocol that guides all wolf capture, physical or chemical immobilization procedures, and animal care and handling procedures. Supplementary training was provided in 2006, and routine consultation assured adherence to the protocol. Additionally, lab personnel carried out routine wolf health and disease surveillance by collecting information from both live and dead wolves.

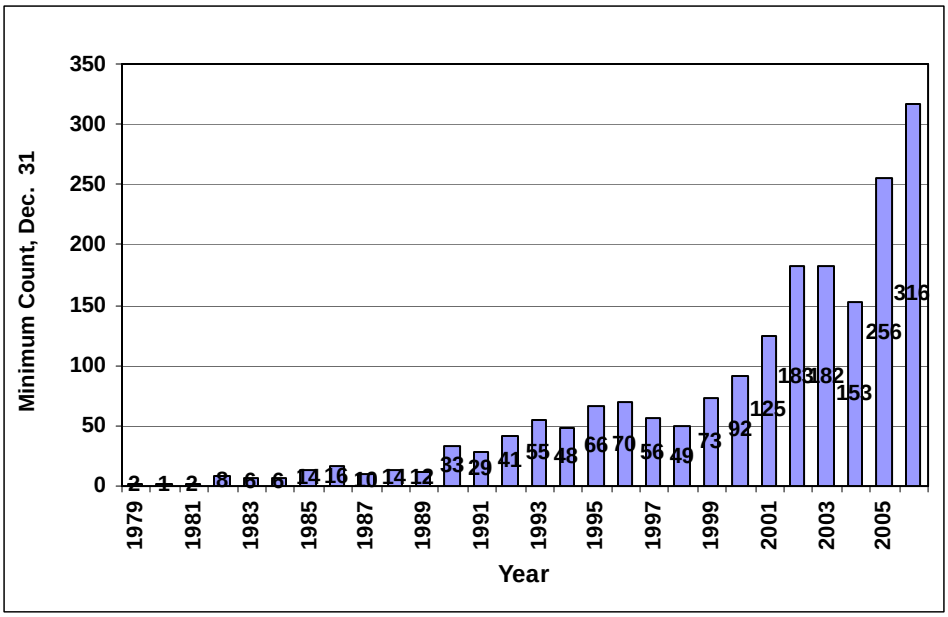

Figure 3. Minimum estimated number of wolves in the State of Montana on December 31, 1979-2006.

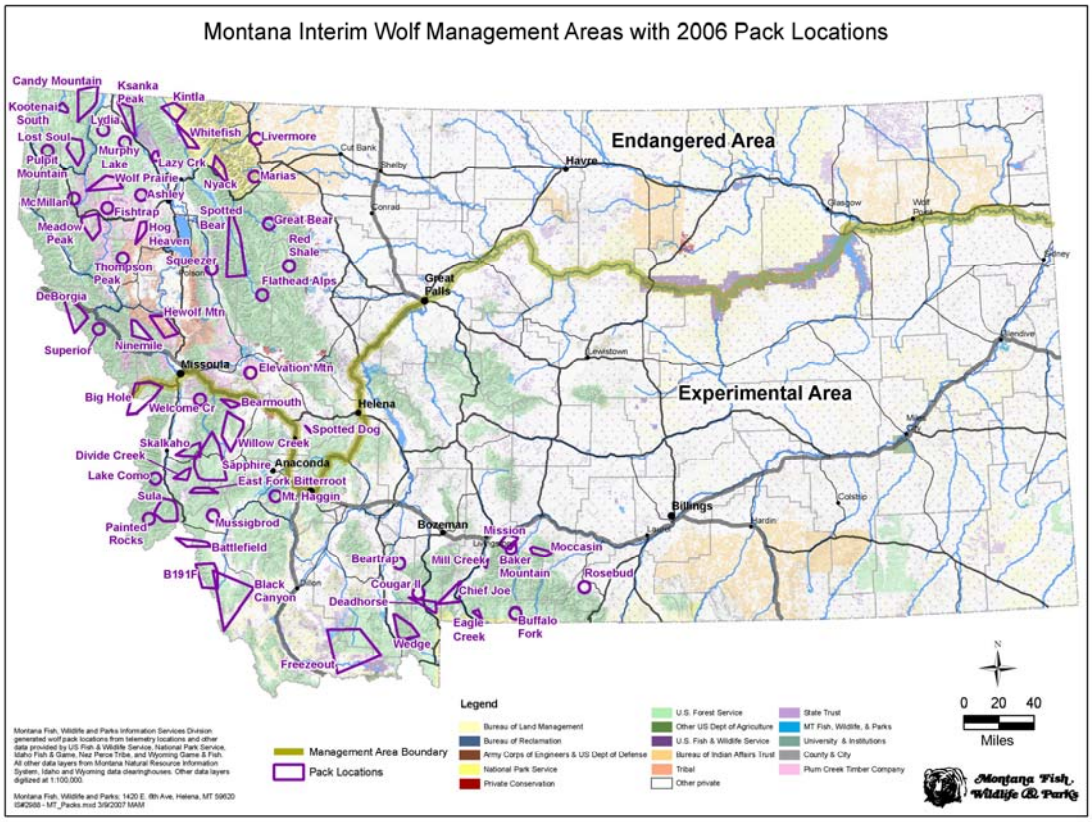

Figure 4. Verified wolf pack distribution in the State of Montana as of December 31, 2006.

Blood samples collected by MFWP and WS from live-captured wolves were sent to the Lab. Blood was screened for exposure to various diseases, and some was archived in a DNA repository. Usable samples were forwarded for hematology, biochemistry, and serology screening. All of the hematology and biochemistry results were within normal limits expected for wolves. However, serology results indicated that most of those individuals had been exposed to some common canid viral and bacterial diseases: canine parvovirus, canine distemper, canine adenovirus, and leptospirosis. The presence of these antibodies in blood collected from live wolves indicated exposure at some time in the animal's life, but that it survived the exposure. While there has been much speculation about the cause of low pup counts in southwest Montana and inside YNP in recent years, clinical evidence to confirm the cause/s was very difficult to obtain.

Additionally, MFWP developed a protocol that called for all dead wolves found in Montana to be submitted to the lab for necropsy examination. Unless special instructions were provided, a standard basic procedure was followed. Typical information collected includes cause of death, body weight, evidence of ectoparasites, etc. Various biological data were also collected. The first premolar, the skull, and a tissue sample were collected and stored. Salvageable hides were retained and processed for educational purposes. The veterinarian had discretion to complete a more in-depth necropsy if preliminary findings warranted additional examination. Abnormal or suspect tissues were submitted to the Montana State Diagnostic Laboratory (or occasionally elsewhere) for further evaluation. Lab personnel may also assist and consult during USFWS law enforcement investigations to determine cause of death and examine physical evidence.

Disease is difficult to detect and measure in free-ranging wild animals. The MFWP Wildlife Research Laboratory works closely with field staff to collect blood and tissue samples to look for evidence of disease in Montana's wolf population. MFWP's goal is to document if disease is present and if so, how commonly it occurs. Wild animals are usually exposed to several potential disease-causing agents at once; multiple infectious and non-infectious disease agents are already present in the environment as well as in other animal species. Thus, MFWP surveillance programs are designed to detect multiple pathogens.

MFWP uses four basic methods to look for disease:

1. Examine carcasses (e.g. euthanasia and/or lethal control)
2. Search for disease agents in sick wolves that are still alive (e.g. mites to confirm a diagnosis of Sarcoptic mange)
3. Search for evidence of disease exposure in blood (e.g. antibodies)
4. Search for evidence of similar disease exposure in a species other than wolves (e.g. Echinococcus in foxes)

Blood samples are commonly used to look for physiological indicators such as antibodies. This testing procedure is called serology. The presence of antibodies indicates prior exposure to viruses, protozoa and bacteria and the animal's immune response to the exposure. It does not document the actual causative agent of the disease or signify the animal actually has the disease. Clinical evidence and additional in-depth procedures are required to actually demonstrate the disease itself.

When evaluating serologic test results it is important to consider the fact that all types of sampling used to detect or monitor disease are potentially compromised by several basic problems:

Sampling bias: wolf samples collected by various methods of live-capture or lethal control may be either *more* or *less* likely to be infected with a disease agent than the general population from which they were drawn.

Sample Size: the number of wolves that must be examined to provide credible information about disease is often greater than we are able to achieve through traditional sampling methods. As a result, we strive to obtain adequate numbers of samples from both live and dead wolves to ensure accuracy of test results.

Validity of Test: the 'validity' of a test is a measure of its ability to distinguish between individual wolves that have been exposed to a disease, and those that have not. Validity has two components:

(i) *Sensitivity:* refers to the ability of a particular test to correctly identify animals exposed to the disease and is expressed as the proportion of animals correctly identified as positive by the test. False positive results will occur if the test used has less than 100% sensitivity or if the animal has been exposed to other organisms similar in structure to the organism in question and falsely cause a positive result (by cross-reacting) in serologic tests.

(ii) *Specificity:* refers to the ability of a test to correctly identify animals that do not have the disease and is expressed as the proportion that are correctly identified as negative.

The MFWP Wildlife Laboratory has examined a total of 122 dead wolves since 2003 for the presence of various diseases and parasites. We conduct full necropsy examinations on all suitable carcasses. General mortality causes are depicted in Figure 5. Human factors have accounted for 89% of reported wolf deaths in Montana since 2003. Human-related causes of death include accidental snare death (2%); illegal shooting (12%); control actions (64%); vehicle trauma (12%) and euthanasia for physical injury or advanced skin disease (10%). Natural factors include starvation, interspecies aggression and disease.

For the last two years, MFWP has been cooperating in a University of Illinois study examining contaminants and toxins in western gray wolf kidneys. Samples are also being submitted from the Canadian provinces. In 2006, MFWP obtained useable kidney samples from about 15 wolves necropsied in 2006. Results are not yet available.

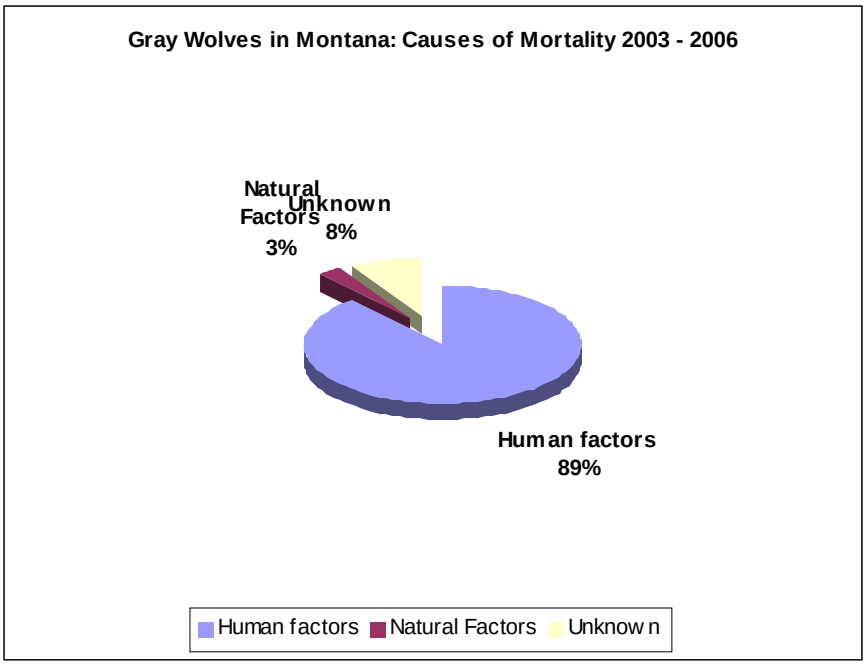

Figure 5. Causes of Gray Wolf Mortality in Montana for wolves examined at the MFWP Wildlife Research Laboratory, 2003 – September, 2006.

Diseases of Interest

1. Canine Distemper Virus

The majority (91%) of Montana wolves tested in the last two years have been exposed to canine distemper virus (CDV). CDV is a widespread, highly contagious disease that affects both domestic and wild carnivores including dog, fox, coyote, wolf, raccoon, ferret and skunk. Mortality following infection tends to be higher in juveniles than in adults. CDV is very resistant to cold and the majority of distemper cases in domestic dogs are seen in the fall and winter. In Montana, die-offs of raccoons due to canine distemper occur yearly and since juveniles are more susceptible to infection, the majority of clinical cases are seen in the spring and summer. Canine distemper is of no public health significance to humans.

The usual route of infection is through the upper respiratory tract, following inhalation of infective virus. Occasionally, infection follows ingestion of infective material. Canine distemper affects the skin, eye membranes, intestinal tract, and sometimes the teeth, footpads or brain of susceptible animals. Initial symptoms include fever, loss of appetite and discharge from the eyes or nose. Diarrhea follows, which will usually cause dehydration. Seizures and death may follow.

Distemper in domestic dogs is now relatively uncommon as a result of widespread vaccination programs but remains common in raccoons and skunks in Montana. Despite broad exposure (based on serologic evidence), clinical disease appears to be rare in wild wolves. In the 1980's the disease was believed to be the cause of pup mortality in northwestern Montana.

More recently, CDV has been implicated as a potential cause of pup mortality in Yellowstone National Park in 2005 and for a single wolf in the Tobacco Roots south of Whitehall, MT in 2006. The animal was found clinically ill and was euthanized by project personnel. Obvious external symptoms of CDV were not readily apparent or documented at the time it was necropsied. However, tissue samples submitted for further study concluded that CDV virus was present and clinically active.

2. Canine Parvovirus

Canine Parvovirus (CPV) is an infectious disease that was first recognized in dogs in 1978. In addition to domestic dogs and cats, CPV may also infect many wild species including coyote, fox, wolf, mountain lion, lynx, raccoon and ferret. All wolves tested in Montana during the past two years (100%) have been exposed to CPV and there is no current evidence to suggest that the virus is a significant mortality factor in Montana. Canine parvovirus is of no public health significance to humans.

Canine Parvovirus is a disease that causes diarrhea, vomiting, and, consequently, dehydration. Its origins are unknown, but it may have arisen from a mutation of a similar virus in nature, e.g., a wild carnivore such as the European red fox. CPV was common in dogs by 1980 and first appeared in wild wolves shortly afterwards. Widespread vaccination programs have helped in the control of this disease in domestic animals.

3. Canine Adenovirus

Canine adenovirus is the cause of infectious canine hepatitis, a severe disease affecting domestic dogs. Other carnivore species including fox, coyote, wolf and bear may be susceptible to infection. Seventy six percent of wolves tested in Montana during the past two years show evidence of exposure to this virus but there are no reports that describe clinical disease in wolves as is seen in susceptible dogs. Canine adenovirus is of no public health significance to humans.

Although clinical disease (signs vary from slight fever to death) in domestic dogs is rare as a result of widespread vaccination programs, recovered dogs may serve as a source of infection for up to 6 months post recovery and may shed virus into the environment. Transmission occurs through ingestion of urine, feces, and saliva however, the virus is stable for long periods of time in the environment and direct contact with a sick animal is not necessary for infection to occur.

4. Rabies

In the United States, rabies is primarily a disease that affects and is maintained by wildlife populations. No wolves have been affected or implicated in the transmission of this disease. All mammals are susceptible to rabies but the most frequently reported rabid wildlife remains raccoons (~38% of all animal cases), skunks (~27%), bats (~20%) and foxes (~6%). Rabies infections of terrestrial animals in most areas of the US occur in geographically definable regions where virus transmission is primarily between members of the same species. Rabies in Montana is generally confined to bats and skunks. Humans are susceptible to rabies but infection from wild animals occurs very rarely in the US.

5. Neosporosis

Neospora caninum, a microscopic protozoal parasite, is a major cause of abortions, premature births and impaired calves in cattle. First recognized in 1988, and linked to dogs in 1998, this parasite causes an infection called neosporosis. Studies have shown that one or more animals in at least half the dairy and beef herds in the United States have been exposed. A survey in 2000 of 55 beef herds in Idaho, Montana, Oregon, Washington, and Wyoming revealed an average herd prevalence of 24%. In dairy cattle herds, prevalence of *Neospora* infection can range from 5% - 75% and is not associated with herd size. Cows typically abort between the fourth and seventh months of gestation. If they do not abort, they are likely to pass the infection to their calves. Fetuses may be reabsorbed prior to three months of gestation. Congenitally infected calves are usually born healthy and develop normally, but pass the infection on to their offspring. In this way, *Neospora caninum* perpetuates itself in lines of cattle. The second way that cattle become infected is through consuming feed or water contaminated with eggs from the parasite, or grazing on contaminated pastures. Natural cases of neosporosis have been reported in different species of wild deer and deer may play an important role in the epidemiology of this disease.

Parasite eggs are shed in the feces of dogs, coyotes and possibly foxes and wolves that become infected by eating infected animals, placentas or fetuses. Scientific studies have proven that dogs and coyotes can spread Neospora through feces. The evidence is less conclusive that foxes and wolves shed Neospora but serologic evidence indicates that wolves in Montana are at least exposed to the parasite.

6. Sarcoptic Mange

Mange is a skin disease of mammals caused by a tissue-burrowing mite. A variety of mange mites exist; the one identified as the cause of mange in Montana wildlife is *Sarcoptes scabiei*. The mites are too small to be seen with the naked eye, but skin changes brought on by infestation can be dramatic. The skin disease caused by this species of mite is known as sarcoptic mange. In Montana, sarcoptic mange has been reported in red fox, coyote, and gray wolf. The mites appear to be quite host species-specific and the likelihood of transmission from a wolf to a healthy dog or human appears to be very low. In a 1980 study, attempts to transfer sarcoptic mange from a red fox, four coyotes and a wolf to dogs and dog-coyote hybrids were unsuccessful (Samuel, 1981).

Sarcoptic mange mites spread to new hosts through direct body contact with an infected animal or by contact with something that an infected animal has contaminated such as common den sites. The parasite lives and burrows in the skin layers. Sarcoptic mange is characterized by thinning and loss of hair, thickening and wrinkling of the skin, and scab and crust formation. Red foxes are the most severely affected, exhibiting a thinning of hair accompanied by accumulations of foul-smelling, wet, crusted exudates about the head, and in severe cases, over much of the trunk and legs. In advanced cases, animals are emaciated and weak. It can be fatal because of a chronically weakened immune system, secondary infections, or even hypothermia due to hair loss.
Several packs in southwest Montana (Montana portion of the GYA) were documented with symptoms associated with Sarcoptic mange (*Sarcoptes scabeii)* in 2006. However, in the

sample of all dead wolves submitted for necropsy in 2006, fewer cases of mange were documented compared to the 2005 necropsied sample.

In 2006, mange was documented in 4 packs in the Montana portion of the Greater Yellowstone Recovery Area. One of the 4 no longer exists because the pair was lethally removed due to livestock conflicts. Of particular interest, one wolf is known to have survived with visible signs of mange for three years. Thus far, mange has been detected in wolf packs living primarily east of the continental divide.

Elimination of mangy wolves to reduce opportunities for transmission of the parasite has been suggested. It has also been suggested that MFWP "treat" clinically affected individual wolves. The effectiveness of either approach is questionable, because the parasite is widely distributed in the environment before infestations become obvious and multiple doses are required for effective treatment. MFWP's management approach has been to let nature takes its course unless mangy wolves are habitually loitering near human dwellings or livestock.

7. Tapeworm: Echinococcus

Echinococcus granulosus is a very small tapeworm that resides in the small intestine of domestic dogs and other canids such as wolves. Gravid tapeworm segments (proglottids) release eggs that are passed in the feces. After accidental ingestion by a suitable intermediate host (deer, moose and elk, livestock and humans), the egg hatches in the small intestine, penetrates the intestinal wall and migrates through the circulatory system into various organs, especially the liver and lungs where it forms a cyst. The definitive host (dog, coyote, wolf etc.) may become infected by ingesting the cyst-containing organs of an infected intermediate host. Proglottids of this tapeworm species have been collected from a wolf in northwestern Montana. Through a collaborative project with the University of Washington, more detailed surveillance is now underway.

The same life cycle occurs with a second species *E. multilocularis*, with the following differences: in Montana the definitive hosts are red foxes and coyotes. Wolves are considered potential hosts but in Montana, this has not been documented. In addition, the intermediate hosts are small rodents rather than ungulates and larval growth (in the liver) remains indefinitely in the proliferative stage, resulting in invasion of the surrounding tissues. Domestic dogs may, under certain conditions, become involved in the otherwise largely wildlife-based transmission, and thereby increase the possibility of infection in humans. Generally, tapeworms do little harm to wolves and larval infections of the intermediate hosts tend to be more serious. For example, cysts of *E. multilocularis* produce tumor-like lesions that can eventually destroy the host's liver and other organs. This condition is known as alveolar echinococcosis whereas the disease caused by *E. granulosus* is known as cystic echinococcosis.

Humans become infected following the accidental ingestion of eggs. Although widely believed, there is no scientific evidence to suggest that inhalation of eggs found in feces presents a transmission risk in humans. While the eggs can survive at least a year in cool, wet environments they are very vulnerable to high temperatures and desiccation, dying in two hours under these conditions.

8. Brucellosis

A variety of species can become "spillover" hosts of *Brucella abortus* (the cause of brucellosis in cattle, bison and elk) in areas where brucellosis is endemic such as the Greater Yellowstone Area. In other words, some wildlife species other than bison and elk can become infected. Wolves may potentially be one of these spillover hosts but research indicates that they do not act as vectors of the disease following infection. Previous studies have found no lesions in naturally infected, free-ranging wolves, coyotes or foxes and scientific evidence suggests that *B. abortus* has little or no effect on the health of wild canids. In Montana a single animal (1 of 25; 4%) tested positive on serology but no evidence of actual infection has ever been observed.

A recent study in Canada evaluated the significance of *B. abortus* in wolves and whether or not wolves might pose a risk of transmitting brucellosis to other wildlife and livestock. The study found that the sporadic excretion of very small numbers of brucellae by wolves was insignificant when compared with the required infective dose for cattle. This led to the conclusion that wolves do not play a significant role in the maintenance and dissemination of *B. abortus* and pose no obstacle to control or eradication of the disease (Tessaro and Forbes, 2004).

Wolf – Ungulate Relationships

In mountainous areas with harsh winter weather conditions, less productive vegetation, and multiple predator species including grizzly bears, wolf predation seemed to be more influential than in areas where livestock were present seasonally or year round. Outside national parks, Montana's wolves routinely encountered livestock. Lethal wolf control to resolve wolf-livestock conflicts seemed to decrease local wolf densities to a point where wolf predation did not appear to significantly affect elk populations. See MFWP 2006 Monitoring and Assessment Report at http://fwp.mt.gov/wildthings/wolf/game.html.

Montana elk herds that inhabit YNP seasonally have declined, due in part to predation where local wolf densities (among other predator species) were high. In a few areas, MFWP curtailed hunter opportunity beginning in 2004. Yet in other areas where wolves and elk interact, elk numbers are stable or increasing. Two thirds of the hunting districts in southwest Montana (all of which support wolves) are currently offering the most liberal hunting opportunities seen in nearly 30 years as a management response to higher elk populations.

Research has shown that elk use habitat differently since wolves have returned. One study showed that when wolves were in the local area, elk spent less time in open areas and more time in forested areas. This seems to have affected individual hunters on individual days. Another study showed that elk are not locally "displaced" or shift habitat use when wolves are in an area. Different vegetation patterns may explain why results differed. Hunters may need to adjust their strategies.

MFWP biologists now consider wolf activity among the many factors potentially affecting big game populations and hunter success. MFWP earmarked money from the federally-funded wolf

program to increase big game monitoring efforts to keep closer tabs on prey populations. This supplements existing data on ungulates populations. Additional surveys for moose were initiated, beginning in 2005. They occur in the North Fork Flathead River, in the White Sulphur Springs area, and south of Phillipsburg. Additional moose survey efforts will be directed at moose populations along the Beartooth face south of Billings and in southwest Montana. Additional elk and moose surveys are also being conducted along the Montana-Idaho border, west of Missoula.

In addition, MFWP is actively involved in various research projects that are investigating predator-prey relations, population dynamics of black bears and mountain lions, large carnivore monitoring techniques, and wildlife diseases. See Hamlin (2006) on the MFWP website wolf pages under "Wolves – Big Game" for additional information on what MFWP has learned so far. See also the main Northern Rockies bibliography included in this report.

Wolf – Livestock Interactions

Montana wolves routinely encounter livestock on both public grazing allotments and private land. Wolves are opportunistic predators, most often seeking wild prey. However, some wolves "learn" to prey on livestock and teach this behavior to other wolves. Wolf depredations are very difficult to predict in space and time. Between 1987 and 2006, the vast majority of cattle and sheep wolf depredation incidents confirmed by WS occurred on private lands. The likelihood of detecting injured or dead livestock is probably higher on private lands where there was greater human presence than on remote public land grazing allotments. The magnitude of under-detection of loss on public allotments was not known. Nonetheless, most cattle depredations occurred in the spring or fall months while sheep depredations occurred more sporadically throughout the year.

WS investigated reports of injured or dead livestock or domestic dogs in Montana. Estimated on a federal fiscal year basis from 2002-2006, slightly more than half of investigations were verified as wolf-caused. The rest were not "confirmed" or "probable" wolf-related (i.e. injuries or death which could be due to a different predator species, poisonous plants, lightning, disease, etc). In the cases that were either classified as a "confirmed" or a "probable" wolf depredation, MFWP had to decide how to address the problem with WS's help and coordination with the livestock producer.

Because wolves are still listed under ESA, wolf-livestock conflicts were addressed using a combination of the approved state plan and federal regulations. Among other things, MFWP considered the number of breeding pairs statewide and in the respective interim management areas (endangered area or experimental area), where the incident occurred, potential for additional losses, and a pack's previous history with livestock when deciding what to do. MFWP and WS tried to connect the management response and the damage closely in space and time, targeting the offending animal/s. WS personnel carried out the lethal control work. MFWP strove to assure the security of the overall wolf population, while addressing depredation losses and control in an incremental fashion responsively and as directed by the state plan.

Both MFWP and WS also provided advice and technical information to individual livestock producers about proactive strategies that may decrease their risk of wolf depredations. Project personnel also worked collaboratively with interested private organizations and local-level community groups (e.g. watershed groups) to provide technical advice and to investigate non-lethal methods of deterring livestock conflicts.

Non-lethal deterrents were explored and implemented proactively to decrease the risk of wolf depredations and were considered after confirmed and probable wolf-caused losses. MFWP personnel collaborated with other wolf managers from around the world to discuss new ways to address conflicts and to exchange "experiences." MFWP and WS staff worked closely to share information throughout the year. This collaboration allowed for timely and well thought out decisions with respect to the application of both non-lethal and lethal tools when conflicts occurred. Fladry, electric night pens, increased human presence, and non-injuriously hazing or harassment were all implemented by both private citizens and agency personnel.

While wolves remain listed under ESA, there are two different classifications and legal frameworks for addressing wolf-livestock conflicts (Figure 2). Wolves across northern Montana are classified as endangered, which offered both livestock producers and MFWP less flexibility. The 1999 Interim Control Plan ultimately guided decisions about lethal control. Citizens cannot harass or kill wolves on private lands, state leases, or federal lands. State and federal agency personnel were responsible for all harassment activity and lethal control of all wolves in the endangered area.

Wolves across southern Montana are classified as experimental, nonessential. Because Montana has a federally-approved management plan, additional flexibility became available to both MFWP and livestock producers in February 2005. Known as the 10(j) regulations, members of the public in the experimental area had the ability to non-injuriously harass wolves that were too close to livestock any time. If wolves were seen actively chasing or attacking livestock on private or federally permitted lands during the active permit, livestock owners, their immediate family members or employees could legally take the wolf. Physical evidence that demonstrated that an attack was imminent was required. All cases of harassment or lethal take had to be reported to MFWP within 24 hours. The 10(j) regulation was patterned after the Montana "defense of property" statutes that will take effect upon delisting allowing take "in the act" of attacking domestic livestock. In 2005, 7 wolves were killed by private citizens under the 10(j) rule compared to 2 in 2006.

Depredation Incidents

The majority of wolf-livestock interactions took place in the experimental area across southern Montana. Livestock densities (number of cattle and sheep per square mile) in south central Montana counties are some of the highest of any in Montana. Habitat, ungulate distribution, and landscape features placed wolves and livestock in closer proximity in space and time than other parts of the state.

WS confirmed that, statewide, 32 cattle, 4 sheep, 4 dogs and 2 llamas were killed by wolves in calendar year 2006 (Figure 6). Additional investigations were determined to be probable wolf

depredations or confirmed injured livestock. Furthermore, some livestock producers reported "missing" livestock and suspected wolf predation. Other reported indirect losses include poor weight gain and aborted pregnancies. There is no doubt that there are undocumented losses. It is difficult to quantify direct and indirect economic losses in totality. Most depredations occurred on private property. Fifty three wolves were killed to reduce the potential for further depredations in 2006. Of the 53, 2 were killed by private citizens under the 2005 10(j) regulations and 2 were killed by private citizens who had been issued a permit in the experimental area of southern Montana.

In the endangered area across northern Montana, the number of livestock and dogs confirmed killed was similar to 2005, but the number of wolves lethally controlled increased in 2006 compared to 2005. Additional livestock were confirmed injured or were determined as probable wolf kills. WS confirmed a total of 6 cattle, 1 sheep, 1 dogs and 2 llamas were killed by wolves. A total of 15 wolves were lethally removed, the majority of which was carried out in the area west of Helena. The Halfway pair was removed and a total of 11 wolves were removed from the Spotted Dog pack (7 wolves remained at the end of 2006). These two packs had a significant amount of private land within their territories and routinely encountered livestock. See pack narratives below.

In the Montana portion of the GYA Experimental Area, the number of confirmed cattle kills was similar from 2005 to 2006, but confirmed sheep losses declined in 2006. Fewer wolves were killed in 2006 (10) compared to 2005 (19). In the Montana portion of the CID Experimental Area, the number of cattle confirmed killed increased from 2005 to 2006, but the number of sheep confirmed killed decreased from 2005 to 2006. The level of lethal removal increased from 14 in 2005 to 28 in 2006. This is primarily due to the elimination of the Sleeping Child pack which, despite significant effort with non-lethal deterrents and incremental lethal control steps, continued to kill livestock on private property in close proximity to human dwellings.

Private citizens killed 4 of the 38 (11% of total) wolves removed in the Montana portion of the GYA and CID experimental areas combined in 2006. Two wolves were killed under the 10(j) regulations and 2 were killed by permit in 2006. All four incidents occurred on private property and involved cattle.

Between 1987 and 2006, most confirmed cattle depredation events in Montana occurred in spring (March, April, May) when calves were small and most vulnerable. A smaller spike occurred in the fall (September and October), presumably as food demands of the pack increased and pups are traveling with the pack. In addition, wild ungulates were still well dispersed on summer range and young-of-the-year ungulates were more mobile. Most confirmed sheep depredation events in Montana occurred in July, September, and October. Because of their smaller size relative to cattle or other classes of livestock, sheep are vulnerable to wolf predation year round. See Figure 7.

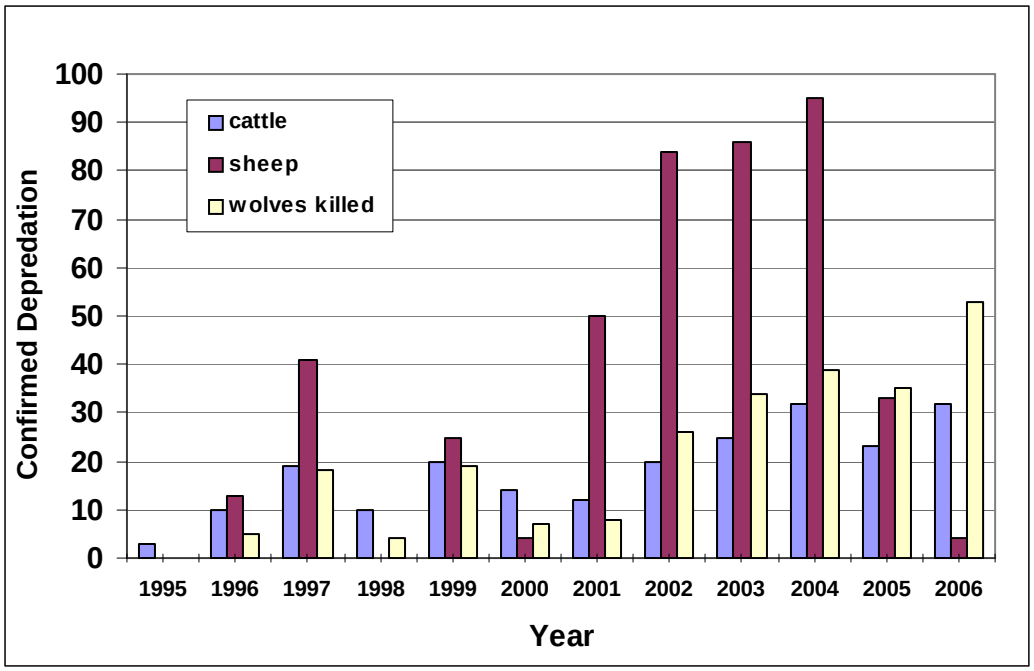

Figure 6. Confirmed cattle and sheep depredation and the number of wolves lethally controlled in the State of Montana based on investigations by USDA Wildlife Services, 1995-2006.

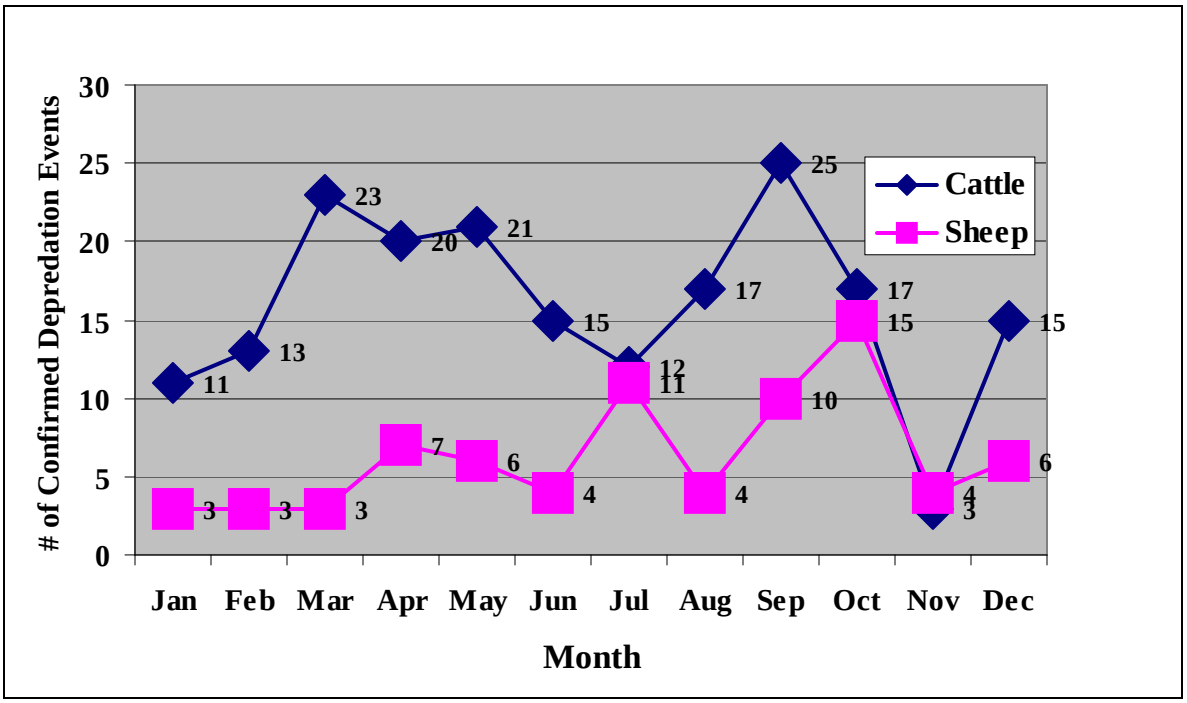

Figure 7. Number of confirmed depredation events on cattle and sheep by wolves in Montana by month in calendar years 1987-2006, based on investigations by USDA Wildlife Services.

Defenders of Wildlife: Bailey Wildlife Foundation Wolf Compensation Trust
(source: http://www.defenders.org/wolfcomp.html)

In 1987, Defenders of Wildlife (Defenders) created at $100,000 fund to compensate livestock producers in the NRM for verified livestock losses due to wolves. The goal was to help reduce wolf-related economic losses as a result of wolf recovery. The trust expanded to $200,000 in 1999. In the fall of 2000, the wolf and grizzly bear compensation fund and trusts were renamed the Bailey Wildlife Foundation Wolf Compensation Trust. This is the only compensation program currently available in Montana.

The program pays for 100% of the fall market value for a WS-confirmed wolf-caused loss up to $2000 per animal and 50% of the market value for probable losses. More recently, Defenders increased the cap per animal to $3000 and implemented some criteria that are supposed to be met in order for a claim to be paid. Livestock losses covered include: sheep, cattle, horses, mules, goats, llamas, donkeys, pigs, chickens, geese, turkeys, herding dogs and livestock guarding dogs. Consult the website for additional information about the program and instructions on submitting claims.

Defenders of Wildlife also created the Proactive Carnivore Conservation Fund to prevent conflict between imperiled predators and humans before it occurs. The fund was renamed The Bailey Wildlife Foundation Proactive Carnivore Conservation Fund in recognition for the foundation's gift. If landowners or other entities have repeated predator problems, Defenders will consider funding projects that could help reduce conflict.

If the concept is practical and within the means of the organization, Defenders will share the cost of the project. Projects can also be proposed by government agencies or by Defenders. According to the Defenders website, the proactive fund has three objectives: to reduce conflicts between predators and humans, to keep predators from being killed by agencies in response to human conflicts, and to increase general tolerance for carnivores across the landscape in an effort to expand the range of predators across the American West by reducing conflict between predators and humans.

From 1987 through October 2006, Defenders of Wildlife paid a total of approximately $242, 832 in claims in the State of Montana (Figure 8). From 2000 to 2005 (inclusive), the total amount paid was $158,451 (65% of the total paid in Montana 1987-2005), averaging about $26,408 per year. The amount paid in any one year ranged from $7,935 to $54,757.

Development of a Montana-based Reimbursement Program

The Montana Wolf Conservation and Management Plan called for creation of a Montana-based program to address the economic impacts of verified wolf-caused livestock losses. The plan identified the need for an entity independent from MFWP to administer the program. The plan also identified that the reimbursement program would be funded through sources independent from MFWP's wolf management dollars and other MFWP funds intended for fish and wildlife management.

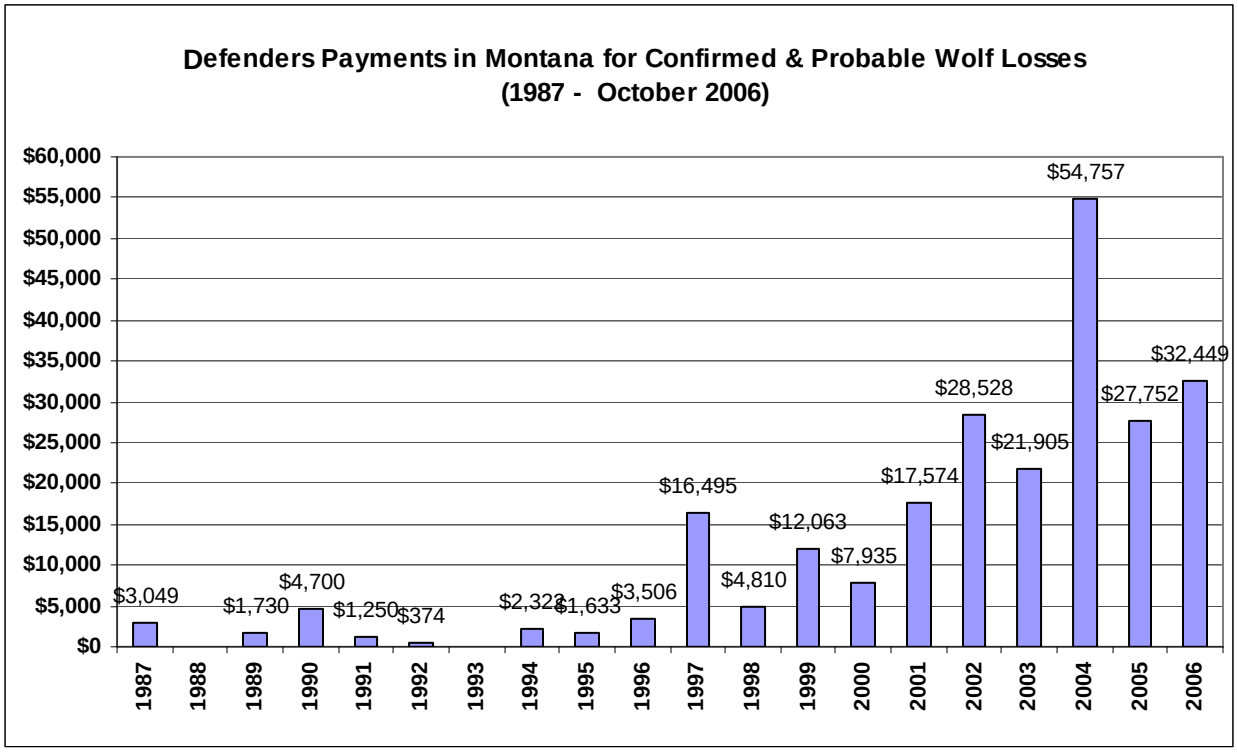

Figure 8. Compensation payments paid in Montana by Defenders of Wildlife, 1987 through October 2006. Source: http://www.defenders.org/wolfcomp.html.

In keeping with Montana's tradition of broad-based citizen participation in wolf conservation and management, a diverse, 30-member working group met 4 times in 2005. The working group was comprised of private citizens, representatives from non –governmental organizations, and representatives from state and federal agencies. A smaller subcommittee continued to meet in 2006. This group finalized a framework which then became the basis for legislation in the 2007 Montana Legislature.

As a part of the comprehensive wolf program implemented by Montana Fish, Wildlife & Parks (MFWP) and its cooperators, the Montana Livestock Loss Reduction and Mitigation Program (MLLRMP) will address economic losses due to wolf predation and create incentives for producers to take proactive, preventive steps to decrease the risk of loss. The large working group agreed that both government and livestock producers want to take reasonable and cost-effective measures to reduce losses, that it is not possible to prevent all losses, and that livestock producers should not incur disproportionate impacts as a result of recovery of Montana's wolf population.

The purposes of the Montana Livestock Loss Reduction and Mitigation Program are to proactively apply prevention tools and incentives to decrease the risk of wolf-caused losses;

minimize the number of livestock killed by wolves through active management of the wolf population and proactive livestock management strategies and defense of property provisions of federal regulations prior to delisting and state laws upon delisting; provide financial reimbursements to producers for losses caused by wolves based on the program criteria.

There are three basic components: a loss reduction element, a loss mitigation element, and the state wolf management plan. MFWP and USDA Wildlife Services (WS) would fulfill their responsibilities and roles outlined in the state management plan. The loss reduction and loss mitigation elements would be administered by an independent quasi-judicial board created by the Montana Legislature.

The Loss Reduction element is intended to minimize losses proactively by reducing risk of loss through prevention tools such as night pens, guarding animals, or increasing human presence with range riders and herders. Active management of the population under the approved Montana Wolf Plan (and the applicable federal regulations for now) should also help decrease the risk of loss.

The Loss Mitigation element would implement a reimbursement payment system for confirmed and probable losses that can be verified by USDA Wildlife Services. Indirect losses and costs are not directly covered, but could be addressed through application of a multiplier for confirmed losses and a system of bonus or incentive payments. Eligible livestock losses are cattle, calves, hogs, pigs, horses, mules, sheep, lambs, goats, and guarding animals. Confirmed and probable death losses would be reimbursed at 100% of fair market value. Veterinary bills for injured livestock that are confirmed due to wolves are covered at 100% of fair market value of the animal.

Of particular concern to all participants was the need to secure funding for <u>both</u> the proactive work and the loss reimbursement components of the Montana wolf program. The working group explored a variety of funding mechanisms. Both the Montana Wolf Advisory Council and the second working group concluded that the MLLRMP would be funded through special state or federal appropriations or private donations. Both groups agreed that MFWP's wolf management dollars, and other MFWP funds (license revenue and federal matching Pittman-Robertson or Dingle Johnson dollars) would not be used to reimburse wolf-caused losses. Private donations will also be sought.

The creation of an adequately funded loss reduction and damage mitigation program will help determine the degree to which people will share the land with wolves, to which the success of wolf recovery can be assured into the future, and the degree to which individual livestock operators who are adversely affected economically by wolf recovery are able to remain viable. Maintaining private lands in agricultural production provides habitat for a wide variety of wildlife in Montana and is vital to wolf conservation in the long run.

PACK SUMMARIES

Northwest Montana Endangered Area

Overview

In 2006, we documented a minimum estimate of 167 wolves in 31 packs in the Montana portion of the NWMT recovery area. This is an increase from 126 wolves in 19 packs at the end of the year in 2005. There were 14 newly identified packs in 2006. Some of these packs are believed to be first year packs, and some are likely to have existed the previous year.

Twenty-six radio collared wolves from 18 packs (58% of the 31 total packs) were being monitored in northwest Montana during 2006. Two additional radio collared packs, Kootenai North (west of Koocanusa Reservoir) and Nettie (North Fork Flathead), were also monitored, but appear to be spend most, or all, of their time in Canada. Radio collared wolves were located from aircraft approximately 1–2 times per month. Radio collared wolves in and around Glacier National Park (GNP) were located more frequently from the ground by GNP staff. Eighteen radio collared wolves from 14 packs (45% of the 31 total packs) were being monitored in northwest Montana by the end of 2006.

MFWP traplines were set in 18 pack territories, and 12 wolves were captured in 2006. Three of these were accomplished in a combination of effort with the Salish Kootenai Confederated Tribes. Eight were radio collared and 4 were too small to collar. Five more wolves were captured, but were able to pull out of the trap. Fur trappers had a total of 5 non-target wolf captures. Three were in the Ninemile pack including a previously collared wolf, which was captured twice, and MFWP personnel released another wolf without a collar. The fourth wolf was from the Elevation Mountain pack, and died soon after release. The fifth wolf, likely from the Hog Heaven pack, was captured in a bobcat set and apparently got away with the trap on its foot.

MFWP surveyed a total of 23 areas for wolf presence and pack status. Nine of these areas resulted in the verification of new packs. Wolf activity was verified in five other areas, but it is unclear whether they are discrete packs or areas used by adjacent packs. These areas will be scheduled for survey again in 2007. Seven surveys were conducted to determine pack status in areas of known packs that do not have functioning radio collars. There were two areas definitive wolf sign could not be determined and will be scheduled for survey again in 2007.

Packs included in the Montana portion of the NWMT recovery area as of December 2006 were Ashley, Candy Mountain, DeBorgia, Elevation Mountain, Fishtrap, Flathead Alps, Great Bear, Hewolf Mountain, Hog Heaven, Kintla, Kootenai South, Ksanka, Lazy Creek, Livermore, Lost Soul, Lydia, Marias, McMillan, Meadow Peak, Murphy Lake, Ninemile, Nyack, Pulpit Mountain, Red Shale, Spotted Bear, Spotted Dog, Squeezer, Superior, Thompson Peak, Whitefish, and Wolf Prairie. Newly documented wolf packs in 2006 included the Ashley, DeBorgia, Elevation Mountain, Flathead Alps, Hewolf Mountain, Ksanka, Lost Soul, Lydia, McMillan, Meadow Peak, Nyack, Pulpit Mountain, Squeezer, and Thompson Peak packs.

Along the transboundary area between Montana and Idaho within the NWMT Recovery area, the Calder Mountain pack is believed to have denned and spends most of their time in Idaho and was therefore counted towards the Idaho wolf population. Along the transboundary area between the NWMT and CID recovery areas, the Fish Creek pack denned and spent most of their time in Idaho and was therefore counted towards the Idaho population. Along the US/Canada Border, the Kootenai North and Nettie packs spend most or all of their time in Canada and are not counted towards the NWMT population.

Reproduction was confirmed in the Candy Mountain, DeBorgia, Fishtrap, Hewolf Mountain, Hog Heaven, Kintla, Ksanka, Livermore, Lydia, Meadow Peak, Ninemile, Pulpit Mountain, Spotted Dog, Thompson Peak, and Whitefish packs. Eleven of these packs met the criterion to be counted as breeding pairs. Pup survival of 2 or more through the end of the year could not be confirmed in the Hog Heaven, Ksanka, Kintla, and Ninemile packs. The breeding status of Kootenai South, Lazy Creek, Lost Soul, Nyack, Spotted Bear, and Wolf Prairie was unknown because we could neither document denning activity in the spring or pups later in the season. The breeding status of Ashley, Elevation Mountain, Flathead Alps, Great Bear, Marias, McMillan, Murphy Lake, Red Shale, Squeezer, and Superior was unknown in large part because they were not collared and therefore more difficult to obtain various population data.

Twenty-one wolf mortalities were documented in the Montana portion of the NWMT recovery area population in 2006. All but one died due to some form of human cause including 15 lethally removed in control actions, 2 illegally killed, 1 legal harvest (Canada), 1 train collision, and 1 from complications after being collared and released from a coyote trap. One wolf died of unknown causes.

A total of 4 radio-collared wolves (Hog Heaven, Murphy Lake, Spotted Bear, and Wolf Prairie), were missing by the end of the year. The Hog Heaven collar is thought to have expired. The other missing collars are due to long-range dispersal, collar failure, or other unknown fate.

Six dispersals were recorded. Some of these likely took place in the last 2 years, but were not discovered until this year. Female wolf 505 who has been missing from the Halfway pack since august of 2004, was found in the Middle Fork of the Flathead River. She is now part of the Nyack pack. Male wolf 272, who has been missing from the Lazy Creek pack since January 2005, was found in the North Fork of the Flathead River (Canada). He is now part of the Nettie pack. Male wolf 263, who has been missing from the Kintla pack since July 2005, was found east of Eureka, MT. He is now part of the Ksanka pack. Female wolf NW030F, who was missing from the Candy Mountain pack since December of 2005, was found dead, near the Ashley pack area. Female wolf NW036F was located while dispersing from the Kootenai South pack in May 2006 and is now part of the Lost Soul pair. Male wolf NW034M who was missing from the Kootenai South pack since June, was found in the North Fork of the Flathead River about 5 miles north of the US/Canada border. He has been missing since.

In NWMT, the number of confirmed livestock and dogs killed was similar to 2005, but the number of wolves lethally controlled increased in 2006 compared to 2005. The increase was due primarily to livestock losses west of Helena where the Spotted Dog pack's territory is mostly private land. This pack had a double litter and rider efforts initiated by the livestock producer

did not stop recurring depredations and two incremental control efforts were completed. During 2006, we documented 10 confirmed livestock and dog kills. There were 6 cattle, 1 dog, and 2 llamas. An additional four calves were confirmed injured and another 4 calves were listed as probable wolf losses in 2006. Five – six packs (we were unsure which pack was involved in an injured cattle calf) of 32 packs were involved in confirmed killed or injured livestock, and a total of 15 wolves, including 1 pair (Halfway, which no longer exists) were lethally removed as a result. These figures only account for verified losses. It is unavoidably impossible to account for the proportion of unverified losses due to wolves. Unverified losses are losses where the cause of dead or missing livestock is not known. Fladry was used as a preventative measure in 5 different instances across 3 different packs. Range riders were used by one ranch within the Spotted Dog territory as part of routine ranch activities.

Verified Packs (Table 1a in Appendix 3)

Ashley

- 4 wolves; not a breeding pair
- no depredations reported

History: New pack in 2006.

2006 Activities: There had been reports in this area since 2005. On 8/1/06 NW030F, who has been missing since 12/6/05 from the Candy Mountain Pack (~ 68 miles away), was located dead near this area. At that time Plum Creek personnel reported that there was a group of wolves near that area last winter. It is not known if NW030F was associated with the Ashley pack or not. On 9/22/06 MFWP followed up on reports from US Forest Service personnel and were able to detect sign and begin a trapline. No wolves were captured and the pack remains uncollared. The Ashley pack territory is estimated to encompass an area from Little Bitterroot Lake, along the Ashley and Lost Creek Divides, to Star Meadows.

Candy Mountain

- 11 wolves; breeding pair
- no depredations reported

History: The Candy Mountain pack was first discovered as a new pair and an adult female (351) was radio collared in 2003. The Candy Mountain territory is in the Yaak River drainage.

2006 Activities: The dispersal of Candy Mountain wolf NW030F was documented in 2006. Female wolf NW030F had been missing since December 2005 and was located dead on 8/1/06 about 68 miles to the southeast near the suspected territory of the newly documented Ashley pack. Candy Mountain produced pups at a new den this year and is now made up of 10 individuals at the end of 2006. This pack has 1 radio collar (351).

DeBorgia

- at least 6 wolves; breeding pair
- no depredations reported

History: Suspected pack in 2005 and confirmed in 2006.

2006 Activities: Wolf activity was reported south of DeBorgia during hunting season 2005 and was confirmed by MFWP personnel in June 2006. A black adult breeding female (NW85F) was trapped and collared by MFWP personnel in June and four black pups were documented. At least 6 wolves (1 gray adult, 1 black adult, 4 black pups) were believed to be in the DeBorgia pack at the end of 2006. DeBorgia is a Montana/Idaho border pack but is counted as a Montana pack for 2006 since they presumably denned in Montana and the majority of 2006 aerial telemetry locations were in Montana.

Elevation Mountain

- at least 5 wolves; not a breeding pair
- no depredations reported

History: New pack in 2006.

2006 Activities: BLM personnel reported wolf activity in the Chamberlain Creek area in the Garnet Mountains in September 2006. MFWP personnel followed up and initiated a trapping effort that was cut short due to archery season and weather. In November a coyote trapper incidentally caught a wolf that ended up dying soon after MFWP personnel collared and released it. Reports of wolf activity in the area continued to come in during the fall and winter and agency personnel documented at least 5 wolves in this pack, although reproductive status is unknown.

Fishtrap

- 8 wolves; breeding pair
- no depredations reported

History: The Fishtrap pack was first documented in 2000. Its territory is in and around the Thompson River, McGuiness Creek, and Fishtrap Creek drainages.

2006 Activities: The Fishtrap pack produced pups at a new den this year. At least 4 pups were documented, but only 2 could be observed by the end of the year. A very short trapline was run from 8/26 to 8/29 until higher priorities emerged. No wolves were captured. This pack has 2 radio collars (266 and 270).

Flathead Alps

- 12 wolves; not a breeding pair
- no depredations reported

History: New pack in 2006.

2006 Activities: There was an increase in reports this season in the White, South Fork Flathead, and Danaher drainages within the Bob Marshall Wilderness. In 2005 there was a report of a dead radio collared wolf in this area. That report was verified in 2006 and the radio collar from wolf 117's carcass, former Spotted Bear alpha male, was retrieved. This

area is outside of the Spotted Bear pack home range. The cause of death, or any relationship of this mortality or its location to the Flathead Alps pack is unknown. During September an outfitter guide and hunter clients had a close encounter with a minimum of 12 wolves. In October a Forest Service employee spotted 12 wolves in a meadow. There are no radio collars in this pack.

Great Bear

- 6 wolves; not a breeding pair
- no depredations reported

History: The Great Bear pack was first discovered as a new pair in 2003 after wolf 271 dispersed from the Spotted Bear pack and paired with another wolf of unknown origin. This pack's territory is along the Middle Fork of the Flathead River and tributaries within the Great Bear Wilderness. The radio collar is suspected to have failed in March 2004.

2006 Activities: There was an abundance of reports during the summer and fall of 2006. USDA Forest Service personnel estimate a minimum of 6 wolves. This pack has no functioning radio collars and successful reproduction could not be determined.

Halfway

- no longer exists
- 1 sheep; 1 calf confirmed killed; 2 wolves lethally removed

History: The Halfway pack was first documented in its current territory between Avon and Helmville in 2002. It was believed to have been started by a female member of the nearby Castle Rock pack, which was eliminated in 2002 after repeated livestock depredations. Throughout most of 2002, 2003, and 2004, it was probably 2 or 3 wolves. In August 2004, the Halfway pack was joined by a male wolf that had dispersed from a pack near Calgary, Alberta Canada. The male was wearing a GPS-satellite radio collar and appeared to have crossed the international border on the side east side of GNP in mid-May 2004, and continued traveling south down the east Front of the Rockies.

2006 Activities: One ewe was verified as a wolf kill in the Halfway pack territory on January 2nd and a calf confirmed killed on March 21st. An uncollared male was removed March 27th and the female was removed April 7th once it was confirmed there were no more wolves associated with her.

Hewolf Mountain

- 6 wolves; breeding pair
- 1 calf, 1 llama confirmed killed, 2 calves confirmed injured, 4 calves probable; 2 wolves killed by WS/Tribe

History: Suspected pack in 2005 and confirmed in 2006.

2006 Activities: Five wolves were suspected in the area at the end of 2005 and were confirmed during summer 2006. In July MFWP and CSKT trapped and collared 2 gray

yearling female wolves (NW88F and NW90F) and pit tagged and released a female pup. This pack spends most of their time on the CSKT reservation. In September a calf was confirmed killed and 1 wolf (NW88F) was removed. In November a llama was confirmed killed, 2 calves were confirmed injured, and 4 calves were considered probable wolf kills. One more wolf was removed from the pack in early December.

Hog Heaven

- 6 wolves, not a breeding pair
- no depredations reported

History: The Hog Heaven pack was first documented as a new pair in 2001, after wolves 278 and 286 from the Parsnip group (a group of wolves translocated in 2001 from the Boulder Creek pack as a management response to cattle depredations), traveled separately to the Hog Heaven/Browns Meadow area and paired.

2006 Activities: Through 2006 we were unable to document any additional wolves traveling with the collared animal. The collar is suspected to have failed after it's last location on 7/11/06 after being on the air for 5.3 years. Five wolves were observed incidentally from aircraft on 10/18/06 within the Hog Heaven pack territory. The wolves were bedded about 50 meters from 3 adult cattle feeding. No radio collars were observed in that group and 1 pup was seen. A trapline was initiated on that same day and run until the beginning of the big game general season on 10/22/06. No wolves were captured. In December, a wolf (likely of the Hog Heaven pack) was captured in a bobcat set and got away with the trap on its foot. This pack has no collars at the end of 2006.

Kintla

- 4 wolves; breeding pair
- no depredations reported

History: The Kintla pack was first documented as a pack in 2000 in the old North Camas territory. The North Camas pack had previously existed from 1990 to 1996 and then fell apart as the neighboring South Camas pack grew to 18 animals in 1997. From 1997 to 1999, South Camas appeared to be the only pack in the area until 2000, when the Kintla pack established itself in the old North Camas territory (see Whitefish pack summary for additional information). The Kintla pack's home range is in the North Fork Flathead River drainage, and spends most of their time within GNP.

2006 Activities: The dispersal of Kintla wolf 263 was documented in 2006. Wolf 263, who had been missing from the Kintla pack since 7/12/05, was located on 3/3/06 25 miles to the west and on the west side of the Whitefish Range. 263 was originally captured as a Whitefish wolf on 5/18/03. By 11/7/03 he had become a member of the Kintla pack until his last location with Kintla on 7/12/05. He is now a member of the Ksanka Pack. Glacier National Park personnel documented at least 5 pups this season, but by the end of 2006, we could only account for a minimum count of 4 wolves in this pack. A trapline was conducted in October until temperatures were too cold. No wolves were captured. This pack has 1 collar (133).

Kootenai South

- 4 wolves; not a breading pair
- no depredations reported

History: Since 2005 the former Kootenai pack now consists of the Kootenai North and Kootenai South packs through either the mechanisms of dispersal or pack splitting. The Kootenai South pack occupies a territory mainly south of the U.S./Canadian border and west of Koocanusa Reservoir, while the Kootenai North pack (collared wolf 329) occupies a territory mainly north of the border and west of Koocanusa Reservoir.

2006 Activities: Both collars, NW036F and NW034M, dispersed in 2006. Wolf NW036F was located 27 miles to the south and has been seen on numerous occasions with another wolf. NW036F is now part of the Lost Soul pair. Wolf NW034M had been missing since June when he was located in September about 44 miles to the northeast in the North Fork Flathead River drainage in Canada. He has been missing since. Trapping was initiated in July, and female wolf NW92F was captured and collared. In November, she was legally harvested in Canada about 4 miles north of the U.S. border. There was no evidence of pups in 2006. At the end of the year the Kootenai South pack is uncollared.

Ksanka

- 3 wolves; breeding pair
- no depredations reported

History: New pack in 2006.

2006 Activities: Ksanka pack was discovered after missing wolf 263 was located on 3/3/06 and was observed with another wolf. Wolf 263 was originally captured as a Whitefish wolf on 5/18/03. By 11/7/03 he had become a member of the Kintla pack until his last location with Kintla on 7/12/05. He was missing for about 8 months when he was located 25 miles west, on the west side of the Whitefish Range. He is now a member of the Ksanka Pack. The Ksanka pack reproduced in 2006 and a minimum of 2 pups were observed, but survival of both pups could not be confirmed at the end of the year. The Ksanka pack has 1 collar (263) and their territory is east of Eureka.

Lazy Creek

- 8 wolves; not a breeding pair
- no depredations reported

History: The Lazy Creek pack was first discovered as a newly formed pair in 2001. This pack filled the vacant territory left by the Whitefish pack when it crossed the Whitefish range to the east and displaced the South Camas pack in 2001. Their territory is north of Whitefish Lake.

2006 Activities: The dispersal of Lazy Creek wolf 272 was documented in 2006. Male wolf 272 had been missing from the Lazy Creek pack since January 2005 and was observed in October 2006 with 3 other wolves 44 miles to the north in the North Fork Flathead River drainage in Canada. He is now a member of the Nettie pack. The Lazy Creek pack consisted of 9 wolves at the end of the year in 2005. In August a total of 12 adult wolves were

recorded and by the end of 2006 9 adult wolves were recorded. There was never any evidence of reproduction. Either we were unable to account for all of the wolves at the end of 2005 or 3 wolves of unknown origin joined with the Lazy Creek pack. The Lazy Creek pack has 2 collars (261 and NW026M).

Livermore

- 6 wolves; breeding pair
- no depredations reported

History: Livermore was first documented in 2005 and its homerange is within the Blackfeet Tribe Reservation.

2006 Activities: The Blackfeet Tribe biologists documented a minimum of 2 adults and 4 pups. There are no radio collars in this pack.

Lost Soul

- 2 wolves; not a breeding pair
- no depredations reported

History: New pack in 2006.

2006 Activities: Female wolf NW036F dispersed about 27 miles to the south from the Kootenai South pack after 4/25/06. She has been seen on several occasions with another wolf. This pair occupies an area between Koocanusa Reservoir and Libby, and has 1 radio collar (NW036F).

Lydia

- 5 wolves; breeding pair
- no depredations reported

History: New pack in 2006.

2006 Activities: An amphibian survey crew for the Montana Natural Heritage Program reported seeing pups in June 2006. A trapline was conducted in June. One animal was captured but pulled out of the trap. The rendezvous site was discovered soon afterwards. This is believed to be the pair's first year of reproduction. Continued trapping efforts occurred July 12-17 and July 22- Aug 1. A pup was captured but too small to radio collar. This pack remains uncollared, but it is estimated to occupy an area in and around the Pinkham Creek drainage.

Marias

- 4 wolves; not a breeding pair
- no depredations reported

History: This pack was first documented in 2005 and occupies an area around the Marias Pass area.

2006 Activities: Glacier National Park documented 4 animals in this pack. This pack is not collared.

McMillan

- 4 wolves; not a breeding pair
- no depredations reported

History: New pack in 2006.

2006 Activities: MFWP documented 4 wolves in this pack. There are wolf reports ranging from an area around Libby Creek, McMillan Mountain, the Fisher River, and east of the Fisher. It is not yet known if this area is occupied by more than 1 pack or how much of this area is occupied by the McMillan pack. This pack is not collared.

Meadow Peak

- 5 wolves; breeding pair
- 1 cattle calf confirmed injured

History: New pack in 2006.

2006 Activity: This pack was verified following reports from ranchers, loggers, and forest recreationists. In August a calf was injured by wolves, but did survive the injuries. In September, 2 rendezvous sites were discovered, but no longer occupied. The location of the pack at that time could not be determined and a trapline was not initiated. This pack is not collared.

Murphy Lake

- ? wolves; not a breeding pair
- no depredations reported

History: The Murphy Lake pack was first documented 15 years ago in 1991. This pack had confirmed depredations in only 2 of the last 15 years. Their territory is between Whitefish and Eureka.

2006 Activities: The only collar in this pack, NW022M has been missing since January. A trapline was established in May during the denning season. The Murphy Lake pack did not use the traditional den this year and little wolf sign was found throughout the Murphy Lake home range. Wolf presence is verified in their traditional home range but otherwise their status is completely unknown. This pack is not collared.

Ninemile

- 6 wolves; not a breeding pair
- 1 dog confirmed killed; 1 llama confirmed killed

History: The Ninemile pack has inhabited the Ninemile drainage since 1990.

2006 Activities: In January 2006, 7 wolves were thought to be in the Ninemile pack: 2 gray adults, 1 gray pup, and 4 black pups. Two of the wolves that were collared in late 2005 continued to be monitored through 2006: NW56F and NW61M. In January a dog was killed. In early March a dog was reported attacked by wolves, and injured but survived. He was wearing a spiked collar, which may have helped. In May a llama was confirmed killed. The Ninemile pack produced 1 gray pup in 2006. NW56F was caught twice by a coyote trapper in the fall and was safely released by MFWP warden staff and WS both times. An uncollared gray wolf was also caught by a coyote trapper in the fall and was safely released. At the end of 2006, six wolves were believed to be in the Ninemile pack: 3 black adults, 2 gray adults, and 1 gray pup.

Nyack

- 2 wolves; not a breeding pair
- no depredations reported

History: This pack is new in 2006.

2006 Activities: In 2005 there were reports of wolves in this area including a radio-collared animal. A dead wolf was also documented in 2005. Wolf 505 who had been missing since capture in August 2004 near the Halfway pack area, was located in September about 125 miles to the NW in the Middle Fork Flathead area. She is now a member of the Nyack pack and is the only radio collar in that pack.

Pulpit Mountain

- 8 wolves; breeding pair
- no depredations reported

History: New pack in 2006.

2006 Activity: In May a bear hunter reported seeing 5-8 black pups. The pups and their location were verified soon after. A trapline was conducted from May -June. One wolf was captured but was able to pullout of the trap. There was an illegal mortality of a pup recorded in June. This pack remains uncollared, but it's estimated territory is in the O'Brien and China Creek drainages.

Red Shale

- 4 wolves; not a breeding pair
- no depredations reported

History: The Red Shale pack (historically referred to as Gates Park or Sun River) was first documented as a pair in 2000 and was believed to have had a continuous tenure in the North Fork of the Sun River ever since. This pack was radio collared in 2002, but has not had a functioning collar since March 2004. Monitoring this pack was coordinated between MFWP and US Forest Service.

2006 Activities: US Forest Service personnel estimate a minimum of 4 wolves. There was a report of a wolf pup carcass this summer, but the carcass could not be located and therefore verified. This pack has no functioning radio collars and successful reproduction could not be determined.

Spotted Bear

- 4 wolves; not a breeding pair
- no depredations reported

History: A Murphy Lake female wolf dispersed to the Bitterroot Valley and mated with a male wolf of unknown origin forming the Bass Creek pack in 1998. The Bass Creek pack was involved in cattle depredations in June 1999. The entire pack (2 adults and 8 pups) was removed from the wild and held at a facility in McCall, Idaho. The alpha male died in a handling accident while in captivity. Three pups died of canine parvovirus in captivity. The alpha female and surviving pups were translocated to a holding pen in the Spotted Bear area in December 1999. The pen was intended to hold the pack for several days to allow acclimation to the new area, and prevent the pack from splitting and dispersing from the area. The first night in the pen, male wolf 117 from the Pleasant Valley Pack, translocated to the same area almost a year previous, was hanging around the pen. The Bass Creek pack was released the next day and joined with the former Pleasant Valley male wolf. The new group established a territory in the South Fork of the Flathead and became the Spotted Bear pack.

2006 Activities: In the fall of 2005, MFWP was informed of a carcass of a wolf like canid, potentially radio collared, in the White River drainage in the Bob Marshall wilderness. We were unable to retrieve the carcass or collar at that time and therefore definitively identify the species. US Forest Service personnel retrieved the collar this summer. The collar was from wolf 117, the original alpha male of the Spotted Bear pack. His last location was on 9/1/03 within in the Spotted Bear home range. The cause of death is unknown but was determined to be during 2005. This area is outside of the Spotted Bear home range. The White River drainage is within the suspected home range of the Flathead Alps pack, but the relationship of this mortality and the Flathead Alps pack is unknown. The only collared animal, NW041M, has been missing since the beginning of 2006. NW111F and NW112M were captured and collared in August. Those 2 collars were still present at the end of 2006.

Spotted Dog

- 7 wolves; breeding pair
- 3 calves confirmed killed; 11 wolves lethally removed

History: The Spotted Dog pack was first verified in July 2005, but was believed to have existed the previous year, possibly longer. MFWP first received reports in the area from landowners, contractors, and hunters in late 2004. Its territory appeared to be primarily south of Avon, but reports of at least 8 animals were received north of Avon in 2005.

2006 Activities: A calf was confirmed wolf killed on February 23rd. Project personnel documented a double litter on private land for the Spotted Dog pack. Eleven pups were counted with at least five adults. A breeding female was collared June 24th and once the pack moved to a rendezvous site, investigation at the den site showed two active whelping dens. In September, WS confirmed a wolf killed calf and suspected several more although not

enough evidence was available. Six wolves were removed focusing on young of the year, the one adult removed was an uncollared breeding female and a necropsy report documented she whelped four of the pups. Another calf depredation was confirmed on November 4th and five more wolves were removed. The pack is still seven strong and counts as a breeding pair for 2006.

Superior

- at least 2 wolves; not a breeding pair
- 1 dog confirmed injured

History: The Superior pack was first documented in 2005.

2006 Activities: We continued to get wolf reports in the Superior area, south of I-90 through the winter and spring of 2006. MFWP initiated a trapping effort in June. One wolf was captured but was able to pullout of the trap. In December, a dog was confirmed injured by this pack and another dog was reported missing. MFWP worked with several landowners where wolves frequented in December and hung fladry around small pastures and yards to try to proactively reduce the risk of conflicts with horses, goats, and dogs. Reproductive status is unknown for this pack. MFWP confirmed there were at least 2 wolves in December based on snow tracking but believe there are probably more wolves in this pack based on the amount of sign and increased wolf reports in this area. Based on sightings, this pack is believed to be a Montana/Idaho border pack but probably spends the majority of its time in Montana.

Squeezer

- 4 wolves; not a breeding pair
- no depredations reported

History: New pack in 2006.

2006 Activities: During the winter of 05/06, there were reports of 2 wolves in the Swan valley. Some sign was detected by MFWP during the summer of 2006. During the 2006 big game hunting season, reports increased significantly. Those reports continued into December and by the end of December we could verify and document 4 wolves. This pack is uncollared and occupies the Swan Valley.

Thompson Peak

- 10 wolves; breeding pair
- no depredations reported

History: New pack in 2006.

2006 Activities: This was an area of suspected wolf activity prior to 2006 based on agency and public reports. In August 2006 we were able to verify wolves and a trapline was conducted during August-September. A pup was captured but was too small to collar and released. This pack remains uncollared and occupies an area in and around the Little Thompson drainage.

Whitefish

- 8 wolves; breeding pair
- no depredations reported

History: The Whitefish pack was first documented in 1996 and formerly occupied a territory north of Whitefish Lake. In 2001, the Whitefish pack crossed the Whitefish Range to the east and established a new territory in the North Fork Flathead River drainage, displacing the former South Camas pack. The Whitefish pack's home range is in the North Fork Flathead River drainage, and spends most of their time within GNP.

2006 Activities: A trapline was conducted in October until temperatures were too cold. No wolves were captured. There is 1 radio collar in this pack (389).

Wolf Prairie

- 3 wolves; not a breeding pair
- no depredations reported

History: The Wolf Prairie pack was first documented in 2004, after receiving livestock depredation complaints. Its territory is NW of Pleasant Valley.

2006 Activities: The alpha female, 331, was hit and killed by a train at the end of February. Male wolf 330 has been missing since that time. The pack was uncollared until summer field efforts located wolf sign, set up a trapline, and captured and collared NW114M. Two other wolves were captured but were able to pullout of the trap. This collar was still active at the end of 2006.

Verified Border Packs Counting in the Idaho Population Estimate (Table 3 in Appendix 3)

Fish Creek

- 14 wolves; breeding pair
- no depredations reported

History: The Fish Creek pack was first documented in 2001 and is believed to have had a continuous tenure in the Fish Creek area since then.

2005 Activities: Two radio-collared wolves, B235F and B236F continued to be monitored through 2006. Seven gray pups were observed by MFWP during a monitoring flight in August. Though they are considered a Montana/Idaho border pack, the Fish Creek pack is counted as an Idaho pack for 2006 since they denned in Idaho.

Calder Mountain

- 6 wolves; breeding pair
- no depredations reported

History: The Calder Mountain Pack was first documented in 2005 through cooperative efforts of MFWP and IDFG. This pack occupies an area west of Troy.

2006 Activities: This pack is thought to den and spend most of their time in Idaho and therefore count towards the Idaho population. This pack's activities are mainly monitored by IDFG. There were very few reports of this pack in Montana during 2006, perhaps indicating less use in Montana this year than in 2005. There were, however, reports of 5 wolves that were later verified by MFWP in an area south of what is believed to be the Calder Mountain pack. Since Calder Mountain is uncollared it is not know if these animals are part of the Calder Mountain pack or a new group. We will continue to monitor this area. This pack is not collared.

Verified Border Packs in Canada that Do Not Count in the Montana Population Estimate

Kootenai North

- 4 wolves
- no depredations reported on the U.S. side of the border

History: Kootenai North was formed from the former Kootenai pack and is a product of either splitting (into Kootenai North and Kootenai South) or is a product of dispersal. The former Kootenai pack was a transboundary pack that has denned both in Canada and the US. The Kootenai North pack occupies a territory mainly north of the U.S./Canadian border and west of Koocanusa Reservoir, while the Kootenai South pack (collared wolf 329) occupies a territory mainly south of the border and west of Koocanusa Reservoir. Because this pack spends most of it's time in Canada, most of our monitoring is from the US side of the border.

2006 Activities: This pack was located 2 times in 2006 in Canada and the radio signals were heard another 2 times from the US side of the border indicating the pack was near the US/Canada border. In January of 2006, 4 wolves were observed.

Nettie

- 4 wolves
- no depredations reported on the U.S. side of the border

History: New pack in 2006.

2006 Activities: This pack was discovered in October after missing wolf 272 was located in the North Fork Flathead in Canada about 15 miles north of the border. Male wolf 272 was missing from the Lazy Creek pack since January 2005 until located approximately 44 miles to the north this October. Since this discovery occurred later in 2006, it is not yet known if any this pack's territory is in the United States. One of the 3 total locations on this pack was ½ mile from the US border in Canada. This pack is estimated to have 4 wolves at the end of 2006. We will continue to monitor this pack mostly from the US side of the border.

Miscellaneous / Lone Individuals in Montana

A male wolf (NW071M) was retrieved on April 10 by MFWP law enforcement and its death is under investigation.

There were additional livestock losses that could not be verified against any known packs. These losses include a killed yearling cattle, an injured calf, and an injured llama. Packs near those areas are not radio collared and therefore wolf movement and landscape use in adjacent pack territories could not be ascertained.

Wolf activity was verified in five other areas, but it is unclear whether they are discrete packs or areas used by adjacent packs. We will continue to monitor these areas. These areas include Grave Creek east of Eureka and adjacent to the Ksanka pack (collared), Libby Creek south of Libby and adjacent to the McMillan pack (uncollared), Spar Lake south of Troy and adjacent to the Calder Mountain pack (uncollared), Briggs Creek west of Kalispell and adjacent to the Hog Heaven pack (uncollared), and Buffalo Bill Creek east of Plains and adjacent to the Thompson Peak pack (uncollared).

Suspected Packs in Northwest Montana
Nothing to report.

Other Miscellaneous Information in Northwest Montana
Nothing to report.

Southern Montana Experimental Area

Montana Portion of the Greater Yellowstone Experimental Area

Overview

Packs in the MT portion of the GYA have been documented from Red Lodge to Dillon. Several packs live on the borders of YNP and WY. Agencies (YNP, MFWP, and WY USFWS) monitor these packs through flights and ground tracking. The location of the den site and the percent area / time in an area determine where that pack will be tallied in the population estimates. See the respective pack summaries below.

In 2006, a minimum estimate of 60 wolves in 14 packs were verified in the Montana portion of the Greater Yellowstone Experimental Area. Packs that were verified in 2005 and still existed in 2006 are Rosebud, Moccasin, Mission Creek, Baker Mountain, Buffalo Fork, Mill Creek, Donohue, Chief Joe, Dead Horse, Cougar II, Freezeout, Beartrap, and Wedge. Of the 14 packs, only five met the breeding pair criteria. We partly attribute this low success in breeding pairs to the mange parasite, which seems to negatively affect pup survival. Four packs had individuals confirmed to have the mange parasite. Lethal control on depredating packs late may also be a factor. Lower wolf numbers inside YNP could also partly explain the difference as fewer animals in the YNP population could result in fewer animals dispersing out of YNP into Montana.

Eagle Creek was the only new pack documented in 2006. However, MFWP did document transient activity in several locations throughout the MT portion of the GYA. Project staff

documented the dispersal of three wolves from their capture sites. The Beartooth pack is a Montana/Wyoming border packs that either denned or spent the majority of its time in Wyoming in 2006 and will therefore count in Wyoming estimates.

During 2006, 12 (86%) of 14 verified packs were monitored using ground and aerial telemetry. At the end of 2006,10 (71%) of 14 verified packs were being monitored using ground and aerial telemetry. Seven wolves were collared during MFWP trapping efforts and 2 were collared by WS. Radio-collared wolves were located 1-2 times per month by fixed-wing aircraft and ground telemetry.

Five collared animals were lost due to control actions or natural mortalities. Four collared animals are considered missing.

In 2006**,** 3 of the 14 verified packs were confirmed to have killed livestock (Table 1b), resulting in the lethal removal of 10 wolves. Two of these wolves were removed by landowners utilizing shoot-on-site permits. No wolves were killed in the MT portion of the GYA under the 10(j) rule.

Verified Packs (Table 1b in Appendix 3)

Mill Creek

- 4 wolves; not a breeding pair
- no depredations reported

History: The Mill Creek pack formed in 2000. It spent a fair amount of time on or near private property on the east side of Paradise Valley and the Yellowstone River.

2006 Activities: Three pups were documented in 2006 by MFWP personnel during a telemetry flight. Landowners reported seeing up to four wolves early in 2006, one of which had mange. The breeding female was found dead on private land on September 12th. The cause of death appeared to be natural with no sign of mange, which is interesting since mange has been documented in the group for several years now, especially in the pups.

Chief Joseph

- 8 wolves; breeding pair
- no depredations confirmed

History: The Chief Joseph pack began as a pair of wolves in 1996 in the northwest part of YNP. It started out primarily in YNP and had been counted as a YNP pack for most years. Although the pack consistently denned within the park boundary, it has spent more and more time in Montana. Through time, Montana project personnel did more of the monitoring. The Chief Joseph pack was included in the population estimate for the Montana portion of the GYA in 2005 and 2006.

2006 Activities: A second collar was put out on a 2 yr old male in August 2006. Late winter movements of this wolf show him leaving the territory and we will see where he ends up after breeding season in early 2007. Wolf 394M continues to occupy the Chief Joseph territory but seems to travel alone. He still shows sign of mange which has been evident for the last 3 years and he has become more visible this winter. Three pups were reported in 2006 and the pack was thought to have denned outside YNP.

Casey Lake

- no longer exists
- no depredations reported

History: The Casey Lake pack formed in 2004. Its territory is north of YNP on the east side of the Yellowstone River in the Paradise Valley. It is thought that mange has played a role in the demise of the pack.

2006 Activities: No wolves were documented for Casey Lake and the pack is thought to have disintegrated. Please see Eagle Creek write up below.

Eagle Creek

- 4 wolves; breeding pair
- no depredations reported

History: This new pair seems to have taken over the Casey lake territory north of YNP. replacement for the Casey lake pack. The Eagle Creek pack is four strong, comprised of a pair of adults and two pups at the end of 2006.

2006 Activities: On September 5th a rendezvous site was found and 2 pups documented. A breeding female was caught and collared on September 15th. Flights and ground tracking documented two pups and two adults at the end of 2006. No mange or other disease was documented in the group.

Donahue

- no longer exists
- 1 calf confirmed killed; 2 wolves removed by WS

History: New pack in 2005; removed due to livestock depredations in 2006.

- *2006 Activities:* Telemetry flights showed only two animals maintaining the Donohue territory in 2006. On October 20th this pair was caught attacking a calf on private land. Both wolves were lethally removed as breeding was never documented and the pair was preying on livestock, living in close proximity to livestock and private lands. There was mange in this pack.

Beartrap

- 8 wolves; breeding status unknown
- no depredations reported

History: The Beartrap pack formed in 2002. It occupied a territory at the north end of the Gallatin Mountain range near the Spanish Peaks consistently since then.

2006 Activities: A total of eight animals were seen on numerous occasions throughout the year but pups were not documented in 2006. The number of wolves and color combination are consistent with last year's counts and interestingly, remains the same at the end of 2006. Trapping to collar was attempted but unsuccessful.

Freezeout Pack:

- 3 wolves; not a breeding pair
- 1 confirmed calf killed, 3 probable calves killed, 3 wolves removed by WS

History: The Freezeout pack first formed in 2001 in the Gravelly Range east of Dillon. It has been one of the larger-sized packs in the Montana portion of the GYA outside YNP.

2006 Activities: On August 30th, while doing coyote work in the Gravelly Mountains, WS darted and recollared wolf SW52F which was wearing a GPS collar and fitted it with a standard VHF collar. The GPS collar was scheduled to come off in October and this was the only collared individual in the pack.

On September 28th, WS confirmed a wolf-killed calf on private land on the north end of the Centennial Valley. Three wolves were authorized for removal and WS could opportunistically remove the collared animal as long as another collar is put out in the same pack. On September 29th WS removed an adult non-breeding female and a SOS permit was issued to the landowner for up to two additional wolves. WS also looked at three more calves found in the same pasture as the landowner was moving the herd and considered the deaths "probable" wolf-caused. On October 2nd and 3rd, WS removed two uncollared gray males and the control action was concluded. There are 3 adults left in the Freezeout pack, which did not have pups this year.

Cougar II:

- 10 wolves; 2 missing radios; breeding pair
- no depredations reported

History: The Cougar Creek pack first formed in 2001 inside YNP. Its home range was mostly inside YNP and NPS personnel did all the monitoring. Since 2002, it has had 10 to 12 members.

2006 Activities: This pack is believed to have denned just inside the YNP boundary and ranged in and out of the park throughout the year. It is considered a Montana pack based on the amount of time it spends outside YNP. MFWP conducts nearly all the monitoring for this pack now.

Dead Horse:

- unknown; not a breeding pair
- no depredations reported

History: New pack in 2005. It occupied a territory at the south end of the Gallatin Mountain range from Big Sky to the Taylor Fork drainage.

2006 Activities: On May 13, the only radioed member of this pack (454M) was hit and killed by a car on Highway 191 south of Big Sky, MT. Contact was lost with this pack, repeated attempts were made to locate the pack for collaring purposes but not enough sign was ever found to warrant setting up a trapline. Several sightings from the fall hunting season indicate that this pack is still intact and is still has a territory south of the Big Sky area.

Wedge:

- 6 wolves; not a breeding pair
- 4 confirmed injured heifers; 3 of these heifers later euthanized, 1 confirmed heifer killed and 2 probable heifers killed; 2 wolves killed on SOS permits; 3 wolves removed by WS

History: New pack in 2005. It occupied a territory at the south end of the Madison range from Mill Creek to Cabin Creek.

2006 Activities: The Wedge Pack denned in its normal area of past years. On May 24 project personnel recaptured SW8 and replaced its radio collar. On May 25, a second wolf, a yearling male (SW79M) was caught, collared and released.

On July 19, a yearling heifer was found injured and was later confirmed as attacked by wolves, this heifer recovered from its injuries. WS was authorized to remove one wolf; and the private landowner was also issued a shoot- on-sight permit. On July 27, a heifer was found dead and was confirmed as a wolf kill by WS. The ongoing control action was increased to 2 wolves for WS and the SOS permit. The private landowner wanted to try and target offending wolves and did not grant access to WS for aerial control operations on the property. On July 28 the radio collared alpha male (SW7M) was removed on the SOS permit. On the following day July 29, a female pup was also removed on the SOS permit ending the control action. While moving cattle on July 29 the riders found 2 more heifer skeletons in the same pasture that were considered probable wolf kills by WS.

On September 18, two yearling heifers were found injured and confirmed as wolf attacks, these heifers were later euthanized. WS control and SOS permits were again issued for 2 wolves. The landowner gave authorization for WS to do aerial control work, as the ranch did not have the resources it did earlier in the summer. WS set foothold traps in the area as the weather was bad for aerial work and the remaining radioed wolf (SW8) was not heard in the area. On September 21, another heifer was found injured and later euthanized in the same pasture and was again confirmed as wolf caused by WS. When ranch personnel found the injured heifer, a lone wolf was seen in the vicinity. On September 22, while on the property, project personnel saw one adult and two pups in the pasture but due to weather could not get a shot at them. On September 30, WS captured and collared a female pup (SW129F) in the same pasture. This wolf is monitored for the next 2 weeks and did not leave the area and based on the earlier sighting and the killing activity, the control action was upped to three wolves preferably the adult and 2 pups. On October 11 WS removed one adult and 2 pups from this pasture and the control action is over.

Rosebud

- 2 wolves; not a breeding pair
- no depredations reported

History: Pack formed late in 2005.

2006 Activities: Traps were set in late April and a wolf was caught, but pulled out of the trap. The wolves traveled widely and did not localize in the 2006 denning season. Public wolf reports throughout the year indicated 2 animals moving along the Beartooth face between Red Lodge and Roscoe. Two other short trapping efforts were attempted in July and October, but there were no captures.

Moccasin Lake

- 4 wolves; breeding pair
- no depredations reported

History: This pack formed in 2004, and its territory is south-southeast of Big Timber. There was no breeding activity in 2005, but in October the Moccasin female 242F was joined by an adult male (473M) that had left the Swan Lake pack in YNP.

2006 Activities: The pack localized during the denning season and was seen traveling with two pups in October. The Derby Fire, which started August 22, burned large areas of Moccasin's territory, including their historic rendezvous site. The wolves spent most their time following the fire in burned areas, possibly scavenging ungulate carcasses.

The Boulder range rider project continued for the second year funded by a grant from the Natural Resource Conservation Service (Environmental Quality Incentives Program), and contributions from the Predator Conservation Alliance. The riders did not have any interaction with the Moccasin Lake, most likely due to fire-related allotment closures which removed all livestock. See the Field Studies and Research section below for more detail on this project.

Mission Creek

- 3 wolves; not a breeding pair
- no depredations reported

History: The Mission Creek pack first formed in 2002. Its territory is southeast of Livingston. Pack dynamics appeared to be greatly affected by mange. In October 2005, the alpha male succumbed to mange and died and SW28M (formerly of the Moccasin Lake pack) joined the pack.

2006 Activities: The pack home range has shifted to the north, most likely due to the presence of the larger Baker Mountain pack to the south. All three wolves are showing varying degrees of mange. In March and April the pack was routinely found in proximity of livestock calving grounds. The ranchers often saw the pack, but said the wolves never bothered their cattle. On several flights 457F was separated from SW28M and another uncollared wolf. There was no evidence of successful breeding. In the last part of the year 457F was not located at all and her status is unknown.

Baker Mountain

- 7 wolves; breeding pair
- no depredations confirmed

History: This group was documented in fall 2005 shortly after SW57F was caught and collared near a depredation site. Its territory is in the West Boulder area, and just south of the Mission Creek pack.

2006 Activities: The pack did not appear to localize in the denning period, but in July the two adults were seen with 5 pups. Their rendezvous site appeared to be located near cattle. In August, a dead calf was found in the vicinity, but WS could not determine cause of death. Project personnel and two of the Boulder range riders moved into the area and hazed the wolves away. Shortly after this the Jungle Fire burned through the area and the wolves moved to the north. See the Field Studies and Research section below for more details on the Boulder range riders.

Buffalo Fork (Mystery pack?)

- 10 wolves; not a breeding pair
- no depredations reported

History: The Buffalo Fork pack formed in 2003. In June 2003, the only radio-collared member of the pack died and contact was lost. At the end of the year, 3 wolves were believed to be left in the pack. Its territory was north of YNP in the Buffalo Fork drainage. In 2005, numerous public reports were received from backcountry recreationists. In July 2005, project personnel backpacked through the historic Buffalo Fork territory in the Absaroka Beartooth Wilderness and found sign of wolf activity.

2006 Activities: In the first part of April it is suspected that this pack entered YNP and took over the Slough Creek pack's territory. YNP personnel are not certain whether it was the old Buffalo Fork pack, but it is very plausible. Once the Slough wolves denned (April 12) this unknown pack focused on the Slough den and essentially pinned the two nursing females inside the den. The intruding wolves were often bedded immediately in front of the Slough pack's den hole and sometimes went in but usually backed out quickly, probably because of the wolves inside. The Buffalo Fork pack killed two members of the Slough Creek pack, adult males 489 and 377. The Slough Creek wolves not in the den were not able to drive away Buffalo Fork and none of their pups survived. Buffalo Fork then had an aggressive interaction with the Druid pack before leaving the Park to the north in late June. In July an outfitter reported wolves coming close to their camp in the Hellroaring drainage, just north of the Park. The alpha male of the Slough pack, 490, was also killed in late December, but it is unclear if Buffalo Fork was responsible.

Verified Border Packs Counting in Wyoming Population Estimate (Table 2 in Appendix 3)

Beartooth:

- 7 wolves; breeding pair
- no depredations reported

History: This pack first formed in 1999 when female wolf #09 originally from the Rose Creek pack in YNP dispersed and paired up with an uncollared black male wolf. The pair established a territory east of YNP near the Montana/Wyoming border.

2006 Activities: For much of 2006, there was a not a collar in this pack. It lives in a relatively remote area near the Montana/Wyoming border. There aren't many livestock within their home range.

Miscellaneous / Lone Individuals in Montana GYA

Wall Creek:

- not a resident pack; not a breeding pair; 2 wolves collared and dispersed
- 1 confirmed calf killed

2006 Activities: During the month of April MFWP personnel reported seeing lone wolves and wolf kills on the Wall Creek Wildlife Management Area. Project personnel scouted the area and set traps on May 5. On May 8, two adult female wolves (SW72F & SW73F) were caught and radio collared on the Wall Creek WMA. On August 4, a producer of the Wall Creek Grazing Association found a dead calf in the South Fork of Hyde Creek that was mostly consumed. He wanted to report the loss but did not request an official WS investigation. An allotment rider had seen three wolves in the area a few days previous. On August 7, another dead calf was found in the same area and was also consumed. As before, a report was made, but a formal WS investigation was not requested by the livestock owner. On August 13 WS investigated a third dead calf in the upper Wall Creek area (FS allotment) and confirmed it as a wolf kill. There was a lot of bear sign in the area but tracks of one wolf traveling alone were found, traps were set near the carcass and were checked for a few days. Neither of the Wall Creek radio-collared wolves could be heard in the area. WS was authorized to kill one wolf if it was caught in the trap over the period of the next few days. No wolves were caught and traps were pulled ending the control effort.

The Gravelly situation was revisited and it was decided to extend the control action for the full 45 days on the Wall Creek grazing allotment for one uncollared wolf. The control action was tied to the Wall Creek grazing allotment, WS was told they could not actively hunt a wolf on the Wall Creek WMA but if they were in pursuit of one and it crossed onto the WMA they could continue pursuit and take it on the WMA. At the end of the 45 days, no wolves were taken and the control effort was over. No more depredations occurred in this area through the fall. Both of the wolves that were captured and radio collared in this area appear to have been dispersers and can no longer be found. SW073F was last heard in the area on August 29 and not found again and SW72F was last herd in the Lima area on September 8 and not heard again.

Suspected Packs in Montana GYA

8-Mile area: A male was collared in the 8-Mile area of Paradise Valley in December 2006. An unknown collared gray was seen in the area as well. Time will determine where this pair ends up.

Sage Creek: In mid-January 2006, while doing helicopter work on coyotes, WS found 6 gray wolves in Basin Creek and darted, collared and released an adult male SW64M. SW64M was monitored through March after which time he dispersed and showed up in July in Big Sheep Creek, southwest of Dillon. We were unable to locate the Sage Creek pack after this time and reports dropped off. Two ewes were confirmed killed by wolves in the Blacktail in October but it was unknown whether the Sage Creek wolves or other wolves were involved. In early January 2007, WS spotted 3-4 sets of wolf tracks from the air in upper Basin Creek.

Other Miscellaneous Information in Montana GYA

In the 2005 annual report, MFWP reported a backcountry pack named Carbonate Mountain. The home range of this pack was unclear, but activity had been verified in the Boulder drainage and near Carbonate Mountain in the Absaroka Beartooth Wilderness. Public reports of wolves in the area around Carbonate Mountain in the Absaroka Beartooth Wilderness were received beginning in September 2005. Numerous hunters and the local MFWP game warden reported seeing 3-5 wolves. In past years, there had been wolf activity in this area occasionally. In 2006, project personnel scouted the areas where activity was detected in 2005, but found no fresh sign. There were no hunter reports from the area either. No conflicts with livestock were reported in 2006. The status of this pack is unknown.

MFWP euthanized a sick male wolf (SW474) on December 2nd near the Tobacco Root Mountains. This animal had dispersed from Idaho's Biscuit Basin pack. A necropsy report showed the animal suffered from canine distemper (see disease section above).

A female wolf (SW109) was struck by a vehicle on August 6th in the Reynolds Pass area.

A calf was confirmed wolf killed on private land in the Paradise Valley on October 18. A collared gray wolf with mange was seen in the area but pack affiliation was unknown. No action was taken due to the upcoming big game season opener.

Sheep depredations in eastern Montana not a wild wolf: The first sheep depredation in Eastern Montana was reported to WS in December of 2005 and by mid-October 2006, approximately 120 domestic sheep had been injured or killed in eight different incidents in Dawson, Garfield and McCone Counties. Initially WS suspected a dog as the culprit in the first few incidents, but as the depredations continued and the animal became more proficient, they concluded it was a wolf.

Although track measurements were smaller than an average Rocky Mountain wild wolf and descriptions of the animal's color were not typical, MFWP authorized wardens and biologists in the agency, affected landowners, USDA Wildlife Services and the McCone County predator control specialist to kill the problem animal. Charles M. Russell National Wildlife Refuge also assisted in the effort by providing special access to refuge lands adjacent to the private lands of the affected producers. During that timeframe there were often lapses in the depredations, sometimes for months. Federal regulations limit lethal control efforts to 45 days after each confirmed incident. The last 45-day control period ended on August 31, 2006 and no wolves or wolf-like canids were killed and no further damage was reported.

In early November 2006, one of the landowners who had depredations previously reported fresh large canid tracks in the snow. MFWP authorized immediate action by WS because of the pattern of continued depredations over nearly a year and the long history of trying to resolve the situation had thus far been unsuccessful. WS launched a helicopter the next day, located the animal and lethally removed it. Once the animal was in hand, agency personnel determined that its appearance was not typical of a wild northern Rocky Mountain wolf. To determine the animal's origin and genetic make up with certainty, DNA samples were sent to the National Fish

and Wildlife Forensics Laboratory in Ashland, Oregon and Dr. Bob Wayne's Genetics Laboratory - Department of Ecology and Evolutionary Biology, University of California, Los Angeles.

Both labs determined independently that the animal did not come from, nor was the genetic fingerprint consistent with wild free, ranging wolf populations in the northern Rockies (MT, ID or WY) midwest states (WI, MI, MN), or Canada. The genetic experts concluded that the animal was the result of human-manipulated breeding in a captive situation and was a “domestic” wolf. The hodgepodge mixture of DNA does not occur naturally in wild, free-ranging wolves in North America.

The National Forensics Laboratory in particular has an extensive DNA library of wild North American wolves, captive domestic wolves, and wolf-dog hybrids for comparison. This lab has run over a thousand samples and maintains the most extensive North American reference collection anywhere. The lab at UCLA has particular expertise with the genetic make-up of wolves within YNP and some reference samlples from other wild northern Rockies wolves.

The carcass's orange color, small foot size and general appearance did not match typical wild, free ranging wolves. Other physical evidence also suggest that the animal had been in captivity, including long claws, tartar stains on the teeth, and teeth that were in relatively good condition compared to most four-year-old wild wolves.

Montana state law and administrative rules require that any captive wolf or hybrid animal that is greater 50% wolf be permanently marked (tattooed) and registered with MFWP (MCA 87-1-231 – 87-1-232). State law also requires that any escape, release, transfer of custody, or other change in disposition of the captive hybrid be reported to MFWP. Financial liability for property damage caused by hybrids is the responsibility of the hybrid’s owners (MCA 87-1-233).

It is not known where the hybrid came from, how it got to this particular area, or when it arrived. There were no permanent markings or tattoos on this hybrid and MFWP has no way to track down its owner. Anyone with information on this domestic wolf is urged to call Montana's violation hotline at 1-800-TIP-MONT (1-800-847-6668).

Montana portion of the Central Idaho Experimental Area

Overview

In 2006, a minimum estimate of 76 wolves in 16 packs was verified in the Montana portion of the CID. Packs that were verified in 2005 and still existed in 2006 were the Battlefield, Black Canyon, Lake Como, Painted Rocks, Sula, Skalkaho, Big Hole, Mt Haggin, Sapphire, and Willow Creek packs. Newly documented packs in 2006 included the Divide Creek, Bearmouth, East Fork Bitterroot, Welcome Creek, B191F pair, and Mussigbrod packs. The Sleeping Child pack was also a new verified pack for 2006, but the pack was removed before the end of 2006 because of repeated livestock depredations. In 2005, MFWP documented wolf activity on the west side of the Sapphire Mountains east of Hamilton all the way south down to the East Fork of

the Bitterroot River, but only 1 pack (Skalkaho) could be confirmed in 2005. In 2006, 4 packs were documented using this area (Skalkaho, Divide Creek, Sleeping Child, and East Fork Bitterroot).

Montana/Idaho border packs that either denned or spent the majority of their time in Idaho in 2006 (and will therefore count in the Idaho population estimate) were the Brooks Creek (7 wolves) and Hughes Creek (13 wolves) packs. SW64M, a disperser from the Sage Creek pack east of Dillon, also counted in the 2006 for Idaho estimate, was found in Montana on multiple occasions.

During 2006, 12 (71%) of 17 verified packs were monitored using ground and aerial telemetry. At the end of 2006, 9 (56%) of 16 verified packs were being monitored using ground and aerial telemetry. Thirteen wolves in 9 packs were captured and radio collared in the Montana portion of the CID in 2006. Seven wolves were radio collared during MFWP trapping efforts, and 6 were radio collared by WS. Two pups were also caught by MFWP, but were too small to radio collar and were pit tagged and released. Radio collared wolves were located 1-2 times per month by fixed-wing aircraft.

Seven of 16 packs monitored in the MT portion of the CID occupied the Montana/ Idaho border: Battlefield, Black Canyon, B191F pair, Painted Rocks, Big Hole, Sula, and Lake Como. The B191F pair, Battlefield, and Big Hole packs have been verified to spend time in Idaho. The others were only suspected to spend time in Idaho, based on proximity of sightings or telemetry locations. Because these 7 packs denned in Montana, or were known to have spent most of their time in Montana, they were counted as Montana packs for 2006. MFWP conducts most of the monitoring of these packs in close coordination with IDFG and the NPT, with the exception of the Big Hole pack, which was monitored by both agencies in both states. Although the Brooks Creek pack denned, and therefore counted in estimates for Idaho, they spent the majority of their time in Montana and were monitored by MFWP. The Hughes Creek pack spent most of its time in Idaho and was monitored primarily by IDFG.

Reproduction was confirmed in 8 packs: Battlefield, Mussigbrod, Big Hole, Sapphire, Willow Creek, Bearmouth, Skalkaho and East Fork Bitterroot packs. Although pups were documented in the Skalkaho and Battlefield packs, their survival could not be confirmed at the end of 2006. For the remaining 6 packs, a minimum estimate of 18 pups was produced and 5 packs (Sapphire, Big Hole, Mussigbrod, Bearmouth, and East Fork Bitterroot) met the breeding pair requirement. Reproductive status of the Mt Haggin, Lake Como, Black Canyon, Painted Rocks, B191F pair, Welcome Creek, Divide Creek, and Sula packs was unknown.

Two dispersals were documented in 2006. B191F, a disperser from the Soldier Mountain pack in Idaho, was found in the Big Hole Valley in July and has been observed with 1 other wolf. She was monitored through the rest of year and seemed to have established a territory between Montana (Big Hole Valley) and Idaho on both sides of the Beaverhead Mountains. In the spring SW64M dispersed from the Sage Creek pack east of Dillon and was located in July in Big Sheep Creek southwest of Dillon on the Montana/Idaho border. He has been found on both sides of the border and was counted in Idaho estimates in 2006. Another Idaho dispersing wolf, B213F from the Five Lakes Butte pack, spent some time on the Montana side of Lolo Pass during summer before traveling back into Idaho.

Six packs were confirmed to have killed livestock: Battlefield, Black Canyon, Mussigbrod, Sleeping Child, Willow Creek, and Skalkaho. Fourteen cattle and 3 dogs were confirmed killed and 3 calves and 2 dogs were confirmed injured. Thirty wolf mortalities were documented in 2006. Twenty-eight wolves were killed in response to depredations: two were shot by private citizens [10(j)] and 27 were killed by WS. Two other wolves were killed illegally. Three radio-collared wolves were missing at the end of 2006.

Verified Packs (Table 1c in Appendix 3)

Battlefield

- 4 wolves; not a breeding pair
- 3 calves confirmed killed; 6 wolves removed by WS and 1 illegal mortality

History: The Battlefield pack formed in 2002.

2006 Activities: Five gray wolves were believed to be in the Battlefield pack in early 2006. However, this pack had moved into Idaho during winter 2005-2006 and was not located until June when they were found in the Big Hole Valley. They presumably denned in Montana. Seven gray pups were seen by MFWP at a rendezvous site in early August. One wolf was shot illegally in October. The individual turned himself in and was fined $2,500 by USFWS Law Enforcement. One calf was killed in early November and a landowner shot one wolf under 10(j) regulations that was involved in the depredation. However, the wolf was searched for but was not found and it was unknown whether it died. WS killed 2 wolves after this depredation event. One was a black wolf that may have joined the pack at some point, since no black wolves had been seen in this pack previously. In December, 2 more calves were confirmed killed and WS killed 4 more wolves. A fifth wolf was injured and was searched for but could not be found and may or may not have died later. The radio-collared yearling female, SW47F, although not present during the December depredation event, was found in Idaho on big game winter range in December with 3 other gray wolves, presumably the remainder of the Battlefield pack.

Black Canyon

- at least 2 wolves; not a breeding pair
- 1 yearling cow confirmed killed, 1 guard dog injured; 3 wolves removed by WS

History: The Black Canyon pack was first confirmed in 2004.

2006 Activities: The Black Canyon pack was believed to contain at least 4 wolves in early 2006, but MFWP was unable to obtain an accurate count of this pack. In February, WS bumped into this pack while doing helicopter control on coyotes and darted and radio collared an adult male (SW67M). A yearling cow was confirmed killed in late March and a guard dog was injured in April. WS subsequently removed 3 wolves from this pack. At least SW67M and another uncollared wolf were believed to remain at that time. SW67M was monitored until his disappearance in August. MFWP continued to receive wolf reports in the area during hunting season and agency personnel confirmed that at least 2 wolves were using the area consistently during the fall.

Mussigbrod

- 2 adults, 4 pups; breeding pair
- 4 calves confirmed killed; 1 wolf removed by WS

History: New pack in 2006.

2006 Activities: This pack was discovered when depredations were confirmed in this area starting in late spring 2006. Four calves were confirmed killed between May and July. One pup was collared and released by WS, but slipped its radio collar soon after. WS killed an adult male wolf in July. While trapping in the area, WS confirmed at least 4 pups in this pack. In August, MFWP attempted to locate this pack again for another capture effort, but the wolves had moved away from their den site and were not located. Consistent reports of wolf activity in the area were received through hunting season.

B191F

- 2 adults; not a breeding pair
- unknown if involved in depredation; 1 calf confirmed injured in area

History: New pair in 2006.

2006 Activities: B191F was a dispersing wolf from the Soldier Mountain pack in Idaho and was found in the Big Hole Valley in July 2006. She has been consistently seen with 1 other black wolf and seemed to hold a territory on both sides of the Beaverhead Mountains between Idaho and Montana. A calf was confirmed injured in the southern portion of the Big Hole in early October in an area B191F has been known to inhabit, but it was unknown whether she was involved. The calf died later.

Mt. Haggin

- at least 3 wolves; not a breeding pair
- no depredations reported

History: The Mt. Haggin pack, west of Butte, was first documented as a group of 3 wolves in 2001. It is unknown whether the current pack in the area is related to the original pack.

2006 Activities: This pack was believed to contain at least 2 wolves in early 2006. Few reports were received during spring and summer. MFWP personnel scouted the area in August, but did not detect any fresh wolf sign. During hunting season, MFWP received additional reports and verified that at least 3 wolves were using the area.

Willow Creek

- 5 wolves; not a breeding pair
- 1 calf confirmed killed; 1 wolf removed by WS

History: The Willow Creek pack was first confirmed between Drummond and Phillipsburg in 2002. It is unknown whether the current pack is related to the original Willow Creek pack.

2006 Activities: In early 2006, 6 wolves (2 adults, 4 pups) were thought to exist in the Willow Creek pack. In January, a calf was confirmed killed by wolves and WS removed a 9-

month-old pup. In June, a yearling female was caught and radio collared and appeared to be the breeder. One pup was documented in 2006 so this pack was not counted as a breeding pair. At the end of the year 5 wolves were consistently seen from the air: 4 adults (including collared wolves B142 and SW82F) and the 1 pup.

Bearmouth

- 4 wolves; breeding pair
- no depredations reported

History: New pack in 2006.

2006 Activities: In spring 2006, DNRC foresters reported wolf activity in the Tyler Creek area southwest of Bearmouth. MFWP scouted this area in June and trapped and radio collared an adult breeding female. Two adults and 2 pups were documented in 2006.

Welcome Creek

- 4 wolves; not a breeding pair
- no depredations reported

History: New pack in 2006.

2006 Activities: MFWP received wolf reports in the Miller Creek and Welcome Creek drainages, and Threemile Wildlife Management Area in 2006. MFWP personnel investigated and confirmed wolf presence. Traps were set but no wolves were caught. However, we were unsure whether individual wolves or a pack was using the area until the end of the year, when 4 sets of wolf tracks were documented on private land near the Threemile Wildlife Management Area. Efforts to trap and radio collar a member of this pack will continue in 2007.

Sapphire

- 14 wolves; breeding pair
- no depredations reported

History: Wolf activity was initially documented in remote areas of the East Fork of the Bitterroot River and the east side of the Sapphire Mountains in 2001.

2006 Activities: Fourteen wolves (13 black and 1 gray) were estimated in the Sapphire pack in early 2006, at least four of which were pups. In June, MFWP trapped and radio collared 2 additional wolves in this pack: an adult male and a yearling female. A yearling female was radio collared in 2005. Four pups were documented from the air in August. At the end of the year, 14 wolves (13 black and 1 gray) were documented, including the 3 radio collared wolves: SW45F, SW83M, and SW84F.

Skalkaho

- unknown number of wolves; not a breeding pair
- 1 calf confirmed killed; 1 wolf removed by WS, 1 illegal mortality, 2 wolves missing

History: The Skalkaho pack is believed to have held a territory east of Hamilton since 2004 but was first verified and documented in 2005.

2006 Activities: In early 2006, MFWP estimated 6 wolves in the Skalkaho pack. In February, 2 lion hunting hounds were killed and one was injured in Gird Creek and MFWP documented at least 8 sets of wolf tracks. In April, MFWP incidentally observed 8 uncollared wolves from the air, which confirmed the track estimate. In May, MFWP trapped and radio collared a yearling female. Three pups were documented from the air in August. One calf was confirmed killed on private property east of Hamilton in September and WS subsequently removed 1 adult male wolf and radio collared 2 more wolves: a female pup and a female adult. A male pup was also caught but was not radio collared. About 1 week later the collared female pup was shot illegally. Her death is still under investigation. A flight in mid October did not locate either of the 2 remaining radio collared wolves. Neither wolf has been found since that time despite extensive searching. Considering that this was a large pack and that MFWP received some wolf sighting reports during hunting season, MFWP believed the pack still existed, but made no estimate of pack size.

Sleeping Child

- pack removed; not a breeding pair
- 2 calves, 2 yearlings confirmed killed, 2 calves injured, 1 dog killed; 14 wolves removed by WS, 1 wolf killed under 10(j)

History: The Sleeping Child pack was believed to have established in 2005, but was verified in 2006.

2006 Activities: Wolf activity in the French Basin and Rye Creek areas was documented in 2005, but no wolves were radio collared. In early 2006, a ranch employee in French Basin reported 8 gray wolves and this count was later confirmed by MFWP. Seven pups were born in 2006, bringing the pack count to 15. MFWP attempted to trap and radio collar in the area in late April, but no wolves were captured. In May, a yearling steer and a dog were confirmed killed on private land. Soon after, a wolf was shot under the 10(j) regulations when a ranch employee witnessed wolves chasing horses. Several days later WS trapped and radio collared 2 wolves on the ranch, a breeding female and an adult male. Around this time, MFWP removed the carcasses of 2 yearling steers that had died of natural causes so as to reduce risk of attracting wolves. In early July 1 calf was confirmed killed and 2 injured on an adjacent DNRC state grazing lease. A yearling steer was also confirmed killed on private property. WS removed two adult wolves soon thereafter, including the radio collared male. Cattle were moved off of the state lease at this time to reduce risk of wolf depredation. MFWP personnel camped in the area for 2 weeks and tried to haze wolves out of the area and into higher elevations that are elk summer range. Shortly after MFWP vacated this area, the pack moved their 7 pups back into the French Basin area and in late July a rancher in the Medicine Tree area reported that his cattle were acting as if they had been harassed. Several days later, 2 uncollared wolves were observed chasing horses in French Basin. In early August, another calf was confirmed killed on private property. Wild game was scarce in the area and the wolves did not follow natural prey to higher elevations so potential for further

conflict was believed to be high. Because MFWP's non-lethal and incremental lethal control methods to reduce wolf-livestock conflict did not prevent additional depredations and because of potential for further conflicts, MFWP requested WS to remove the remainder of this pack. Twelve wolves were removed in early August.

Divide Creek

- 4 wolves; not a breeding pair
- no depredations reported

History: New pack for 2006.

2006 Activities: After removing the Sleeping Child pack MFWP were surprised to receive a report from archery hunters of wolf activity in upper Rye Creek, close to where the Sleeping Child pack had occasionally been found. MFWP set traps and caught an adult breeding female in September. Monitoring through the fall determined that this pack consisted of 4 wolves (1 black, 3 gray) and held a territory in the Sleeping Child drainage between the Skalkaho pack and former Sleeping Child pack.

East Fork Bitterroot

- 6 wolves; breeding pair
- no depredations reported

History: New pack for 2006.

2006 Activities: Wolves have been reported in the East Fork of the Bitterroot for several years, but this pack was initially documented in 2006. MFWP trapped and pit-tagged 2 pups in July, and in August radio collared an adult breeding female. Three pups and 3 adults were documented from the air.

Sula

- 7 wolves; not a breeding pair
- no depredations reported

History: This pack has existed since at least 2004 and has been monitored since 2005.

2006 Activities: Seven wolves were believed to comprise the Sula pack at the beginning of 2006. The pack appeared to localize during denning season, but no pups were documented. We continued to monitor radio-collared wolf SW20M throughout the year and in December saw a minimum of 7 wolves in this pack.

Painted Rocks

- at least 4 wolves; not a breeding pair
- no depredations reported

History: Wolf activity was initially documented in the Painted Rocks area (West Fork of the Bitterroot River near the Montana/Idaho border) with the location of dispersing Idaho female

B67 in this area in 2001. B67 was monitored through 2002, and the pack has not contained a radio-collared individual since. At least 4 wolves have been in the area continuously and appeared to spend the majority of their time on the Montana side of the state border.

2006 Activities: At least 4 wolves were thought to comprise the Painted Rocks pack at the beginning of 2006. In mid March a landowner in the West Fork drainage reported that wolves attacked his dog. He had to euthanize the dog because of its injuries. He buried the dog before an investigation could be conducted to determine if its injuries had been inflicted by wolves. MFWP personnel scouted the West Fork several times during summer and found old wolf sign, but nothing fresh enough to warrant a capture effort. MFWP conducted snow tracking surveys in the West Fork drainage in December and confirmed presence of a minimum of 4 wolves at the end of 2006.

Lake Como

- at least 2 wolves; not a breeding pair
- no depredations reported

History: This pack initially produced pups and was documented as a breeding pair with 5 members at the end of 2002. Since then, little has been known about wolf activity in this remote area.

2006 Activities: Throughout 2006, MFWP received numerous reports in the Tin Cup, Spoon Creek, Lost Horse, and Rock Creek/Lake Como areas. During summer, MFWP investigated a report of a potential rendezvous site, but no wolf sign was found. A minimum of 2 wolves was documented in the area by the end of 2006, but winter snow tracking efforts in early 2007 suggested a larger group. Efforts to locate and radio collar a member of this pack will continue in 2007.

Big Hole

- 9 wolves; breeding pair
- no depredations reported

History: The Big Hole pack formed when B7 and B11 (released in 1995 as part of the original reintroduction efforts) pair bonded in 1996. B7 and B11 were translocated out of the Big Hole Valley, Montana twice, in 1996 and 1997, before settling and establishing a territory near Lolo Pass, west of Missoula. The Big Hole pack has had a continuous tenure in its home range since 1997.
2006 Activities: Because they denned and spent most of their time in Montana, the Big Hole pack was officially counted as a Montana pack in 2006. Field work and monitoring flights were conducted by both the NPT and MFWP. NPT personnel trapped the area in spring to radio collar additional wolves in the pack, but none were caught. Four pups were seen by NPT in spring and also by MFWP during a flight later in summer. Original alpha B7 left, or was expelled from the pack after summer 2005; he was found hit by a car near Salmon, Idaho in early January 2007. He had virtually no canines left and appeared to be surviving primarily on road kill. He was at least 13.75 years old. It was unknown whether B11 was still alive, but she has not been observed with the Big Hole pack since 2005. Five adults (including radio-collared female B151) and 4 pups were believed to comprise this pack at the end of the year.

Verified Border Packs Counting in Idaho Population Estimate (Table 3 in Appendix 3)

Brooks Creek

- 7 wolves; breeding pair
- no depredations reported

History: The Bass Creek pack initially established in this area in 1998. After repeated conflicts with livestock on private property, the entire pack was translocated to the Spotted Bear area of the South Fork of the Flathead River where they established the Spotted Bear pack (see northwest Montana pack summaries above). The Brooks Creek pack was first documented in 2005.

2006 Activities: The Brooks Creek pack denned in Montana in 2005, but denned in Idaho in 2006 and therefore counted in Idaho estimates for 2006. However, this pack spent the majority of their time in 2006 in Montana's Bitterroot Mountains, ranging from Bass Creek south to Fred Burr Creek. Because the majority of their time was spent in Montana, MFWP primarily monitored this pack. Six pups were documented from the air in July. In October 9 wolves were seen in this pack, but by the end of the year only 7 were seen on a regular basis.

Hughes Creek

- 13 wolves; breeding pair
- no depredations reported

History: First documented by IDFG in 2005.

2006 Activities: The Hughes Creek pack spent the majority of their time in Idaho, but was located in the West Fork of the Bitterroot River on 1 occasion. IDFG conducted all monitoring activities on this pack. Eight pups were documented in June. IDFG estimated 13 wolves in this pack at the end of 2006.

SW64M

- unknown number of wolves; not a breeding pair
- depredations in ID unknown

History: Was a member of the Sage Creek pack east of Dillon which established in 2005.

2006 Activities: SW64M dispersed from the Sage Creek pack east of Dillon in the spring and was located on the Montana/Idaho border east of Leadore, Idaho in mid summer. He was found on several occasions in the Big Sheep Creek area in Montana. In September and October, he was located with an uncollared female. However, Idaho WS killed her in a control action later that fall. It was unknown whether SW64M was involved in these depredations. After this time, SW64M was seen in proximity of a group of uncollared wolves near Leadore, but did not appear to join this group by the end of the year. Because he seemed to be spending more time on the Idaho side at the end of the year he counted in Idaho estimates.

Miscellaneous / Lone Individuals in Montana CID

On May 26, a female black wolf was shot under the 10(j) regulations when she was observed chasing cattle on private property near Philipsburg. This occurred in the Willow Creek pack territory, but no black wolves were believed to belong to this pack so it was presumed that she was a dispersing wolf.

Suspected Packs in Montana CID

There are several areas where MFWP suspected or verified wolf activity, but did not have enough information to verify whether new packs were present. In areas where MFWP have verified uncollared packs, such as Lake Como and Painted Rocks, it was especially difficult to tell how large these territories were and whether they were used by more than 1 pack. These areas will potentially be explored in 2007.

Other Miscellaneous Information in Montana CID

In mid-October, landowners in the Rock Creek drainage west of Philipsburg reported wolf activity on their ranch and adjacent USFS grazing allotment. Although the Sapphire pack had been found in this area before and the Willow Creek pack had also been found nearby on occasion, no radio-collared wolves were found nearby. By late October wolves were still being reported in the area by both the landowners and hunters and still neither the Sapphire nor Willow Creek packs were found nearby. The landowner was having trouble getting their yearling cattle off of their federal grazing lease and was concerned for their safety. WS and MFWP initiated a trapping operation in the area but no wolves were caught before traps had to be pulled because of cold temperatures. In late November, one of the yearlings was confirmed injured by wolves. WS attempted trapping in the area again but no wolves were caught. It is unknown whether the wolves involved are part of a new pack or uncollared wolves from the Sapphire or Willow Creek packs. Trapping and radio collaring efforts in this area will continue in 2007.

In early January 2007, MFWP spotted 3 uncollared gray wolves southeast of Wisdom in the Big Hole Valley while conducting elk surveys. Later in the month a coyote trapper caught an uncollared gray wolf in this area and it was collared by MFWP. Monitoring in 2007 will determine whether this wolf is part of a pack.

OUTREACH AND EDUCATION

MFWP's wolf program outreach and education efforts are varied, but significant. Outreach activities take a variety of forms and include: meeting people in the field, visiting landowners on their ranches, phone conversations and email to share information and answer questions, and granting interviews with the media, writers, and others. MFWP wolf staff also gave presentations at organized functions. MFWP also prepared and distributed a variety of printed outreach materials and media releases to help Montanans become more familiar with the Montana wolf population, the state's plan, and the current federal regulations. During the course of the year, MFWP staff note most their efforts in the USFWS Wolf Weekly report.

Other MFWP staff and volunteers are instrumental in accomplishing MFWP's outreach efforts. These include area game wardens, area wildlife biologists, block management personnel, information officers and front desk staff, staff of the Education Bureau, State Parks employees, the Helena staff (who work closely with the MFWP Commission, the legislature, and a variety of other elected or appointed officials), hunter education instructors, etc.

An important specific initiative in 2006 was the redesign of the wolf pages on the MFWP website. The pages were updated with new information on a variety of subjects with respect to wolf conservation and management in Montana. In February, MFWP launched an application for the public to log on and view flight reports. The wolf report application continued to bring valuable information from the public. Wolf reports help MFWP monitoring existing packs and documenting wolf activity in new areas. See www.fwp.mt.gov/wildthings/wolf.

A wide variety of media requests are received, ranging from daily newspapers, magazines, documentary filmmakers, and authors. Additionally, the MFWP website receives email comments and questions from a wide variety of interested publics. Efforts are made to respond to as many as feasible.

The most significant outreach occurs on a daily basis when project personnel are meeting people in the field and answering phone calls and email inquiries. This informal outreach is not recorded here. In addition to the field contacts MFWP wolf staff gave many more formal presentations throughout the year to a variety of groups. A minimum of 47 presentations were given to over 2,000 in 2006. When broken down by category, the majority of presentations were made to other agency/government professionals and livestock interests. However, no single group or setting dominated our efforts, as shown below.

Outreach Categories:
Civic: Kiwanis Club, Rotary Club, Lions Club, etc.
Teacher/school: K-12 and teachers
College/Professional: colleges, conferences, and adult education
Hunting: hunting, check stations, outfitting, road and gun, etc.
Livestock: livestock groups, permittees, etc.
Agency/government: Forest Service, BLM, NPS, county, Montana Legislative Committees, etc.
Other: all other

Outreach Categories	# of Programs	Number of public
Civic	4 (8 %)	220 (11%)
Teacher/school	10 (21 %)	660 (34%)
College/professional	8 (17%)	292 (15%)
Hunting	5 (11%)	110 + + (6%)
Livestock	6 (13%)	270 + + (14%)
Agency/government	9 (19%)	254 + (13%)
Other	5 (11%)	130 + (7%)
Total:	47	1,936

+ indicates an event that did not specifies numbers. For instance in the Hunting category, there were two more events where numbers were not noted.

RESEARCH AND OTHER FIELD STUDIES

Effects of Wolves, Hunters, and Human Access on Elk Spatial Dynamics

Investigators: Jamin Grigg and Robert Garrott (Department of Ecology, Montana State University, Bozeman MT 59717, Ken Hamlin, Craig Jourdonnais, Mike Ross (Montana Fish Wildlife & Parks, 1400 S. 19th, Bozeman MT 59715)

Collaborators: Montana State University, Montana Fish Wildlife & Parks, Montana Department of Livestock, Denver Zoological Foundation, and numerous landowners in the Madison Valley, MT.

This project focuses on measuring differing behavioral patterns of elk when exposed to various types and levels of risk, particularly wolf predation pressure and human hunting pressure.

Building upon previous graduate research in the Madison Valley of southwestern Montana, we placed 49 GPS collars and 17 VHF collars on adult, female elk on winter range over a two year period from February 2005 to February 2007. Coupled with the resource of 1 GPS collar each year and several VHF collars on the resident Wedge wolf pack during this same time period, we are studying how elk on this winter range behaviorally respond to the various risks of wolf predation and late-season hunting. We are also documenting off-take by wolves and hunters and measuring functional equivalency of these two types of predators. A second focus of this research involves evaluating the impacts of roads, trails and hunting seasons on elk summer and fall distribution, movement rates, and timing of migration. By assessing how elk respond to predation pressure from both wolves and human hunters, combined with dynamic climatic conditions and varying levels of human use, we build upon four years of previous research conducted on the wildlife dynamics of the Madison Valley and compliment ongoing research in two nearby sister study sites.

Elk and wolf GPS collars deployed in February 2005 have been retrieved and retrieval of GPS collars deployed in February 2006 is currently under way. Locations stored at 30-minute (elk) and 3-hour (wolf) intervals on the GPS collars, combined with locations obtained through intensive daily ground telemetry monitoring of GPS and VHF collars, are enabling analyses of both fine and broad-scale spatial distribution of wolves and elk on multiple temporal scales. By intensively researching the effects of two differing types of predation risk, we are addressing questions regarding how differing threats influence elk behavior. Data collection was completed in 2006. Analyses and publications will be completed in 2007.

References:

Grigg, J. and Garrott R. Lower Madison valley wolf/ungulate research project, 2004/2005 annual report.

Responses of elk to wolves- behavior, nutrition, and demography.

Investigators: Scott Creel and David Christianson, Department of Ecology, Montana State University, Bozeman, MT 59717.

This project continued a six-winter study of elk responses to wolves in the Gallatin Canyon, Montana. In this area, elk population size and calf:cow ratios have been depressed since recolonization by wolves in a manner that is not fully explained by direct predation alone. This project measured behavioral responses of elk to wolves and is measuring the affects of these responses for nutrition, survival, and reproduction of elk. Elk behavior was strongly dependent on temporal and spatial variation in wolf activity. Behavioral responses included changes in activity budgets, herd size and habitat selection. Also, the presence of wolves altered the manner in which environmental conditions (such as snow depth and density) affects habitat selection by elk. These responses were different between the sexes, possibly because of differing nutritional constraints facing male and female elk in winter. These behavioral responses strongly suggest that winter foraging is influenced by wolf activity. For this and other populations, progesterone levels were significantly related to the level of predation risk, and calf recruitment was significantly related to both progesterone levels and level of risk. The project continues to investigate changes in foraging strategies, diet selection, diet quality, nutrient balances, and body condition in winter as wolf predation risk varies, while monitoring changes in elk recruitment, demography, and population size. Field data collection was completed in winter 2006, and laboratory analyses of diet and nutritional effects are well underway.

Recent project publications:

Christianson, D. and S. Creel. (in press). A review of environmental factors affecting winter elk diets. *Journal of Wildlife Management.*

Coyotes (Canis latrans) and recolonizing wolves (Canis lupus): social rank mediates risk-conditional behaviour at ungulate carcasses

Investigators: Todd C. Atwood[1], Eric M. Gese[2]
[1]Department of Wildland Resources, Utah State University, Logan, UT 84322;
[2]USDA/APHIS/WS/National Wildlife Research Center, Department of Wildland Resources, Utah State University, Logan, UT, USA, 84322

Abstract submitted for publication: Wolf (*Canis lupus*) recolonization of the Greater Yellowstone Ecosystem provides a rare opportunity to identify behaviours facilitating coexistence between sympatric canids. Accordingly, we investigated behavioural interactions between coyotes (*Canis latrans*) and recolonizing wolves at ungulate carcasses in Montana's Madison range. We employed a field experimental study design consisting of a 2-level carcass treatment (actual wolf presence, wolf absence) to assess factors influencing coyote risk assessment, carrion consumption, and aggressive encounters with wolves. Socially dominant coyotes (alphas and betas) responded to wolf presence by increasing the proportion of time spent vigilant while scavenging. Vigilance behaviour was more pronounced when scavenging closer to structurally complex vegetation where lateral occlusion inhibited the ability of coyotes to scan for, and possibly escape from, returning wolves. Despite greater time spent vigilant, alpha

coyotes consumed the greatest amount of carrion biomass by feeding on carcasses in earlier stages of consumption when organs and large muscle tissues were still present. This suggests that alpha coyotes might trade-off greater risk for higher quality food items. Coyotes would aggressively confront wolves: numerical advantage by coyotes and the stage of carcass consumption were influential in determining whether coyotes were able to displace wolves from carcasses. Coyotes relied on a gradient of risk-sensitive behaviours, ranging from elevated vigilance to aggressive confrontation, to manage risk associated with wolf presence. Identification of these behaviours, and their sensitivity to numeric and social factors, is an important step in elucidating mechanisms of resource partitioning in social canids.

Resource Selection and Social Behaviour Modulates the Partitioning of Hostile Space by Sympatric Canids

Investigators: Todd C. Atwood[1], Eric M. Gese[2]
[1]Department of Wildland Resources, Utah State University, Logan, UT 84322;
[2]USDA/APHIS/WS/National Wildlife Research Center, Department of Wildland Resources, Utah State University, Logan, UT, USA, 84322

Abstract submitted for publication: Investigations into mechanisms of resource partitioning are particularly suited to systems where interactive behaviors are emergent. Wolf (*Canis lupus*) recolonization of the Greater Yellowstone Ecosystem (GYE) provided such a system and we were able to identify behaviors influencing the partitioning of resources by coyotes (*Canis latrans*) and wolves. We observed coyote-wolf interactions immediately after wolf recolonization, when re-emergent behaviors mediating the outcome of competitive interaction were detectable and mechanisms of spatial avoidance identifiable. Although coyotes used the same space as wolves, they minimized risk of encounter by making adaptive changes in resource selection based on perception of wolf activity. When exploiting carrion subsidies (i.e., wolf-killed ungulates), coyotes relied on social behaviours (i.e., numerical advantage in concert with heightened aggression) to mitigate escalating risk from wolves and increase resource holding potential. We concluded coyotes do not perceive wolves as a threat requiring generalized spatial avoidance. Rather, the threat of aggressive interactions with wolves is spatially discrete and primarily contained to areas immediate to carrion resources. Coyotes relied on subtle behaviors to avoid spatial interactions with wolves, and conspicuous behaviors to mediate the outcome of temporal interactions. By adapting behaviors to fluctuating risk, coyotes might reduce the amplitude of asymmetries.

Spatial Partitioning of Total Predation Risk in a Multiple Predator-Multiple Prey System

Investigators: Todd C. Atwood[1], Eric M. Gese[2], and Kyran Kunkel[1]
[1]Department of Wildland Resources, Utah State University, Logan, UT 84322;
[2]USDA/APHIS/WS/National Wildlife Research Center, Department of Wildland Resources, Utah State University, Logan, UT, USA, 84322

Abstract submitted for publication: Partitioning predation risk among multiple predators can be exceptionally difficult, particularly when the indirect effects of one predator enhance the direct

effects of another. Because habitat that serves as refugia from one predator may enhance predation by another, it is necessary to understand how predation risk varies over space and between prey species. In this paper, we decomposed spatial predation risk in a wolf-cougar-elk-mule deer predator-prey system into the probabilities of prey being encountered and the conditional probabilities of being killed given an encounter. We then generated spatially explicit functions of total predation risk for each prey species by combining the encounter and conditional kill probabilities. For both mule deer and elk, topographic and habitat effects, along with resource selection by their respective primary predator, strongly influenced encounter probabilities. However, once a predator was encountered, habitat effects increased the risk of death for elk and decreased the risk of death for mule deer. For example, the odds of mule deer encountering a predator were greatest in juniper savanna (7.664) and on south aspects (3.202), where the odds of cougar occurrence (1.529 and 3.081) were elevated. However, given an encounter, the risk of death for mule deer declined for those landscape covariates. This would suggest that landscape attributes did not render mule deer more vulnerable to predation by cougars. By contrast, elk were substantially more likely to be killed on south aspects and in riparian, grassland, and shrub/steppe habitats after encountering a predator, and the conditional probability of an elk kill generally increased in habitats where the relative odds of wolf occurrence was greatest. Thus, predation risk for elk was not only a function of where wolves were, but also of landscape attributes that increased elk vulnerability to predation following an encounter. We endorse a spatial modeling approach as a crucial step in helping to increase our understanding of predator-prey interactions in complex systems.

Expanding the Use of Time of Death Determination Parameters to Carnivores: A Two Part Project

Investigator: F. Carleen Gonder, University of Montana; Masters of Interdisciplinary Studies: Criminology and Forensic Anthropology (Wildlife Forensics); (406) 244-0007; carleen_montana@yahoo.com.

Sponsor: The Association of Midwest Fish and Game Law Enforcement Officers.

Purpose: Determining time of death (TOD) during the first 24 hours postmortem is a technique long used for traditional game species such as deer and elk. In poaching investigations TOD is crucial as court accepted evidence. An issue when investigating poaching of many federally protected species such as grizzly bears and wolves is the discovery of carcasses in advanced stages of decomposition with little information about time since death. Investigators have long understood the importance of TOD determinations, both short term or during the initial hours postmortem, and long term by understanding the various stages of decomposition. This endeavor will explore both via a two part project focusing on carnivores. The practical research involved in this project will provide baseline data on short term postmortem changes (Part One) and long term decomposition (Part Two) in order to develop standards for use in the field by federal and state wildlife law enforcement officials. While decomposition stage descriptions will form the bulk of the thesis for this project, development of a network of state and provincial agency personnel to document changes during the initial 24 hours postmortem will over time provide

data that will result in establishment of standards for carnivores similar to those long in use for ungulates.

Project Summary: Current Carcasses for Decomposition: On 19 June 2006, two wolves were placed for decomposition in an electrified exclosure. Their decomposition stage is mummified. On 15 Sept. two wolves and a black bear were placed in a second exclosure and their current stage is advanced decay. A black bear was placed 28 Oct. and was at the early active decay stage when it became snow covered. Three mountain lions and a whitetail deer were placed 22 Nov., and two additional wolves were placed 1 Dec. Another lion was placed 11 Jan. 2007.

Seasonal Variation for One Carnivore Species: Due to their availability, wolves will provide seasonal variation for one species and will be the thesis focus. Two yearling females were placed early summer and the weather remained hot and dry for most of that season. Within two weeks of placement their hides were nearly mummified, with little underlying tissue. Two adult females were placed early fall. While temperatures remained warm, there was slightly more precipitation. This resulted in delayed carcass drying. As the second pair became snow-covered, they were still at the advanced decay stage. Two adult males were placed early winter, after the ground was under snow. The larger of the two was in excellent condition at the time of placement. The smaller male was in poor condition and though frozen, produced a small amount of odor indicating possible early decay. Currently with warm temperatures, all the wolf carcasses are free of snow and the two males are starting early bloat.

Range Rider Projects and their Effectiveness in Southwest Montana

Collaborators: Montana Fish Wildlife & Parks, Madison Valley Ranchlands Group, Boulder Watershed Association, individual livestock producers, Turner Endangered Species Fund, USDA Forest Service, Predator Conservation Alliance, the Sun Ranch, USDA Wildlife Services, USDA Natural Resources and Conservation Service, Sweet Grass County Conservation District, and MSU Extension Service.

The Range Riders Project is a collaborative effort between ranchers, government agencies, and conservationists. The primary goal of these efforts is to reduce livestock/predator interactions. Secondary goals and objectives are to reduce livestock depredation from predators, to detect injured or dead livestock more rapidly, to preserve the evidence and increase the likelihood that an investigation would yield a definitive conclusion about whether or not it was a predation event and the species responsible, to improve livestock management and range conditions, to increase knowledge about livestock/predator interactions in space and time, and to build relationships among project partners. All project collaborators provided funding and in-kind contributions. In particular, significant funding was provided through the Natural Resources and Conservation Service's Environmental Quality Incentives Program.

Range Rider projects were implemented in 2004, 2005, and 2006 on a combination of public grazing allotments and private lands in a variety of settings in the Madison Valley south of Ennis and in the Boulder River Valley south of Big Timber. Although the rider protocols varied from place to place, the underlying premise is similar: increased and continual human presence and

immediate response to wolves that are interacting with livestock. The rider response towards wolves when they are interacting with livestock ranges from non-lethal harassment to a lethal bullet. By responding as closely as possible in space and time to the inappropriate behavior (e.g., chasing livestock), the wolves are more likely to associate that behavior with something negative than if they had not been harassed while behaving inappropriately.

Even though the rider(s) are out day and night, cattle on public grazing allotments and in some circumstances on private lands are dispersed across a wide area. Livestock may also be in rugged, partially forested terrain. Nonetheless, use of horses and vehicles (where applicable) allows the rider to cover as much ground as possible while checking on livestock. There is still a good chance they will not be in exactly the right location at the exactly the right time to respond to the wolves. However, the chances of preventing a depredation are expected to be better than when/where human presence is more limited or infrequent.

Due to the incredible number of variables from place to place, there is no clear evidence that these efforts have actually prevented depredations. However, when surveyed, many participating producers said they thought it was helpful and indicated an interest in continuing their participation. Efforts to collect information to better understand the effectiveness of this technique continued in 2006.

2006 marked the third field season of the Range Riders project in the Madison, and second in the Boulder. There were a total of 5 riders (3 in Boulder drainage, and 2 in Madison drainage). The riders in the Madison were out from June 15 - October 15, and the riders in the Boulder were out from June 1 - October 30th. They were each paid $2,000 a month – Predator Conservation Alliance covered all costs in the Madison, and put in $10,000 for riders in the Boulder. There were no confirmed or probable depredations in the project sites, although there were depredations outside of the actual rider sites in the Madison. There were no missing livestock reported that was attributed to wolf kills. In the Madison, the riders reported seeing a total of 6 uncollared wolves. They did chase wolves away from cattle on horseback, but did not use less than lethal munitions. The riders also rode 1-2 times a week on the neighboring allotment to the Sun Ranch, and there were no depredations there. In the Boulder, the riders had direct encounters with the Baker Mountain Pack, where they chased the wolves away, but did not have time to use less-than-lethal munitions. The riders encountered a lot of sign and tracks of wolves, as well as bears.

LAW ENFORCEMENT

The USFWS Office of Law Enforcement remained the lead agency investigating wolf deaths in Montana in 2006. MFWP provided assistance on request.

FUNDING

MFWP's core wolf program is funded through 2 separate federal sources. Approximately half is obtained through a direct annual Congressional line-item appropriation and half is obtained directly from USFWS as a part of the agency base budget. These sources are identified in the state-federal wolf cooperative agreement and are transferred on a federal fiscal year cycle which is offset from the state fiscal year cycle by six months. Federal funds can be spent anywhere in Montana for the wolf management and conservation activities specified in the cooperative agreement. Although the agreement states that a total of $637,000 is to be available to Montana annually, federal budget constraints have sometimes resulted in Congressional recessions (across the board percentage cuts). Therefore, Montana received about $607,000 in federal fiscal year 2005. In 2006, Montana received about $641,000. Montana may renegotiate the responsibilities identified in the agreement in the future if adequate federal funds are not available and Montana is unable to fulfill the responsibilities described in the agreement.

Montana allocated its wolf budget in ways typical of any other wildlife conservation and management program. The vast majority of dollars were allocated to population monitoring. Funds were also allocated to support: the MFWP Wildlife Research Lab in Bozeman, MFWP law enforcement assistance, outreach and information / education activities, miscellaneous field equipment, research, increased ungulate monitoring, and additional step-down planning and program development. In-kind contributions and investments were made by the many private citizens who supported or were affected by the success of wolf recovery, by interested non-governmental organizations, and other state and federal agencies.

In federal fiscal years 2005 and 2006, Montana USDA WS was funded through the regular Congressional budgeting process for federal agencies and did not receive USFWS-direct funding. Historically and beginning in the early 1990s, USFWS provided funding to USDA WS western region to assist in wolf recovery and management in the tri-state area. By 2001, about $100,000 per year was being transferred from USFWS to USDA WS across the tri state area for field assistance. At that same time, USDA WS also began receiving direct annual appropriations through the USDA Congressional budget process in recognition of the increased workload in the northern Rockies. USFWS continued to fund USDA WS until 2005 through a direct Congressional appropriation and USDA WS western region continued to receive special Congressional directives.

However, in federal fiscal year 2005, Congress deleted the federal appropriation that had been given to USFWS and transferred to USDA WS for their work in the tri state area. Other special Congressional directives had been incorporated into the USDA WS western region budgets to address funding needs as a result of increased workloads beginning in federal fiscal year 2001. These special directives have been maintained each year since. Both MFWP and MT WS have concerns that Congressional earmarks and/or special directives will be cut or eliminated at the Congressional level. That would have important implications for the two agencies and their ability to fulfill their respective agency responsibilities and the commitments made in the Montana Wolf Plan.

There has been confusion over the coincidental timing of elimination of funding received by MT WS and MFWP taking on wolf management responsibilities. In federal fiscal year 2005, the USFWS Congressional appropriation that had been provided to the western region of USDA WS was eliminated. In the same federal fiscal year, an interagency cooperative agreement was completed between MFWP and USFWS. As a condition of MFWP signing the agreement, USFWS agency base funding was transferred to MFWP since MFWP was now doing the field program with state personnel. The loss of USFWS funding for tri-state USDA WS gray wolf field activities had nothing to do with a different, independent Congressional earmark appropriation and USFWS base funding for to MFWP to implement work outlined in an MFWP-USFWS interagency cooperative agreement to manage wolves in Montana.

In federal fiscal year 2006, WS spent an estimated $152,000 investigating wolf complaints and carrying out lethal control activities. This was similar to expenditures in federal fiscal year 2005.

In 2004, Montana coordinated the efforts of Idaho and Wyoming to prepare a tri-state Congressional budget request. MFWP's director presented it to the Congressional Sportsmen's Caucus in fall 2004. The message presented was a celebration of recovery success, accompanied by the honest assessment that securing the investment into the future will require an ongoing national commitment to funding.

How well the nation's wolves and grizzly bears fare in the NRM depends on how well they are accepted by the people who live, work and recreate in these areas. The establishment of adequately funded conservation and management programs will determine the degree to which people will share the land, how well they will tolerate wolves and grizzly bears, and how successfully they will rise to the challenges posed by species recovery. Those challenges are shared by everyone, not just residents of the tri-state area.

PERSONNEL AND ACKNOWLEDGEMENTS

By now, literally hundreds of people have assisted with wolf recovery efforts in a wide variety of ways, and we are indebted to them all. Since 2000, countless more have assisted with the development of the Montana wolf plan and many more continue to assist during the transition from federal management to state management. We especially want to acknowledge the support and understanding from our families and friends.

The MFWP wolf team is comprised of Kent Laudon in Kalispell, Carolyn Sime in Helena, Mike Ross and Val Asher in Bozeman, Liz Bradley in Dillon, and Jon Trapp in Red Lodge. But the wolf team is part of a much bigger team of tremendously dedicated agency professionals that make up Montana Fish, Wildlife & Parks. In particular, Dr. Mark Atkinson (MFWP's wildlife veterinarian) oversees our animal handling protocols welfare guidelines, in addition to being the MFWP lead for wolf disease surveillance and necropsy work. Additional staff at the MFWP Wildlife Research Laboratory also provide significant logistical support and services for the wolf program. Salish Kootenai Confederated Tribes biologist Stacey Courville and Blackfeet Tribe biologist Dan Carney monitored wolves in and around their respective tribal reservations. We

thank them for sharing information contained in this report and the close coordination throughout the year.

In 2006, the Montana wolf management program benefited from the contributions from our seasonal technicians Ty Smucker and Jonathan Derbridge both of which excelled at these new positions and contributed enormously. The Montana wolf management volunteer program was very fortunate to be served by Stefanie Bergh, Kristina Boyd, Mike Cooper, Allie Hunter, Kari Holder, James Nowack, Janine Payne, Emily Schock, Alan Whitehead, and Damon Zeller who worked enthusiastically and with good humor and dedication through long days and weeks. Arlie Burke, Eureka area logger and houndsman, lent his time unselfishly to help with fieldwork, local information, and to pass on old tried and true "woodsmanship" to the next generation of biologists in our volunteer program.

MFWP's wolf program is supported by others throughout the agency. We thank Adam Messer of MFWP Information Services for his patience, good humor, and expertise in creating the maps for this report, his work on all our other wolf project data requests, and for his help with data management. Regional biologists and game wardens, information officers, front desk staff, and program managers contribute their time and expertise in a variety of ways and have been invaluable. We appreciate the MFWP Helena staff from all the Divisions who contributed their expertise and time. We thank Caryn Amacher, Denise Dawson, Rebecca Cooper, Adam Brooks for assisting us with interagency cooperative agreements, grant agreements, and budgeting. We appreciate the wise counsel and participation of the MFWP legal staff, especially Bob Lane. We appreciate the work and dedication of the MFWP Website Team. Jay Lightbody and Don Bartsch at the Print shop prepared and printed outreach materials. We thank the staff of the Communications and Education Division for their thoughtful reviews of our work and for their media contributions throughout the year. The Montana Governor's Office, MFWP Director's Office, and the MFWP Commission deserve special recognition for their strong commitment to move forward despite the delisting delay; they provided important leadership and steady guidance.

USFWS personnel in Montana included wolf recovery coordinator Ed Bangs (Helena) who shepherded the development of the state-federal cooperative agreement and freely shared information and data about wolves in Montana. We are especially grateful for the financial support and his confidence in the developing state program. Law enforcement agents Rick Branzell (Special Agent, Missoula) and Doug Goessman (Special Agent, Bozeman) investigated wolf mortalities throughout Montana and provided important guidance about the federal regulations. Dominic Dominici (USFWS Agent in Charge, WY) provided valuable guidance and information about a variety of subjects and the interpretation of federal regulations.

USDA WS investigates suspected wolf damage and carries out wolf control activities in Montana. We thank them for contributing their expertise to the state's wolf program and for their willingness to complete investigations in a timely fashion, 7 days a week. WS personnel involved in wolf management in Montana in 2006 included now-retired state director Larry Handegard, the new state director John Steuber, eastern district supervisor Paul J. Hoover, western district supervisor Kraig Glazier, wildlife specialists Dennis Biggs, John Bouchard, Steve Demers, Michael Hoggan, Dan Thomason, Alan Brown, Brian Noftsker, Mike Thomas,

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The Montana Wolf Management program field operations also benefited in a multitude of ways from the continued cooperation of other state and federal agencies and private interests such as the USDA Forest Service, Montana Department of Natural Resources and Conservation ("State Lands"), U.S. Bureau of Land Management, Plum Creek Timber Company, Glacier National Park, Yellowstone National Park, Idaho Fish and Game, Wyoming Game and Fish, Nez Perce Tribe, Canadian Provincial wildlife professionals, Defenders of Wildlife, Predator Conservation Alliance, Boulder Watershed Group, and the Madison Valley Ranchlands Group.

We deeply appreciate and thank our pilots whose unique and specialized skills, help us find wolves, get counts, and keep us safe in highly challenging, low altitude mountain flying. They include David Hoerner (Hoerner Aviation Inc., Kalispell), Steve Davidson (Selway Aviation, Hamilton), Doug Chapman (Montana Aircraft, Bozeman), Roger Stradley (Gallatin Flying Service, Belgrade), Steve Ard (Tracker Aviation Inc., Belgrade), Mark Duffy (Bozeman).

The citizens of Montana deserve special recognition for their cautious willingness to craft a balanced plan that recognizes that wolves are a native species now back on the landscape where people live, work and recreate, to accept the responsibility for wolf conservation and management, and their willingness to move forward knowing that it will continue to be controversial, challenging, and that hard decisions have to be made. We also appreciate the time they take to send us wolf report postcards, on-line wolf reports, or to call us on the phone with their information. The individuals who served on the original Montana Wolf Management Advisory Council and the Wolf Compensation Working Group continue to serve Montana informally by sharing their perspectives and being a source of information in their respective communities.

And lastly, the countless private landowners in Montana whose property is used by wolves, sometimes at great cost to the owner, deserve our respect, our understanding and attention to their new challenges, and our gratitude.

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APPENDIX 1

MONTANA CONTACT INFORMATION

Montana Fish, Wildlife & Parks

Carolyn Sime
Montana Fish, Wildlife & Parks
Gray Wolf Program Coordinator, Helena
406-461-0587
casime@mt.gov

Kent Laudon
Montana Fish Wildlife & Park
Wolf Management Specialist, Kalispell
406-751-4586
laudon@mt.gov

Jon Trapp
Montana Fish, Wildlife & Parks
Wolf Management Specialist, Red Lodge
406-425-1132
jtrapp@cablemt.net

Liz Bradley
Montana Fish, Wildlife & Parks
Wolf Management Specialist, Dillon
406-865-0017
liz_bradley@mt.gov

Mike Ross
Montana Fish, Wildlife & Parks
Wolf Management Specialist, Bozeman
406-581-3664
mross@mt.gov

Val Asher
Montana Fish, Wildlife & Parks Volunteer
Wolf Management Specialist, Bozeman
406-581-3281
valasher@montana.net

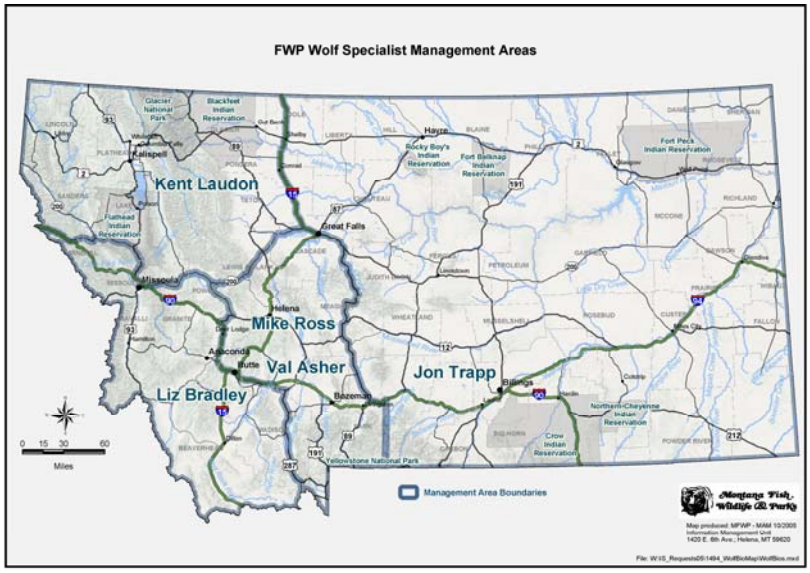
USDA Wildlife Services
(to request investigations of injured or dead livestock):

John Steuber
USDA WS State Director, Billings
(406) 657-6464 (w)

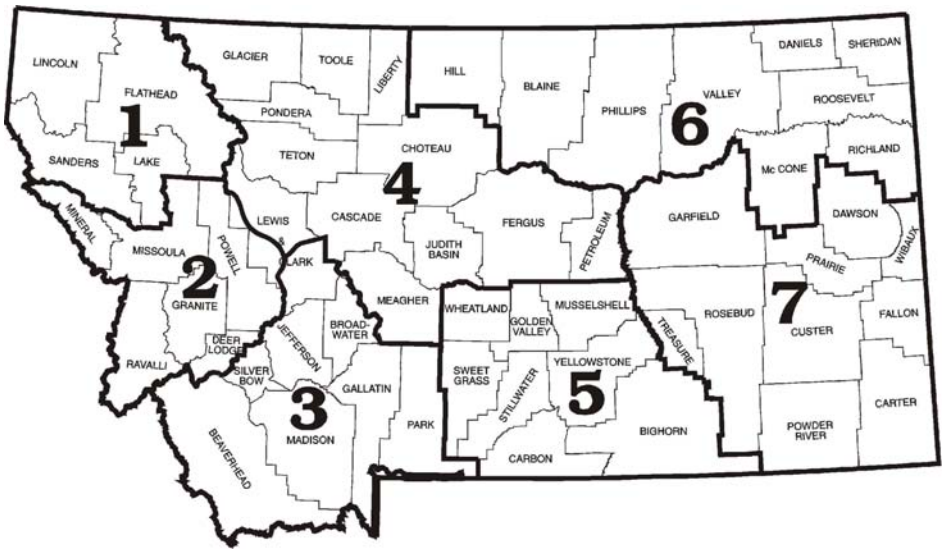
Kraig Glazier
USDA WS West District Supervisor, Helena
(406) 458-0106 (w)

Jim Hoover
USDA WS East District Supervisor, Columbus
(406) 322-4303 (w)

Montana Fish, Wildlife & Parks Wolf Specialist Areas of Responsibilities



MONTANA FISH WILDLIFE & PARKS ADMINISTRATIVE REGIONS



STATE HEADQUARTERS
MT Fish, Wildlife & Parks
1420 E 6th Avenue
PO Box 200701
Helena, MT 59620-0701
(406) 444-2535

REGION 1
490 N Meridian Rd
Kalispell, MT 59901
(406) 752-5501

REGION 2
3201 Spurgin Rd
Missoula, MT 59804
(406) 542-5500

REGION 3
1400 South 19th
Bozeman, MT 59718
(406) 994-4042

HELENA Area Res Office (HARO)
930 Custer Ave W
Helena, MT 59620
(406) 495-3260

BUTTE Area Res Office (BARO)
1820 Meadowlark Ln
Butte, MT 59701
(406) 494-1953

REGION 4
4600 Giant Springs Rd
Great Falls, MT 59405
(406) 454-5840

LEWISTOWN Area Res Office (LARO)
215 W Aztec Dr
PO Box 938
Lewistown, MT 59457
(406) 538-4658

REGION 5
2300 Lake Elmo Dr
Billings, MT 59105
(406) 247-2940

TO REPORT A DEAD WOLF OR POSSIBLE ILLEGAL ACTIVITY:

U.S.Fish and Wildlife Service

- Special Agent, Missoula MT: (406) 329-3000
- Special Agent, Bozeman, MT: (406) 582-0336
- Special Agent, Casper, WY: (307) 261-6365

Montana Fish, Wildlife & Parks

- Dial 1-800-TIP-MONT

TO SUBMIT WOLF REPORTS ELECTRONICALLY AND TO LEARN MORE ABOUT THE MONTANA WOLF PROGRAM, SEE:

- www.fwp.mt.gov/wildthings/wolf

APPENDIX 2

Gray Wolf Chronology in Montana

1800
- Wolves are common throughout Montana.

1884
- Wolf-bounty law initiates Montanas official eradication effort.

1915
- Federal authorities begin wolf control in the West.

1925
- Wolf populations eliminated from most of the West.

1936
- Gray wolf believed extinct in Montana although wolves and wolf sign still occasionally observed.

1950
- Wolves still seen in Wyoming, Montana, and Idaho occasionally but no self-sustaining breeding documented; wolves, likely dispersing from Canada, are killed in Montana and Idaho in every decade through 2000.

1973
- Montana protects wolves as state endangered species.

1974
- Wolves protected under federal Endangered Species Act of 1973.

1979
- A wolf is monitored in British Columbia, just north of Glacier National Park.

1980
- A lone wolf kills livestock near Big Sandy, Montana and is killed by the U.S. Fish and Wildlife Service. This is Montana's first documented wolf depredation in more than 50 years.

1986
- A wolf den is confirmed in Glacier National Park. The Magic Pack establishes a territory in the North Fork Flathead River valley, in the western portion of Glacier National Park.
- A pack denned on the Blackfeet Reservation, but was not discovered until 1987 when they began to depredate on livestock.

1987
- Camas Pack established in the North Fork of the Flathead River valley in Glacier National Park.
- First livestock depredation occurs on the Blackfeet Reservation.

1990
- The U.S. Congress establishes a Wolf Management Committee to recommend wolf recovery strategies for Yellowstone National Park and central Idaho.

1991
- Congress directs the US Fish and Wildlife Service to prepare a Draft Environmental Impact Statement on wolf recovery in Yellowstone National Park and central Idaho.

1993

- An estimated 45 wolves in five packs occupy the federal Northwestern Montana Recovery Area. One pack establishes west of Helena, founded by a female wolf which disperesed from Canada.

1994

- Federal EIS on the reintroduction of wolves into Yellowstone National Park and central Idaho completed. Wolves to be reintroduced into Yellowstone National Park and central Idaho for three to five years under the Endangered Species Acts experimental, non-essential rules that grant additional management flexibility. Wolf recovery is defined as 30 breeding pairs--an adult male and an adult female raising two or more pups to Dec. 31--in Montana, Idaho, and Wyoming for three successive years.

1995

- Fifteen wolves from four packs captured in Canada are relocated to Yellowstone National Park and 17 individual wolves are released in central Idaho.

1996

- Yellowstone National Park receives 17 more wolves from Canada and 10 wolf pups from a depredating pack in northwestern Montana. Twenty wolves are released in central Idaho; 1st pups are born in the wild.

1999

- Governors of Montana, Idaho, and Wyoming renew a 1997 Memorandum of Understanding to coordinate public involvement to pursue plans to manage a recovered wolf population in the northern Rockies and to assure a timely delisting.

2000

- Montana Governor Marc Racicot appoints 12 Montana citizens to the Montana Wolf Management Advisory Council. The council, chaired by rancher Chase Hibbard of Helena, is charged to advise Montana Fish, Wildlife & Parks on wolf management in anticipation of the wolf's delisting.
- US Fish and Wildlife Service determines there are 30 breeding pair in the tri-state Rocky Mountain Recovery Area, marking 2000 as the first year of the three-year countdown to meet wolf population recovery goals.
- An estimated 97 wolves in 8 breeding pairs are counted in Montana.

2001

- Montana Wolf Management Advisory Council presents its Report to the Governor to Governor Judy Martz, who directs MFWP to draft wolf conservation and management planning document.
- Montana Legislature removes the gray wolf from Montana's list of predatory species once the wolf is delisted. Upon delisting, wolves will be legally reclassified in Montana as species in need of management. New law includes provisions for the defense of life and private property when a wolf is attacking, killing, or threatening to kill a person, or livestock.
- Montana Fish, Wildlife & Park's draft of the Montana Wolf Conservation and Management Planning Document is reviewed, amended and approved by the Montana Wolf Management Advisory Council.
- An estimated 35 breeding pair, in 51 packs, are counted in the tri-state Rocky Mountain Recovery Area, totaling about 550 wolves. The US Fish and Wildlife Service determines 2001 is second year of the three-year countdown to trigger an official proposal to delist the wolf.
- An estimated 123 wolves in 7 breeding pairs are counted in Montana.

2002

- Montana Wolf Conservation and Management Planning Document is released in January. Montana Fish, Wildlife & Parks begins to develop an environemntal impact statement (EIS) on the state management of wolves. The public is invited to participate at community work sessions around the state and asked to identify issues and help develop management alternatives.
- Montana Fish, Wildlife & Parks develops draft EIS with five alternatives.
- An estimated 43 breeding pairs are counted in the tri-state Rocky Mountain Wolf Recovery Area, totaling about 663 wolves. The US Fish and Wildlife Service determines 2002 is the third year of the three-year countdown to trigger official proposal to delist the wolves.

- U.S. Fish and Wildlife Service announces that the northern Rockies gray wolf population has achieved biological recovery under the federal Endangered Species Act.
- An estimated 183 wolves in 17 breeding pairs are counted in Montana.

2003

- Montana's EIS process includes a 60-day public comment period and statewide community work sessions. The final EIS recommends the adoption of the "updated council" alternative. The Montana Fish, Wildlife & Parks Commission approves the adoption of the preferred alternative – the Council's Update.
- State conservation and management plans completed by MT, ID, and WY and submitted to USFWS.
- States of Montana, Idaho, and Wyoming request funding from Congress.
- U.S. Fish and Wildlife Service expected to begin the official administrative process of delisting gray wolves in the northern Rockies.
- An estimated 761 wolves in 51 breeding pairs are counted in the tri-state Rocky Mountain Wolf Recovery Area at the end of the year.
- An estimated 182 wolves in 10 breeding pairs are counted in Montana.

2004

- U.S. Fish and Wildlife Service approves state management plans from Montana and Idaho and rejects Wyoming's plan. Delisting is officially delayed until the impasse is resolved.
- Montana Fish, Wildlife & Parks and the Montana Fish, Wildlife & Parks Commission approve amending the Record of Decision to pave the way for interim state participation in northwest Montana through a limited cooperative agreement.
- In February, Montana Fish, Wildlife & Parks and U.S. Fish and Wildlife Service complete a cooperative agreement covering northwest Montana.
- Montana Fish, Wildlife & Parks receives federal funding and hires staff who begin implementing the state plan prior to delisting and in consultation with U.S. Fish and Wildlife Service.
- Montana Fish, Wildlife & Parks begins close coordination with USDA Wildlife Services to investigate and resolve wolf-livestock conflicts.
- An estimated 835 wolves in 66 breeding pairs are counted in the tri-state Rocky Mountain Wolf Recovery Area at the end of the year.
- An estimated 153 wolves in 15 breeding pairs are counted in Montana.

2005

- Wolves in northwest Montana recoveyr area reclassified as "endangered" by court order.
- U.S. Fish and Wildlife Service adopts more flexibile regulations [known as 10(j) regulations] for the experimental population areas of Montana and Idaho.
- Montana Fish, Wildlife & Parks and U.S. Fish and Wildlife Service complete a cooperative agreement paving the way for Montana to assume independent and full reponsibility for wolf management and conservation statewide. Montana begins implementing the state plan to the extent allowed by federal regulations throughout the state. Funding from U.S. Fish and Wildlife Service and through special Congressional appropriations fund Montana Fish, Wildlife & Park's wolf team.
- Montanans form a diverse working group of private citizens, non-governmental organizations, and state and federal agencies to begin developing the Montana Livestock Loss Reduction and Mitigation Program. Work is ongoing.
- An estimated 256 wolves in 19 breeding pairs are counted in Montana.

2006

- Montana implements as much of approved state plan as possible and within federal guidelines.
- Funding from U.S. Fish and Widllfie Service and special Congressional appropriations continue.
- Montana Fish, Wildlife & Parks and USDA Montana Wildlife Services update an existing interagency cooperative agreement to include gray wolves
- Montana Livestock Loss Reduction and Mititgation Program draft framework completed and draft legislation is prepared for the 2007 Montana Legislature.
- An estimated 316 wolves in 21 breeding pairs are counted in Montana. Distribution continues to be the western one-third of Montana.

APPENDIX 3

NORTHERN ROCKIES WOLF PACK TABLES

Table 1a. Northwest Montana wolf recovery area: wolf packs and population data 2006.

Table 1b. Montana outside of NWMT recovery area (and statewide totals): wolf packs and population data 2006.

Table 1c. Montana portion of the Central Idaho Experimental Area (Montana statewide totals): wolf packs and population data 2006.

Table 2. Wyoming wolf packs and population data 2006, and totals for Greater Yellowstone Recovery Area.

Table 3a,b,c. Idaho wolf packs and population data 2006, and totals for Central Idaho Recovery Area.

Table 4a. Northern Rocky Mountains minimum fall wolf population and breeding pairs 1979-2006, by recovery area.

Table 4b. Northern Rocky Mountains minimum fall wolf population and breeding pairs 1979-2006, by state.

Table 5a. Northern Rocky Mountain states: confirmed wolf depredation and wolf management (by recovery area, 1987-2006.

Table 5b. Northern Rocky Mountain states: confirmed wolf depredation and wolf management, by state, 1987-2006.

APPENDIX 4

NORTHERN ROCKIES PACK DISTRIBUTION MAPS 2006

Figure 1. (map) Central Idaho, Northwest Montana and Greater Yellowstone wolf recovery areas (Key: Tables 1 - 3).

Figure 2. (map) Northwest Montana Wolf Recovery Area (Key: Table 1a).

Figure 3. (map) Greater Yellowstone Wolf Recovery Area (Key: Tables 1b, 2).

Figure 4. (map) Central Idaho Wolf Recovery Area (Key: Tables 1c, 3 a, b, c, d).

APPENDIX 5

NORTHERN ROCKIES WOLF POPULATION GRAPHS

Figure 5. Northern Rocky Mountain wolf population trends 1979-2006, by recovery area.

Figure 6.Northern Rocky Mountain wolf population trends 1979-2006, by state.