Rocky Mountain Wolf Recovery
2006 Interagency Annual Report

A cooperative effort by the U.S. Fish and Wildlife Service, Nez Perce Tribe, National Park Service, Montana Fish, Wildlife & Parks, Idaho Fish and Game, and USDA Wildlife Services

MFWP photo by Liz Bradley

This cooperative annual report presents information on the status, distribution and management of the Northern Rocky Mountain wolf population from January 1, 2006 to December 31, 2006. It is also available at:

http://westerngraywolf.fws.gov/annualreports.htm

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Note to Readers:

Because of the transition to state-led management in Montana and Idaho, the 2006 Interagency Annual Report has a different organization and look than in previous years. This year's interagency report is comprised of separate sections, one each for the individual annual reports from the states of Montana and Idaho respectively, federal agencies for Wyoming and Yellowstone National Park combined, and the overall U.S. Fish and Wildlife Service Northern Rockies Recovery Program. This type of organization makes for some degree of overlap and duplication between sections. However, U.S. Fish and Wildlife Service requires Montana and Idaho to submit an annual report each year. By incorporating their state annual reports in this modified structure, the public can still access information about gray wolves in the northern Rockies in a single, comprehensive report. I hope you find this useful.

Please let us know what you think so we can make improvements next year.

Thank you,

Ed Bangs
U.S. Fish and Wildlife Service Northern Rockies Wolf Recovery Program Coordinator

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NORTHERN ROCKIES SUMMARY

The gray wolf *(Canis lupus)* population in the Northern Rocky Mountain (NRM) states (Idaho, Montana, and Wyoming) continued to increase in distribution and abundance (Figure 1, Tables 4a, 4b). Estimates of wolf numbers at the end of 2006 were 739 wolves in the Central Idaho Recovery Area (CID), 390 in the Greater Yellowstone Recovery Area (GYA), and 171 in the Northwest Montana Recovery Area (NWMT) for a total minimum estimate of 1,300 wolves (Figure 1, Table 4a). By state boundaries, there were an estimated 673 wolves in the state of Idaho, 311 in Wyoming and 316 in Montana (Table 4b). Of approximately 173 packs (groups of 2 or more wolves), 86 packs met the definition of "breeding pair," defined as an adult male and female raising 2 or more pups until December 31 (Tables 4a, 4b). This made 2006 the seventh year in which 30 or more breeding pairs were documented and well distributed within the 3-state area. Biological recovery criteria have been met for removing NRM wolves from the Endangered Species list. By the end of 2006, no confirmed wolves or wolf packs were documented in states adjacent to Montana, Idaho and Wyoming. In 2006, one lone GYA wolf was confirmed killed in north Central Utah (near Tremonton) and another was confirmed killed in western South Dakota (near Sturgis).

Wolves in the NRM subsisted mainly on elk, white-tailed deer, mule deer, moose, and bison. Livestock depredations in 2006 included 184 cattle, 247 sheep, 8 dogs and 1 horse, and 2 llamas that were confirmed as killed by wolves (Tables 5a, 5b). Approximately of 43 out of 179 NRM wolf packs (24%) were involved in confirmed livestock depredations, six of these packs no longer existed at the end of 2006. In response, 142 wolves were lethally removed within the 3-state area (about 12% of the 2006 wolf population). No wolves were relocated in 2006. In Montana, about 21% of packs were confirmed to have killed livestock, the majority of which had territories in the Montana portion of CID (35%), Montana GYA (21%), and MT – NWMT (13%), respectively. Two of these packs were removed by the end of 2006. In Wyoming outside of Yellowstone National Park, about 33% of wolf packs had confirmed livestock kills. One pack was removed. In Idaho, 29% of wolf packs had confirmed livestock kills. As new packs form within the original core recovery areas and individual animals disperse, the 3 populations increasingly resemble and function as a single, large meta-population (Figure 1). Numerous research projects are underway, examining wolf population dynamics, predator-prey interactions and livestock depredation.

NORTHERN ROCKIES BACKGROUND

Gray wolf populations were extirpated from the western U.S. by the 1930s. Subsequently, wolves from Canada occasionally dispersed south into Montana and Idaho but failed to survive long enough to reproduce. Eventually, public attitudes toward predators changed and wolves received legal protection with the passage of the Endangered Species Act (ESA) in 1973. Wolves began to successfully recolonize northwest Montana in the early 1980s. By 1995, there were 6 wolf packs in northwest Montana. In 1995 and 1996, 66 wolves from southwestern Canada were reintroduced to Yellowstone National Park (YNP) (31 wolves) and CID (35 wolves).

The NRM wolf population contains 3 core recovery areas: the NWMT (Figs. 1, 2) includes northern Montana and the northern Idaho panhandle; the GYA (Figs. 1, 3) includes Wyoming and adjacent parts of Idaho and Montana; the CID (Figs. 1, 4) includes central Idaho and adjacent parts of southwest Montana. Wolves in the 3 recovery areas are managed under different guidelines, depending upon their designated status under the ESA.

In 2003, NWMT wolves were reclassified from endangered, the most protected classification under the ESA, to threatened, a less restrictive classification. On January 31, 2005, and August 19, 2005, the U.S. District Courts in Oregon and Vermont, respectively, concluded that the 2003 final rule was "arbitrary and capricious" and violated the ESA (Defenders of Wildlife v. Norton 03-1348-JO, D. OR 2005; National Wildlife Federation v. Norton 1:03-CV-340, D. VT. 2005). The Court's rulings invalidated the April 2003 changes to the ESA listing for the gray wolf. Therefore, the gray wolf in the Rocky Mountains, outside of areas designated as nonessential, experimental populations, reverted back to the endangered status that existed prior to the 2003 reclassification.

The GYA and CID wolves are classified as nonessential experimental populations (as allowed by section 10(j) of ESA) and managed with more flexible options than an endangered or threatened population. In 2005 a new 10(j) experimental population regulation allowed even more management flexibility for wolves in the experimental population areas in states with approved wolf management plans (Montana and Idaho). Currently the states of Montana and Idaho manage wolves in their states, with federal funding and according to federal guidelines.

The U.S. Fish and Wildlife Service (USFWS), responsible for administering the ESA for terrestrial and freshwater species and some marine mammals, determined that at least 30 or more breeding pairs composed of at least 300 wolves, with an equitable distribution among the 3 states for 3 successive years, constitutes a viable and recovered wolf population. That criterion (including the temporal element) was met at the end of 2002. USFWS has proposed delisting throughout the NRM except northwestern WY. Until Wyoming's regulatory framework for wolf management can be approved, wolves in northwestern Wyoming will remain protected by the ESA.

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

This report may be copied in its original form and distributed as needed.

Suggested Citation: Sime, Carolyn A., V. Asher, L. Bradley, K. Laudon, M. Ross, J. Trapp, M. Atkinson, L. Handegard, and J. Steuber. 2007. Montana gray wolf conservation and management 2006 annual report. Montana Fish, Wildlife & Parks. Helena, Montana. 96 pp plus appendices.

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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.

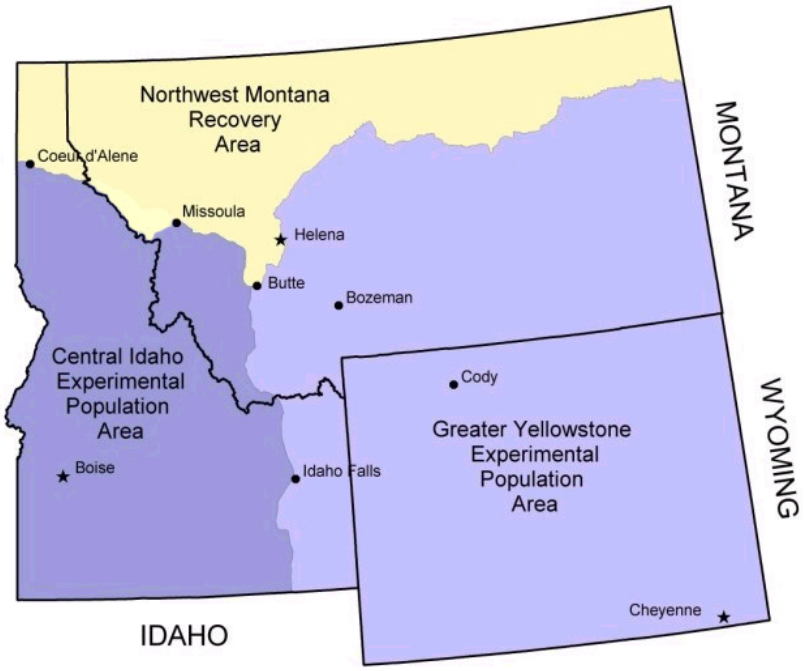

Figure 1. Northern Rockies gray wolf recovery area comprised of the states of Montana, Idaho, and Wyoming

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.

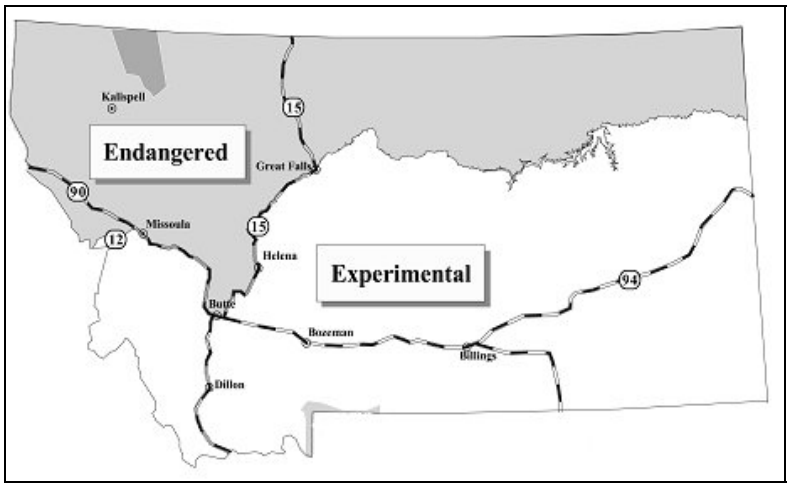

Figure 2. Map of the interim federal wolf management areas showing the endangered area where the 1999 Interim Wolf Control Plan applies and the experimental area where the 10(j) regulations apply. The central Idaho and Greater Yellowstone experimental areas are shown as one since the approved status 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.

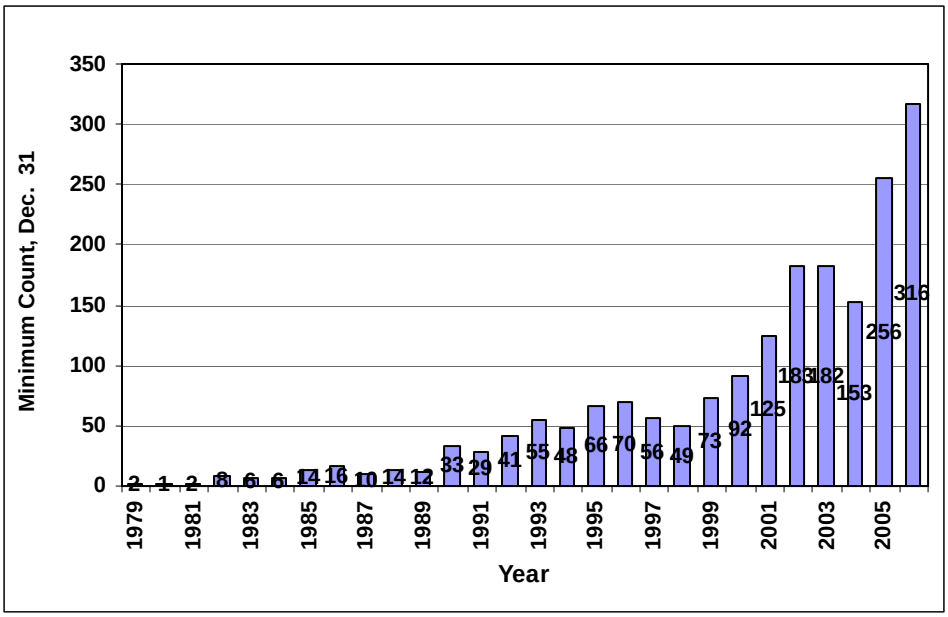

Figure 3. Minimum estimated number of wolves in the State of Montana on December 31, 1979-2006.

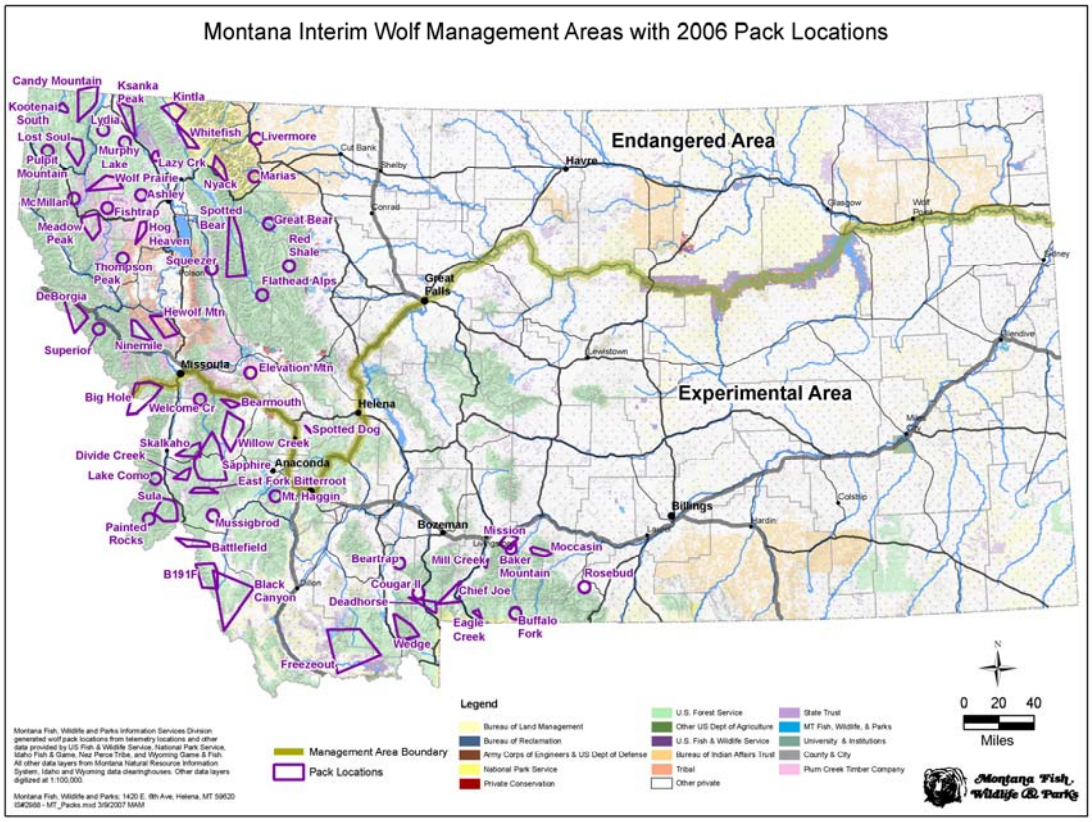

Figure 4. Verified wolf pack distribution in the State of Montana as of December 31, 2006.

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.

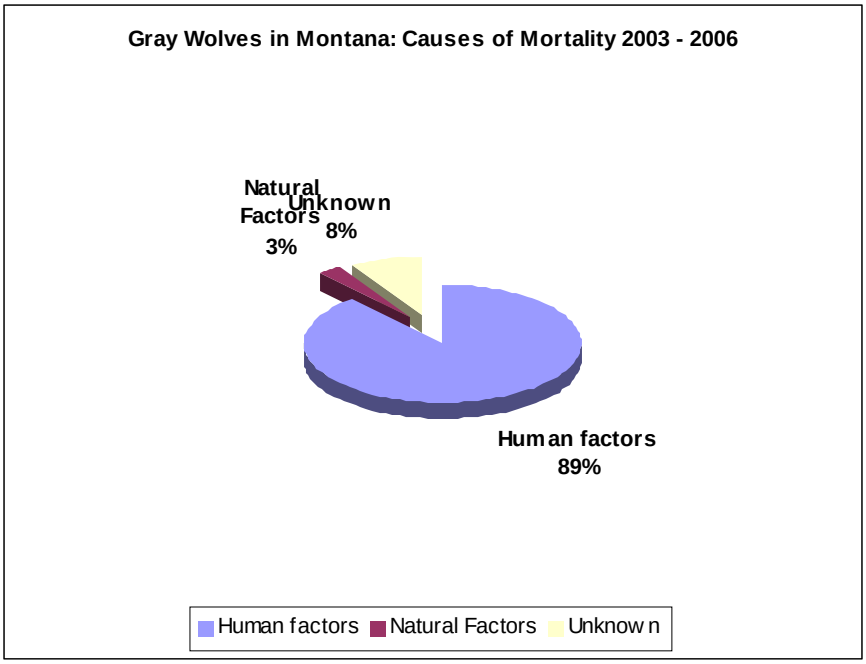

Figure 5. Causes of Gray Wolf Mortality in Montana for wolves examined at the MFWP Wildlife Research Laboratory, 2003 – September, 2006.

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.

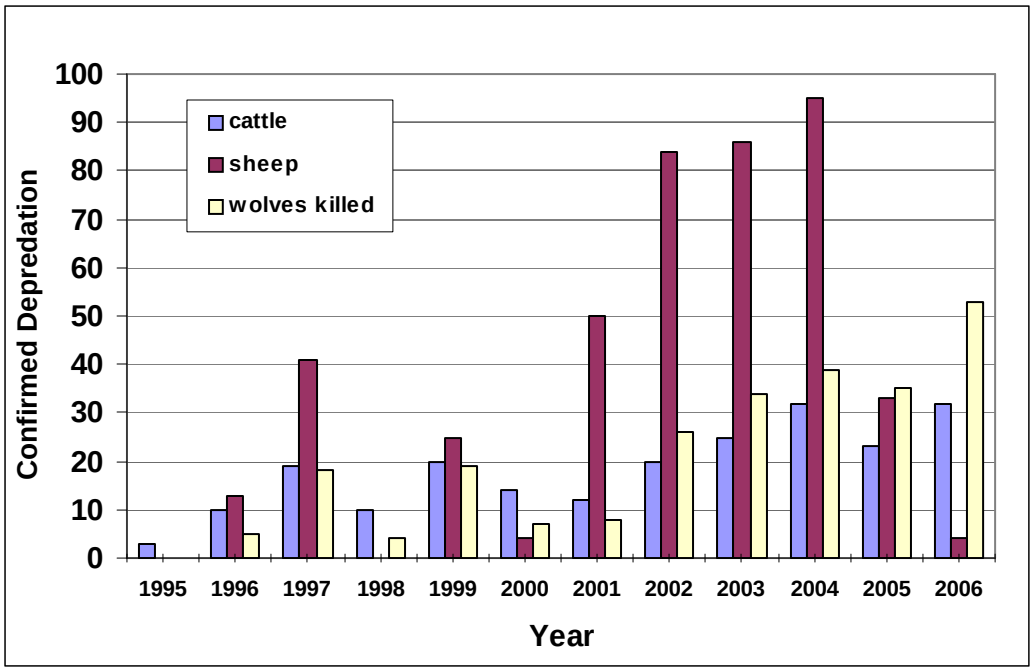

Figure 6. Confirmed cattle and sheep depredation and the number of wolves lethally controlled in the State of Montana based on investigations by USDA Wildlife Services, 1995-2006.

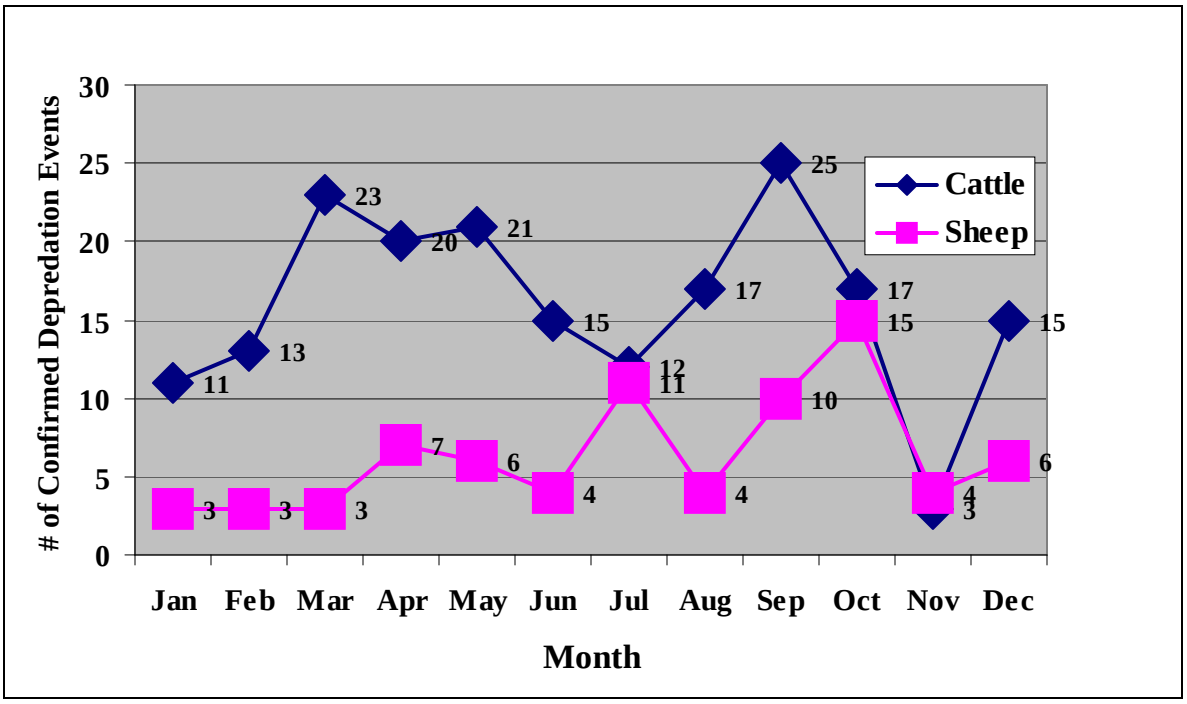

Figure 7. Number of confirmed depredation events on cattle and sheep by wolves in Montana by month in calendar years 1987-2006, based on investigations by USDA Wildlife Services.

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.

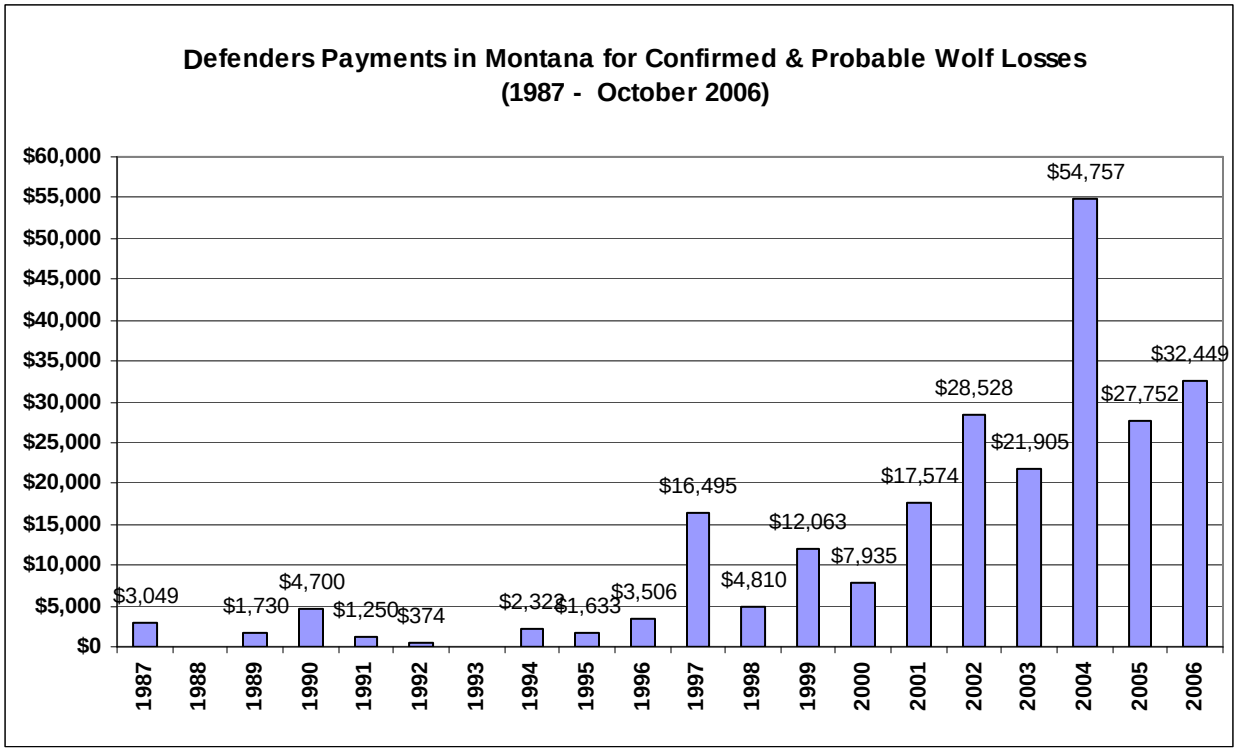

Figure 8. Compensation payments paid in Montana by Defenders of Wildlife, 1987 through October 2006. Source: http://www.defenders.org/wolfcomp.html.

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]
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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]
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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

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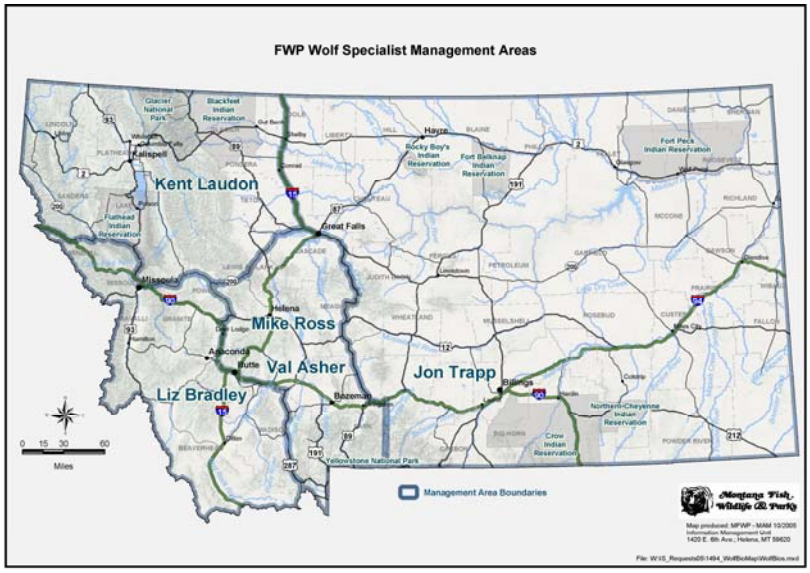
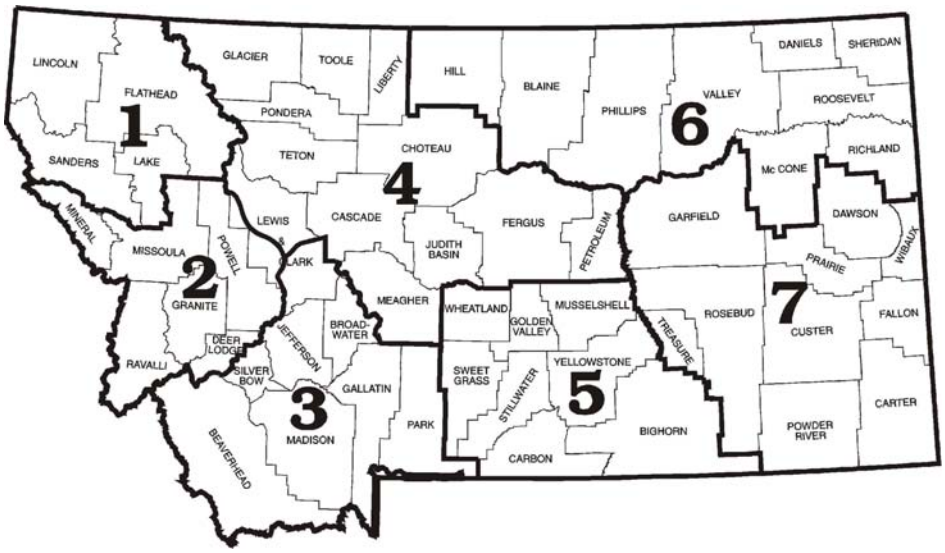
Montana Fish, Wildlife & Parks Wolf Specialist Areas of Responsibilities



MONTANA FISH WILDLIFE & PARKS ADMINISTRATIVE REGIONS



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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.

WOLF CONSERVATION AND MANAGEMENT

IN IDAHO

PROGRESS REPORT 2006

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March 2007

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EXECUTIVE SUMMARY

In January 2005, the U.S. Fish and Wildlife Service (USFWS) published and adopted new regulations (10(j) Rule) governing wolf management within the Nonessential Experimental Population Areas of Idaho south of Interstate Highway 90 (Endangered and Threatened Wildlife and Plants; Regulation for Nonessential Experimental Populations of the Western Distinct Population Segment of the Gray Wolf [50 CFR Part 17.84]). The new 10(j) Rule allowed states, with USFWS-approved wolf management plans, to petition the Secretary of Interior for certain wolf management authorities as an interim measure to delisting. In January 2006, the Secretary of Interior and the Governor of Idaho signed a Memorandum of Agreement (MOA), which transferred most wolf management responsibilities to the State of Idaho. The Idaho Department of Fish and Game (IDFG) is the primary state agency responsible for carrying out wolf management activities in Idaho. In April 2005, the Governor of Idaho and the Nez Perce Tribe (NPT) signed an MOA that outlined responsibilities between the State of Idaho and the NPT in regards to wolf conservation and management. This annual progress report is a cooperative effort between the IDFG and the NPT with contributions from USDA Wildlife Services (WS) summarizing wolf activity and related management in Idaho during 2006.

During 2006, biologists documented 76 resident wolf packs in Idaho and 72 of those remained by the end of the year. A minimum of 415 wolves was observed, and the minimum population was estimated at 673 wolves (Appendix A). In addition, 10 documented border packs counted for Montana and Wyoming established territories straddling the Idaho state boundary and likely spent some time in Idaho. Of the 53 packs known to have reproduced, 41 qualified as breeding pairs by the end of the year. These 53 reproductive packs produced an estimated minimum 185 pups.

In Idaho, wolf packs ranged from near the Canadian border south to Interstate Highway 84, and from the Oregon border east to the Montana and Wyoming borders. Dispersing wolves were occasionally reported in previously unoccupied areas. Thirteen new packs were documented during 2006 of which 3 were removed for livestock depredation control. Four hundred ninety-six wolf observations were reported on IDFG's online website report form during 2006.

Sixty-eight wolves were confirmed to have died in Idaho in 2006. Of known mortalities, agency control and legal landowner take in response to wolf-livestock depredation accounted for 45 deaths, other human causes (including illegal take) 14 deaths, 7 unknown causes, and 2 wolves died of natural causes.

During the 2006 calendar year, 40 cattle, 237 sheep, and 4 dogs were classified by WS as confirmed or probable kills by wolves.

ACKNOWLEDGEMENTS

Wolf management in Idaho is a cooperative effort between the State of Idaho, NPT, WS, and the USFWS. The Governor's Office of Species Conservation director Jim Caswell and program advisor Jeff Allen provided insight, assistance, and oversight. The NPT's Executive Committee and Wildlife Program Director Keith Lawrence provided support and input. Mark Collinge, George Graves, Todd Grimm, Rick Williamson, and other WS field personnel expertly investigated and helped resolve wolf depredations on livestock. Ed Bangs, Jeff Foss, Steve Duke, Craig Tabor, Scott Bragonier, Scott Kabasa, and Scott Winkler with the USFWS provided support and assistance during transition of wolf management authorities. Jim Unsworth and Brad Compton provided support and input and numerous strategy sessions along with making some wolf control calls. We would also like to thank all the Outfitters and Guides for their information and assistance in the backcountry, especially Scott Farr and Travis Hutton for helping us trap wolves in the Middle Fork.

We would like to thank Dave Spicer, Lauri Hanauska-Brown, and Martha Wackenhut for assuming additional regional responsibilities. Carter Niemeyer worked as seasonal wolf biologist and did an excellent job trapping and helping in the livestock conflict arena. Additionally, George Pauley, Mark Hurley, Pete Zager, Jay Crenshaw, Mark and Henry Hill, Jeff Lonneker, Jim Derig, Craig White, Mike Scott, Clay Hickey, Bret Stansberry, Mark Bowman, Josh Stanley, Nate Borg, Dr. Mark Drew, Julie Mulholland, Crystal Christensen, Lynne Stone, and Nadine Hergenrider provided additional field and administrative assistance. Thanks to Roger Fuhrman, Sue Nass, Ed Mitchell, Niels Nokkentved, and Linn French from the communications bureau; and Jon Heggen, enforcement bureau chief, for oversight of field enforcement operations.

Dr. Clarence Binninger, NPT Wolf Recovery Program veterinarian, continues to assist with wolf capture efforts. We appreciate the field assistance of biologists Isaac Babcock and Tyler Hollow, as well as volunteers Brandon Mueller and Kerry Rennie. Thanks are also extended to Mary Allen, NPT Wolf Recovery Project; Jim and Holly Akenson, University of Idaho Taylor Ranch; Montana Fish, Wildlife and Parks wolf staff; Dr. Mike Mitchell and David Ausband, University of Montana Cooperative Wildlife Research Unit; Defenders of Wildlife; Stan Hawkins and Mike Westover.

We especially recognize Mike Dorris, Rod Nielson, Glen Gemelli, and John Ugland, McCall Aviation; Steve and Michele Wolters, Northstar Aviation; Gene Mussler, Sawtooth Aviation; Jon Blakely, AV Center; Sam Kocherhans and Joe Dory, WS; Pete Nelson, Middle Fork Aviation; Arnold Aviation; and Doug Gadwa, Joe Myers, and Brandon Startin, Inter-State Aviation for their expertise and flying safety.

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INTRODUCTION

In 1973, the gray wolf (*Canis lupus*) was listed under the Endangered Species Act (ESA) and protected as an endangered species in the continental United States. The USFWS is mandated to recover federally listed species, including gray wolves. In the early 1980s, individual wolves, naturally dispersing from Canada, recolonized portions of northwest Montana near Glacier National Park. The first USFWS wolf recovery plan was developed through interagency cooperation in 1987 (USFWS 1987). The 1987 plan called for establishing 3 northern Rocky Mountain wolf recovery areas: northwest Montana (NWMT), the greater Yellowstone Area (GYA) predominantly in Wyoming, and central Idaho (CID). The plan called for natural recovery in northwestern Montana and reintroductions of wolves into Yellowstone National Park and central Idaho. Following the guidelines of the 1987 plan, the USFWS developed an Environmental Impact Statement (EIS) for the reintroduction of gray wolves into Yellowstone National Park and central Idaho (USFWS 1994). The EIS designated the GYA and CID recovery areas as Nonessential Experimental Population Areas and called for reintroductions of wolves as nonessential experimental populations, a lesser protective classification under section 10(j) of the ESA, to facilitate wolf management and conflict resolution. The Secretary of Interior approved the final EIS in 1994. In 1995 and 1996, 66 wolves were captured in Alberta and British Columbia, Canada, respectively; 31 of which were reintroduced into Yellowstone National Park and 35 into central Idaho.

Also in 1994, the USFWS developed a Final Rule, which provided management guidelines for recovering nonessential experimental wolf populations in the GYA and CID recovery areas. These guidelines differed somewhat from federal guidelines for fully endangered wolves in the NWMT recovery area. The state of Idaho contains portions of all 3 northern Rocky Mountain recovery areas (Figure 1). Wolves south of Interstate Highway 90 (I-90) are classified as nonessential experimental and are managed according to the provisions of the Final Rule. Wolves north of I-90 are classified and managed under a fully endangered ESA classification.

Efforts between the State of Idaho and the USFWS to develop a state wolf recovery plan were terminated in 1995 when the state legislature rejected a draft plan and forbade the IDFG to engage in wolf recovery activities. In 1995, the NPT completed, and the USFWS approved, the "Wolf Recovery and Management Plan for Idaho", providing the mechanism for the USFWS to enter into a Cooperative Agreement with the NPT to recover and manage wolves in the CID recovery area. Wildlife Services also became partners with the USFWS to assist in investigating depredations and implementing wolf control actions in response to wolf-livestock conflicts.

In March 2002, the Idaho Legislature accepted and passed the Idaho Wolf Conservation and Management Plan (http://fishandgame.idaho.gov/cms/wildlife/wolves/wolf_plan.pdf). In April 2003, the Legislature passed House Bill 294, allowing the state to participate in wolf management, and IDFG to assist the Governor's Office of Species Conservation in implementing the State of Idaho's Wolf Conservation and Management Plan as well as participate in wolf management with the USFWS and the NPT.

In 2003 and 2004, the IDFG participated in wolf management in cooperation with other governments and agencies. The IDFG also started to develop a statewide program in preparation for overseeing wolf management in Idaho. Wolves were monitored and managed under cooperative agreements and work plans between cooperating governments and agencies.

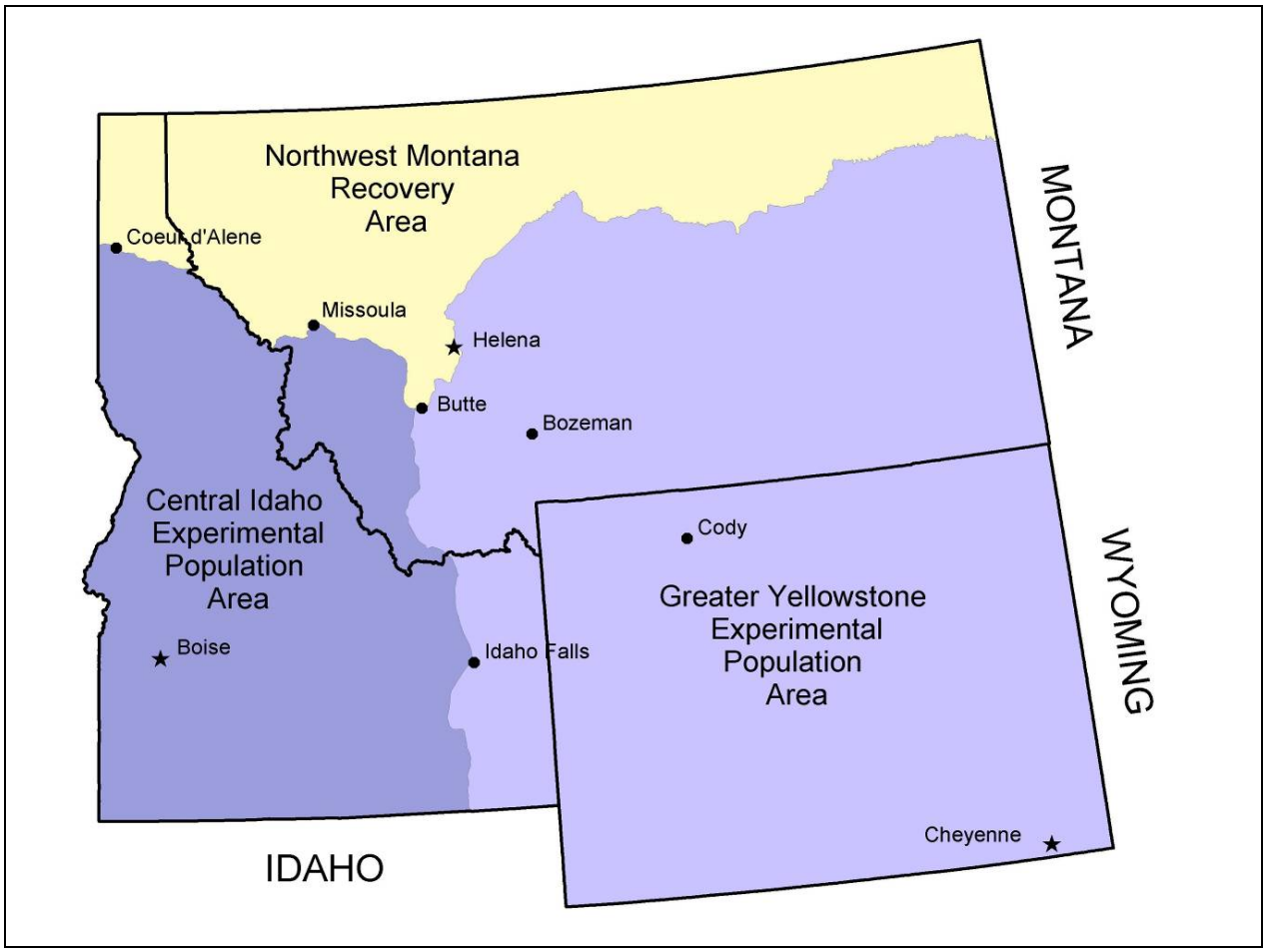

Figure 1. Recovery areas established by the U.S. Fish and Wildlife Service to restore gray wolf populations in the northern Rocky Mountains of Idaho, Montana, and Wyoming. Wolves are naturally recovering in the Northwest Montana Recovery Area, while wolves were reintroduced into the Central Idaho and Greater Yellowstone Experimental Population Areas.

In December 2002, the northern Rocky Mountain wolf population attained the established population recovery goal of 30 breeding pairs of wolves well distributed throughout the 3 states of Idaho, Montana, and Wyoming for 3 consecutive years (USFWS et al. 2003). In 2003, the USFWS adopted regulations that reclassified, or down-listed, wolves from endangered to threatened in Idaho north of I-90; however, in early 2005, a federal court judge remanded these regulations. Consequently, wolves north of I-90 remained classified as fully endangered.

The ultimate goal of federal, state, and tribal governments is to recover and remove wolves from the protections of the ESA (delisting process). The USFWS will initiate the delisting process when the northern Rocky Mountain wolf population meets or exceeds established population goals, and the 3 states of Idaho, Montana, and Wyoming each have USFWS-approved wolf management plans and other legislation and regulations in place to ensure long-term conservation of wolves. By 2003, most federal delisting requirements had been met. Wolf population recovery goals were met in 2002 and the states of Idaho and Montana had USFWS-

approved wolf management plans and adequate state laws in place. Wyoming's wolf management plan, however, was not approved by the USFWS. In response, Wyoming sued the federal government requesting court approval of their plan. Consequently, delisting was delayed until Wyoming makes USFWS-requested adjustments to its plan or federal courts rule that the USFWS accept Wyoming's plan.

In response to this delay, in February 2005, the USFWS revised the Final Rule (10(j) Rule). The new 10(j) Rule (Endangered and Threatened Wildlife and Plants; Regulation for Nonessential Experimental Populations of the Western Distinct Population Segment of the Gray Wolf [50 CFR Part 17.84]) applies only within the Nonessential Experimental Population Areas for states with USFWS-approved wolf management plans; currently Idaho and Montana (Figure 2). The 10(j) Rule is an interim measure to provide Idaho and Montana with more local wolf management authorities until Wyoming's situation is resolved and wolves can be delisted.

The 10(j) Rule allowed the states of Idaho and Montana to petition the Department of Interior to assume many day-to-day wolf management authorities. In January 2006, a Memorandum of Agreement (MOA) between the Secretary of Interior and the Governor of Idaho was signed that transferred most management authorities previously held by the USFWS to Idaho. The State of Idaho currently oversees daily management of wolves in Idaho and coordinates between agencies to fulfill obligations under the 10(j) Rule, the ESA, and the state wolf management plan.

In May 2005, an MOA was signed between the NPT and State of Idaho that outlined wolf monitoring and management responsibilities shared between the 2 governments. Under the MOA, the NPT is responsible for monitoring wolves within IDFG Clearwater Region and McCall Subregion, while the State of Idaho is responsible for monitoring wolves across the rest of the state and management statewide.

This report fulfills annual USFWS requirements to summarize and report wolf status and management activities in Idaho. The goal of the State of Idaho, NPT, USFWS, and WS is to continue to maximize knowledge of wolves in Idaho while reducing conflicts and continuing toward eventual delisting of wolves in the northern Rocky Mountains. (Editor's Note: at the time of this printing, the USFWS has proposed to delist wolves within the northern Rocky Mountains and posted a delisting rule in the Federal Register on February 7, 2007. The process will take at least a year to delist).

STATEWIDE SUMMARY

Previous progress reports by the NPT and the USFWS summarized wolf status within the Central Idaho Experimental Population Area including central Idaho and portions of southwestern Montana. However, this report summarizes the status of wolves and wolf management within the borders of the State of Idaho, including portions of all 3 northern Rocky Mountain recovery areas: endangered wolves in the NWMT recovery area north of I-90; and nonessential experimental wolves within Idaho portions of the CID and GYA recovery areas south of I-90.

Central Idaho, a vast, mountainous, and remote area, is one of the largest remaining undeveloped blocks of public land in the conterminous United States. Central Idaho includes 3 contiguous Wilderness Areas, the Selway-Bitterroot, Frank Church River-of-No-Return, and Gospel Hump, encompassing almost 4 million acres (1.6 million ha), which represents the largest block of federally-designated Wilderness in the lower 48 states.

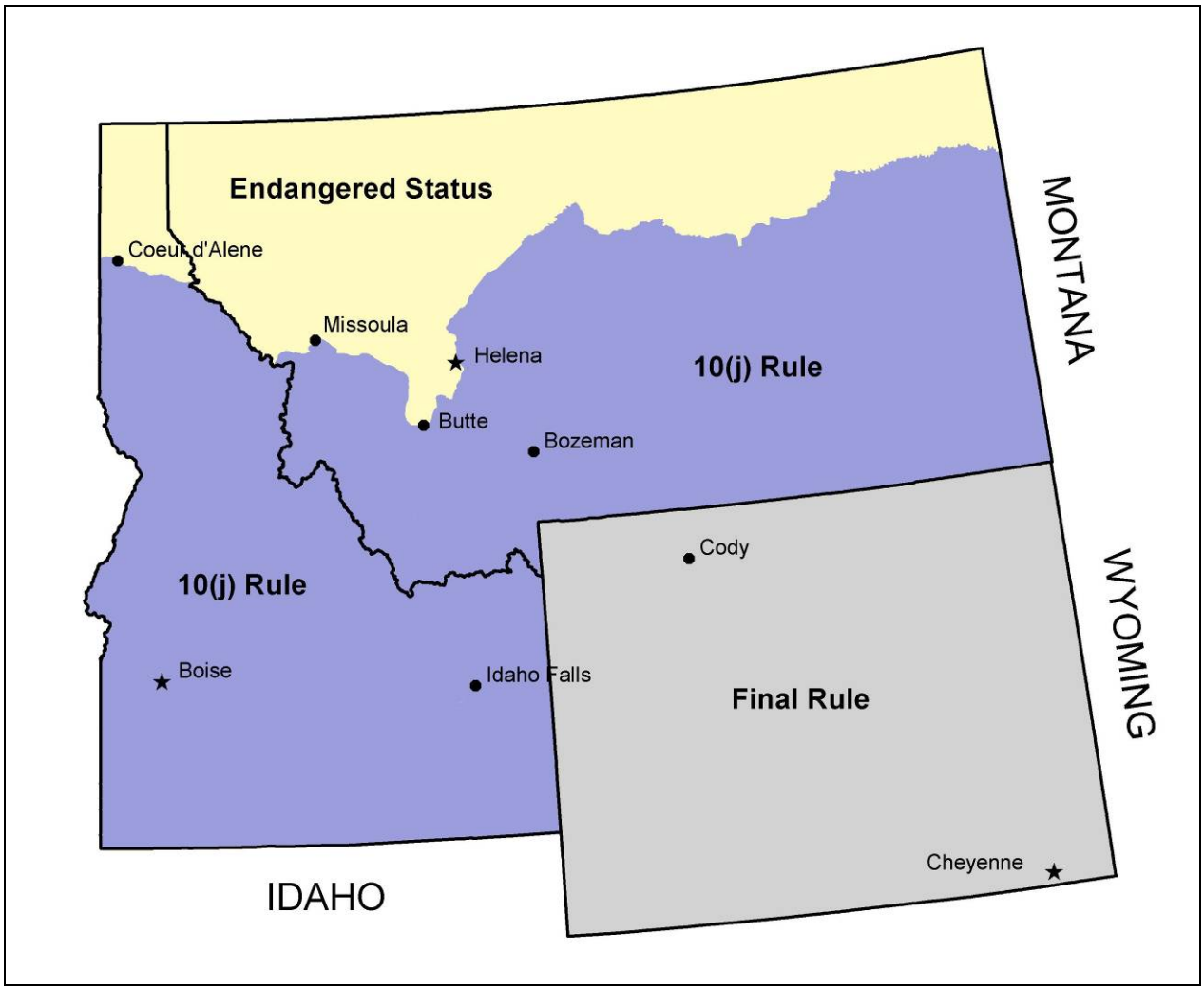

Figure 2. Management areas established by the U.S. Fish and Wildlife Service to restore gray wolf populations in the northern Rocky Mountains of Idaho, Montana, and Wyoming.

Three major mountain chains and 2 large river systems create a very diverse landscape, ranging from sagebrush-covered flatlands in the southern part of Idaho, to extremely rugged peaks in the central and northern parts. A moisture gradient also influences the habitats of both wolves and their prey, with wetter maritime climates in the north supporting western red cedar-western hemlock vegetation types, grading into continental climates of Douglas fir and Ponderosa pine to the south. Elevations vary from 1,500 feet (457 m) to just over 12,000 feet (3,657 m). Annual precipitation varies from less than 8 inches (20 cm) at lower elevations to almost 100 inches (254 cm) at upper elevations.

Wolf Population Status

The Idaho wolf population has continued to expand in both numbers and packs since initial reintroductions in 1995 (Figures 3 and 4). By the end of 2006, 72 of 76 documented wolf packs remained extant in Idaho, including 10 of 13 new packs, and a minimum of 415 wolves was observed or monitored by wolf program personnel. Using techniques established in previous

years, the Idaho population was estimated at 633 wolves (Appendix A). During the last 2 years, we have been exploring alternative population estimate techniques that are based on the number of documented packs and individuals within the packs, and using a lone wolf correction factor. This new method was peer reviewed by wolf biologists in the northern Rocky Mountains, as well as statisticians from the University of Idaho. **The minimum population estimate using the new technique is 673 (Appendix A), and is the official estimate for Idaho for 2007**.

Distribution, Reproduction, and Population Growth

Wolves were well distributed in the state from the Canadian border, south to the Snake River plain, and east to the Montana and Wyoming borders (Figure 5). Of the 72 documented packs that survived during 2006, territories of all were wholly or predominantly on U.S. Forest Service (USFS) public lands.

Of 72 documented packs, a minimum of 53 produced litters and 41 qualified as breeding pairs (Table 1). A minimum of 185 wolf pups was documented in 2006. Wolf pup counts were conservative estimates because not all pups were observed from packs that were monitored, and some documented packs were not visited. Minimum documented litter size ranged from 1-9 pups. Average minimum litter size for those packs where counts were believed complete (n = 32) was 4.5 pups per litter. Seven new breeding pairs were documented and the reproductive status of 23 documented packs was either not verified or believed to be non-reproductive during 2006. Many areas typically visited to count pups were not available to field crews due to extensive forest fires and subsequent area closures this year.

Comparing population growth rate between 2005 and 2006, using the same population estimation techniques between years, the Idaho wolf population increased by an estimated 22% (nearly identical to the previous year). The social carrying capacity for wolves will likely be below the biological carrying capacity as wolves are managed in concert with other wildlife values, livestock concerns, and management objectives. Ultimately the citizens of Idaho, not habitat, will determine the number of wolves that will persist in the state.

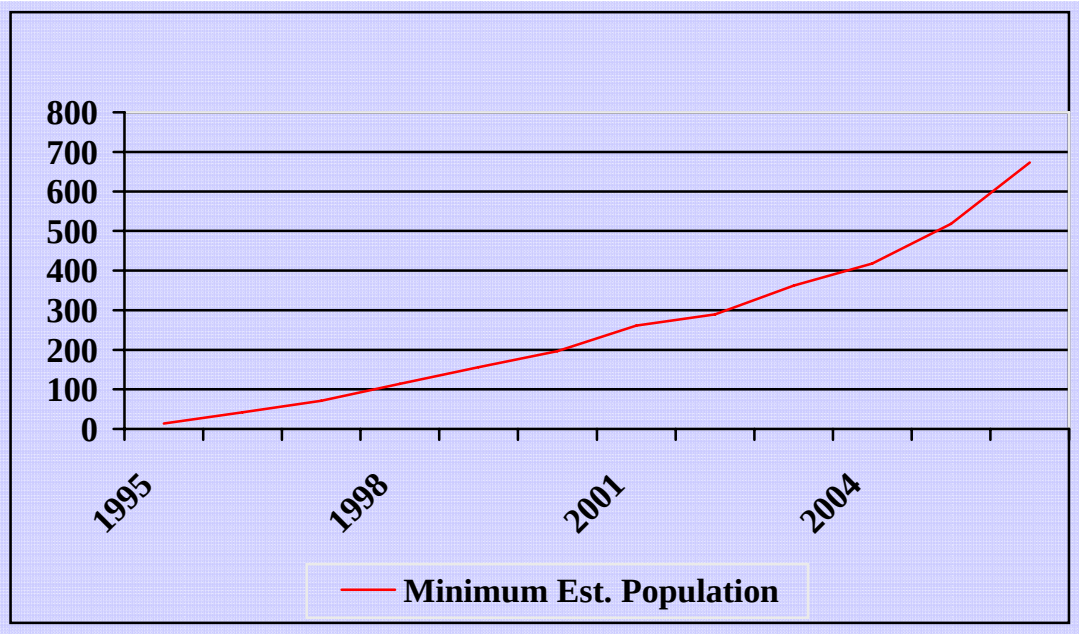

Figure 3. Estimated number of wolves in Idaho, 1995-2006. Annual numbers were based on best information available and were retroactively updated as new information became available.

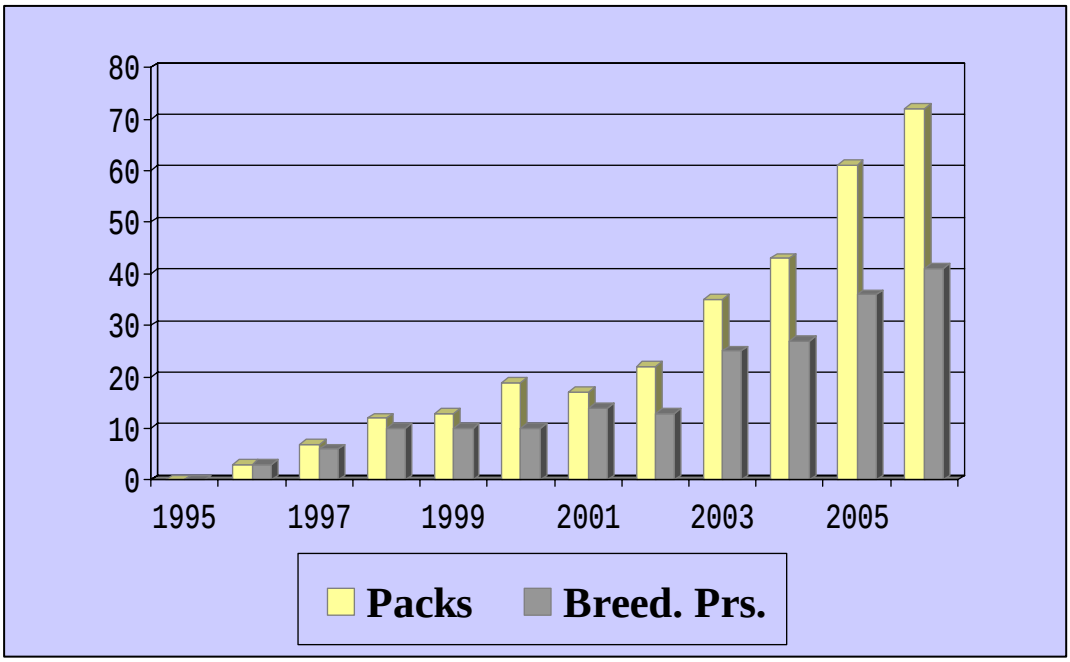

Figure 4. Number of documented wolf packs and breeding pairs in Idaho, 1995-2006. Annual numbers were based on best information available and were retroactively updated as new information became available.

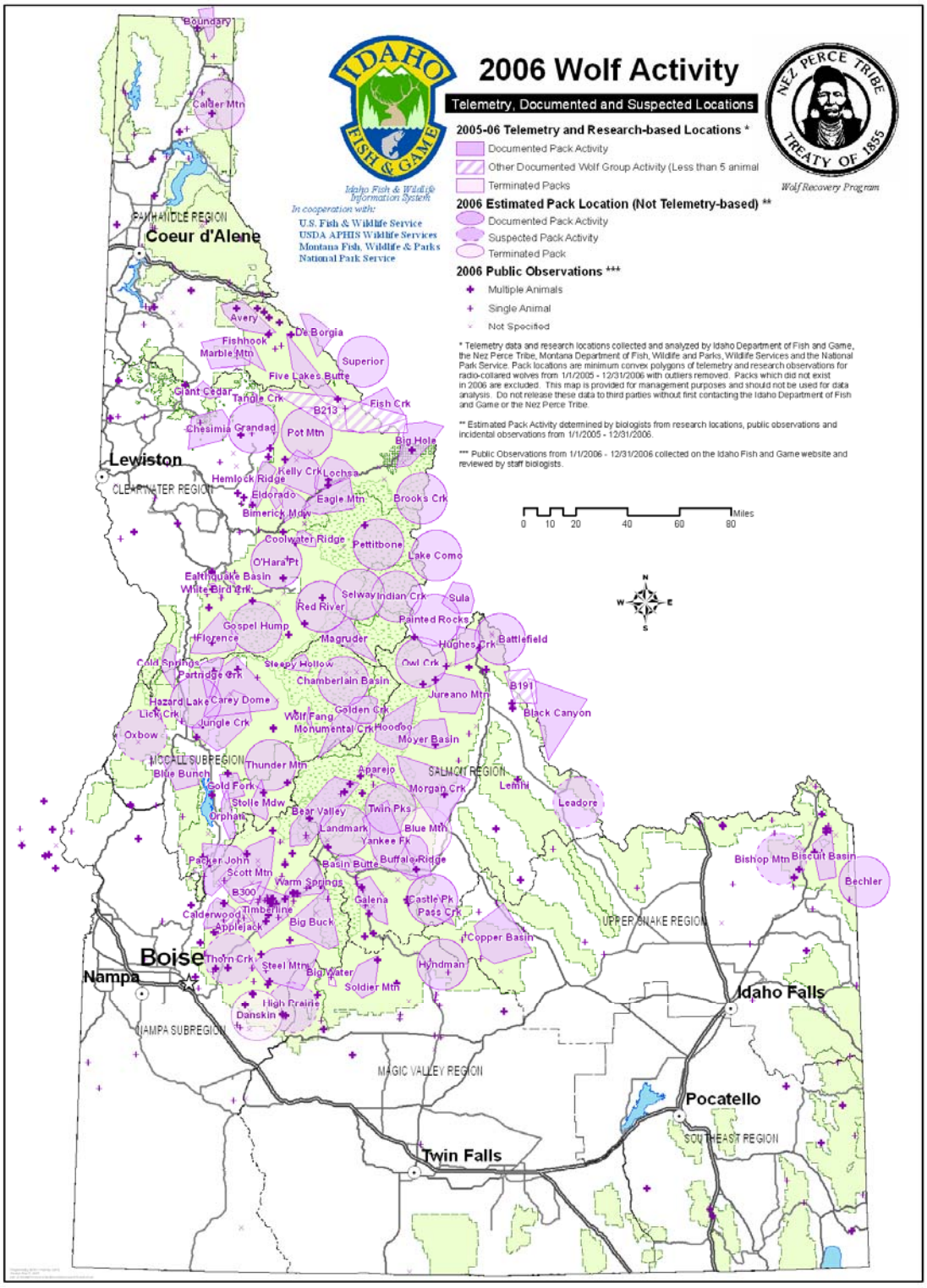

Figure 5. Distribution of documented and suspected wolf packs, other documented groups, and public wolf reports in Idaho, 2006.

Table 1. Number of wolves observed, documented packs, and other documented wolf groups; dispersal; reproductive status; mortality; monitoring status; and wolf-caused livestock depredations within Idaho Department of Fish and Game management regions, 2006.

	Management Region								
	Panhandle	Clearwater	McCall	Nampa	Magic Valley	Southeast	Upper Snake	Salmon	Total
Minimum number wolves detected[a]	35	125	73	61	9	0	14	98	415
Number documented packs	7	23	15	9	3	0	2	17	76
Packs lethally removed	0	0	1	1	1	0	0	1	4
Packs at end of year	7	23	14	8	2	0	2	16	72
Number other documented groups[b]	0	4	1	2	0	0	3	2	12
Groups lost	0	1	0	0	0		2	1	4
Groups at end of year	0	3	1	2	0		1	1	8
Known dispersal	1	2	1	3	1	0	1	4	13
Reproductive status									
Minimum number pups produced	14	56	35	24	7	0	9	40	185
Number reproductive packs	5	15	10	8	2	0	2	11	53
Number breeding pairs[c]	4	12	9	5	1	0	1	9	41
Documented mortalities									
Natural	0	1	0	0	0	0	0	1	2
Control[d]	0	0	12	13	3	0	6	11	45
Other human-caused[e]	1	3	2	1	2	0	2	3	14
Unknown	1	2	0	0	0	0	0	4	7
Monitoring status									
Active radiocollars	8	28	11	13	2	0	5	17	84
Number wolves captured[f]	8	11	10	9	0	0	5	12	55
Number wolves missing[g]	0	1	3	5	0	0	0	0	9
Confirmed & probable wolf-caused livestock losses									
Cattle	0	4	7	5	0	0	8	17	41
Sheep	0	0	145	57	15	0	14	6	237
Dogs	0	3	0	1	0	0	0	0	4

[a] Number of wolves detected by wolf program personnel through observations of wolves or wolf sign and believed alive at end of 2006. Unknown status denoted by "?" Sum of this column does not equate to number of wolves estimated to be present in the population.

[b] Other documented wolf groups include suspected packs and known and suspected mated pairs; verified groups of wolves that do not meet the definition of a documented pack.

[c] Breeding pairs are the measure of Federal and State wolf recovery and management goals. A breeding pair is defined as "an adult male and an adult female wolf that have produced at least 2 pups that survive until December 31 of the year of their birth…".

Table 1. Continued.

[d] Includes agency lethal control and legal take by landowners.
[e] Includes all other human-related deaths.
[f] Includes all wolves captured during 2006 for radiocollaring purposes (excludes captures for lethal control). Most, but not all, were radiocollared.
[g] Radiocollared wolves that became missing in 2006.

Mortality

Sixty-eight documented wolf mortalities were recorded in 2006 (Table 1). Fifty-nine of the confirmed mortalities were human caused, 7 were unknown, and 2 were natural. Of 59 confirmed human-caused mortalities, 39 were wolves controlled for livestock depredations by WS, 8 were illegally taken, 6 were from other human causes, and 6 were legally taken (shot by landowner while harassing or attacking livestock). These figures are underestimates of the true amount of overall mortality occurring within the wolf population, as documenting mortalities of uncollared wolves that are not controlled by agencies is difficult. Only 2 wolf deaths due to natural causes were recorded, another indication that mortality was underestimated, as more individuals likely succumbed to non human-related factors. There were no means to estimate deaths of pups that occurred prior to our visits.

More wolves (n = 39) were lethally controlled by WS in Idaho in 2006 than in any previous year. This mortality stemmed from removals in 14 packs: the Big Water pack (2 wolves) near Pine, Idaho; the Blue Bunch pack (2 wolves) southwest of McCall, Idaho; the Blue Mountain pack (2 wolves) west of Challis, Idaho; the Buffalo Ridge pack (2 wolves) near Clayton, Idaho; the Carey Dome pack (3 wolves) north of McCall; the Copper Basin pack (3 wolves) northwest of Mackay, Idaho; the Danskin pack (4 wolves) near Garden Valley, Idaho; the Gold Fork pack (4 wolves) east of Cascade, Idaho; the Jungle Creek pack (1 wolf) north of McCall, Idaho; the Morgan Creek pack (2 wolves) northwest of Challis, Idaho; the Moyer Basin pack (2 wolves) southwest of Salmon, Idaho; the Packer John pack (2 wolves) near Round Valley , Idaho; the Steel Mountain pack (4 wolves) near Trinity Lakes, Idaho; and the Timberline pack (2 wolves) north of Idaho City, Idaho. An additional 4 wolves were lethally removed from paired or unknown groups of wolves. Finally, 6 wolves were taken in the act of attacking livestock on private property by landowners under the revised 10(j) Rule.

Livestock and Dog Mortalities

During 2006, WS conducted 117 depredation investigations involving reported wolf-killed livestock. Of those, 63 (54%) involved confirmed wolf depredations, 16 (14%) involved probable wolf depredations, 24 (21%) were possible/unknown wolf depredations, and 14 (12%) were due to causes other than wolves. During the calendar year, WS reported 41 cattle, 238 sheep, and 4 dogs that were classified as confirmed or probable wolf kills (Table 1). Non-lethal techniques were used to reduce wolf-livestock conflicts when appropriate.

Law Enforcement

During 2006, USFWS Special Agents and IDFG Conservation Officers cooperatively investigated and reported 23 known and suspected cases of unlawful take of wolves. Of the 23 wolves investigated, 2 died of natural causes, 14 from human causes, and the cause of death for 7 was unknown.

Two people were prosecuted for the same incident through the federal court system. One was implicated in the “taking” of a gray wolf and both were charged with destruction of government property. Other investigations were ongoing.

Research and Management

Agencies continue to coordinate and support scientific research assisting in long-term wolf conservation and management.

Statewide Elk and Mule Deer Ecology Study

During 2006, the IDFG continued its effort to measure the effects of wolf predation, habitat condition, and forage nutrition on elk and mule deer populations across Idaho. Goals were met to radiocollar adult female elk and mule deer, 6-month-old elk calves and deer fawns, and newborn elk calves and deer fawns. Action is on-going to meet research objectives which include 1) determine survival, cause-specific mortality, pregnancy rates, and body condition for radiocollared animals; 2) monitor wolf distribution and abundance within project areas; 3) develop habitat condition and trend maps for Idaho; and 4) manipulate predator populations in project areas and monitor ungulate population responses. This research is providing contemporary estimates of non-hunting mortality, survival, and productivity of elk and deer populations for determining appropriate hunting seasons. Further, this research will help identify and evaluate specific predator and habitat management actions necessary to achieve ungulate population objectives.

Effects of Wolf Predation on North Central Idaho Elk Populations

The IDFG developed a proposal to evaluate effects of wolf predation on elk populations in the Lolo and Selway elk management zones. Elk populations in these 2 zones are below established state management objectives. The proposal included a review of elk population data, cause-specific mortality research being conducted on elk, wolf population data, and modeling conducted to simulate impacts of wolf predation on elk using estimated population parameters. Additionally, this proposal identified conservation measures already implemented, and future management actions and objectives proposed, in an attempt to improve and monitor elk populations in these areas. The proposal calls for removal of 75%, up to 43 wolves, within the Lolo elk management zone to enhance female elk survival. The USFWS has indicated to IDFG that the 10(j) requirement was to show that wolves were the "primary cause of the decline." The proposal clearly identified that the population of elk was in decline before the wolf reintroductions, but the concerns were more for continued impact on the declining elk population that were additive and preventing the population from recovering. The IDFG commission directed staff to continue to monitor and conduct research in the area and potentially submit the proposal for official review if wolf delisting is delayed.

Developing Monitoring Protocols for the Long-term Conservation and Management of Gray Wolves in Idaho

Gray Wolf recovery efforts in the northern Rocky Mountains (Idaho, Montana, and Wyoming) have met with much success, as all 3 states support viable recovered wolf populations. Monitoring and estimating recovering wolf populations in the northern Rocky Mountains has, to date, relied on time-intensive and expensive radiotelemetry techniques. Although this approach worked well in Idaho with initial small population sizes, these techniques are no longer appropriate or cost-effective given the current, much larger recovered population size and nearly statewide distribution.

The NPT, University of Montana Cooperative Wildlife Research Unit (Coop), the USFWS, and the IDFG are collaborating on a multi-year research effort to develop less intensive and more cost-effective approaches for estimating wolf population numbers across the varied landscapes of Idaho. Primary funding for this effort was provided by USFWS through their Tribal Wildlife Grants Program. A 3.5-year research effort will develop standardized wolf monitoring protocols for estimating wolf population parameters appropriate for meeting post-delisting monitoring and management needs, help implement wolf management plans, address wolf management goals and objectives, and ensure long-term conservation and management of the species.

During 2006, collaborators hired a project research assistant and developed a study plan that will be implemented summer 2007. Research will evaluate developing fine and broad scale monitoring approaches. Initial fine-scale approaches will focus initially on scat surveys and DNA analysis appropriate for obtaining high resolution data for specific regions of management concern. A Patch Occupancy model will be developed and evaluated as a broad-scale, statewide, monitoring approach. Fine and broad scale data sets will be combined into a single cohesive monitoring program to address wolf management goals and objectives.

Standardized monitoring protocols will be important in satisfying the USFWS' 5-year post-delisting monitoring requirements and will be crucial to ensure sustainability of the population through effective post-delisting conservation and management of wolves. Results of this effort will also be useful to other states, particularly Montana and Wyoming, developing monitoring protocols for wolves across the northern Rocky Mountains.

Outreach

Program personnel presented 45 information and education programs to a minimum of 1,838 people. Audiences included school students, agency personnel, livestock associations, community groups, sportsmen and outfitters, and legislators. In addition to organized presentations, program personnel talked to numerous members of the public via telephone, email, and in person. Also, news articles were released by IDFG summarizing all wolf-related livestock mortalities as well as wolf mortalities and any other noteworthy news item about wolves on a weekly basis. Program personnel talked with reporters from across Idaho and the nation regularly. Wolves continued to be an interesting topic for the public and television, radio, and print media contacted the program leader often to obtain wolf information and agency perspective. Thus, thousands more people were contacted regularly by program personnel about wolves through radio, television, and print media.

The IDFG online wolf reporting system provided an opportunity for the public and professionals to record wolf observations in Idaho. During 2006, 496 wolf observations were reported on the web site. The online reporting system is a tool which assists biologists locate new packs and allows the public a means to communicate wolf concerns to the appropriate agency.

REGIONAL SUMMARIES

Determining numbers, distribution, and population trends of wolves in Idaho is important for many reasons including effective species management, addressing social concerns of Idahoans, and meeting federal minimum wolf population requirements. A wolf pack is a group of wolves usually consisting of an adult male and female (alpha pair) and their offspring from one or more generations. A pack is first formed when a mated pair produces its first litter of pups. Because a

wolf pack is the basic reproductive unit for this species, enumerating the number of packs within the population is important in determining the reproductive status and long-term viability of the population. As such, the wolf pack has become the unit of measure for federal wolf recovery goals and relisting thresholds, and state wolf management objectives. Unfortunately, because wolf packs are dynamic, varying in size and age and sex composition, do not always travel together in 1 discrete group, and travel across large territories, they are difficult to detect and differentiate from one another in the field. In addition, not all groups of wolves are associated with reproductive packs.

The status of the wolf population was tracked by documenting and counting different wolf groups. Wolf groups reported here are classified as documented packs, suspected packs, potential mated pairs, and lone wolves. In Idaho, a documented pack was defined as 5 or more wolves verified (by program personnel or other reliable sources with evidence such as photos) traveling together, or 2 or more wolves that have had verified reproduction. Documented packs are considered fully reproductively functioning wolf packs containing an alpha pair and offspring. The estimate of the number of wolf packs in the state, for any given year, is based on counts of documented packs. Usually, some information about a documented pack's composition and social structure was known, as program personnel study these multi-generational packs from year to year. Although most wolf packs produce a litter every year, some packs do not. The reproductive history of documented packs is monitored annually. Documented packs that produced litters for a given year were considered reproductive packs for that year, and documented packs that did not produce litters, or for which reproduction was not verified, were considered non-reproductive packs for the year.

In addition, the USFWS has established a stricter definition for a wolf pack called a breeding pair. The USFWS defines a breeding pair as "An adult male and an adult female wolf that have produced at least 2 pups that survived until December 31 of the year of their birth…" (USFWS 1994). Breeding pairs are the USFWS' unit of measure for wolf recovery goals and relisting thresholds in the northern Rocky Mountains. Until wolves are delisted, and for a 5-year period following delisting, the USFWS will require the State of Idaho to monitor the numbers of breeding pairs. For any given year, all documented reproductive packs that survive intact or are composed of two adults plus a minimum of 2 pups, until December 31, are counted as breeding pairs for that year.

Suspected packs are known or suspected groups of wolves with unknown pack composition (numbers, sex and age structure, social structure) and reproductive history. A suspected pack is defined as multiple wolves or wolf activity repeatedly reported or documented that has not been verified as a pack. Suspected packs are assigned to geographic areas where, based on available evidence, wolf pack presence is suspected but not verified. Evidence can include multiple unverified reports suggesting pack presence, or verified presence of wolves of unknown status or composition.

Most documented packs were resident packs with year-round territories contained wholly within Idaho. However, some documented and suspected packs, called border packs, were only part-year residents of Idaho. Border packs had known or suspected territories that overlapped state boundaries between Idaho and neighboring states of Montana and Wyoming. The states of Idaho, Montana, and Wyoming have agreed, for federal recovery purposes, that border packs would be assigned to that state in which border packs den, or spend the majority of their time. For purposes of this report, we listed documented and suspected border packs for each IDFG

region and indicated the state to which the pack had been assigned for 2006. Specific information for border packs assigned to Montana and Wyoming were not provided in this report, with the exception of livestock depredations or wolf mortalities occurring within Idaho. For more information on Montana and Wyoming border packs, please see the Rocky Mountain Wolf Recovery 2006 Interagency Annual Report (USFWS et al. 2007).

Potential mated pairs are known small groups of wolves traveling together that have not yet formed a pack, but are anticipated to produce their first litter of pups the following year. Lone wolves are wolves not associated with a territory or other wolves. Usually, identified potential mated pairs and lone wolves are actively monitored through radiotelemetry and some information is known about their numbers, age and sex composition, and home range. For purposes of this report, potential mated pairs and lone wolves have been grouped into a single category called "Other Documented Wolf Groups."

Lastly, many areas of potential wolf activity are monitored based on sporadic reports to determine if packs are present; however, these are not reported herein. Also, any verifications of new wolf pack activity that occurred after December 31, 2006, are not included in the information presented below.

Monitoring the status of these different wolf groups from year to year assists the Recovery Program in verifying as many documented wolf packs as possible annually, and provides more accurate information for estimating and tracking wolf population numbers and trends.

Panhandle Region

Wolves found north of I-90 in this region are part of the NWMT Recovery Area and are classified as endangered. Wolves south of I-90 along the southern boundary of this region are within the CID recovery area and are classified as nonessential experimental animals.

There were 5 documented resident and 4 documented border packs in the Panhandle Region in 2006 (Figure 6; Table 2). Five of the 9 documented packs (Avery, Calder Mountain, Tangle Creek, Marble Mountain, and De Borgia) produced litters, 4 of which qualified as breeding pairs. The Calder Mountain border pack shared time between Idaho and Montana, and was counted as an Idaho pack, while De Borgia and Superior packs were counted by Montana. The Boundary pack moves between Idaho and Canada.

Two wolf-livestock conflicts were investigated in this region; one was considered a possible wolf kill and the other was a coyote kill. No dogs (herding/guarding or hunting) were reported killed by wolves in 2006.

Documented Resident Packs

Avery

This pack was first documented in 2005, but was suspected in 2004. In spring 2006, female B233 was found dead by gun shot. Personnel did not get a pup count on this pack but observed multiple pup sign during trapping efforts in early October. Trapping for this pack was unsuccessful in 2006, but alpha male B234 remains collared. The Avery pack ranges from the St. Joe River north almost to I-90 and from Elsie Peak east to Bird Creek. Ten wolves were

observed on a December monitoring flight. The Avery pack was counted as a breeding pair for 2006.

Fishhook
Two new radiocollars were put on wolves in this pack in 2006, female pup B293 and suspected breeding male B294. Two pups were observed in early August. In late October, female pup B293 was found dead from unknown causes. IDFG personnel observed 6 wolves during monitoring flights. Because 1 of the 2 pups died, Fishhook was not counted as a breeding pair for 2006.

Five Lakes Butte
Female B213 was not located with B212 during 2006. However both wolves are using portions of what has been considered Five Lakes Butte territory. Two trapping and scouting efforts into the traditional Five Lakes Butte denning area and rendezvous sites turned up no sign of reproduction. During December, B212 was observed with 2 other wolves on several occasions in the northern portion of the territory while B213 was observed with 2 other wolves in the southern portion of the territory. The Five Lakes Butte pack was not counted as a breeding pair for 2006.

Marble Mountain
Three pups were documented in this pack in late September. Female pup B314 was radiocollared on 25 September; she weighed 70 lb. at that time. We have had consistent counts of 6 wolves during monitoring flights. This pack ranges from south of Grandmother Mountain west to Blackwell Hump. Marble Mountain was counted as a breeding pair for 2006.

Tangle Creek
This is the first year Tangle Creek pack has been monitored; however, evidence indicates wolves were in the area in 2005. Three pups were confirmed during summer trapping efforts. Male pups B302, B310, and B311 were captured and collared in September, but B302 slipped his collar. He was recaptured but not recollared. The signal for B311 has not been heard since November. This pack ranges south from Freeze Out Ridge to the north and west shores of Dworshak Reservoir. Tangle Creek was counted as a breeding pair in 2006.

Documented Border Packs

Boundary
This newly documented pack was documented when IDFG bear research personnel captured subadult female B296 in a bear snare in late August. While no other wolves have been observed, WS investigated a wolf-livestock complaint in the Hull Mountain area during February, so we are considering this a confirmed pack. Only a few aerial locations were gathered for this pack, but from those locations we know they range from Wall Mountain north to at least 5 miles into Canada. The Boundary pack was not counted as a breeding pair for 2006.

Calder Mountain (ID)
This pack was first documented in 2005; however, no wolves were radiocollared. Successful reproduction was documented in 2006, but the only adult wolf captured escaped from the trap before it was anesthetized and collared. Calder Mountain pack dens near a popular horse trail that receives high use during prime trapping season making trapping efforts difficult. This pack is a border pack between Montana and Idaho and was counted as an Idaho breeding pair for 2006.

De Borgia (MT)
One wolf was radiocollared in the De Borgia pack during summer 2006. This pack is monitored by Montana Department of Fish, Wildlife, and Parks (MFWP), and IDFG personnel. DeBorgia is considered a border pack between Idaho and Montana and was counted as a breeding pair by Montana in 2006.

Superior (MT)
Superior is a confirmed pack for 2006, but reproduction was not documented. They are considered a border pack between Montana and Idaho. Superior was not considered a breeding pair for 2006.

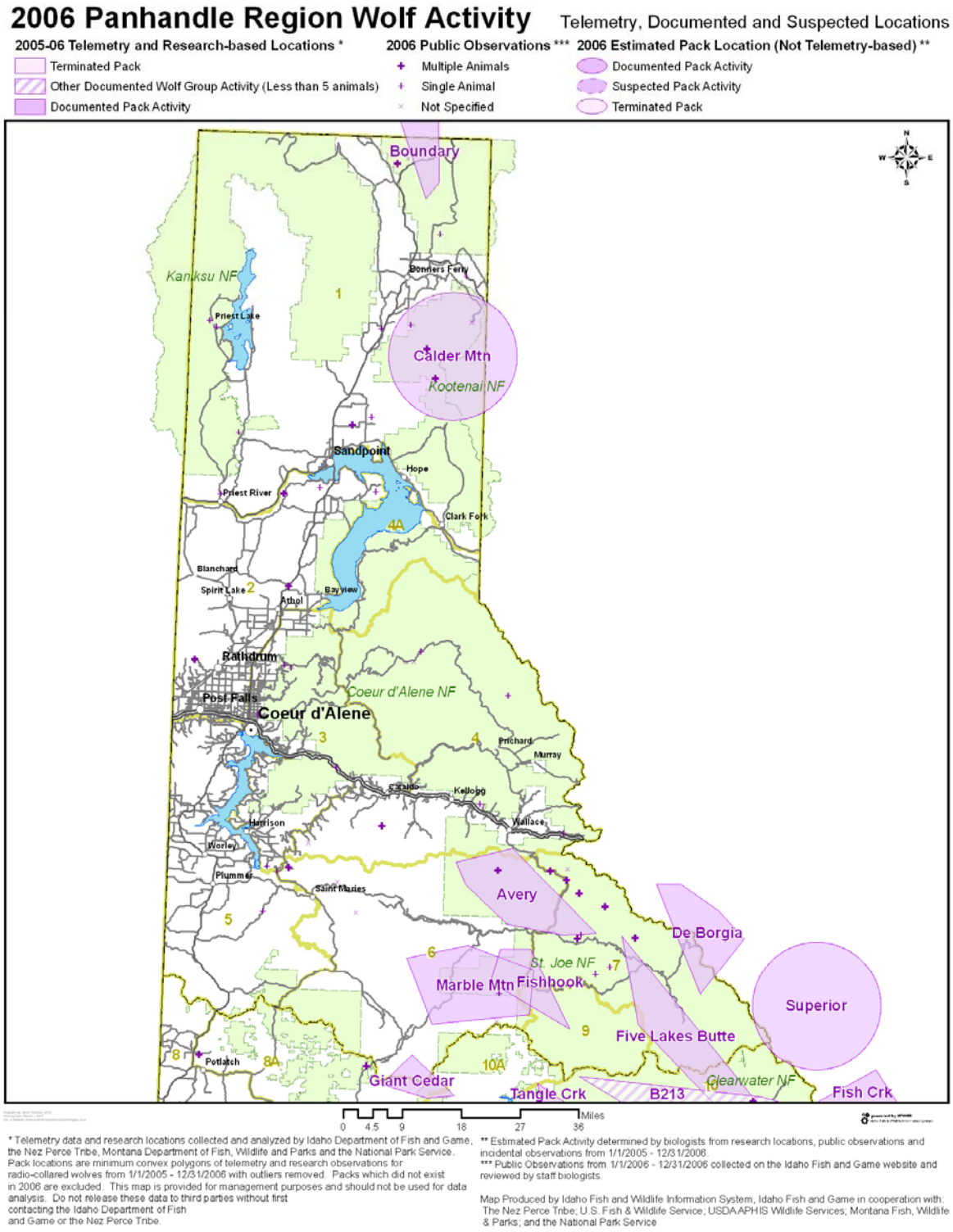

Figure 6. Wolf pack activity and observations in the Panhandle Region, 2006.

Table 2. Estimated pack size, reproductive status, mortality, dispersal, monitoring status, and livestock depredation for documented and suspected wolf packs within Idaho Department of Fish and Game Panhandle Region, 2006.

		Reproductive status			Documented mortalities					Monitoring status			Confirmed & probable wolf-caused livestock losses		
Wolf pack or group	Min. no. wolves detected[a]	Min. no. pups prod.	Reported as reprod. packs	Reported as breeding pairs[b]	Natural	Control[c]	Other human[d]	Unknown[e]	Known dispersal	Active radio collars	Number wolves captured[f]	Number wolves missing[g]	Cattle	Sheep	Dogs
Documented pack															
Avery	10	2	yes	yes	0	0	1	0	0	1	0	0	0	0	0
Boundary (ID)[h]	1	?	no	no	0	0	0	0	0	1	1	0	0	0	0
Calder Mtn (ID)[h]	4	4	yes	yes	0	0	0	0	0	0	0	0	0	0	0
De Borgia (MT)[h]															
Fishhook	6	2	yes	no	0	0	0	1	0	2	2	0	0	0	0
Five Lakes Butte	3	?	no	no	0	0	0	0	1	1	0	0	0	0	0
Marble Mountain	6	3	yes	yes	0	0	0	0	0	2	1	0	0	0	0
Superior (MT)[h]															
Tangle Creek	5	3	yes	yes	0	0	0	0	0	1	4	0	0	0	0
Regional total	35	14			0	0	1	1	1	8	8	0	0	0	0

[a] Number of wolves detected by wolf program personnel through observations of wolves or wolf sign and believed alive at end of 2006. Unknown status denoted by "?" Sum of this column does not equate to number of wolves estimated to be present in the population.

[b] Breeding pairs are the measure of Federal and State wolf recovery and management goals. A breeding pair is defined as "an adult male and an adult female wolf that have produced at least 2 pups that survive until December 31 of the year of their birth…".

[c] Includes agency lethal control and legal take.

[d] Includes all other human-related deaths.

[e] Does not include pups that disappeared before winter.

[f] Includes all wolves captured during 2006. Most, but not all, were radiocollared.

[g] Radiocollared wolves that became missing in 2006.

[h] Border pack officially tallied to (state/nation); territory known or likely shared with Idaho. Data on these packs can be found in Rocky Mountain Wolf Recovery 2006 Interagency Annual Report.

Clearwater Region

The Clearwater Region was occupied by 21 documented resident, 4 documented border (including 2 tallied for Idaho [Fish Creek and Brooks Creek] and 2 for Montana [Big Hole and Lake Como]), and 1 suspected pack (Figure 7; Table 3). Twelve of the 15 Idaho (excluding Big Hole, see above) packs documented to have reproduced qualified as breeding pairs. For the 3 packs that did not qualify as breeding pairs, only 1 pup was observed for Lochsa pack, only 1 pup survived for Red River pack, and no pup count could be obtained for the Selway pack (although reproduction was confirmed as 1+ pups based on pup sign). Six wolf mortalities were recorded; 3 from illegal take, 2 by unknown causes, and 1 from natural cause. Livestock losses in the Clearwater Region during 2006 included 1 confirmed and 3 probable wolf-killed cattle. The White Bird Creek pack was responsible for the loss of 2 hunting hounds (and injured a third) and unknown wolves killed a hound near Weippe, Idaho, in 2006. Eleven wolves were captured and fitted with radiocollars in the region.

Law Enforcement Summary

Regional Conservation Officers, in consultation with USFWS Special Agents, investigated 1 incident involving a dead wolf. The wolf was determined to have been illegally killed and was reported to the USFWS for further investigation.

Documented Resident Packs

Bimerick Meadow
Monitoring male B247, suspected alpha, and newly radiocollared female B289 led biologists to a rendezvous site where 6 gray pups were observed in late August 2006. Minimum pack size, based upon an aerial observation, was estimated at 7 wolves. This pack was a breeding pair in 2006 for the second consecutive year.

Chesimia
After lethal control removed the alpha female and 3 other wolves in 2005, this pack did not display denning behavior in 2006 as indicated by telemetry locations of sole radiocollared wolf, yearling female B222. In addition, the livestock operator in this pack's territory noted significantly less evidence of wolves in 2006 near his cow camp, located in close proximity to the 2005 den site. Monthly aerial locations for B222 in August and September suggested that she might be dispersing, as they were outside of the pack's defined home range. B222 was not located during the October 2006 monitoring flight, but was found on the western edge of their territory in early December 2006. Four gray wolves, including B222, were observed in late December during a monitoring flight. The Chesimia pack was not considered a breeding pair for 2006.

Cold Springs
Following the death of the alpha female, B206, in October 2005, there were no radiocollared individuals in this pack. Multiple investigations of areas previously used by this pack failed to detect evidence of wolf activity. The southernmost aerial telemetry location for B206, from May 2005, was approximately 8 miles (13 km) northeast of the Lick Creek pack's 2006 rendezvous site, suggesting the possibility that these 2 packs were one and the same, and that the Cold Springs pack had shifted south during 2006. Further aerial telemetry data will be needed to

determine pack identities in this area of potential overlap. The Cold Springs pack was not a breeding pair for 2006.

Coolwater Ridge
The suspected alpha male of this pack, B286, was captured in June 2006. The alpha female, B163, was also radiocollared. Two black pups were observed and 2 others were heard howling at a rendezvous site in late June. A hunter illegally shot B286 in October 2006, possibly impacting this pack's capacity to reproduce in 2007. Field observations (official count) indicated a minimum pack size of 6 individuals, although an observation from the public during hunting season, following the death of B286, suggested that this pack contained 7-12 individuals. Despite the loss of the suspected alpha male, the Coolwater Ridge pack was a breeding pair in 2006.

Eagle Mountain
Alpha male B136 and his uncollared mate produced their fourth litter of pups in 2006. A minimum of 3 pups was observed in late July in a tributary of the Lochsa River. Because B136 was the sole radiocollared wolf and the collar was expected to expire soon, a capture effort was initiated in early August. Facilitated by a USFS horse packer, a program biologist trapped and radiocollared a young adult female, B295. During the October 2006 monitoring flight, B136 and B295 were located approximately 8 miles (13 km) southeast of the previously defined territorial boundary, in the North Fork of Moose Creek; it was not known if this represented an extraterritorial movement or whether this area was indeed part of the pack's home range. Pack size for 2006 was estimated at a minimum of 10, including 2 black individuals (no documentation of black wolves previously), based upon an aerial observation. This pack was a breeding pair for 2006.

Earthquake Basin
Two subadult female wolves were captured and radiocollared from this previously uncollared pack in early May 2006. Radio tracking of B274 and B275 subsequently led biologists to a rendezvous site where 5 black and 4 gray pups were observed, the largest litter recorded for 2006. Based upon field observations, this pack was estimated to contain a minimum of 13 wolves. The Earthquake Basin pack was a breeding pair for 2006.

Eldorado Creek
Trapping operations during summer led to the capture and radiocollaring of 2 wolves; adult male B281 and possible alpha female B301. Based upon howling, a minimum of 3 pups was detected. Aerial observations indicated a minimum of 5 wolves in this pack. The Eldorado Creek pack was a breeding pair for 2006.

Florence
Two of 3 radiocollared male wolves captured from this pack in 2004, B200 and B201, remained with the pack during 2006. The third, B202, either dispersed or his radiocollar failed, as he was not located after March 2005. Investigations of the den site in early June documented the presence of 4 gray pups. A domestic cow was listed as a probable wolf-kill in this pack's territory. Based upon field observations, a minimum of 7 wolves was present, although aerial sightings in both 2004 and 2005 revealed 15 individuals. Breeding pair status was retained by the Florence pack for 2006.

Giant Cedar
Although Giant Cedar was a suspected pack in 2005, subsequent monitoring of female wolf B256, radiocollared in 2005, allowed biologists to reclassify this group as a documented pack for 2006. Localized radiolocations during spring indicated probable denning. In early June, a single pup was heard howling in the vicinity of the suspected den site. The wolves moved away from the area following this detection, allowing biologists to locate the actual den structure, which happened to be a "giant" cedar log. Three more field efforts were required before a pup count was obtained in late August, at which time 3 gray pups were seen. Two of them, a male (B307) and female (B308), were subsequently captured and fitted with radiocollars. Pack size was estimated at a minimum of 6 individuals. The aptly named Giant Cedar pack was a breeding pair in 2006.

Gospel Hump
Contact with both radiocollared wolves, females B138 and B139, was lost during 2004, making monitoring of this pack difficult. Program personnel received reports during May, via a contract trail crew working for the USFS in the Gospel Hump Wilderness, of persistent howling and wolf sign in the vicinity of the pack's most recently known den site. Before the program could mount a survey effort, additional reports from the trail crew indicated that the wolves had probably left the area as no further howling was heard. No other reports were received and limited efforts failed to locate the pack. The Gospel Hump pack was not a breeding pair in 2006 and there was no estimate of pack size.

Hemlock Ridge
This pack produced its fourth documented litter in 2006. Based upon howling, a minimum of 2 pups was detected. Because of dense vegetation at the rendezvous site, program personnel observed no pups, but a fisheries biologist for Idaho Department of Lands reported seeing 2 gray pups and was able to photograph one. In addition, at least 4 adults were accounted for based upon radiocollared animals and howling that resulted in a minimum pack size estimate of 6 wolves for 2006. An aerial observation indicated the first presence of a black wolf in this pack. The Hemlock Ridge pack was a breeding pair for 2006.

Indian Creek
Five wolves were observed in this drainage during a winter ungulate survey conducted by IDFG in 2004, so this group was retroactively added as a documented pack for 2004. No reports of wolf activity were received in 2006. This pack was not considered a breeding pair and there was no estimate of pack size for 2006.

Kelly Creek
Three wolves, suspected alpha male B220 along with females B237 and B238, were present at a traditional rendezvous site in early August. Three gray pups were observed and a fourth was suspected based upon howling. Thirteen wolves were seen during a monitoring flight in December 2006, which did not include B238, whose membership in the pack was uncertain (she was not located with B220 or B237 after 1 August 2006 and had shifted west a few miles). The longstanding Kelly Creek pack was a breeding pair in 2006.

Lochsa
Radiocollared female wolf B232 led biologists to a rendezvous site in mid-August, where she was observed with 3-4 other gray adult-sized wolves and a single gray pup. There may have been additional pups, although group howls heard by project personnel did not support that

assumption. A trapping effort resulted in 2 wolf captures, but both pulled out of the traps; 1 escaped as it was approached to be sedated. Pack size was estimated at a minimum of 5-6 individuals in 2006 based upon field observations. An aerial observation of 9 gray wolves in December 2006 provided the official pack size count. The Lochsa pack was not a breeding pair for 2006.

Magruder
Suspected alpha male B110 had not been located since June 2004, probably due to expiration of his radiocollar, and female B219 not since late May 2005. One effort to investigate this uncollared pack's previously used rendezvous sites was made, but no wolf sign was found. Reports from backpackers and hunters in the area indicated that wolves were still residing within the home range. The Magruder pack was not a breeding pair in 2006 and there was no estimate of pack size.

O'Hara Point
Suspected alpha male B111 had not been located since October 2004, and it was likely his radiocollar expired. Male B162, captured as a pup in 2003, dispersed by mid-May 2005, leaving no radiocollared wolves in this pack. The pack did not use their traditional denning area in 2006, complicating efforts to document reproduction and conduct capture operations. Tracks of multiple wolves were found by biologists, confirming the continued presence of wolves in the territory. Also, wolves were confirmed to have injured 2 adult cows and 1 calf and probably killed 1 calf in this pack's territory in late August. B111's radiocollar was found by a hunter during November 2006, likely indicative of this wolf's death. The O'Hara Point pack was not a breeding pair in 2006.

Pettibone Creek
Six wolves were observed in this drainage during a winter ungulate survey conducted by IDFG in 2004, so this group was retroactively added as a documented pack for 2004. No estimate of pack size was made and no evidence of reproduction was obtained, so this pack was not a breeding pair for 2006.

Pot Mountain
Five wolves were observed on the flank of Pot Mountain during a winter ungulate survey conducted by IDFG in spring 2005, so this group was added as a documented pack for 2005. Field efforts in 2006 were unsuccessful in locating these wolves as very limited wolf sign was detected in the area. No estimate of pack size was made and no evidence of reproduction was obtained, so this pack was not a breeding pair for 2006.

Red River
No radiocollared wolves were monitored during 2006. In mid-July, a single black pup was observed along Red River south of the Red River Wildlife Management Area. The following day, 1-2 pups responded to howling. The presence of pups initiated a capture operation, despite the lack of adult wolf sign observed in the area. This trapping session and a subsequent one was unsuccessful, so this pack remained without a radiocollared member. A dead wolf was reported to program personnel in early October; a gray pup was recovered in the South Fork of Red River drainage and USFWS Law Enforcement initiated an investigation. Sightings of 8-10 wolves observed at Red River Wildlife Management Area were received in early fall. The Red River pack was not considered a breeding pair for 2006.

Selway
Monitoring efforts in 2006 included 3 investigations of previously used rendezvous sites. Tracks of 4 wolves were located in the Meadow Creek drainage in late September, and hunters reported hearing multiple wolves howling the night these tracks were discovered. Copious pup scats were located the following day at a previously identified rendezvous site in the Bargamin Creek drainage; no evidence of wolf use was previously detected at this site in mid-July, indicating the pack occupied the area between mid-July and mid-September. The Selway pack was counted as a reproductive pack (officially tallied as 1+ pups based on sign observed), but not a breeding pair in 2006 because a minimum of 2 pups was not documented.

White Bird Creek
Alpha female B284 and adult male B285 were captured and radiocollared following an incident between this pack and hunting dogs. Three wolves killed 2 hounds and injured a third when the wolves encountered the dogs in late May 2006. A program biologist subsequently located the pack's rendezvous site, leading to the successful trapping effort. A minimum of 2 pups and 3 adults was detected at that time, based upon howling. This pack was also implicated in a probable wolf-killed cattle loss and the probable wounding of another. One wolf was documented as an illegal kill in November. Six wolves were observed during a monitoring flight during winter 2006/2007. The newly documented White Bird Creek pack was a breeding pair for 2006.

Documented Border Packs

Big Hole (MT)
Because they denned in Montana, and the majority of their locations were there as well, the Big Hole pack was officially counted as a Montana pack in 2006 for the second consecutive year (fieldwork was conducted by NPT personnel in coordination with MFWP). The pack produced 2 black and 2 gray pups. Estimated pack size at the end of 2006 was 6 wolves based on an aerial sighting from July. The sole radiocollared wolf, female B151, remained with the pack. This pack qualified as a breeding pair for Montana in 2006.

Brooks Creek
A radiocollar was placed on a wolf, SW17M, in this drainage in spring 2005 by an MFWP biologist. Based upon telemetry locations obtained during spring 2006, MFWP personnel believed this pack denned in the White Sand Creek drainage of Idaho. During a monitoring flight in July, an MFWP biologist observed 4 black and 2 gray pups. Minimum pack size was estimated at 9 wolves based upon a ground observation in October. Counted as a breeding pair for Montana in 2005, this border pack was tallied as a breeding pair for Idaho in 2006 due to its suspected den location.

Fish Creek
The Fish Creek pack denned in Idaho on the Clearwater National Forest in 2006; their previous den was in Montana in 2005. During a monitoring flight conducted by MFWP in August 2006, 7 pups were observed. In November, 14 wolves were seen during a monitoring flight. This border pack was considered an Idaho breeding pair for 2006.

Lake Como (MT)
A minimum of 3 wolves was present in this area, as documented by MFWP, but none were radiocollared. No evidence of reproduction was obtained in 2006. Pups were last known to be

produced in the Lake Como pack in 2002. Very little was known about wolf activity in this area from 2002 to present and this pack, tallied for Montana, was not a breeding pair in 2006.

Suspected Resident Packs

Grandad
Investigation of the area where an outfitter, in May 2005, reported 6 wolf pups and program biologists observed 3 gray adults, yielded little evidence of wolf use in 2006. The livestock manager in the area reported that he had seen less wolf sign in 2006 than the 2 preceding years, suggesting either a reduced level of wolf activity or those wolves had shifted use to another area. Video of a wolf was taken in mid-June near Flannery Creek, a tributary of Washington Creek, approximately 12 miles (19 km) from where 3 wolves were observed in 2005. An extensive survey of the heavily roaded area yielded minimal wolf sign. A prolonged survey/trapping effort during the latter half of August detected 4 sets of wolf tracks and a wolf capture; however, the wolf escaped by pulling out of the trap. Wolf presence was confirmed, but pack and reproductive status were not verified during 2006.

Other Documented Wolf Groups

B147
After dispersing from the Jureano Mountain pack, female B147 resided in what would be the White Bird Creek pack's territory (although their range was not well understood at the time due to limited number of locations) from May 2004 until she crossed the South Fork Clearwater River in spring 2006. She was later located in Earthquake Basin, home to the pack of that name. While conducting a capture effort for the Earthquake Basin pack, biologists detected B147's radio signal on mortality mode in May 2006 and discovered her carcass. Necropsy results determined that her death was due to natural causes, osteosarcoma and terminal sepsis.

B213
Female B213, radiocollared as an adult in the Five Lakes Butte pack in 2004, was last located within this pack's territory in September 2005. Her signal was not detected again until January 2006 when she was located in the Kelly Creek drainage, within the Fish Creek pack's territory. B213 continued her extraterritorial wanderings, when she was located near Lolo Hot Springs (Big Hole pack's home range) and Scurvy Mountain (home to Paradise/Scurvy/Gorman/ Toboggan area of suspected wolf activity); she then returned to Five Lakes Butte pack's home range in May 2006. She was not located with the other radiocollared wolf in that pack, B212, throughout 2006. Her pack membership and social status was uncertain at the end of 2006, although she was observed with 2 other wolves in the North Fork Clearwater River drainage in December 2006.

B238
Female B238's affiliation to the Kelly Creek pack seemed to have ended in August 2006. She was present at the pack's rendezvous site, along with B220 and B237 in August 2006, but during the next monitoring flight (mid-August 2006), she was located apart from her radiocollared pack mates and was not located with them for the rest of 2006. From August through November, she seemed to have settled in the interstice between the Kelly Creek and Eldorado Creek packs' territories. In mid-December, B238 was seen scent-marking within the Eldorado Creek pack's territory, possibly attempting to join that pack or usurp a portion of their territory. Further observations will be required to determine B238's status.

B258

Female B258, sole radiocollared individual in the Eldorado Creek pack at the end of 2005, dispersed from her territory, and in January was found approximately 34 miles (55 km) northwest of her December 2005 aerial location. B258 was located again in April west of Elk River, approximately 41 miles (65 km) from this pack's home range; she has not been detected since.

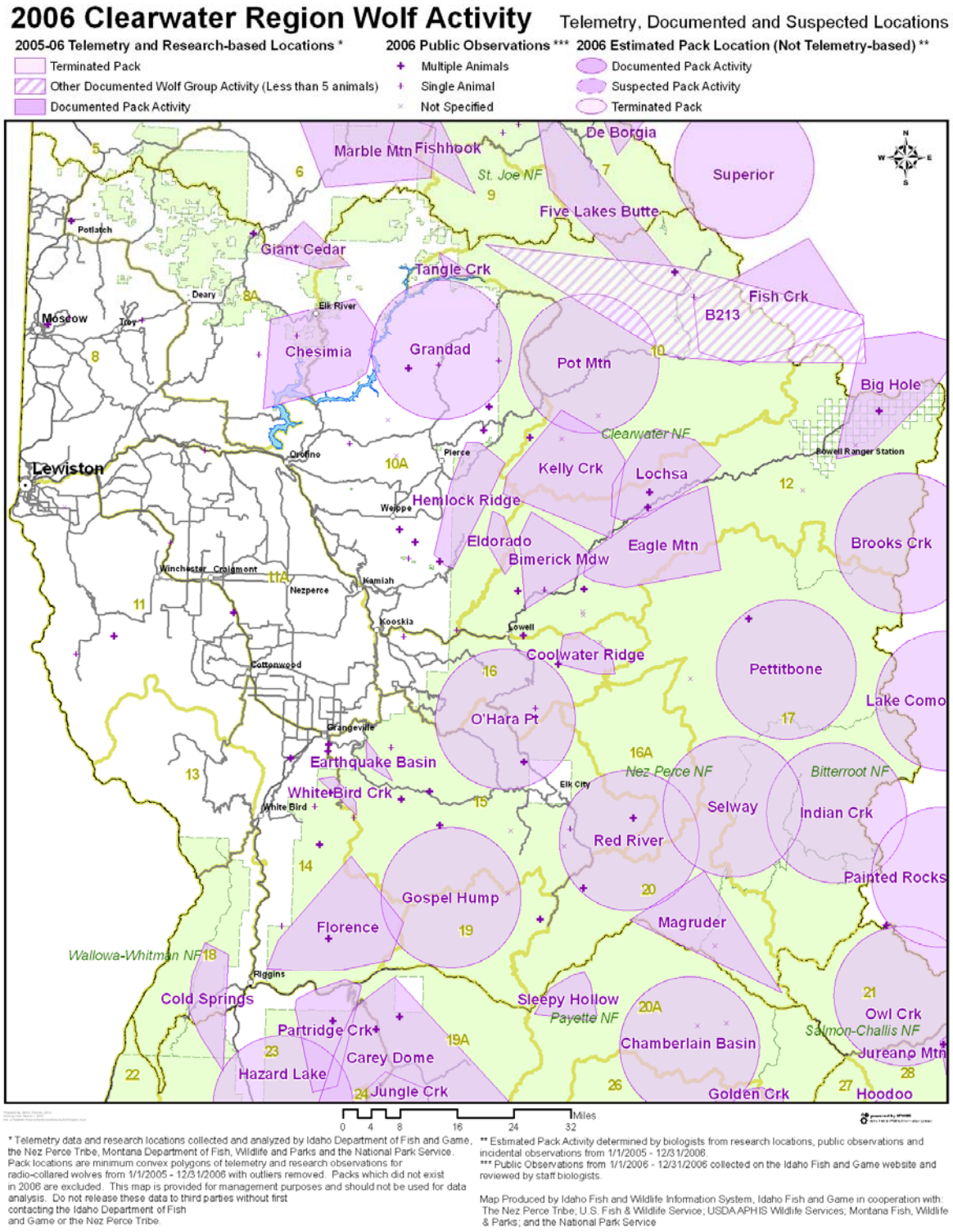

Figure 7. Wolf pack activity and observations in the Clearwater Region, 2006.

Table 3. Estimated pack size, reproductive status, mortality, dispersal, monitoring status, and livestock depredation for documented and suspected wolf packs within Idaho Department of Fish and Game Clearwater Region, 2006.

		Reproductive status			Documented mortalities					Monitoring status			Confirmed & probable wolf-caused livestock losses		
Wolf pack or group	Min. no. wolves detected[a]	Min. no. pups prod.	Reported as reprod. packs	Reported as breeding pairs[b]	Natural	Control[c]	Other human[d]	Unknown[e]	Known dispersal	Active radio collars	Number wolves captured[f]	Number wolves missing[g]	Cattle	Sheep	Dogs
Documented pack															
Big Hole (MT)[h]															
Bimerick Meadow	7	6	yes	yes	0	0	0	0	0	2	1	0	0	0	0
Brooks Crk (ID)[h]	9	6	yes	yes	0	0	0	0	0	1	0	0	0	0	0
Chesimia	4	0	no	no	0	0	0	0	0	1	0	0	0	0	0
Cold Springs	?	?	no	no	0	0	0	0	0	0	0	0	0	0	0
Coolwater Ridge	6	4	yes	yes	0	0	1	0	0	1	1	0	0	0	0
Eagle Mountain	10	3	yes	yes	0	0	0	0	0	2	1	0	0	0	0
Earthquake Basin	13	9	yes	yes	0	0	0	0	0	2	2	0	0	0	0
Eldorado Creek	5	3	yes	yes	0	0	0	1	1	2	2	0	0	0	0
Fish Creek (ID)[h]	14	7	yes	yes	0	0	0	0	0	2	0	0	0	0	0
Florence	7	4	yes	yes	0	0	0	0	0	2	0	0	1	0	0
Giant Cedar	6	3	yes	yes	0	0	0	0	0	3	2	0	0	0	0
Gospel Hump	?	?	no	no	0	0	0	0	0	0	0	0	0	0	0
Hemlock Ridge	6	2	yes	yes	0	0	0	0	0	2	0	0	0	0	0
Indian Creek	?	?	no	no	0	0	0	0	0	0	0	0	0	0	0
Kelly Creek	13	3	yes	yes	0	0	0	0	1	2	0	0	0	0	0
Lake Como (MT)[h]															
Lochsa	9	1	yes	no	0	0	0	0	0	1	0	0	0	0	0
Magruder	?	?	no	no	0	0	0	0	0	0	0	0	0	0	0
O'Hara Point	?	?	no	no	0	0	0	0	0	0	0	0	1	0	0
Pettibone Creek	?	?	no	no	0	0	0	0	0	0	0	0	0	0	0
Pot Mountain	?	?	no	no	0	0	0	0	0	0	0	0	0	0	0
Red River	1	2	yes	no	0	0	0	1	0	0	0	0	0	0	0
Selway	4	1	yes	no	0	0	0	0	0	0	0	0	0	0	0
White Bird Creek	6	2	Yes	yes	0	0	1	0	0	2	2	0	1	0	2
Subtotal	120	56			0	0	2	2	2	25	11	0	3	0	2
Suspected pack															
Grandad	4				0	0	0	0	0	0	0	0	0	0	0
Subtotal	4				0	0	0	0	0	0	0	0	0	0	0
Other doc. group															
B147[i]	0				1	0	0	0	0	0	0	0	0	0	0
B213	3				0	0	0	0	0	1	0	0	0	0	0
B238	1				0	0	0	0	0	1	0	0	0	0	0
B258	1				0	0	0	0	0	1	0	1	0	0	0

Wolf pack or group	Min. no. wolves detected[a]	Reproductive status: Min. no. pups prod.	Reproductive status: Reported as reprod. packs	Reproductive status: Reported as breeding pairs[b]	Documented mortalities: Natural	Documented mortalities: Control[c]	Documented mortalities: Other human[d]	Documented mortalities: Unknown[e]	Known dispersal	Monitoring status: Active radio collars	Monitoring status: Number wolves captured[f]	Monitoring status: Number wolves missing[g]	Confirmed & probable wolf-caused livestock losses: Cattle	Sheep	Dogs
Subtotal	5				1	0	0	0	0	3	0	1	0	0	0
Unknown					0	0	1	0	0	0	0	0	1	0	1
Subtotal					0	0	1	0	0	0	0	0	1	0	1
Regional total	129	56			1	0	3	2	2	28	11	1	4	0	3

[a] Number of wolves detected by wolf program personnel through observations of wolves or wolf sign and believed alive at end of 2006. Unknown status denoted by "?" Sum of this column does not equate to number of wolves estimated to be present in the population.

[b] Breeding pairs are the measure of Federal and State wolf recovery and management goals. A breeding pair is defined as "an adult male and an adult female wolf that have produced at least 2 pups that survive until December 31 of the year of their birth…".

[c] Includes agency lethal control and legal take by landowners.

[d] Includes all other human-related deaths.

[e] Does not include pups that disappeared before winter.

[f] Includes all wolves captured during 2006. Most, but not all, were radiocollared.

[g] Radiocollared wolves that became missing in 2006.

[h] Border pack officially tallied to (state); territory known or likely shared with Idaho. Data on these packs can be found in Rocky Mountain Wolf Recovery 2006 Interagency Annual Report.

[i] Lost during 2006; not included in end-of-year tallies.

McCall Subregion of the Southwest Region

The McCall Subregion was home to 15 documented packs and 1 suspected pack during 2006 (Figure 8; Table 4). Nine of 10 reproductive packs qualified as breeding pairs. All documented mortalities (n = 14) were related to human causes: agency lethal control (n = 10); legal take (n = 2); and illegal take (n = 2). A Golden Creek pack disperser, originating in the McCall Subregion, was found dead in the Salmon Region. Confirmed (n = 5) and probable (n = 2) wolf-caused losses of cattle were attributed to the Gold Fork and Orphan packs, and wolves within the Hazard Lake pack home range. Confirmed (n = 143) and probable (n = 2) wolf-caused losses of sheep were attributed to the Blue Bunch, Carey Dome, Gold Fork, Jungle Creek, and Lick Creek packs, and wolves within the Hazard Lake pack home range. Due to lethal control conducted in 2004 and 2005, the status of the Hazard Lake and Partridge Creek packs was not known during 2006; these packs may no longer exist, although both were officially counted per program protocols. Ten wolves were captured by program personnel that resulted in the placement of 8 new radiocollars and replacement of 2 existing radiocollars. In addition, 2 wolves were lethally controlled after having been trapped. One wolf trapped during a lethal control effort was found dead at the capture site, apparently killed by other wolves.

Law Enforcement Summary

Regional Conservation Officers, in consultation with USFWS Special Agents, investigated 5 reports of shot or dead wolves. Of those, 2 were determined to be legally shot under authority of the 10(j) Rule while observed harassing livestock guard dogs and livestock. A Fish and Game officer responded to a report of a wolf lying dead on a road near McCall, which was determined to have been illegally shot. The fourth incident involved a dead wolf that was reported to an IDFG officer by an antler hunter; follow-up interviews led USFWS agents to conclude this was not an illegal kill. Lastly, a wolf was retrieved by an IDFG officer after it had been reported by an observer; the wolf was determined to have been shot and was turned over to the USFWS for investigation.

Documented Resident Packs

Blue Bunch

Founded by alpha female B218 and an unknown male, this pack produced its second litter of pups in 2006. The vicinity of the den site was located near their namesake ridge, where 7 gray pups were observed in early July 2006. This pack was implicated in depredations on domestic sheep, when 5 lambs were confirmed killed by wolves; the resulting control action led to lethal removal of 2 subadult females, as well as re-collaring of B218 and radiocollaring of a pup (slipped collar within 2.5 weeks). Based upon field observations, minimum pack size was estimated at 9 individuals. The Blue Bunch pack attained breeding pair status for 2006.

Carey Dome

Female wolf B257 was radiocollared during a control action in late August 2005, after depredations on domestic sheep in this area. In early May 2006, a dispersing male from the Scott Mountain pack, B263, was located on the north side of the Salmon River across from the mouth of French Creek. In May 2006, he was aerially located with B257 approximately 2 miles (3 km) west of Carey Dome. These 2 wolves were never located together again, but each used portions of what was formerly Partridge Creek pack territory, including the Little French Creek and French Creek drainages. B257 remained in the pack's home range until August, at which

time she apparently dispersed as her signal was not detected after that. B263 was observed with 2-3 other gray wolves, from the air and ground, in mid-August. Wolves known or believed affiliated with the Carey Dome pack were implicated in depredations on domestic sheep that resulted in 63 confirmed and 2 probable losses; an additional 45 sheep were missing. During control actions, 2 additional wolves, females B309 and B315, were captured and radiocollared; they were believed to be members of the Carey Dome pack, although actual number of packs and wolf membership was not certain in this area. Three pups were observed with B309 from a helicopter during a lethal control action in which 2 uncollared gray wolves were killed on Center Ridge in September 2006. A third wolf was lethally controlled during a trapping effort. During the October 2006 monitoring flight, B263's signal was detected on mortality mode; based upon their findings, USFWS Law Enforcement opened an investigation. Two other investigations were initiated in 2006 for wolves illegally killed in the Carey Dome pack's territory. Based upon field observations, minimum pack size was estimated at 6 wolves. The Carey Dome pack was considered a breeding pair for 2006.

Chamberlain Basin

During surveys of former Chamberlain Basin pack rendezvous sites, wolves were located southwest of the Chamberlain airstrip and a trapping operation was initiated. A male pup, B298, was captured and radiocollared in mid-August 2006. This was the first time the program was able to monitor this pack since 2001 when the founding pair's (male B9 and female B16) radiocollars expired. During the September 2006 monitoring flight, B298's signal was on mortality mode; investigation revealed that the pup had slipped the radiocollar. Four gray pups were observed, marking the Chamberlain Basin pack as a breeding pair for 2006.

Gold Fork

Aerial telemetry indicated that suspected alpha female B130 probably did not den during spring or lost her litter shortly after giving birth. During a June monitoring flight, she was observed with 3 other gray wolves north of Boulder Lake. Also in June, B117, formerly the Gold Fork pack's alpha male but last known associated with the Orphan pack, was legally killed while chasing cattle in the southern portion of the Gold Fork pack's territory. Field observations and information from residents of Little Valley suggested only 2-3 wolves were present in early August. This pack was implicated in depredations on cattle (3 confirmed losses) and sheep (5 confirmed losses). During a helicopter control action in late September 2006, an uncollared gray wolf with B130 was fired upon, but it was unknown whether it was killed. In late November 2006, 2 uncollared gray wolves from a group of 5 (including B130) were lethally removed. One subsequent aerial observation of 3 gray wolves was made. In December, B130 and a gray adult male wolf were lethally controlled, functionally eliminating this pack. This pack was not a breeding pair in 2006.

Golden Creek

Researchers from the University of Idaho's Taylor Ranch field station captured and radiocollared female B267 in late April, bringing to 2 the number of wolves being monitored in the pack (female B229 was radiocollared in 2005). Personnel from Taylor Ranch observed 4 gray pups near the suspected den area. A program biologist recaptured B229 in late June and found she had lactated; presumably she was the alpha (breeding) female. B267's signal was not detected after July 2006, but her carcass was reported to IDFG in November 2006; her remains were retrieved and USFWS Law Enforcement opened an investigation. Estimated pack size was 6 individuals. The Golden Creek pack was a breeding pair for 2006.

Hazard Lake
Little information pertaining to this pack was obtained in 2006 following lethal control of all radiocollared pack members in 2004 and 2005. Reported wolf activity in the Brown Creek drainage, known to have been used by this pack in the past, suggested that wolves were still present in this area, but pack status and reproduction were not confirmed. Also, 2 cattle and 5 sheep were classified as probable or confirmed wolf-kills, respectively, in this pack's home range; an additional 19 sheep were missing. The Hazard Lake pack was not a breeding pair in 2006.

Jungle Creek
This pack made an extraterritorial foray outside of their previously defined home range from December 2005 through March 2006. During that time, the sole radiocollared wolf, suspected alpha male B157, and pack mates were located north and east of New Meadows, Idaho. During an April 2006 monitoring flight, B157 and 3 gray wolves were seen traveling toward their traditional den site area. Monitoring flights in May 2006 confirmed that the pack had denned there. Field efforts in early July led to a sighting of 6 adult-sized wolves and 2 pups. Although additional pups were suspected based upon howling, only 2 were confirmed. This pack was implicated in 2 depredations on domestic sheep that resulted in the confirmed loss of 22 sheep; an additional 84 sheep were missing. Wildlife Services implemented control actions and a subadult gray female was found dead in a trap on 4 September 2006. A field necropsy suggested that this individual had been killed by other wolves; however, it is extremely unusual for wolves to kill a member of their own pack. One possible scenario was the wolf was trespassing and was killed by the resident Jungle Creek pack. Field observations led to a minimum estimated pack size of 7 individuals. This pack was a breeding pair for 2006.

Lick Creek
Multiple wolf reports were received in a short time span from the vicinity of Lick Creek Lookout in late June. Program personnel located a rendezvous site while conducting a capture operation. The alpha female, B288, was captured and radiocollared. Three gray pups and 3 gray adult-sized wolves were observed at the rendezvous site, although the number of adult wolves was estimated at 4-5 from howling. The Lick Creek pack was apparently all gray, whereas the Cold Springs pack contained 3 black wolves when last observed; the lack of black wolves could be due to death or dispersal. Further aerial telemetry data will be needed to determine pack identities in this area of potential overlap; i.e., should locations for the Lick Creek pack occur in areas formerly occupied by the Cold Springs pack, the assumption that they are the same group would be strengthened, although an alternate possibility could be that the Cold Springs pack dissolved and their territory was annexed by the Lick Creek pack. This pack was implicated in 2 depredations that resulted in 43 sheep confirmed killed; an additional 124 sheep were missing. During a helicopter control action, 2 uncollared gray wolves were fired upon, but it was unknown whether they were killed. An aerial observation of 8 gray wolves was made during winter 2006/2007. The Lick Creek pack was a breeding pair for 2006.

Monumental Creek
Female B250, captured and outfitted with a radiocollar in 2005, remained with this pack in 2006. A second wolf, female B287, was radiocollared in July 2006 near the traditional den/rendezvous site in the Monumental Creek drainage. Several days prior to B287's capture, program biologists elicited howling from multiple adults and 3+ pups there. Based upon aerial telemetry, this pack's territory encompassed the Monumental Creek drainage from its headwaters eastward to Rush Creek, with locations on the north side of Big Creek, in what would be considered the

Golden Creek pack's home range around the mouth of Cabin Creek. This pack qualified as a breeding pair for 2006.

Orphan
Following the death of female B244 in October 2005, program biologists maintained contact with the pack via male B246. His signal was detected within the pack's territory in March 2006 but was not located afterwards. With no radiocollared wolves to assist biologists, this pack was difficult to monitor. The pack did not use the same area for a rendezvous site as they did in 2005; the possibility existed that no pups were produced in 2006. Little wolf sign was detected in areas of past use, although a program biologist heard 2 adults howling in Scott Valley northeast of Cascade, Idaho. Tracks indicated that only 2 wolves were in the area at that time. A capture operation was initiated, but was terminated due to lack of wolf activity and human disturbance. An adult cow and a calf were deemed confirmed wolf-kills in this pack's home range in November 2006. Pack and reproductive status of the Orphan pack was unknown at the end of 2006.

Partridge Creek
It was believed that this pack was eliminated, dissolved, or remnant members absorbed by other packs following lethal removals and illegal kills in 2004 and 2005. Prior to depredations on domestic sheep, the Partridge Creek, Hazard Lake, Jungle Creek, and probably the Carey Dome packs were resident between McCall, Idaho, and the Salmon River. Program personnel suspected that the level of wolf control resulting from livestock depredations had potentially upset the inter- and intra-pack social dynamics of wolves inhabiting this area, which made it extremely difficult to ascertain the true number of wolf packs and their territorial boundaries, if any. Carey Dome pack members B257, B263, B309, and B315 were all located within the Partridge Creek pack's territory in 2006, including the rendezvous site used by the latter in 2004. Additional evidence supported the contention that this pack no longer existed: the Jungle Creek pack traversed the southern portion of Partridge Creek pack's territory in December 2005 and April 2006, a movement never undertaken while the latter pack was known to exist. Per program protocol, the Partridge Creek pack remained a documented pack because evidence was not conclusive regarding their demise. This pack was not a breeding pair in 2006.

Sleepy Hollow
Though it was still not resolved which radiocollared wolf was present, reproduction was confirmed for this newly documented pack. Male B148, captured as a member of the Big Hole pack, and male B181, captured as a member of the Partridge Creek pack, have adjacent radio frequencies and due to frequency drift, program personnel have been unable to identify which of these wolves was being monitored. Radio contact with B148 was lost from October 2003 until January 2005; he was approximately 71 miles (115 km) from his last location in his natal territory. After capture in January 2004, B181 moved eastward and was located in the core of Sleepy Hollow territory in April 2004; approximately 40 miles (64 km) from his last location in Partridge Creek pack home range. Aerial telemetry locations during spring 2006 indicated probable denning in a tributary entering the Salmon River from the south. In mid-August 2006, a program biologist observed 3 gray pups and heard 4 adult-sized wolves howling at a rendezvous site near Sheepeater Lookout. The Sleepy Hollow pack was documented as a breeding pair for the first time in 2006.

Stolle Meadows
Aerial telemetry locations suggested that alpha female B249 had denned in spring 2006. A reproduction survey in early June appeared to validate this as 1) pup-sized scats and beds were found in the suspected den area, and 2) both radiocollared wolves, B249 and suspected alpha male B259, were repeatedly located there. Multiple surveys and ground tracking efforts throughout the summer and fall failed to yield either a sighting of pups or elicit pup howling. Based upon aerial sightings during winter 2006/2007, pack size was estimated at 2 wolves (radiocollared pair); suggesting any pup(s) may have perished. . The Stolle Meadows pack was not a breeding pair for the second consecutive year, although, based on sign, a minimum of 1 pup was recorded.

Thunder Mountain
Program efforts to document continued wolf occupancy of this pack's territory were unsuccessful; however, reported wolf harassment of livestock at a hunting camp at Mule Hill provided evidence that wolves were still present. No evidence of reproduction was obtained, so the Thunder Mountain pack was not a breeding pair for 2006.

Wolf Fang
This pack, whose last radiocollared wolf was suspected to have died in 2003, returned to active monitored status with the capture and radiocollaring of alpha female B282 in early June. Her radio signals led biologists to a rendezvous site where 5 gray pups were observed. B282's signal was last detected in September; possibly due to premature radiocollar failure or illegal take, as it was unlikely an alpha (breeding) female would disperse. Despite B282's disappearance, the Wolf Fang pack was considered a breeding pair for 2006.

Suspected Resident Packs

Oxbow
Program personnel confirmed the presence of multiple wolves in and around the Wildhorse River drainage during winter 2004-2005. In March 2006, 2 wolves were observed fighting with livestock guard dogs north of Cambridge, Idaho. One of the wolves, a gray female, was legally killed. She was infested with lice (*Trichodectes canis*), the first known instance of this external parasite in wolves in Idaho, which had caused some hair loss. In August 2006, multiple wolves were reported howling near Lafferty Campground along the Crooked River approximately 9 miles (14 km) west of Lost Valley Reservoir. These 2 reports were approximately 22 miles (35 km) apart.

Other Documented Wolf Groups

B315
Female B315 was captured during a control action near Hartley Meadows north of McCall, Idaho, in mid-October 2006. It was supposed that she was a member of the Carey Dome pack, although other radiocollared members of that pack had not been located in the Hartley Meadows area before. Her November 2006 aerial location was along the breaks of the Salmon River west of Carey Dome approximately 13 miles (21 km). A subsequent aerial location placed her east of Pollock, Idaho, along the Little Salmon River in what was formerly Hazard Lake pack territory.

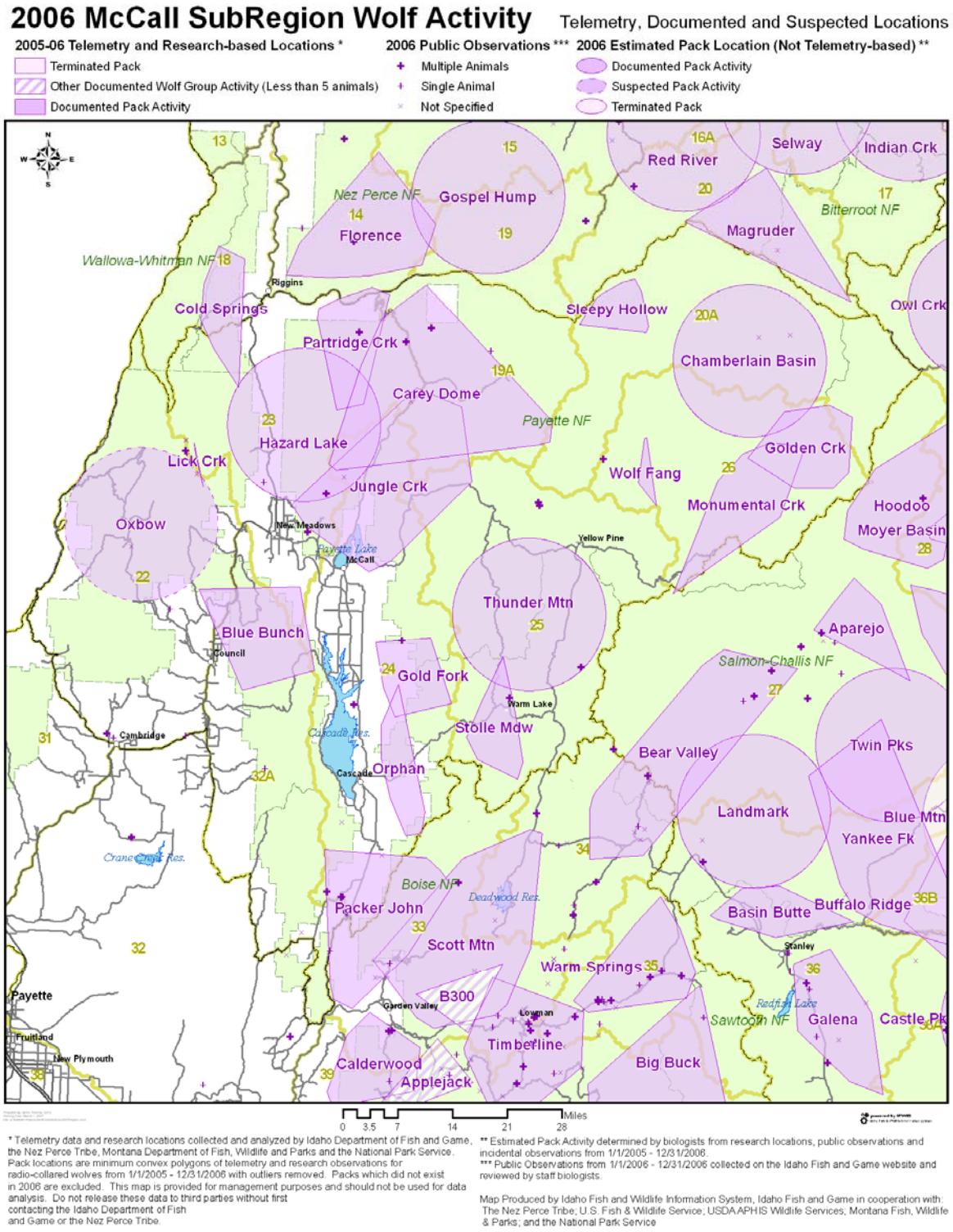

Figure 8. Wolf pack activity and observations in the McCall Subregion, 2006.

Table 4. Estimated pack size, reproductive status, mortality, dispersal, monitoring status, and livestock depredation for documented and suspected wolf packs within Idaho Department of Fish and Game McCall Subregion, 2006.

		Reproductive status			Documented mortalities					Monitoring status			Confirmed & probable wolf-caused livestock losses		
Wolf pack or group	Min. no. wolves detected[a]	Min. no. pups prod.	Reported as reprod. packs	Reported as breeding pairs[b]	Natural	Control[c]	Other human[d]	Unknown[e]	Known dispersal	Active radio collars	Number wolves captured[f]	Number wolves missing[g]	Cattle	Sheep	Dogs
Documented pack															
Blue Bunch	9	7	yes	yes	0	2	0	0	0	1	2	0	0	5	0
Carey Dome	6	3	yes	yes	0	3	2	0	0	1	1	1	0	65	0
Chamberlain Basin	6	4	yes	yes	0	0	0	0	0	0	1	0	0	0	0
Gold Fork[h]	1	0	no	no	0	5	0	0	0	0	0	0	3	5	0
Golden Creek[i]	6	4	yes	yes	0	0	0	0	1	1	2	0	0	0	0
Hazard Lake	?	?	no	no	0	0	0	0	0	0	0	0	2	5	0
Jungle Creek	7	2	yes	yes	0	1	0	0	0	1	0	0	0	22	0
Lick Creek	8	3	yes	yes	0	0	0	0	0	1	1	0	0	43	0
Monumental Crk	10	3	yes	yes	0	0	0	0	0	2	1	0	0	0	0
Orphan	2	0	no	no	0	0	0	0	0	0	0	1	2	0	0
Partridge Creek	?	?	no	no	0	0	0	0	0	0	0	0	0	0	0
Sleepy Hollow	7	3	yes	yes	0	0	0	0	0	1	0	0	0	0	0
Stolle Meadows	2	1	yes	no	0	0	0	0	0	2	0	0	0	0	0
Thunder Mountain	?	?	no	no	0	0	0	0	0	0	0	0	0	0	0
Wolf Fang	7	5	yes	yes	0	0	0	0	0	0	1	1	0	0	0
Subtotal	71	35			0	11	2	0	1	10	9	3	7	145	0
Suspected pack															
Oxbow	1				0	1	0	0	0	0	0	0	0	0	0
Subtotal	1				0	1	0	0	0	0	0	0	0	0	0
Other doc. Group															
B315	1				0	0	0	0	0	1	1	0	0	0	0
Subtotal	1				0	0	0	0	0	1	1	0	0	0	0
Regional total	73	35			0	12	2	0	1	11	10	3	7	145	0

[a] Number of wolves detected by wolf program personnel through observations of wolves or wolf sign and believed alive at end of 2006. Unknown status denoted by "?" Sum of this column does not equate to number of wolves estimated to be present in the population.

[b] Breeding pairs are the measure of Federal and State wolf recovery and management goals. A breeding pair is defined as "an adult male and an adult female wolf that have produced at least 2 pups that survive until December 31 of the year of their birth…".

[c] Includes agency lethal control and legal take by landowners.

[d] Includes all other human-related deaths.

[e] Does not include pups that disappeared before winter.

[f] Includes all wolves captured during 2006. Most, but not all, were radiocollared.

[g] Radiocollared wolves that became missing in 2006.

Table 4. Continued.

[i] One wolf died in the Salmon Region while dispersing from this territory.
[h] Lethally removed during 2006; not included in end-of-year tallies.

Nampa Subregion of the Southwest Region

During 2006, the Nampa Subregion portion of the Southwest Region was home to 9 documented wolf packs (Figure 9; Table 5). Five documented packs were counted as breeding pairs. All 14 documented mortalities were human caused. Confirmed sheep losses (*n* = 57) were attributed to the Steel Mountain, Timberline, and Warm Springs packs. Additionally, sheep losses which could not be attributed to a known pack occurred near Trapper Creek. Confirmed cattle losses (*n* = 5) were attributed to the Danskin and Packer John packs. The Timberline pack was confirmed to have killed 1 dog, and the Warm Springs pack was confirmed to have injured a dog.. Twelve wolves were lethally removed from the Danskin, Packer John, Steel Mountain, and Timberline packs. One wolf was lethally removed from the Trapper Creek depredation site. Nine wolves were captured and radiocollared; 7 by trapping and 2 by aerial darting.

Law Enforcement Summary

Regional Conservation Officers, in consultation with USFWS Special Agents, investigated 2 incidents of reports involving shot or dead wolves. The first report involved a possible wolf shooting near Prairie, Idaho. Officers from IDFG and the USFWS responded and confirmed that a wolf had been shot and wounded based on physical evidence. The officers attempted to trail and locate the animal, but it was not found. In the second incident, an IDFG officer responded to a report of a dead wolf in Garden Valley, Idaho. The officer determined the wolf was shot and the case was turned over to the USFWS for investigation.

Documented Resident Packs

Bear Valley
Female B215 remained the sole radiocollared member of this pack throughout the year. While flight locations indicated this pack was localized in their traditional Bear Valley denning area, forest fire closures in the vicinity prevented access so that field confirmation of reproduction could not be obtained. Because pups were not documented over the course of the summer, the Bear Valley pack was not counted as a breeding pair for 2006; however, given the relatively large increase in pack size from 2005 (*n* = 8 gray) to 2006 (*n* = 13 gray), it's likely these wolves did raise a litter of pups.

Big Buck
Alpha female B255 remained the sole radiocollared member of this pack throughout the year. Late fall flights confirmed biologists' summer tracking estimate of 2 pups. This first year pack had a minimum of 5 wolves (4 gray, 1 black), was not implicated in livestock depredations, and was counted as a breeding pair for 2006.

Photo Michael Lucid
Members of Big Buck pack feeding on a kill.

Calderwood
Alpha female B141 remained the sole radiocollar in this pack. Ground monitoring led to an observation of 4 gray pups. This third-year pack had a minimum of 5 gray wolves, was not implicated in livestock depredations, and was counted as a breeding pair for 2006.

Danskin
Livestock producers reported wolf activity in spring 2006, which was confirmed by program personnel. Three gray pups were observed. Danskin was confirmed in 3 calf depredations and probably depredated on a fourth. Two adults and 2 pups were subsequently removed via aerial gunning. This first-year pack had a minimum of 5 wolves (4 grays, 1 black) during the summer, but was reduced to a minimum of 1 gray wolf in the fall. It was not counted as a breeding pair for 2006.

Packer John
B261 disappeared shortly after capture in December 2005, leaving the 2 alphas, B205 and B262, as remaining radiocollared members. One gray pup was observed over the course of the summer. This may not have been a complete pup count. Packer John was implicated in depredating upon 1 calf. Two gray adult females were lethally controlled as a result. This third-year pack had a minimum of 3 wolves (2 grays, 1 black) based on aerial counts and was not counted as a breeding pair for 2006.

Scott Mountain
This pack began 2006 with 2 radiocollars; B178 and B263. B263 dispersed shortly after December 2005. Winter aerial observations indicated B263 may have paired with another wolf in the Garden Valley area; however, contact was briefly lost with B263 when he dispersed to join the Florence Pack. B178 remained with the pack but was found sporadically through spring monitoring. Eventually she led biologists to a rendezvous site where 1 black pup was counted. In addition to the pup, B178 and another collared gray wolf were observed. The other collared gray was with the pup and is assumed to be alpha female B78, whose collar is presumed to be non-functional. Howling observations later in the summer confirmed the presence of at least 1 pup and 2 adults. During December mule deer composition counts, biologists observed a group of 4 gray wolves, of which 1-2 had radiocollars, in Scott Mountain's territory. The combination of a same-day wolf monitoring flight which confirmed these wolves were not an adjacent documented wolf pack and that the observed wolves were wearing radiocollars (Scott Mountain likely has 1 or 2 inactive collars) suggests they were Scott Mountain. Thus, this sixth-year pack had a minimum of 4 gray wolves, was not implicated in livestock depredations, and did not count as a breeding pair for 2006.

Steel Mountain
Early in 2006, subordinate female B188 dispersed to found the Big Water pack along the South Fork of the Boise River. This left alphas R241 and B189 as collared pack animals. Subordinate male B271 was captured and collared in May. During the capture operation, 2 gray and 2 black pups were observed at the den. Between June and September, pack members were implicated in 5 separate sheep depredation events totaling 23 confirmed and 11 probable. The result of these depredations was a control action which removed 3 black and 1 gray subadult females. All depredations and 3 of the wolf removals actually occurred in the Magic Valley Region (Table 6). This fourth-year pack had a minimum of 10 wolves (5 black, 5 gray) and was counted as a breeding pair for 2006.

Photo Michael Lucid
Steel Mountain pups in Den.

Photo Michael Lucid
Hollie Miyasaki handling B266 of the Timberline pack.

Timberline

2006 began with no Timberline wolves on the air. In February, 2 subadults (B265 and B266) were darted and radiocollared. These wolves were originally believed to belong to a separate pack. However, subsequent monitoring of 2 Timberline subadult wolves (B279 and B280) which were captured in April revealed an association between all 4 wolves. These radiocollared wolves led biologists to a rendezvous site where 3 gray pups were observed. Later in the summer, an additional 2 subadults (B299 and B300) were radiocollared resulting in 6 active radiocollars. By late fall, 3 radios (B279, B280, and B299) were missing and B300 had dispersed. By December, B265 and B266 were the only collars in the pack. In September, this pack was implicated in 1 confirmed and 1 probable sheep depredation as well as 1 confirmed guard dog depredation. This depredation resulted in a control action which removed 1 subadult female and 1 pup. This fifth-year pack had a minimum of 10 gray wolves and was counted as a breeding pair for 2006.

Photo Michael Lucid
Member of Timberline pack.

Warm Springs
Alpha male B190 was the sole radiocollared member until subadult B283 was captured in June. A bear hunter confirmed reproduction by submitting a video of 6 gray pups feeding on his bait. Warm Springs again chose the Bull Trout Lake area as a rendezvous site providing numerous campers the opportunity to hear wolves howling near a developed campground. In August, WS confirmed Warm Springs pack members killed a sheep and injured a guard dog. Traps were not set to remove a wolf due to high human activity. Instead, WS personnel spent a few nights with the sheep band to be on hand in case the wolves attacked again. The wolves never returned. In the fall, B190 was illegally shot leaving B283 as the sole radiocollared wolf at the end of the year. This third-year pack had a minimum of 4 gray pack members and was counted as a breeding pair for 2006.

Photo Michael Lucid
Warm Springs pack members.

Suspected Resident Packs

Thorn Creek
Multiple reports indicated there may have been undocumented wolf activity in this area. Biologists confirmed wolf tracks in the Thorn Creek drainage during February.

Other Documented Wolf Groups

B300
This female was captured as a member of the Timberline pack in late summer. In the fall, she dispersed and was located at various locations throughout the Garden Valley area. During a December monitoring flight, a black wolf was observed near her, although a visual of B300

could not be obtained. This first-year group had a minimum of 2 wolves (1 gray, 1 black) and was considered a potential mated pair.

B306

A subadult female, B306, was caught during a late-summer trapping operation for Calderwood. Despite Calderwood's alpha female B141 being nearby when B306 was captured, subsequent monitoring did not support a pack affiliation between the 2 wolves. A visual was obtained during a September monitoring flight of B306 with 1-2 other gray wolves and a visual of 3 gray wolves was obtained during a December monitoring flight. This first-year group had a minimum of 3 gray wolves and was considered a potential mated pair.

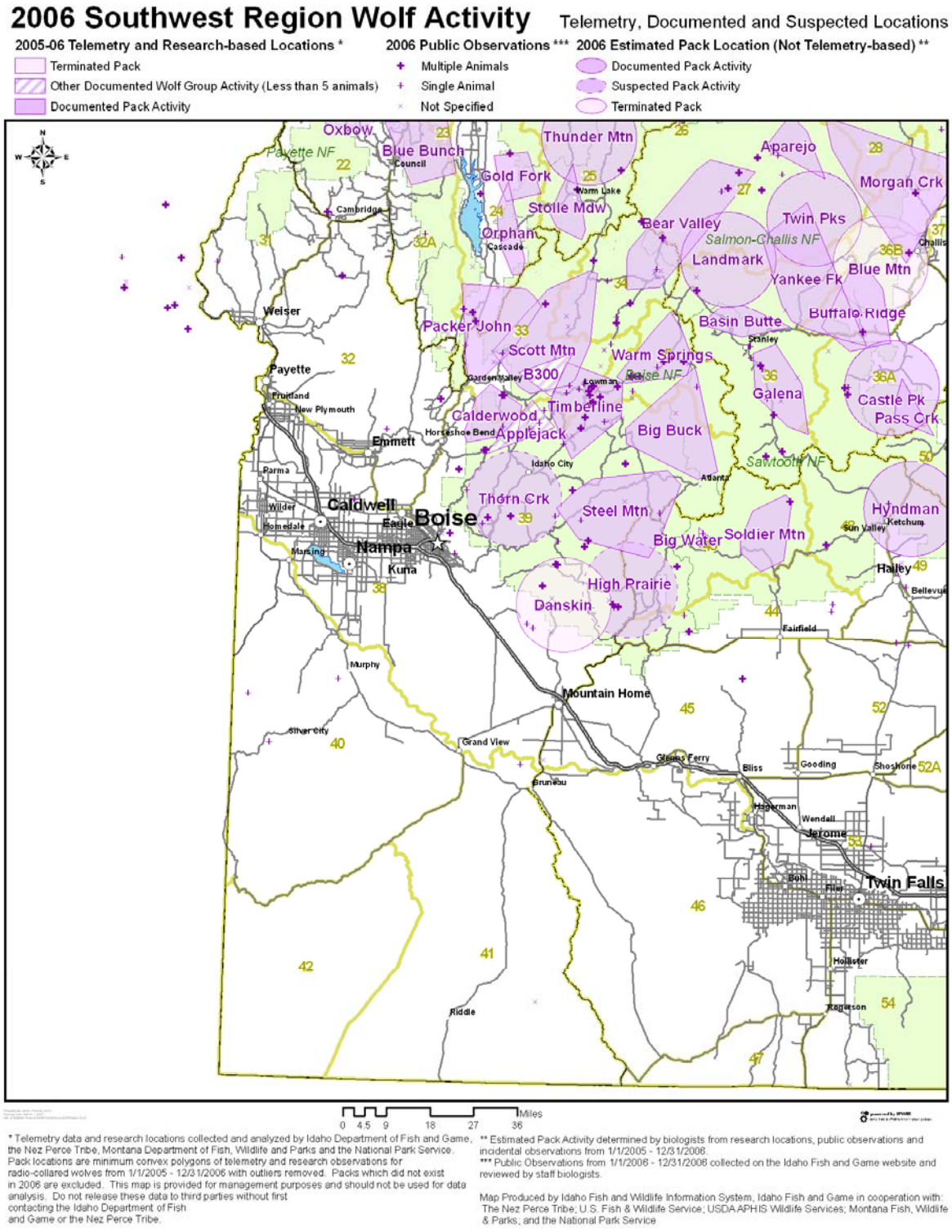

Figure 9. Wolf pack activity and observations in the Nampa Subregion, 2006.

Table 5. Estimated pack size, reproductive status, mortality, dispersal, monitoring status, and livestock depredation for documented and suspected wolf packs within Idaho Department of Fish and Game Nampa Subregion, 2006.

		Reproductive status			Documented mortalities					Monitoring status			Confirmed & probable wolf-caused livestock losses		
Wolf pack or group	Min. no. wolves detected[a]	Min. no. pups prod.	Reported as reprod. packs	Reported as breeding pairs[b]	Natural	Control[c]	Other human[d]	Unknown[e]	Known dispersal	Active radiocollars	Number wolves captured[f]	Number wolves missing[g]	Cattle	Sheep	Dogs
Documented pack															
Bear Valley	13	?	no	no	0	0	0	0	0	1	0	0	0	0	0
Big Buck	5	2	yes	yes	0	0	0	0	0	1	0	0	0	0	0
Calderwood	5	4	yes	yes	0	0	0	0	0	1	0	0	0	0	0
Danskin[h]	1	3	yes	no	0	4	0	0	0	0	0	0	4	0	0
Packer John	3	1	yes	no	0	2[i]	0	0	0	2	0	1	1[i]	0	0
Scott Mountain	4	1	yes	no	0	0	0	0	1	0	0	1	0	0	0
Steel Mountain	10	4	yes	yes	0	4[j]	0	0	1	3	1	0	0	33[j]	0
Timberline	10	3	yes	yes	0	2	0	0	1	2	6	3	0	2	1
Warm Springs	4	6	yes	yes	0	0	1	0	0	1	1	0	0	1	0
Subtotal	55	24			0	12	1	0	3	11	8	5	5	37	1
Suspected pack															
Thorn Creek	1				0	0	0	0	0	0	0	0	0	0	0
Subtotal	1				0	0	0	0	0	0	0	0	0	0	0
Other doc. Group															
B300	2				0	0	0	0	0	1	0[k]	0	0	0	0
B306	3				0	0	0	0	0	1	1	0	0	0	0
Subtotal	5				0	0	0	0	0	2	1	0	0	0	0
Unknown					0	1	0	0	0	0	0	0	0	21	0
Subtotal					0	1	0	0	0	0	0	0	0	21	0
Regional total	61	24			0	13	1	0	3	13	9	5	5	57	1

[a] Number of wolves detected by wolf program personnel through observations of wolves or wolf sign and believed alive at end of 2006. Unknown status denoted by "?" Sum of this column does not equate to number of wolves estimated to be present in the population.

[b] Breeding pairs are the measure of Federal and State wolf recovery and management goals. A breeding pair is defined as "an adult male and an adult female wolf that have produced at least 2 pups that survive until December 31 of the year of their birth…".

[c] Includes agency lethal control and legal take by landowners.

[d] Includes all other human-related deaths.

[e] Does not include pups that disappeared before winter.

[f] Includes all wolves captured during 2006. Most, but not all, were radiocollared.

[g] Radiocollared wolves that became missing in 2006.

[h] Lethally removed during 2006; not included in end-of-year tallies.

Table 5. Continued.

[i] Depredations and control action happened in the McCall Subregion.
[j] All Steel Mountain depredations and 1 of 4 control actions occurred in the Magic Valley Region.
[k] B300 was captured in 2006 while a member of Timberline and subsequently dispersed.

Magic Valley Region

During 2006, the Magic Valley Region was home to 3 documented wolf packs. One documented pack counted as a breeding pair (Figure 10; Table 6). All 5 documented mortalities were human caused. Confirmed sheep losses (*n* = 11) were attributed to the Big Water pack, which was subsequently removed (*n* = 7 wolves). Additional sheep (*n* = 4) were lost in the Lime Creek and Vat Creek areas. These losses were not attributed to a known pack. The Steel Mountain pack also killed sheep in the Magic Valley Region; however, these losses are documented in the Nampa Subregion section (Table 5). Four Steel Mountain wolves were controlled; one of which was within the boundaries of the Magic Valley Region. No cattle or dog losses were documented. No wolves were radiocollared in 2006.

Photo Michael Lucid

Soldier Mountain alpha male B149 with pack mate.

Law Enforcement Summary

Regional Conservation Officers, in consultation with USFWS Special Agents, investigated 3 reports of shot wolves. The first incident involved 2 subjects that admitted to shooting a wolf near the South Fork Boise River. An IDFG officer collected the initial evidence and assisted USFWS Special Agents in interviewing the subjects, resulting in a conviction. In the second incident, a Conservation Officer responded to a wolf shot in amongst sheep by the livestock owner; it was determined a wolf had been shot, but no carcass could be found. In the third incident, a bow-hunter called in a group of 3 wolves near Pine and shot 1 of the wolves with an arrow. A carcass was not recovered and the investigation is on-going. Additionally, a road-killed wolf was found near Mountain Home.

Documented Resident Packs

Big Water
Mid-winter monitoring flights detected Steel Mountain subordinate female B188 had dispersed and localized along the South Fork of the Boise River. B188 was observed with another wolf through winter and spring. Five pups were counted in the spring, confirming reproduction. In June, this pack was implicated in a sheep depredation event in which 11 sheep were killed. Alpha female B188 and her mate were subsequently trapped and euthanized. The remaining pups are suspected to have died from lack of parental care. Big Water was not counted as a breeding pair for 2006.

Hyndman
Multiple attempts by biologists failed to locate wolves in Hyndman's traditional use area. Although wolf presence was not verified in 2006, Hyndman is listed as a documented pack due to the 2-year rule.

Soldier Mountain
In May, coyote hunters illegally shot alpha female B150. This left alpha male B149 and subordinate female B192 as the remaining radiocollars in this pack. A biologist visited the den site several days after B150's death but was unable to determine if pups still survived. In July, a biologist visited a rendezvous site and was able to get multiple pups to howl; confirming reproduction and pup survival several months after the alpha female's death. Subordinate female B191 was documented as a disperser to Montana by MFWP biologists. This fifth-year pack had a minimum of 9 wolves (3 gray, 6 black), was not implicated in livestock depredations, and was counted as a breeding pair for 2006.

Photo Michael Lucid
Soldier Mountain den hole.

Suspected Resident Packs

High Prairie
A sheep depredation in Lime Creek affirmed wolf activity in this area and resulted in the control of 1 wolf. Additionally, several public reports indicate there may be pack activity in this area.

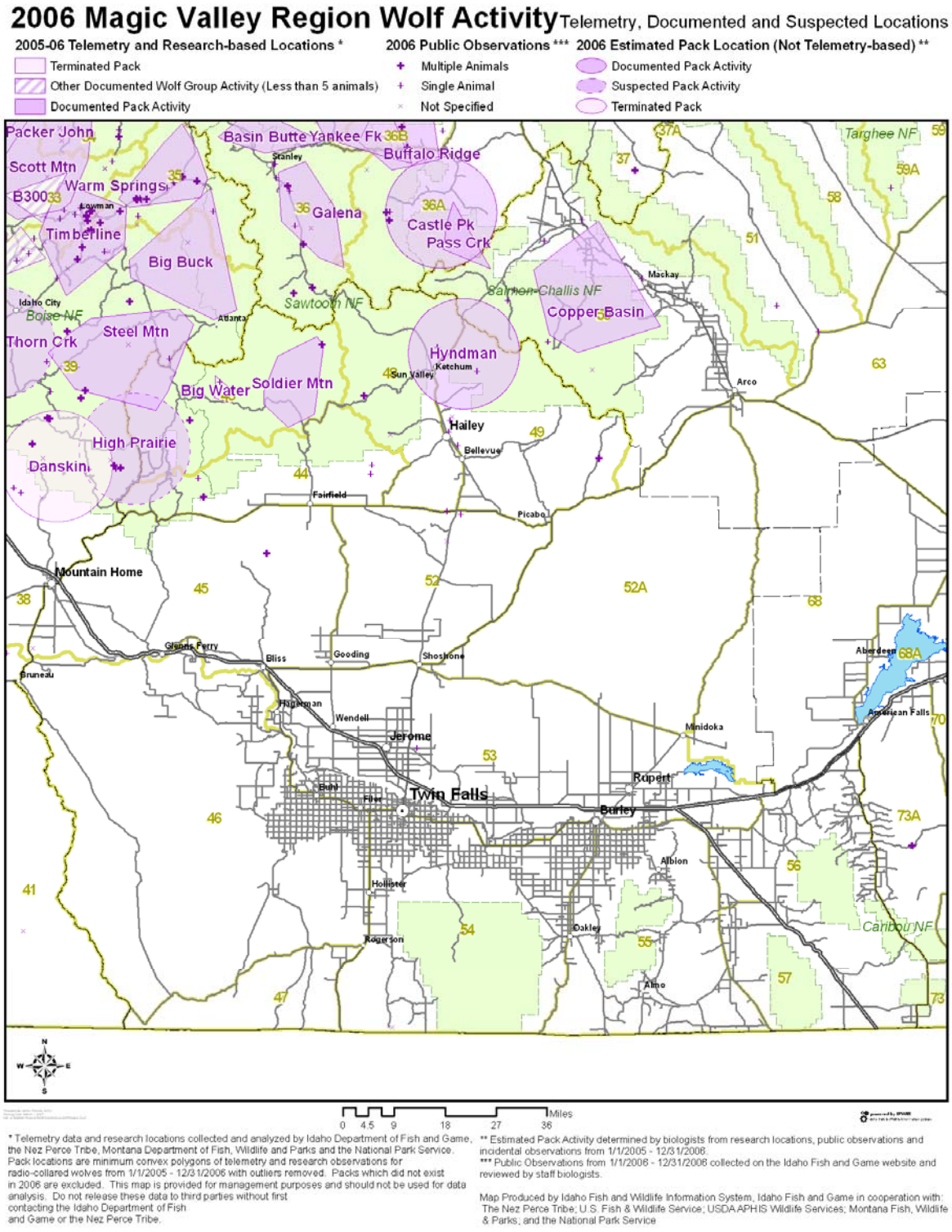

Figure 10. Wolf pack activity and observations in the Magic Valley Region, 2006.

Table 6. Estimated pack size, reproductive status, mortality, dispersal, monitoring status, and livestock depredation for documented and suspected wolf packs within Idaho Department of Fish and Game Magic Valley Region, 2006.

		Reproductive status			Documented mortalities					Monitoring status			Confirmed & probable wolf-caused livestock losses		
Wolf pack or group	Min. no. wolves detected[a]	Min. no. pups prod.	Reported as reprod. packs	Reported as breeding pairs[b]	Natural	Control[c]	Other human[d]	Unknown[e]	Known dispersal	Active radiocollars	Number wolves captured[f]	Number wolves missing[g]	Cattle	Sheep[h]	Dogs
Documented pack															
Big Water[i]	0	5	yes	no	0	2	0	0	0	0	0	0	0	11	0
Hyndman	?	?	no	no	0	0	0	0	0	0	0	0	0	0	0
Soldier Mountain	9	2	yes	yes	0	0	1	0	1	2	0	0	0	0	0
Subtotal	9	7			0	2	1	0	1	2	0	0	0	11	0
Suspected pack															
High Prairie	?				0	1	0	0	0	0	0	0	0	1	0
Subtotal					0	1	0	0	0	0	0	0	0	1	0
Unknown					0	0	1	0	0	0	0	0	0	3	0
Subtotal					0	0	1	0	0	0	0	0	0	3	0
Regional total	9	7			0	3	2	0	1	2	0	0	0	15	0

[a] Number of wolves detected by wolf program personnel through observations of wolves or wolf sign and believed alive at end of 2006. Unknown status denoted by "?" Sum of this column does not equate to number of wolves estimated to be present in the population.

[b] Breeding pairs are the measure of Federal and State wolf recovery and management goals. A breeding pair is defined as "an adult male and an adult female wolf that have produced at least 2 pups that survive until December 31 of the year of their birth…".

[c] Includes agency lethal control and legal take by landowners.

[d] Includes all other human-related deaths.

[e] Does not include pups that disappeared before winter.

[f] Includes all wolves captured during 2006. Most, but not all, were radiocollared.

[g] Radiocollared wolves that became missing in 2006.

[h] The Steel mountain pack (reported under the Nampa Subregion, Table 5) was responsible for 33 confirmed and probable sheep depredations in the Magic Valley Region.

[i] Lethally removed during 2006; not included in end-of-year tallies.

Southeast Region

There were no established packs documented in the Southeast Region during 2006 (Figure 11). Observations of lone wolves have been reported over several years and a wolf was killed along the Utah border near Weston in 2003.

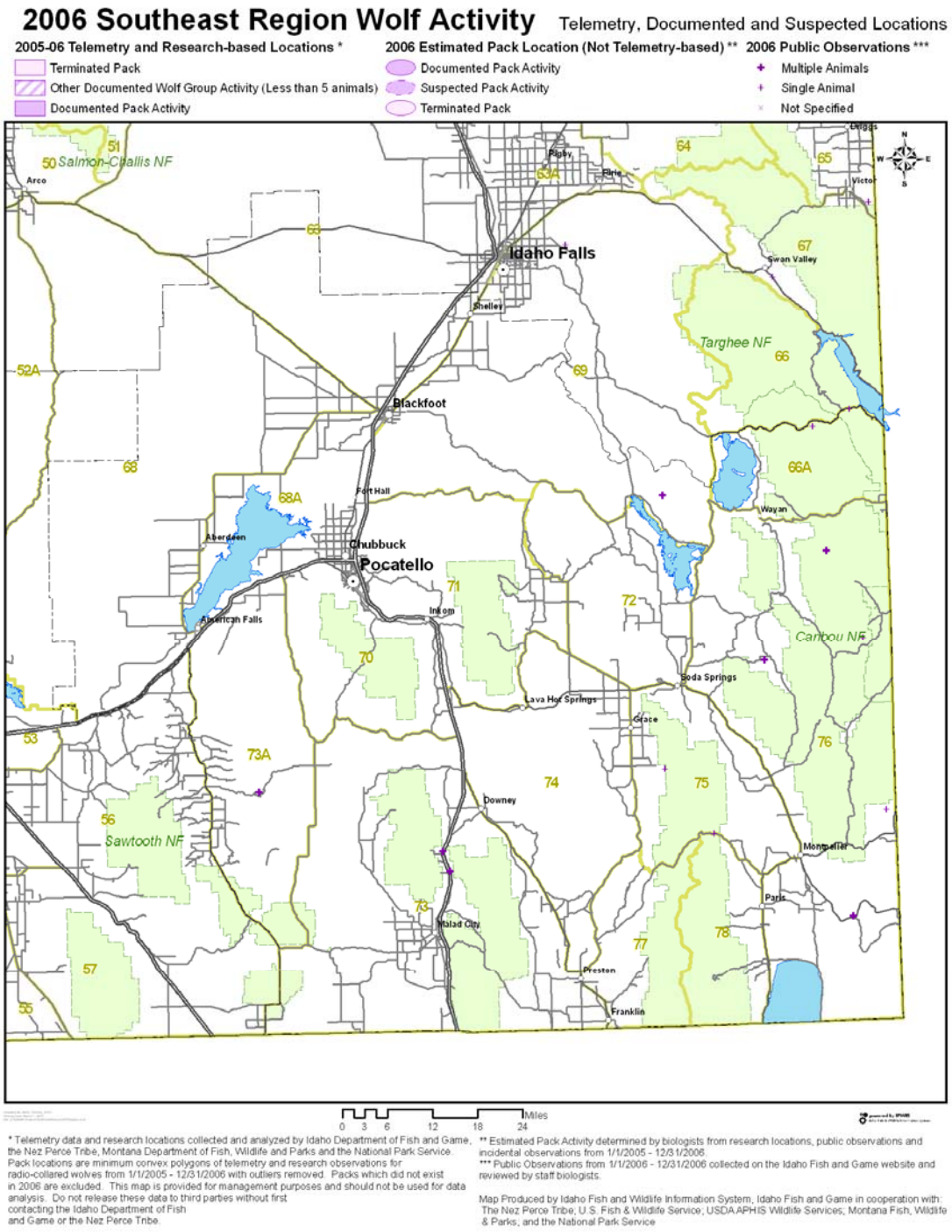

Figure 11. Wolf pack activity and observations in the Southeast Region, 2006.

Upper Snake Region

The Upper Snake Region was occupied by 2 documented resident, 2 documented border, and 1 suspected resident packs during 2006 (Figure 12; Table 7). While both Copper Basin and Biscuit Basin packs reproduced, only the Biscuit Basin pack qualified as a breeding pair; lethal control removed all breeding-age wolves from the Copper Basin pack and thus disqualified them from breeding pair status. The primary source of mortality was lethal control ($n = 6$), followed by other human causes ($n = 2$). Two lethally controlled wolves were from a Wyoming wolf pack and were legally taken under the 10(j) Rule near Driggs, Idaho. Confirmed and probable cattle and sheep losses were attributed to the Copper Basin and Driggs/Teton packs (WY). There were also several other confirmed/probable depredations attributed to suspected (Bishop Mountain) or unknown groups of wolves. Five wolves were captured, resulting in the deployment of 4 standard VHF radiocollars and 1 GPS radiocollar.

Law Enforcement Summary

Regional Conservation Officers, in consultation with USFWS Special Agents, investigated 2 incidents involving wolf shootings in the Teton Valley. The first wolf, killed near Victor in early May, was determined to be legal under the 10(j) Rule. The second wolf, killed near Victor 2 weeks later, was also determined to be legal under the 10(j) Rule. A Conservation Officer in Mackay retrieved a road-killed wolf near Arco. The same officer also investigated a wolf reported killed by a snare; it was later determined the snare was placed and left by WS personnel for coyote control.

Documented Resident Packs

Biscuit Basin

Having relocated from Wyoming, this was the second consecutive year the Biscuit Basin pack resided in Idaho. Of the 2 radiocollared animals in the pack, 1 dispersed in winter and was later found lying in a road in the Tobacco Root Mountains of Montana. The animal was euthanized, and lab tests indicated the wolf was infected with Canine Distemper Virus. Three pups were observed in June at their den site, and aerial observations indicated a minimum of 6 wolves in the pack. This pack was considered a breeding pair in 2006.

Copper Basin

Reduced to adults B197 and B227 and 2 pups by the end of 2005, this pack denned and produced a litter of 6 pups in spring of 2006. In May, a wolf was trapped and instrumented with a GPS radiocollar with the intent of examining wolf-livestock interactions; however, the collar came off prematurely when the drop-off mechanism failed. Another 4 pups were captured and radiocollared, so this pack with a history of chronic livestock depredations could be better monitored. As in previous years, the Copper Basin wolves continued to exhibit a propensity for livestock depredations in this area of high cattle densities. With 5 confirmed/probable cattle losses and an additional sheep depredation over the course of the summer, 3 wolves were lethally removed in response: the suspected breeding pair and a subadult. The vacancy created by the removal of the 2 adults was quickly filled in December by male B253 (see B253 pair). Because of wolf control measures, this pack did not contain breeding adults at the end of the year and was not counted as a breeding pair for 2006.

Documented Border Packs

Bechler (WY)
The Bechler pack was a Wyoming-documented pack that occasionally used the Idaho side of the state border near Driggs, Idaho.

Driggs/Teton (WY)
The Driggs/Teton pack was a Wyoming-documented pack that occasionally crossed the border into Idaho during spring 2006. In March, USFWS biologists collected a radiocollar that had been chewed off outside of Victor, Idaho, from a wolf previously collared in Wyoming. Two wolves were legally shot in Teton Valley under the 10(j) Rule in May. One domestic calf was confirmed killed by wolves on the ranch where these wolves were killed. A third wolf (B276) was radiocollared following the removals. The carcass of B276 was later located near the Idaho border in Wyoming in mid-August. Laboratory reports confirmed the wolf died of natural causes. While unverified wolf reports continued to come in from this area, it is believed this is no longer a viable pack.

Suspected Resident Packs

Bishop Mountain
Bishop Mountain was a suspected pack that appeared to be derived from the Nez Perce pack of Yellowstone National Park. The only radiocollared wolf in this group was last located in September 2005. There were no radiocollars in this group during 2006, and therefore reproduction was not verified. One depredation of 1 domestic sheep was attributed to this suspected pack. Trapping efforts in response to livestock conflicts and for research purposes were unsuccessful.

Other Documented Wolf Groups

B93
Displaced as breeding male from the Buffalo Ridge pack, this wolf was missing for several months before being located in the Big Wood River drainage in September. This animal continued to roam widely, and was last located within the Upper Snake Region in the Little Lost River drainage.

B242
Male B242 dispersed from the Moyer Basin pack during summer; he was eventually located when he was killed by a car north of Arco, Idaho, in October.

Photo J. Husseman

Wolf B242 appears ragged as he sheds from his thick winter coat.

B253

This wolf was captured as a member of the Galena pack in 2005 and stayed until the following spring, when he dispersed. He was later located north of Copper Basin with an uncollared wolf. In August, this pair was implicated in the injury of a domestic calf, and the uncollared female was lethally controlled. B253 was not located again until December, when he was observed traveling with the Copper Basin pack (see Copper Basin).

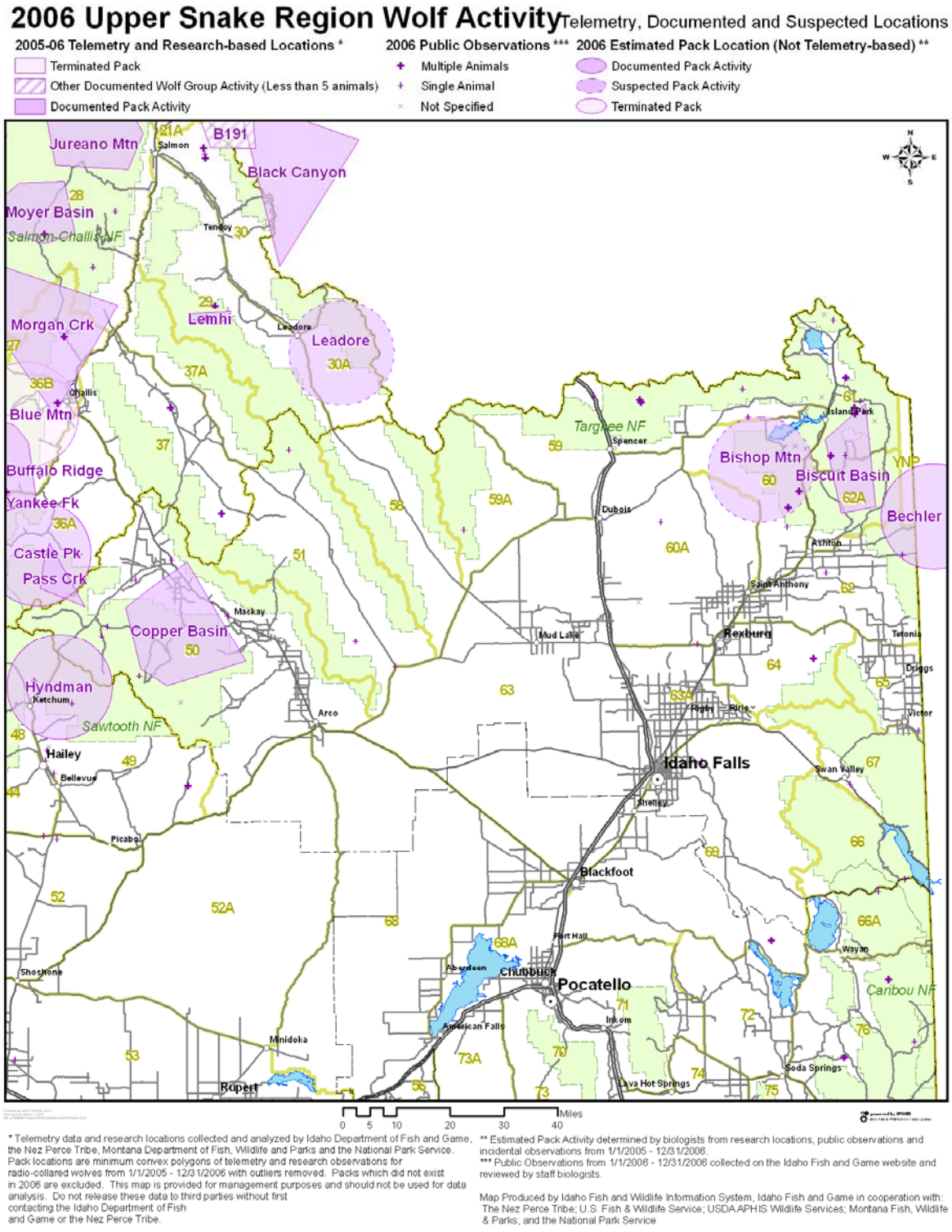

Figure 12. Wolf pack activity and observations in the Upper Snake Region, 2006.

Table 7. Estimated pack size, reproductive status, mortality, dispersal, monitoring status, and livestock depredation for documented and suspected wolf packs within Idaho Department of Fish and Game Upper Snake Region, 2006.

		Reproductive status			Documented mortalities					Monitoring status			Confirmed & probable wolf-caused livestock losses		
Wolf pack or group	Min. no. wolves detected[a]	Min. no. pups prod.	Reported as reprod. packs	Reported as breeding pairs[b]	Natural	Control[c]	Other human[d]	Unknown[e]	Known dispersal	Active radiocollars	Number wolves captured[f]	Number wolves missing[g]	Cattle	Sheep	Dogs
Documented pack															
Bechler (WY)[h]															
Biscuit Basin	6	3	yes	yes	0	0	0	0	1	1	0	0	0	0	0
Copper Basin	7	6	yes	no	0	3	0	0	0	3	5	0	5	1	0
Driggs/Teton (WY)[h]						2							1		
Subtotal	13	9			0	5	0	0	1	4	5	0	6	1	0
Suspected pack															
Bishop Mountain	0				0	0	0	0	0	0	0	0	0	1	0
Subtotal	0				0	0	0	0	0	0	0	0	0	1	0
Other doc. Group															
B93	1				0	0	0	0	0	1	0	0	0	0	0
B242	0				0	0	1	0	0	0	0	0	0	0	0
B253[i]	0				0	1	0	0	0	0	0	0	0	0	0
Subtotal	1				0	1	1	0	0	1	0	0	0	0	0
Unknown					0	0	1	0	0	0	0	0	2	12	0
Subtotal					0	0	1	0	0	0	0	0	2	12	0
Regional total	14	9			0	6	2	0	1	5	5	0	8	14	0

[a] Number of wolves detected by wolf program personnel through observations of wolves or wolf sign and believed alive at end of 2006. Unknown status denoted by "?" Sum of this column does not equate to number of wolves estimated to be present in the population.

[b] Breeding pairs are the measure of Federal and State wolf recovery and management goals. A breeding pair is defined as "an adult male and an adult female wolf that have produced at least 2 pups that survive until December 31 of the year of their birth…".

[c] Includes agency lethal control and legal take by landowners.

[d] Includes all other human-related deaths.

[e] Does not include pups that disappeared before winter.

[f] Includes all wolves captured during 2006. Most, but not all, were radiocollared.

[g] Radiocollared wolves that became missing in 2006.

[h] Border pack officially tallied to (state); territory known or likely shared with Idaho. Data on these packs can be found in Rocky Mountain Wolf Recovery 2006 Interagency Annual Report.

[i] Remaining wolf B253 joined Copper Basin pack and was included in that pack's statistical totals.

Salmon Region

The Salmon Region was occupied by 16 documented resident, 5 documented border (including 1 tallied to Idaho [Hughes Creek] and 4 to Montana [Battlefield, Black Canyon, Painted Rocks, and Sula]), and 1 suspected packs during 2006 (Figure 13; Table 8). Nine of 11 confirmed reproductive packs also qualified as breeding pairs; lack of radiocollars prevented determining the reproductive status of the remaining resident packs. Lethal control was the primary source of mortality (n = 11), followed by unknown (n = 4), other human-related (n = 3), and natural (n = 1) causes. One pack (Blue Mountain) was functionally eliminated after the founding pair was killed for livestock depredations. Eight resident packs were responsible for 13 confirmed and probable cattle depredation losses. An additional 4 confirmed/probable cattle were killed by suspected packs or unknown wolves. The loss of 1 sheep was attributed to the Lemhi pack, 2 were confirmed killed by the Blue Mountain pack, and 3 sheep were killed by unknown wolves. Twelve wolves were captured; 11 were previously uncollared wolves that received radiocollars, and another wolf was recaptured and its radiocollar replaced.

Law Enforcement Summary

Regional Conservation Officers, in consultation with USFWS Special Agents, investigated or responded to 7 reports involving wolves. In January, an IDFG officer and biologist responded to a wolf caught in a bobcat snare; the wolf had to be euthanized due to its injuries. Conservation officers also investigated 2 dead wolves for which cause of death could not be determined. Another 2 dead wolves were investigated by IDFG officers, 1 killed by a vehicle and the other died of natural causes. Two wolves shot near a ranch in Leadore were investigated, and it was determined by USFWS Special Agents that these shootings were justified under the 10(j) Rule. Lastly, an IDFG officer investigated a report of a foreign substance found near a suspected wolf den.

Documented Resident Packs

Aparejo
Several sightings in spring 2006 of wolves near a tributary of the Middle Fork Salmon River in the Frank Church Wilderness prompted IDFG program to fly in and attempt to radiocollar this suspected pack. With generous assistance by the local outfitter and his guide, ample wolf sign was located and traps were set. As a result, 2 wolves were captured and fitted with radiocollars. Unfortunately, 1 collar was later retrieved, having been chewed off by other wolves. Due to the remoteness of the location and time constraints, this group of wolves was not surveyed to determine whether pups were present. As such, this pack was not considered a breeding pair in 2006. However, due to the relatively large pack size (n = 11) observed in winter flights, reproduction in the previous year(s) was assumed with a reasonable degree of confidence, and this pack was retroactively counted for 2005.

Basin Butte
Originating from dispersing wolf B171 and her uncollared mate, this new pack established a territory north of Stanley and raised their first litter of 5 pups in spring-summer 2006. This pack was involved with 1 confirmed depredation of a domestic calf on private property. Trapping for this pack in the fall resulted in 2 pups being fitted with radiocollars, bringing to 3 the number of wolves being monitored in the pack. Aerial counts of 8 wolves confirmed the presence of a wolf

of unknown origin, in addition to the 5 pups and the breeding pair. This pack was considered a breeding pair for 2006.

Blue Mountain
This pair of wolves was lethally removed from an area between Challis and Blue Mountain in May after 2 sheep were confirmed killed on a private residence near Challis, Idaho. A necropsy suggested this wolf had given birth to multiple pups based upon placental scars, although it did not appear the animal had been nursing. It is unknown whether these wolves were associated with other wolves, or if they were a newly-established pair. However, because evidence indicated reproduction occurred, this was considered a newly established, but eliminated, pack.

Buffalo Ridge
In early winter 2005/2006, male B93 began traveling apart from the rest of the pack; it was thought that dispersing male B196 from the Morgan Creek pack, accepted into the Buffalo Ridge pack in February 2005, displaced him as breeding male. Denning surveys revealed the presence of 5 black pups, corroborating the assertion that this previously all-gray pack had a new breeding male. Wolf B95, wearing a non-functioning radiocollar, was also observed with the pups, suggesting she was still the breeding female. Two wolves were removed from this pack in January after a domestic calf was killed. Another wolf was trapped and radiocollared in spring. The Buffalo Ridge pack once again qualified as a breeding pair in 2006.

Photo J. Husseman
Suspected breeding female B95 of the Buffalo Ridge pack playing with several black pups at a rendezvous site.

Castle Peak
The status of this pack has been unknown since the disappearance of B195, the sole radiocollared wolf in the pack, in March 2004. While there was some speculation that the wolves using the

East Pass drainage could be the Castle Peak pack, the areas used by the wolves in East Pass was inconsistent with what the small amount of location data acquired on the Castle Peak pack revealed of their territorial use (see Pass Creek). Sightings of wolves and wolf sign, as well as a confirmed depredation in the East Fork Salmon River drainage, indicated this pack was still present; however, it was not counted as a breeding pair for 2006.

Galena
A longstanding pack in the Sawtooth Valley, the Galena pack's status was temporarily unknown in spring when the collar on B107 expired and wolf B253 dispersed. However, a flurry of wolf activity southeast of Stanley resulted in the capture and radiocollaring of 2 wolves by IDFG biologists in May (1 wolf subsequently died of unknown causes). The observation of 5 pups by a USFS biologist resulted in this pack qualifying as a breeding pair for 2006.

Hoodoo
Aerial telemetry locations indicate this pack once again denned in a tributary of the Middle Fork Salmon River, although the remoteness of the location precluded ground confirmation. During a trapping effort near a rendezvous site, multiple pups were heard howling along with several adults. Unfortunately, the only capture resulted in a wolf managing to pull itself free of the trap. Aerial observations in December indicated this pack consisted of 9 wolves. This pack was counted as a breeding pair for 2006.

Jureano Mountain
In 2006, the Jureano Mountain pack continued to use their traditional denning and rendezvous sites in the Panther Creek drainage west of Salmon, Idaho. A ground observation in January of a large, radiocollared gray wolf suggested B106, whose collar failed 2 years previous, remained as the pack's breeding male. Reproductive surveys and aerial observations verified 5 pups and a total of 12 wolves in this pack. There was a single documented mortality in 2006, when wolf B225 was found dead of unknown causes. This pack was responsible for 1 confirmed depredation on a calf. The control effort initiated from the depredation resulted in the capture and recollaring of wolf B223 by WS personnel. The Jureano Mountain pack was counted as a breeding pair for 2006.

Landmark
This pack has remained without a functioning radiocollar since 2003, and therefore little was known about their status. Surveys of historical use areas (den, rendezvous sites) in past years have indicated that this pack was still in existence; however, time constraints were such that no historical Landmark sites were surveyed in 2006. Therefore, this pack did not count as a breeding pair in 2006.

Lemhi
This pack was first discovered when Wildlife Service agents trapped and collared the suspected breeding male in response to a livestock depredation. The collared wolf led IDFG personnel to a probable den location where a single pup was observed. The Lemhi pack was implicated in depredations of 2 cattle and a single sheep. Aerial observations resulted in a pack count of at least 5 wolves. Although reproduction was documented, only 1 pup was observed; therefore, this pack did not satisfy the breeding pair definition.

Morgan Creek
Aerial monitoring indicated this pack again used their traditional den location, but by the time the area was accessible, the wolves had already moved before reproduction could be confirmed. Four pups were eventually observed at a rendezvous site. In response to several sightings of wolves in the Morgan Creek drainage, a subadult wolf was captured and radiocollared by IDFG personnel. This pack was implicated in 3 confirmed or probable cattle losses, resulting in the lethal removal of 2 wolves. Another wolf, suspected breeding female B198, was found dead in December of unknown cause. Aerial observations indicated at least 11 wolves in the pack at the end of 2006. This pack qualified as a breeding pair in 2006.

Moyer Basin
Based upon aerial and ground telemetry, it appeared this pack continued to use its traditional denning location, but ground searches revealed their 2004/2005 den to be unoccupied. After several attempts, a minimum of 2 pups were located several miles from their old den. The Moyer Basin wolves were responsible for 3 confirmed or probable cattle losses, which led to the lethal removal of 2 wolves. Two of 3 wolves radiocollared in the previous year also died in 2006, both killed by vehicles; male B243 was hit within the pack's territory in January, and male B242 was struck near Arco (tallied to Upper Snake region) in October after dispersing sometime in late summer. The third animal radiocollared in 2005 dispersed in winter, and was believed to be traveling with the Yankee Fork pack. Given the level of mortality, it was not unexpected that the end-of-year count dropped from 11 in 2005 to 7 in 2006. This pack met the criteria of a breeding pair for 2006.

Photo J. Husseman
An uncollared Moyer Basin pack wolf finds a shady spot to nap during a hot summer day.

Owl Creek
Since this pack was first verified by IDFG biologists in 2005, there have been no reports of wolf sightings or activity from the remote location this pack is believed to occupy. Therefore, this pack did not qualify as a breeding pair in 2006.

Pass Creek

This pack was initially located in 2005 when IDFG personnel confirmed reports of wolves using the upper tributaries of the East Fork Salmon River. Subsequent investigations in summer 2006 led to the capture of a subadult wolf, as well as an observation of 3 pups. Given their proximity to the uncollared Castle Peak pack, there was speculation this newly radiocollared pack could be the Castle Peak pack (see Castle Peak). However, telemetry locations and other evidence suggested these were in fact 2 separate packs. The Pass Creek pack was implicated in 1 cattle loss, although no lethal control was conducted. Aerial counts resulted in a minimum pack size of 6 wolves. The Pass Creek wolves qualified as a breeding pair for 2006.

Photo J. Husseman

Wolf B297 of the Pass Creek pack recuperates from anesthesia after being trapped and fitted with a radiocollar.

Twin Peaks

The collarless Twin Peaks pack's existence has until recently been confirmed via surveys for wolf activity at their traditional rendezvous site. However, time constraints did not permit a survey of this remote area in 2006 (a survey in 2005 indicated this pack did not return to their rendezvous site). This pack was not counted as a breeding pair in 2006.

Yankee Fork

Initially documented in late summer 2005 with the radiocollaring of female B252, this pack appeared to have gained another member when wolf B240 was located with them in early spring. However, wolf B252 was found dead of natural causes in June. Attempts to confirm reproduction based on B240's movements proved unsuccessful, as he ranged widely throughout the pack territory. Evidence suggested this animal was traveling alone, raising questions with respect to his pack association, or whether the Yankee Fork pack was still intact. During a winter monitoring flight, wolf B240 was seen with at least 2 other wolves within the pack's territory, indicating pack persistence. Because reproduction was not verified, the Yankee Fork pack was not counted as a breeding pair in 2006.

Documented Border Packs

Battlefield (MT)
The Battlefield pack was a Montana-documented pack whose territory overlapped the state border near Gibbonsville, Idaho. As in 2005, depredations in Montana's Big Hole Valley led to control actions that resulted in lethal removal of 6 wolves in 2006. In November and December 2006, the sole radiocollared Battlefield wolf was located on the Idaho side of the border. By the end of 2006, aerial observations indicated this pack numbered 4 wolves. The Battlefield pack was not listed as a breeding pair for Montana in 2006.

Black Canyon (MT)
The Black Canyon pack was a Montana-documented pack. Although there was no evidence that this pack's territory overlapped into Idaho, this pack was considered a border pack because of the close proximity to the Montana/Idaho border around the upper Lemhi River area. Depredations led to removal of 3 wolves from this pack. An adult male wolf was opportunistically radiocollared by WS conducting coyote control in February; however, radio contact with this wolf was lost in August. Although reproduction was not confirmed, a minimum of 2 wolves continued to occupy this pack's territory.

Hughes Creek
Until 2006, the Hughes Creek pack had managed to evade capture; however, IDFG biologists managed to dart and radiocollar the suspected breeding male during big game helicopter surveys in January. In late spring, the suspected breeding female was observed with a large litter, consisting of 4 black and 4 gray pups. Another observation during winter big game surveys in December resulted in a minimum pack count of 13 wolves. Because this pack was located in Montana on 1 occasion, they are considered to be a border pack. The Hughes Creek pack was a breeding pair for 2006.

Painted Rocks (MT)
The Painted Rocks pack was a Montana-documented pack. Wolf activity was first documented by NPT in the Painted Rocks area (West Fork of the Bitterroot River near the Montana-Idaho border) with the dispersal of Idaho female B67 in 2001. B67 was monitored through 2002, and the pack has not been collared 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 border. MFWP personnel scouted the West Fork several times during the summer and found old wolf sign but nothing fresh enough to trap on. MFWP conducted snow tracking surveys in the West Fork in December and confirmed a minimum of 4 wolves at the end of 2006. Montana did not count this pack as a breeding pair in 2006.

Sula (MT)
The Sula pack was a Montana-documented pack. Seven wolves were believed to exist in the Sula pack at the beginning of 2006. The pack appeared to localize near the denning season but no pups were seen or documented. Monitoring of the radiocollared wolf resulted in a minimum count of 7 wolves in this pack. This pack was not considered a breeding pair in 2006.

Suspected Resident Packs

Leadore
In early spring 2006, the probable breeding male and female from this often-seen group of wolves were shot under authority of the 10(j) Rules near a ranch south of Leadore. A necropsy revealed the female was in fact pregnant, although it was undetermined if the other wolf shot was the breeding male. While reproduction by this group was prevented, other wolves were reportedly seen in the area prior to, as well as after, the shooting of the 2 wolves. With the presence of other wolves, the potential existed for this suspected pack to continue to occupy the area. Future monitoring will be required to determine the status of this group.

Other Documented Wolf Groups

B191 (MT)
A disperser from the Soldier Mountain pack, B191 was missing for several months before she was eventually located in summer 2006 with another wolf in the Big Hole Valley, Montana. Although this pair was occasionally located on the Idaho side of the Beaverhead Mountains, aerial telemetry locations indicated these wolves were residing primarily in Montana and will be counted for that state's total.

B267
Wolf B267 was found dead of unknown causes in a tributary of the Middle Fork Salmon River, within the Salmon Region boundary. Thought to be a member of the Golden Creek pack in the adjacent McCall Subregion, it was unknown if this wolf was dispersing or if it was traveling with other Golden Creek wolves when it died.

SW-64
Originally a member of the Sage Creek pack in Montana, wolf SW-64 appeared to have dispersed and was located by IDFG and MFWP biologists traveling with an uncollared wolf between southwest Montana and the upper Lemhi Valley, Idaho. After a confirmed livestock depredation in October, the uncollared wolf traveling with SW-64 was lethally controlled southeast of Leadore. Wolf SW-64 remained in the general vicinity, and by late fall, all telemetry locations of this wolf were within the Lemhi Valley. This animal will continue to be monitored in 2007.

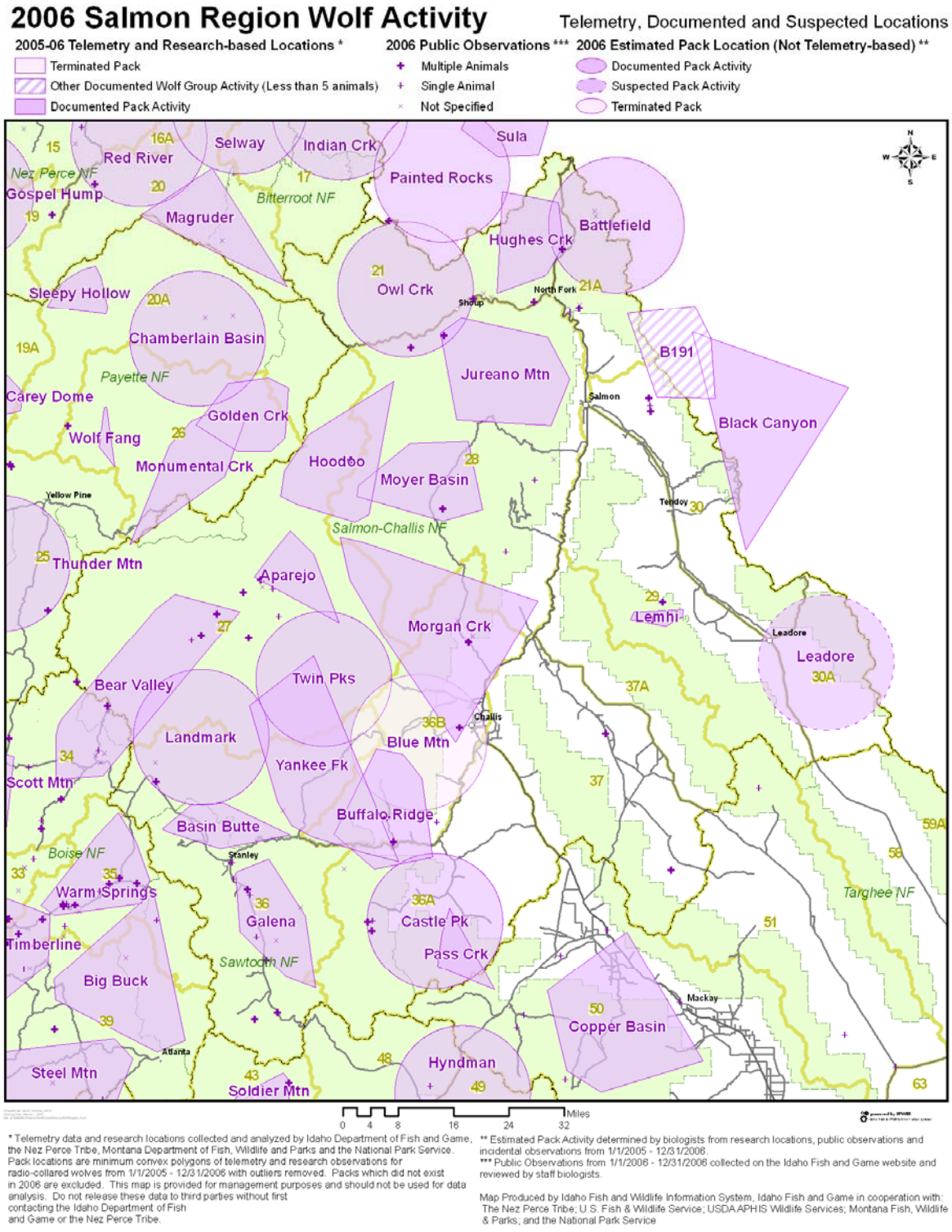

Figure 13. Wolf pack activity and observations in the Salmon Region, 2006.

Table 8. Estimated pack size, reproductive status, mortality, dispersal, monitoring status, and livestock depredation for documented and suspected wolf packs within Idaho Department of Fish and Game Salmon Region, 2006.

		Reproductive status			Documented mortalities					Monitoring status			Confirmed & probable wolf-caused livestock losses		
Wolf pack or group	Min. no. wolves detected[a]	Min. no. pups prod.	Reported as reprod. packs	Reported as breeding pairs[b]	Natural	Control[c]	Other human[d]	Unknown[e]	Known dispersal	Active radio collars	Number wolves captured[f]	Number wolves missing[g]	Cattle	Sheep	Dogs
Documented pack															
Aparejo	11	?	no	no	0	0	0	0	0	1	2	0	0	0	0
Basin Butte	8	5	yes	yes	0	0	0	0	0	3	2	0	1	0	0
Battlefield (MT)[h]															
Black Cyn (MT)[h]															
Blue Mountain[i]	0	?	yes	no	0	2	0	0	0	0	0	0	0	2	0
Buffalo Ridge	6	5	yes	yes	0	2	0	0	1	2	1	0	1	0	0
Castle Peak	?	?	no	no	0	0	0	0	0	0	0	0	1	0	0
Galena	6	5	yes	yes	0	0	0	1	1	1	2	0	0	0	0
Hoodoo	9	2	yes	yes	0	0	0	0	0	1	0	0	0	0	0
Hughes Creek (ID)	13	8	yes	yes	0	0	0	0	0	1	1	0	0	0	0
Jureano Mountain	12	5	yes	yes	0	0	0	1	0	2	1	0	1	0	0
Landmark	?	?	no	no	0	0	0	0	0	0	0	0	0	0	0
Lemhi	5	1	yes	no	0	0	0	0	0	1	1	0	2	1	0
Morgan Creek	11	4	yes	yes	0	2	0	1	0	1	1	0	3	0	0
Moyer Basin	7	2	yes	yes	0	2	1	0	2	1	0	0	3	0	0
Owl Creek	?	?	no	no	0	0	0	0	0	0	0	0	0	0	0
Painted Rocks (MT)[h]															
Pass Creek	6	3	yes	yes	0	0	0	0	0	1	1	0	1[j]	0	0
Sula (MT)[h]															
Twin Peaks	?	?	no	no	0	0	0	0	0	0	0	0	0	0	0
Yankee Fork	3	?	no	No	1	0	0	0	0	1	0	0	0	0	0
Subtotal	97	40			1	8	1	3	4	16	12	0	13	3	0
Suspected pack															
Leadore	?				0	2	0	0	0	0	0	0	2	0	0
Subtotal					0	2	0	0	0	0	0	0	2	0	0
Other doc. group															
B191 (MT)[h]															
B267	0				0	0	0	1	0	0	0	0	0	0	0
SW-64	1				0	1	0	0	0	1	0	0	0	0	0
Subtotal	1				0	1	0	1	0	1	0	0	0	0	0

		Reproductive status			Documented mortalities					Monitoring status			Confirmed & probable wolf-caused livestock losses		
Wolf pack or group	Min. no. wolves detected[a]	Min. no. pups prod.	Reported as reprod. packs	Reported as breeding pairs[b]	Natural	Control[c]	Other human[d]	Unknown[e]	Known dispersal	Active radio collars	Number wolves captured[f]	Number wolves missing[g]	Cattle	Sheep	Dogs
Unknown					0	0	2	0	0	0	0	0	2	3	0
Subtotal					0	0	2	0	0	0	0	0	2	3	0
Regional total	98	40			1	11	3	4	4	17	12	0	17	6	0

[a] Number of wolves detected by wolf program personnel through observations of wolves or wolf sign and believed alive at end of 2006. Unknown status denoted by "?" Sum of this column does not equate to number of wolves estimated to be present in the population.

[b] Breeding pairs are the measure of Federal and State wolf recovery and management goals. A breeding pair is defined as "an adult male and an adult female wolf that have produced at least 2 pups that survive until December 31 of the year of their birth…".

[c] Includes agency lethal control and legal take by landowners.

[d] Includes all other human-related deaths.

[e] Does not include pups that disappeared before winter.

[f] Includes all wolves captured during 2006. Most, but not all, were radiocollared.

[g] Radiocollared wolves that became missing in 2006.

[h] Border pack officially tallied to (state); territory known or likely shared with Idaho. Data on these packs can be found in Rocky Mountain Wolf Recovery 2006 Interagency Annual Report.

[i] Lethally removed during 2006; not included in end-of-year tallies.

[j] Depredation attributed to this pack occurred outside the Salmon Region.

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APPENDIX A

: POPULATION ESTIMATION TECHNIQUES USED TO DETERMINE WOLF POPULATION NUMBERS IN IDAHO

Since wolves were first reintroduced into Idaho, annual winter wolf population estimates have been calculated using the same technique. Following this technique, for any given year, the wolf population is estimated by starting with the previous end-of-year estimate, adding all documented reproduction and immigration, and subtracting all documented mortality and emigration for the current year. Mathematically this technique is represented as:

Minimum Wolf Population Estimate = Last year's population estimate + documented pups produced + immigrants – documented mortalities – emigrants

Using this technique, the 2006 wolf population estimate is 633 wolves:

(518) + (185) + (1) – (68) – (3) = 633 wolves*

This technique worked well for the first several years after wolves were reintroduced when the population was relatively small and most wolves were radiocollared. As most, if not all, packs could be actively monitored using radiotelemetry, reproduction, mortality, and dispersal could be accurately assessed. For small recovering populations monitored using radiotelemetry, this technique is essentially a total count method.

Using the same population estimation technique from year to year is important to assess population trends across years. Idaho wolf population estimates have increased every year since wolves were first reintroduced in 1995. The 2006 estimate indicated a 22.2% population increase from the previous year (*lambda* = 1.22).

As the Idaho wolf population expanded, our confidence in this technique has waned because it became increasingly difficult to document all packs; a smaller proportion of the wolf population was radiocollared increasing the difficulty for monitoring status of known packs; and reproduction, mortality, and dispersal became more difficult to assess. Static funding and personnel levels in the face of an expanding wolf population and workload added to the challenge of collecting sufficient data required by this technique to accurately estimate the growing number of wolves.

We have, for the past few years, explored additional methods of estimating the wolf population that are more appropriate given a much larger, fully recovered population and applicable for the types of data we are able to collect. Our efforts have recently focused on one of the most promising methods, which we provided to a peer review group of wolf biologists and statisticians in spring 2006. This technique bypasses the need to count pups in every pack, and instead relies on our documented packs, estimated pack size, number of wolves documented in

small groups not considered packs, and a percentage of the population believed to be lone wolves. Mathematically this technique is represented as:

Minimum Wolf Population Estimate = ((Documented packs * mean pack size) + (Wolves in other documented wolf groups)) * (lone wolf factor)

Using this technique, the 2006 wolf population estimate is 673 wolves:

((72 * 8.2) + (8)) * 1.125
(590 + 8) * 1.125
602 * 1.125 =
673

The number of documented packs that were extant at the end of 2006 was 72.

Mean pack size (8.2) was calculated using only those packs (n = 29) for which biologists believed complete pack counts were obtained in 2006. Even so, these counts should be considered minimums.

To account for wolves not classified as lone wolves and not associated with documented packs, we included a "total count" for those radiocollared wolves in groups of 2-4 wolves that were not considered packs under Idaho's definition. This resulted in the addition of 8 wolves from 3 groups.

A lone wolf factor (12.5%) was added to account for that component of the wolf population comprised of wolves not associated with packs or groups of 2-4 wolves. This was a mid value derived from 5 peer-reviewed, published studies and 4 non-reviewed papers from studies that occurred in North America and were summarized and reported in 2003 (Mech and Boitani 2003, page 170). For 2006, an estimated 75 lone wolves were in the Idaho population.

* An error was found and corrected in the 2005 minimum population estimate (Nadeau et al. 2005), 6 additional wolves were added for a total of 518.

APPENDIX B: CONTACTS FOR IDAHO WOLF MANAGEMENT

Idaho Fish and Game Regional Offices at:

Headquarters Wildlife Bureau	(208) 334-2920
Panhandle Region	(208) 769-1414
Clearwater Region	(208) 799-5010
Southwest Region	(208) 465-8465
McCall Subregion	(208) 634-8137
Magic Valley Region	(208) 324-4350
Southeast Region	(208) 232-4703
Upper Snake Region	(208) 525-7290
Salmon Region	(208) 756-2271

For information about wolves in Idaho and IDFG management:
http://fishandgame.idaho.gov/cms/wildlife/wolves/

To contact IDFG via email:
http://fishandgame.idaho.gov/inc/contact.cfm

The Nez Perce Tribe's Idaho Wolf Recovery Program:

Telephone: (208) 634-1061
Fax: (208) 634-3231
Mail: P.O. Box 1922
McCall, ID 83638-1922
Email: cmack@nezperce.org
jholyan@nezperce.org

For information about the Nez Perce Tribe's Wildlife Program and to view Recovery Program Progress Reports, please visit the following website:
http://www.nezperce.org/programs/wildlife_program.htm

U.S. Fish and Wildlife Service Northern Rocky Mountain Wolf Recovery:

For information about wolf recovery in the Northern Rocky Mountains, please visit the USFWS website at the following:
http://www.westerngraywolf.fws.gov/

To report wolf sightings within Idaho:
Report online: http://fishandgame.idaho.gov/wildlife/wolves/report.cfm

To report livestock depredations within Idaho:

USDA/APHIS/Wildlife Services	
State Office, Boise, ID	(208) 378-5077
District Supervisor, Boise, ID	(208) 378-5077
District Supervisor, Gooding, ID	(208) 934-4554
District Supervisor, Pocatello, ID	(208) 236-6921
Wolf Specialist, Arco, ID	(208) 681-3127

To report information regarding the illegal killing of a wolf or a dead wolf within Idaho:

U.S. Fish and Wildlife Service Senior Agent, Boise, ID	(208) 378-5333
Citizens Against Poaching (24hr)	1-800-632-5999
or any IDFG Office	

Interagency Report 174

WYOMING WOLF RECOVERY
2006 ANNUAL REPORT

A cooperative effort by the U.S. Fish and Wildlife Service, National Park Service, and USDA Wildlife Services

Photo by: Karen Colclough

This cooperative report presents information on the status, distribution, and management of wolves in Wyoming, including Yellowstone National Park, from January 1, 2006 through December 31, 2006.

Suggested Citation: Jimenez, M.D., D.W. Smith, D.S. Guernsey, and R.F. Krischke, 2007. Wyoming Wolf Recovery 2006 Annual Report. Pages 174- 201*in* U.S. Fish and Wildlife Service Rocky Mountain Wolf Recovery 2006 Annual report. USFWS, Ecological Services, 585 Shepard Way, Helena, Montana, 59601. 235 pp.

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APPENDIX

SUMMARY

The total gray wolf (*Canis lupus*) population in Wyoming increased approximately 23% from 252 wolves in 2005 to 311 wolves in 2006.The wolf population in Wyoming included Yellowstone National Park (YNP) and the entire state of Wyoming; however, wolf recovery occurred primarily in the northwest section of the state. The number of wolves in YNP increased 15% from 118 wolves in 2005 to 136 in 2006. Wolf numbers in Wyoming outside YNP increased 31% from 134 wolves in 2005 to 175 wolves in 2006. YNP had 13 packs including 10 breeding pairs producing > 60 pups surviving through December 31. Average pack size in YNP was 10.5 and ranged from 4 to 19 wolves. Wyoming outside YNP had > 23 packs including 15 breeding pairs producing > 58 pups that survived until December 31. Average pack size was 6.7 and ranged from 2 to 13. The wolf population in YNP rebounded 15% in 2006 after a population decline in 2005; however, the overall population in YNP has not increased since 2003. In contrast, wolf numbers in Wyoming outside YNP increased on average >28% each year since 2003.

Numerous ongoing research projects investigated predator-prey interactions, wolf population dynamics, disease, genetics, interactions between wolves and other predators, and livestock depredations.

Wolves in Wyoming were responsible for killing > 169 livestock (including 162 confirmed and 7 probable depredations) and 1 dog. Confirmed livestock depredations included 123 cattle (110 calves; 13 cows/yearlings); 38 sheep (22 ewes; 16 lambs); and 1 horse. Forty-four wolves (approximately 17% of the Wyoming wolf population outside YNP) were killed in control actions to reduce further depredations.

GREATER YELLOWSTONE RECOVERY AREA - WYOMING

PERSONNEL

Personnel in Wyoming outside Yellowstone National Park

Wolves in Wyoming outside Yellowstone National Park (YNP) were monitored by Project Leader Mike Jimenez (USFWS), Jim Pehringer (USDA Wildlife Services) (WS), Steve Cain, Sarah Dewey (Grand Teton National Park), and volunteers Susannah Woodruff, Karen Colclough, Lydia Dixon, Dylan Taylor, and Hilary Eisen. In 2006, the USFWS and WS combined funding for a second year to maintain a wolf management specialist position Jim Pehringer (WS) stationed in Cody, Wyoming and work under the direction of the USFWS.

USFWS law enforcement agents in Wyoming were Dominic Domenici (Resident Agent-in-Charge, Casper), Tim Eicher (Special Agent, Cody), and Roy Brown (Special Agent, Lander).

Wyoming employees of WS who were involved with wolf control or management in 2006 included State Director Rod Krischke, District Supervisors Craig Acres and Merrill Nelson, Asst. District Supervisor Rod Merrell, Specialists Jim Pehringer, Arnold DeBock, Tracy Frye, Stephen Moyles, Michael Peterson, Jed Edwards, Matt Lumley, Chuck Bunch, Jeremy Johnson, Wade Jones, Dan Bragg and Pilots Miles Hausner, Kelly Huseby and Ted Jensen .

Personnel in Yellowstone National Park

Three full-time employees worked for the Yellowstone Wolf Project in 2006: Project Leader Douglas Smith and Biological Science technicians Debra Guernsey and Daniel Stahler. This concludes a four-year term appointment for Dan, but he will continue as a student temporary employee while he is at UCLA working on his PhD.

The Wolf Project was able to hire paid seasonal staff through the Yellowstone Park Foundation and Yellowstone Association to assist in several key aspects to our annual work. Emily Almberg, Matt Metz, Abby Nelson, Jesse Newby, and Katie Yale worked for the summer field season and were crucial to summer den monitoring, invertebrate scavenger study, summer GPS predation work, as well as other duties. Emily, Matt and Abby worked all winter long in this capacity, and Katie assisted in the March Pelican Valley study. Rick McIntyre worked diligently year-round for the Wolf Project with six months as a seasonal Park Service employee and six months as a volunteer. Emily and Rick worked primarily for the Wolf and Human Road Management Project during the summer, but also assisted in many other project goals during winter months. All six spent many hours collecting data throughout the year and contributed largely to the increased research productivity of the Yellowstone Wolf Project for 2006.

Volunteer Program

Nineteen volunteer field technicians worked a total of 6200 hours in 2006, worth $52,147.20 at a GS-5 level (see Appendix), which was equal to 1.8 full time GS-5 employees. Volunteer field positions continued to be highly competitive with three to four applicants applying for each position. Chosen volunteers received free housing and $500/month food stipend.

Most positions are available during winter, when studies of wolf behavior and predation rate take place. A background in biological science is required. Interested persons should mail a cover letter and resume to the Yellowstone Wolf Project, P.O. Box 168, Yellowstone National Park, Wyoming, 82190.

MONITORING

Monitoring in Yellowstone National Park

Population and Territory Status

At the end of 2006, at least 136 wolves in 13 packs occupied Yellowstone National Park. This represents a 15% rebound in wolf numbers after the population decline in 2005. Disease was the cause of the population drop last year, and there appears to be no evidence of a disease outbreak in 2006; adult and pup survival was very good.

Unlike previous years, there was very little turnover in packs. Twelve of thirteen packs (92%) present in 2006 were present in 2005, and there was only one new pack, the Oxbow Creek pack. This pack formed by three Leopold wolves dispersing and joining with another unidentified wolf and taking over a portion of Leopold territory.

Seven packs (75 wolves, up 38% from 2005) used the northern range, and six packs (61 wolves, down 5% from 2005) used the rest of the park. Pack size ranged from 4 (Cougar Creek) to 19 (Leopold) wolves and averaged 10.5.

Despite being smaller in size (1000 km^2 compared to 7,991 km^2) the northern range of the park continues to support the majority of the park's wolves, a consistent pattern of previous years as well. Greater year round prey density is the reason for this finding, but recent analyses indicate that social strife (wolf-wolf killing and territorial clashes) and probably disease were limiting wolf numbers. In other words based on prey biomass available there should have been more wolves, but there were not, something else was limiting their numbers and we believe it to be wolf-wolf related mortality and dispersal.

There were indications of more social strife in 2006. Conflicts between Agate Creek and Hellroaring, Agate Creek and Slough Creek, and Slough Creek and Druid, Leopold and Oxbow Peak are all indicative of social competition that is related to wolf density and probably declining prey availability. Elk numbers have declined by about 50% since 1995, which are the wolves' primary winter prey, and this along with conflict inspired by high density has contributed to our observed increase in wolf-wolf conflict. Based on these observations, and despite the recent 1-year increase in wolf numbers, we expect wolf numbers to decline over the next several years.

A wolf decline may have already begun as by the end of the year the Swan Lake pack was residing north of the park without returning. The Hellroaring Creek pack, after one territorial clash with Agate Creek, moved north for a time as well. It will be interesting to watch the future of the Oxbow Creek pack as they live on a small territory essentially within the Leopold pack territory. How long these two packs will coexist is open to question and if short-lived, would lead to another lost pack from the northern range. Regardless of future projections, it is clear that Leopold, Agate Creek, and probably Druid Peak are dominant packs while the others are likely to be at a competitive disadvantage.

Packs in the park interior are much more stable and occur at lower density without the level of conflict observed on the northern range. Their numbers changed little, from 64 to 61, and they lost only one pack. Territories are large with space in between them. The Madison-Firehole has stabilized somewhat after a previous high density that supported three packs in 2004. The two southern packs (Bechler and Yellowstone Delta), the most isolated in the park, and ones that spend significant amounts of time outside YNP (boundary packs), both reproduced with good pup survival, which maintained relatively large packs (>10 wolves each). Two interior packs, however, are in decline. Although speculative, the Hayden Valley pack because of poor habitat (largely just bison in winter) in Hayden Valley and pressure from Mollie's pack; in the case of Cougar Creek an aging alpha female.

Across the park wolf distribution was unchanged, and has been so for several years indicating that all available wolf habitat is settled. Pack turnover, when it occurs, is always within the occupied wolf range and new areas of settlement have so far not been recorded.

Reproduction

Pup survival was excellent in 2006. After a poor year in 2005, there seemed to be some compensatory survival. Seventy-five pups were born parkwide and 60 (80%) survived compared to only 32% survival last year. The northern range did especially well with 39 of 52 (75%) pups surviving compared to last year only 16% survived. Pup numbers in the interior were slightly up, 21 compared to 14 in 2005, but it is hard to assess pups born and survived because interior pups are rarely seen early in the season at their dens.

Average pups born/pack was 6.8 but three packs had two females breed so the average pups born/female was 5.4 (splitting pups between females when there was >1 litter as we could not assign maternity). Park-wide pups surviving/pack was 5.9 and the northern range had more pups surviving/pack, 7.6 versus 4.2 which was due to no multiple litters in the park interior.

Three of 13 packs had no surviving pups. In two cases, Slough Creek and Hellroaring Creek, pups were born but none survived. Pup mortality in both cases was probably due to competitive interactions with other packs. In the third case of reproductive failure, the Cougar Creek pack, the cause of pup mortality is unknown but possibly related to old age in the breeding female. Field data indicated that this pack localized around a den, but only briefly suggesting that the pups died early.

Wolf Project staff visited every den site except Gibbon meadows pack and most rendezvous sites to collect scats for summer food habits studies. Dens were also visited because of unexpected surprises, like finding a dead wolf inside a secondary den, or the possibility of finding dead pups like in 2005.

Mortalities

Not counting over-summer pup mortality, 9 wolves died in 2006 (collared only). These included 1 yearling and 8 adults (2-5 years). Seven males and 2 females died. Again the leading cause of mortality (44%) was intraspecific strife. The mortality rate in 2006 was 18%, about equal to the 11 year average of 20%.

Monitoring in Wyoming outside Yellowstone National Park

Population status: We combined 3 census techniques to estimate the total number of wolves in Wyoming outside YNP: 1) direct observations of wolves, 2) winter track counts of wolves traveling in snow, and 3) confirmed reports of wolf sightings from other agencies. We counted the number of wolves in packs containing radio collared wolves using visual observations from the ground and aerial telemetry flights. Twenty-one wolves were radio collared in 2006. We monitored 27 radio collared wolves (15% of the population) in 16 packs (70% of the packs). We

tracked wolves in winter and counted the different sets of wolf tracks in snow. In areas where repeated sightings were confirmed, we incorporated those observations into our estimates. We averaged the high and low population estimates to calculate other statistics used to describe the wolf population in Wyoming. Visual observations from telemetry flights in early January 2007 were also used to improve our year-end estimates. As of December 31, 2006, we estimated that at least 175 wolves inhabited western Wyoming outside YNP in 2006. Twenty-three packs contained 154 wolves and another 21 wolves (single wolves and smaller groups of non-breeding wolves) were located throughout the western portion of the state (Appendix Figure 1). Pack size ranged from 4 to 13 and averaged 6.7 wolves.

Reproduction: Fifteen packs produced at least 58 pups that survived past December 2006: Washakie, Pacific Creek, Beartooth, Sunlight, South Fork, Gooseberry, Greybull River, Rock Creek, Owl Creek, Cub Creek, Bliss Creek, Buffalo, Gros Ventre, Snake River, and Huckleberry (Appendix Tables 4a and 4b). Mean litter size was 5.2 pups per litter. Only 1 pup survived in the Absaroka Pack and no pups were produced by Teton or Carter Mountain Packs. We were not able to confirm pup production in 5 packs: East Fork, Black Butte, Togwotee, Daniel, and Prospect Packs.

Population growth:
In 2004, we reported that the wolf population increased 23% from 82 wolves in 2003 to 101 wolves in 2004. In 2005, the wolf population increased 33% from 101 wolves in 2004 to 134 wolves in 2005. The number of wolves increased 31% in 2006 to >175 wolves (Figure 1).

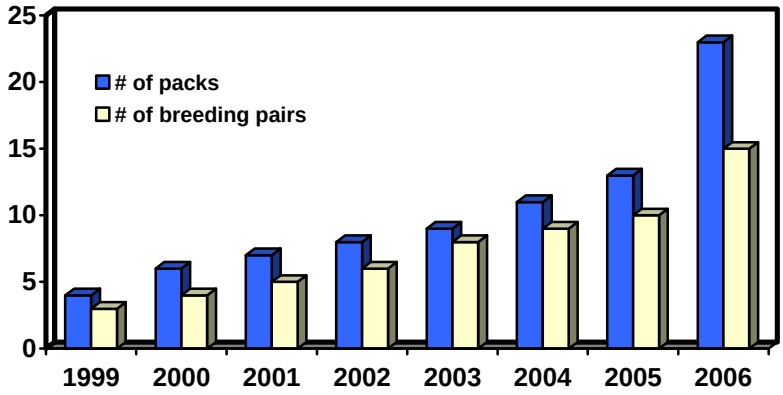

Figure 1. Number of wolf packs and breeding pairs in Wyoming 1999 – 2006.

Mortalities: In 2006, a total of 59 wolves (25% of the total population) were known to have died in Wyoming outside YNP. Causes of mortality included: control = 44 (75% of documented mortality); under law enforcement investigation = 8 (13%); natural = 1 (2%); vehicles = 3 (5%); other human caused = 2 (3%); and unknown =1(2%).

Sarcoptic mange was first documented in 2002, when a severely mange-infested wolf from the Absaroka Pack, east of YNP, was captured and radio collared. In 2003 and 2004, mange was documented in the Sunlight and Absaroka Packs in the Sunlight Basin area. Three wolves infested with mange from the Sunlight Pack were collared in 2004, however none of the wolves from the Sunlight Pack appeared to have mange in 2005 or 2006. We suspect the wolves infested with mange in the Absaroka Pack died in winter 2005. In spring 2006, other healthy wolves recolonized the area and continued to use the same general home range of the old Absaroka Pack. However, in summer 2006, several wolves in this re-established Absaroka Pack were again infested with mange. Yellowstone wolf #453m dispersed from the Slough Creek Pack and settled within the home range of the Absaroka Pack in spring 2006. Wolf #453m became severely infested with mange, began harassing livestock, and was eventually shot in a control action in 2006 for killing cattle.

Misc. wolves/Unconfirmed packs in Wyoming: In 2006, we documented at least 21 single wolves or small groups of non-breeding wolves throughout western Wyoming. We routinely received and recorded reports of possible wolf sightings throughout various regions of Wyoming. If we observed a clustering of wolf sightings in particular areas, we then spent time on the ground to determine if wolves were present. In winter 2006, we suspected that wolf packs may be trying to form in the several areas in northwest Wyoming (Table 1).

Population movement and dispersals in Wyoming: At least 4 radio collared wolves dispersed in 2006 from YNP to various areas in northwest Wyoming (Table 2).

Table 1. Miscellaneous packs in Wyoming – 2006.

General Location	# of wolves	Comments
Pinedale/Cora	5	no radio collars
Flat Creek	4-6	no radio collars
Big Horn Mountains	≥ 4	no radio collars
Kemmerer/Hamsfork	≥ 2	no radio collars
Big Piney	4	no radio collars
Minimum total:	21wolves	

Table 2. Radio collared wolves dispersing from YNP – 2006. Cause of mortality for wolves #493m and #487m are under law enforcement investigation.

YNP Dispersing Wolves	Natal Pack	New Location	Fate
493m	Delta	NW Wyoming	mortality
487m	Delta	NW Wyoming	mortality
481m	Gibbon Meadows	NW Wyoming	unknown
453m	Slough Creek	NW Wyoming	control

RESEARCH

Research in Yellowstone National Park

Wolf-Prey Relationships

Wolf–prey relationships were documented by observing wolf predation directly and by recording the characteristics of wolf prey at kill sites. Wolf packs were monitored during two winter-study sessions, 30-day periods in March and November–December during which wolves were intensively radio-tracked. The Leopold, Slough, and Hellroaring packs were the three main study packs monitored by two person teams from the ground and from aircraft. In addition, crews opportunistically monitored the Agate, Druid, Mollie's (March), and Oxbow Creek (Nov-Dec) packs collecting prey selection and kill rate data. The Swan Lake, Cougar Creek, Hayden, Gibbon Meadows, and remnant Nez Perce wolves were monitored from aircraft only. The Yellowstone Delta and Bechler packs were rarely located by ground or air due in part to their absence from the park or poor conditions for aerial monitoring in southern YNP. Project staff recorded and entered into a database behavioral interactions between wolves and prey, predation rates, the total time wolves fed on their kills, percent consumption of kills by wolves and scavengers, characteristics of wolf prey (e.g., sex, species, nutritional condition), and characteristics of kill sites. In addition, similar data were collected opportunistically throughout the year during weekly monitoring flights and ground observations.

Composition of Wolf Kills

Project staff detected 281 kills (definite, probable, and possible combined) made by wolves in 2006, including 219 elk (80%), 30 bison (14%), three deer (1%), two bighorn sheep (<1%), two moose (<1%), one beaver (<1%), one golden eagle (<1%), six coyotes (2%), five wolves (2%), and 12 unknown prey (4%; Fig 5). The composition of elk kills was 32 % calves (0–12 months), 16 % cows (1-9 years old), 14 % old cows (≥ 10 years old), 31 % bulls, and 7 % elk of unknown sex and/or age. Bison kills included 12 calves (unknown sex), 11 cows, three bulls, and two unknown sex and age.

This represents an increase in the percentage of calves taken but a decline for bull elk, a switch after two years of high selection for bull elk. Use of cow elk remains low, especially prime age cows, and has historically been so. Use of bison has increased.

Winter Studies

March **-** During the 2006 March winter study (30 days), study packs were observed for 423 hours from the ground. The number of days wolf packs were located from the air ranged from 11 (Swan Lake) to 18 (Leopold, Slough, Hellroaring). Fifty-seven definite or probable wolf kills were detected, including 41 elk, 11 bison, two bighorn sheep, one mule deer, and two unknown species. Among elk, five (12%) were calves, 20 (49%) were cows, 15 (37%) were bulls, and one (2%) was of unknown sex adult. In addition, 31 winterkilled ungulates (8 bison, 21 elk, 2 unknowns) were scavenged by wolf packs. Not since the heavy winterkill of later winter 1997

has wolf project staff documented such a high degree of winterkill, and this was reflected in the degree to which packs incorporated such carcasses into their biomass consumption for the month. The Hayden Valley and Mollie's packs were found to live exclusively off bison (as detected by monitoring), and most other packs had at least one bison killed or scavenged during the month, suggesting the importance of this ungulate in late winter diets for wolves. In a rare event, the Slough Creek pack killed two bighorn sheep that they encountered in an island of rocky habitat in one of the pack's main travel routes.

November-December **-** During the 2005 November–December winter study (30 days), wolves were observed for 271 hours from the ground. The number of days wolf packs were located from the air ranged from three (Bechler) to 13 (Leopold, Hellroaring Creek, Slough Creek, Oxbow Creek, Agate Creek, Swan Lake). Aerial monitoring was severely effected by poor weather conditions. Sixty-two definite or probable wolf kills were detected during the November-December 2006 winter study. Project staff only documented elk being killed by wolves, and their breakdown includes seven (11%) cows, nine (15%) bulls, 43 (63%) calves, and 3 (5%) were of unknown sex and age.

Compared to the prey selection in recent November-December winter studies that were dominated by selection for bulls, this year showed an increase use of elk calves. This likely reflects a greater availability of calves in the northern range elk herd. Although it is unclear to what degree these calf:cow ratios will contribute to population and predator-prey dynamics in the near future, data on prey selection this winter study suggests a response to greater availability of this age class in the elk herd.

Summer Studies

Summer Predation- In the summer of 2006, project staff continued efforts to document summer predation patterns of wolves. Documenting the predatory habits of wolves in summer is problematic due to the lack of snow for tracking, increased nighttime activity of wolves, lack of pack cohesiveness, and smaller prey packages leading to quick consumption and loss of evidence. Traditionally, the best data concerning wolf summer food habits have come from analysis of scat contents collected at den and rendezvous sites. Although this effort on scat collection continued in 2006, downloadable GPS collars were deployed to facilitate a greater understanding of summer wolf predation.

In the 2006 capture season, the Wolf Project deployed four downloadable GPS (Global Positioning System) collars on the northern range to enhance understanding of: 1) seasonal predation patterns; 2) spatial and temporal interactions with other wolf packs and other carnivores; 3) movements with respect to dens during pup rearing season; and 4) territory size, use, and overlap. Using GPS collars with downloadable data acquisition technology, the goal was to perform weekly data gathering on collars programmed to collect location data every 30 minutes. This approach has proven successful in prior years for summer predation studies by yielding high-resolution wolf movement data revealing wolf prey selection and kill rates, even for newborn elk calves.

As has been the case over the past several years, a combination of malfunctioning collars or the death of the wolves wearing GPS collars made summer predation patterns difficult to document. Hellroaring wolf 528M, who was slated to be one of our main summer predation wolves, was killed by the Slough Creek a couple weeks after collar deployment in January. Another summer predation collar on Leopold's 535M worked well until mid-March, after which time it malfunctioned, preventing any GPS monitoring of Leopold. Slough Creek's 527F was one of the breeding females that was involved in the conflict with the unknown pack during the denning season. She lost her litter and disappeared for a while, and when staff attempted to download data from her collar mid-summer, the collar malfunctioned and dropped off prematurely. Agate wolf 525F's collar did perform very well, but due to the pack's summer range being within the Antelope Creek Bear Management Closure, project staff were not able to conduct weekly downloads and cluster searches. Some effort to locate carcasses was possible when 525F spent time outside of the closure, allowing staff to find wolf kills from her points, affirming that the technology is adequate to study summer predation when the collars are working. Although future summer predation efforts are planned, more reliable and cost effective GPS collar technology is required to adequately address summer predation.

Summer Scavenging- An important aspect of wolf ecosystem effects as it relates to wolf restoration is the effect on scavenger guilds in the Yellowstone ecosystem. Research on wolf and scavenger interactions has been conducted since 1998 through support from Canon USA, Inc. and Yellowstone Center for Resources (YCR). This research, largely done in the winter, has monitored how wolves influence the abundance and distribution of carrion, both spatially and temporally, as well as how they facilitate food acquisition by other carnivores. Although we have learned a great deal about the magnitude and relative importance of wolf-killed carcasses to the winter scavenger communities, we know little about the impact on summer scavengers, both vertebrate and invertebrate communities. An unexplored area where wolves may be having the greatest effect of all, insect communities that feed off of their kills, remains unexplored. Prior to the reintroduction of wolves, two studies revealed an enormous community of insects utilizing elk carcasses in the summertime.

In summer of 2006, project staff conducted carrion insect research in collaboration with Dr. Chris Wilmers (University of California, Davis). Staff collected data on invertebrate diversity and abundance at summer carcasses. This data will be used to test the effects of wolf reintroduction on this specious community. We sampled invertebrates at eight carcasses (bison and elk) from May 15th to July 20th. Members of the order Coleoptera (including beetles) dominated the sampling, particularly those in the family Silphidae (carrion beetles). Insect samples will be identified by trained entomologists at the end of the study, which will continue in 2007. Once completed, an analysis will be done on this diverse and abundant component to Yellowstone scavenger guild and compared to pre-wolf data sets to test hypotheses on community structure and potential changes associated with wolf recovery.

Population Genetics

A collaborative effort with the University of California at Los Angeles was continued in 2006 to use genetic techniques to construct a population pedigree for all handled Yellowstone wolves and understand gene flow between the three Rocky Mountain wolf recovery areas. DNA

samples from over 500 wolves from Idaho, Montana, and Wyoming have been analyzed in the canid genetics lab of Dr. Robert Wayne at UCLA for genotyping and determination of diversity. In September, Dan Stahler began his Ph.D. at UCLA joining doctoral student Bridgett vonHoldt in the Wayne lab in an effort to combine field-based data with laboratory-based genetic analysis in order to integrate social, ecological, and genetic information to further our understanding of wolf ecology and conservation. In 2006, project staff made considerable efforts to get DNA samples from key breeders in the population that will allow for greater understanding of pack lineages, parentage, and relatedness among packs.

Through an internship with the Dog Genome Project at National Institute of Health (NIH), Bridgett learned new molecular techniques that will allow for higher resolution of analysis in the future, including collaborating with researchers who have identified the gene responsible for coat color in wolves. At the end of 2006, parentage analysis and population pedigrees for wolves from 1995-2004 were nearly completed, along with analyses of relatedness within and between packs and breeding pairs, genetic diversity of the population, and levels of gene flow. Using the population pedigrees and genetic parameters, Dan will address questions about how social and ecological factors influence reproductive strategies and their outcomes, as well as how kinship mediates wolf pack formation, interactions, and territoriality. Scientific papers on Yellowstone genealogies and genetic structure of the Rocky Mountain recovery areas are being written up for submission in 2007.

Collaborative Research

The wolf project and Yellowstone Park Foundation provided financial and in-kind support for collaborative research with scientists at other institutions, including universities, interagency divisions, and non-government research organizations. These investigations required wolf project staff to assist graduate students and outside researchers in their efforts to better understand wolf ecology, ecosystem function, and conservation work, much of which is pioneering research.

Wolf Project Students: Direct Assistance

Two new students began work in collaboration with the Wolf Project in 2006: Daniel Stahler and Emily Almberg. Both long-time employees on the project they moved on to work in a new capacity and are partially supported by project funding. Dan's project focuses on combining behavioral data gathered in the field with genetic data gleaned from blood samples and overlaying the two techniques to better understand wolf social behavior. Dan works with Dr. Robert Wayne at the University of California at Los Angeles. Emily's project focuses on wolf diseases both from a current and historical perspective. With severe morality caused by disease in 2005, and evidence of a smaller outbreak in 1999, Emily plans to fully explain the role of diseases for wolf population ecology. Emily works with Dr. L. David Mech and the University of Minnesota.

Linking socioecological factors to reproductive success in complex kin-structured societies.

Graduate Student: Daniel Stahler

Committee Chair: Dr. Robert Wayne, University of California, Los Angeles

Project Summary: The evolution of complex societies, such as seen in wolves, is greatly influenced by how ecological and social constraints impact population structure and mating systems. In combination with the underlying genetic structure of wolf packs, aspects of wolf ecology such as reproduction, dispersal, pack formation, and territoriality is predicted to vary with the abundance and distribution of resources. This research will investigate the link between socioecological conditions and these aspects of wolf ecology in Yellowstone. This project will take advantage of long-term datasets following the 1995 reintroduction: 1) a complete population pedigree of marked individuals resulting from the integration of molecular and field-based behavioral data; and 2) predator-prey and wolf population dynamics. By combining field and laboratory-based data, this study will ask questions concerning breeding strategies, reproductive success, territoriality, and pack interactions and how it is associated with kinship and ecological condition. By combining long-term ecological, behavioral, and molecular datasets, this study will enhance our understanding of the evolution of complex, kin-structured societies, as well as provide a better understanding of how social and ecological conditions are related to wolf population dynamics and conservation.

Project Activity in 2006: Coursework and development of research questions.

Anticipated Completion Date: 2010

A comprehensive survey of the infectious diseases and parasites of Yellowstone wolves: Implications for population dynamics and management

Graduate Student: Emily Almberg

Committee Chair: Dr. L. David Mech, University of Minnesota, St. Paul
Project Summary: In 1999 and 2005, the Yellowstone wolf population experienced significantly reduced pup recruitment suggestive of a disease outbreak. Despite fuelling abundant speculation, these two suspected outbreaks have highlighted how little is known about the presence and role of disease in the Yellowstone wolf population. The present study seeks to (i) identify and describe the spatial and temporal patterns of select pathogens and parasites in the Yellowstone National Park (YNP) and the Greater Yellowstone Ecosystem (GYE) wolf populations, (ii) to attempt to understand the impacts of disease on population parameters such as adult wolf mortality and pup survival, (iii) to track the distribution, prevalence, and population-level effects of sarcoptic mange among wolves in YNP and the GYE, and (iv) to address the potential role of domestic dogs and sympatric carnivores in pathogen/parasite invasion and persistence in YNP. The study will begin its first field season in summer, 2007.

Project Activity in 2006: Coursework and development of research questions.

Anticipated Completion Date: May, 2010

Other Research or Collaborative Work with the Wolf Project

Topic	***Collaborator***	***Institution***
Wolf-cougar interactions	Toni Ruth,	Wildlife Conservation Society
Wolf-coyote interactions	Robert Crabtree, Jennifer Sheldon	Yellowstone Ecological Research Center
Wolf-bear interactions	Charles Schwartz, Mark Haroldson, Kerry Gunther	Interagency Grizzly Bear Study Team, Bear Management Office/YCR
Wolf-carnivore interactions	Howard Quigley	Beringia South
Wolf-scavenger interactions	Chris Wilmers	University of California, Davis
Wolf population genetics	Robert Wayne Bridgett vonHoldt Daniel Stahler	University of California, Los Angeles
Wolf-elk relationships-Madison-Firehole Watershed	Bob Garrott, Matt Becker, Claire Gower, P.J. White	Montana State University
Wolf-pronghorn	P.J. White, John Byers, Kerey Barnowe-Meyer	YCR, University of Idaho
Wolf-willow	Evelyn Merrill, Roy Renkin, Bill Ripple, David Cooper, Tom Hobbs, Don Despain	Univ of Alberta, USGS, YCR, Colorado State Univ.
Wolf –aspen	William Ripple, Eric Larsen, Roy Renkin, Matt Kauffman	Oregon State University, Univ of Wisconsin at Stevens Point, YCR, Univ. of Montana
Wolf –trophic cascades	L. David Mech; Mark Boyce, Nathan Varley; Rolf Peterson Dan MacNulty	USGS; University of Alberta; Michigan Technological University University of Minnesota
Wolf predation	Tom Drummer, John Vucetich, Rolf Peterson, Dan MacNulty	Michigan Technological University, University of Minnesota
Wolf survival	Dennis Murray	Trent University
Wolf Population Genetics	Robert Wayne, Daniel Stahler, Bridgett vonHoldt, John Pollinger	University of California, Los Angeles

Wolf Diseases & Parasites	L. David Mech, Emily Almberg	University of Minnesota
Wolf, Willows, & Songbirds	Andy Hansen Lisa Baril	Montana State University
Wolf Movements/Dispersals	Douglas McWhirter, L.D. Mech, Mike Jimenez	Wyoming Game & Fish, USGS, USFWS

Research in Wyoming outside Yellowstone National Park

Predator-Prey Relationships

Annual predation patterns of wolves near Jackson, Wyoming: USFWS Wolf Recovery Program, Jackson, Wyoming.

Cooperators: Grand Teton National Park, National Elk Refuge, Bridger-Teton National Forest, and Wyoming Game and Fish Department.

From 1999 to 2006, we monitored wolves to determine prey selection of wolves near Jackson, Wyoming. We divided the calendar year into 4 seasons: winter (1 December - 31 March); spring (1 April - 31 May); summer (1 June – 31 August); fall (1 September – 31 October). In winter, we used VHF radio telemetry to locate collared wolves daily. We tracked wolves in the snow to locate carcass remains of ungulates killed or scavenged by wolves. In spring, summer, and fall we radio collared wolves with downloadable GPS collars programmed to collect location data every half hour. We investigated location points on the ground to locate carcasses of wolf-killed ungulates. We located 281carcasses of ungulates killed by wolves in winters 2000-2006 and 74 ungulate carcasses in spring/summer/fall 2005-2006. Winter prey species consisted of 95% elk (*Cervus elaphus*), 4% moose (*Alces alces*), 0.7% deer (*Odocoileus hemionus*), and 0.3% bison *(Bison bison)*. Prey composition of elk killed by wolves was 38% cows, 15% bulls, and 47% calves. Prey composition of moose killed in winter was 50% cows and 50% calves. Mean age of adult elk killed was 9.3 years and the oldest elk was 23 years old. Prey species in spring/summer/fall consisted of 85% elk, 14% moose, and 1% bison. Prey composition of elk killed by wolves in spring/summer/fall was 43% cows, 16% bulls, and 41% calves. Prey composition of moose killed was 50% cows, 20% bulls, and 30% calves. Prior to wolf recolonization in 1999, elk and moose calf/cow ratios declined from 1989 through 1999 and the 10-year average ratio was 28.8 elk calves/100 cows and 41 moose calves/100 cows. Since wolf recolonization, calf/cow ratios averaged 25.5 elk calves/100 cows and 33 moose calves/100 cows.

Collaborative Research

A comparison of wolf and cougar kill sites in the southern Yellowstone Ecosystem

Graduate Student: Susannah Woodruff, Prescott College, Prescott, Arizona

Major advisor: David Parsons, Prescott College.

Status: Thesis and masters degree completed in 2006.

Cooperators: U.S. Fish and Wildlife Service, Grand Teton National Park, U.S. Forest Service, and Wyoming Game & Fish.

We examined kill site habitat characteristics of sympatric wolves (*Canis lupus*) and cougars (*Puma concolor*) in the southern Yellowstone ecosystem. We tracked radio collared wolves and cougars to locate and describe kill sites from December 1999-May 2006. Using computer mapping techniques, we: 1) identified kill site characteristics (elk density, vegetation cover types, distance to waterways, slope, aspect, elevation, and terrain roughness) associated with wolf and cougar kill sites; 2) compared and contrasted characteristics between wolf and cougar kill sites; and 3) compared and contrasted winter versus spring kill site characteristics. Analysis indicated wolf kill sites were not randomly selected; cougar kill sites generally did not differ from random sites. Wolf kills occurred on less steep slopes in more often open areas, and in areas with mid to high elk density. Cougar kill sites were characterized by rougher terrain and greater canopy cover and appeared unaffected by elk density. We concluded that variation in kill site habitat likely stems from differences in hunting techniques.

Wolf habitat selection in a variety of land-use types: assessing the impact of elk and cattle distribution on wolf habitat use and cattle depredation patterns in the Absaroka Range of Wyoming.

Graduate Student: Abby Nelson, University of Wyoming, Laramie, Wyoming.

Major advisors: Matt Kauffman and Steven Buskirk, University of Wyoming.

Cooperators: U.S. Fish and Wildlife Service, USDA Wildlife Services, and Wyoming Game & Fish Department.

Status: Field work will begin in summer 2007.

This project aims to analyze wolf habitat selection in response to elk and cattle distribution in the Absaroka Range of Wyoming. The GPS data from wolves, elk, and cattle as well as location data on wolf kills will provide information to develop a predictive model of the spatial occurrence of cattle depredations. This analysis will determine the extent to which wolf depredations on cattle are mediated by the proximity of cattle to resident elk herds, after accounting for other landscape

attributes. The project will also attempt to provide information to managers that will help identify characteristics that constitute high-risk areas for cattle depredations.

Other Collaborative Research Projects with the USFWS Wolf Recovery Program

Topic	Collaborators	Institution
Evaluating wolf impacts on ranch productivity and environmental quality.	Pat Clark	USDA Agricultural Research Service
Absaroka Elk Ecology Project	Doug McWhirter Matt Kauffman	WYG&F Univ. of WY
Wolf population genetics	Robert Wayne Bridgett vonHoldt	Univ. of Calif., Los Angeles
Wolf Diseases & Parasites	David Mech Emily Almberg	Univ. of Minn.

MANAGEMENT

Management in Yellowstone National Park

Area Closures

The Slough Creek den area was initially closed but the wolves abandoned their den after being supplanted by another pack, so the area was opened by late May (normally closed to July 1). The Hayden Valley pack also denned within view of the road and closure was put in place, first a particular section of the trail, then a complete trail closure, then a closure to off-trail hiking. Despite this level of protection this pack had numerous human intrusions on their den and rendezvous site. This pack, possibly as a result of this close contact with people, has made them the most human tolerant of any pack in the park, a concern both for their and human welfare. They also had only two pups survive, well below the park average, and it may be due to increased human disturbance.

Wolf Road Management Project (Formerly Druid)

Since wolf reintroduction, Lamar Valley and other areas in the park have become premier locations worldwide to observe free-ranging wolves. The main pack of interest has been the Druid Peak pack, which had denned in the valley from 1997 through 2004. Since then when the Druid Peak pack has not been visible, other packs such as, Slough Creek or Agate Creek, have been able to fill the void. Nonetheless, each year visitor numbers have grown and in 2000, the Yellowstone Center for Resources (YCR), Resource and Visitor Protection, and Division of Interpretation cooperated to better deal with the opportunities and problems that accompany

increasing visitors that want to see wolves. As a result, the Druid Management Project was initiated, with the following objectives: 1) human safety: protect visitors that are viewing wolves alongside the road, and control both traffic along the road and parking to prevent an accident; 2) wolf safety: protect wolves from vehicle strikes, permit wolves to cross roadways without harassment from visitors, and protect the closed area around the den from visitor intrusion; 3) visitor enjoyment: through protection of natural wolf behavior, preserve visitor opportunity to view wolves and interpret wolf and other wildlife ecology to visitors; and 4) wolf monitoring and research: continue to monitor and study the denning behavior, predation, activity, and interactions of wolves with other wildlife. Since the Druid Peak pack is less visible than they were, the project has evolved to manage other packs and educate visitors where they encounter wolves.

This was the seventh year that private funds were used to manage wolf viewing. Unlike the previous summer where the Slough Creek pack was the most visible pack, this summer two other packs were seen on a regular basis, the Druid Peak pack in Round Prairie and the Agate Creek pack in Antelope Creek. The Druid Peak pack denned in a forested area east of the Pebble Creek Campground. Visitors first started viewing pups at the end of June and they were visible through early July, after which time they moved east into Cache Creek. The Agate Creek pack denned in the Antelope Creek near the road. Scores of visitors were able to view both pups and adults on nearly a daily basis from mid-June to mid-September. The Slough Creek wolves were visible in April, but after the attack from the unknown pack, they abandoned their den (see ***Pack Histories***) and were not easily or predictably observed.

Because wolf viewing was not at one location, project staff split up and varied their daily schedule to meet visitors and observe wolves. Nonetheless, even with numerous areas to monitor that changed on a daily basis, there were no accidents or close-calls with wildlife. In all, it is estimated that over 13,000 visitors were able to view wolves during the summer of 2006.

The Hayden Valley pack in the interior of the park has become a reliable viewing opportunity for summer visitors in recent years. As with northern range packs, the Hayden Valley wolves are regularly required to negotiate the road corridor in order to hunt, bring food back to their pups, and maintain their territory. As a result, the Wolf Project staff worked closely with the Division of Resource and Visitor Protection and Division of Interpretation to monitor and manage visitors and situations involving wolves to ensure the objectives of wolf and human safety, education, and research.

Management in Wyoming outside Yellowstone National Park

Livestock depredation & management

Potential livestock depredations in Wyoming were investigated by WS and USFWS. Depredations were classified as confirmed, probable, or other based on specific criteria agreed upon by the USFWS and WS. The following livestock depredation statistics were based on reported livestock loses and do not reflect lost or missing livestock. In 2006, wolves in Wyoming

outside YNP were responsible for killing at least 169 livestock (including 162 confirmed and 7 probable depredations) and 1 dog. Confirmed livestock depredations included 123 cattle (110 calves; 13 cows/yearlings), 38 sheep (22 ewes; 16 lambs) and 1 horse (Appendix Tables 2, 5a, and 5b). One guard dog, 2 calves, and 1 mule were injured by wolves, but survived the attacks. The total number of livestock depredations recorded in 2006 increased approximately 64% from 2005 when >103 livestock were lost to wolves (Figure 2).

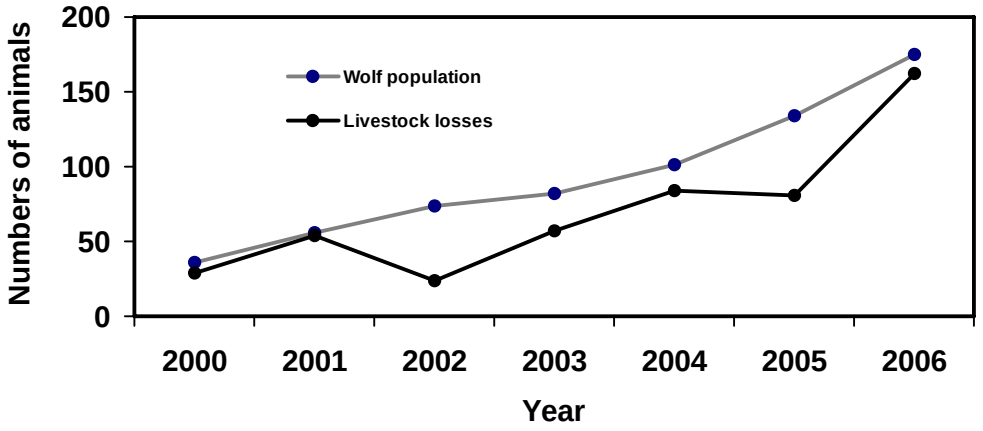

Figure 2. Annual wolf population size and number of confirmed livestock losses/year in Wyoming, 2000 - 2006.

Number of packs involved in depredations

Eight of the 23 known packs plus all four of the suspected or unconfirmed packs (44% of all known or suspected packs) in Wyoming were involved in at least 1 depredation in 2006 (Figure 3). Three packs (South Fork, Prospect, and Green River Packs) were responsible for 68 confirmed livestock depredations (42% of all confirmed losses). In an attempt to prevent additional livestock depredations, the entire Green River Pack was removed. After repeated depredations in summer 2006, the USFWS authorized lethal removal of the entire South Fork and Prospect Packs. Four wolves were killed in the South Fork Pack and a S.O.S permit was issued to the livestock producer. Five wolves were killed in the Prospect Pack. Despite continued effort to eliminate both packs, the South Fork and Prospect Packs still existed in December 2006. All 3 packs will be removed early in the 2007 grazing season if chronic depredations occur.

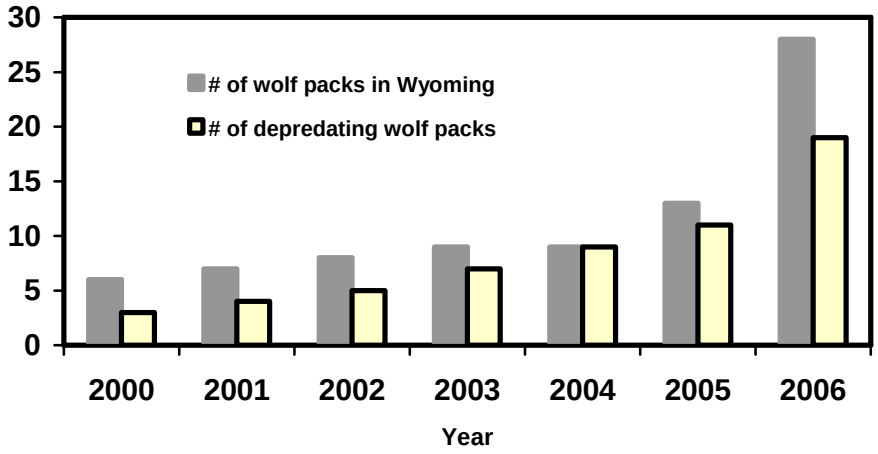

Figure 3. Annual number of wolf packs in Wyoming and number of wolf packs that are involved in at least 1 livestock depredation/given year.

Frequency of livestock losses to individual producers

From 2000 through 2006, we documented 108 people who experienced animal losses due to wolves. Losses were recorded as confirmed or probable and included all cattle, sheep, dogs, and horses that were killed or injured by wolves. Fifty people (46%) experienced multiple losses due to wolves and 58 individuals (54%) experienced a single loss to wolves in the 7-year period from 2000 through 2006 (Figure 4). Eighty-nine people had animals killed by wolves that were recorded as strictly confirmed depredations. Forty-seven of these individuals (53%) had losses due to wolves more than once and 42 people (47%) experienced a single loss to wolves in the 7-year time period from 2000 through 2006 (Figure 5).

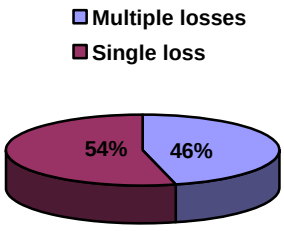

Figure 4. Frequency of multiple and single losses of all recorded wolf damges.

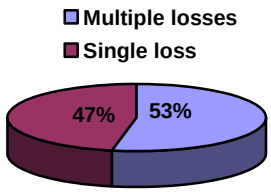

Figure 5. Frequency of multiple and single losses of all confirmed wolf depredations.

Time of year and location of livestock depredations

Cattle depredations in Wyoming followed a seasonal pattern from 2000 through 2006 with the highest number of depredations occurring in late summer from July through September (Figure 6). In 2006, most confirmed cattle depredations occurred in 3 counties: Sublette (58%), Park (32%), and Fremont (6%). Washakie County had 1.6% of all cattle depredations, Lincoln 0.8%, Hot Springs 0.8%, and Teton 0.8% (Figure 7).

From 2000 through 2006, sheep depredations peaked in June and July (Figure 8). In 2006, sheep depredations occurred in 3 counties: Johnson (53%), Fremont (31%), and Sublette (16%) (Figure 9).

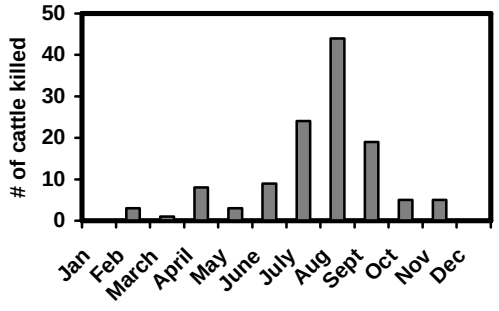

Figure 6. Number of confirmed cattle depredations/month.

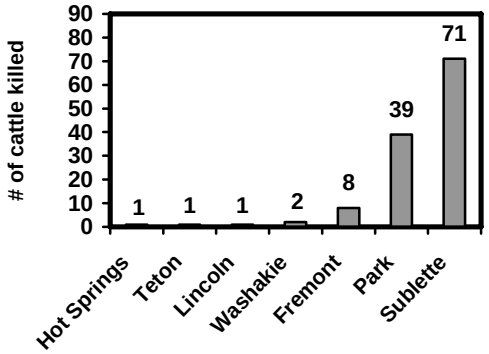

Figure 7. Number of confirmed cattle depredations/county.

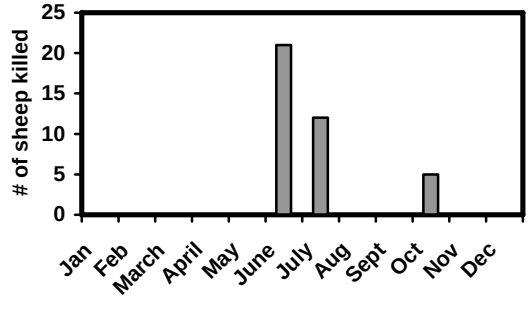

Figure 8. Number of confirmed sheep depredations/month.

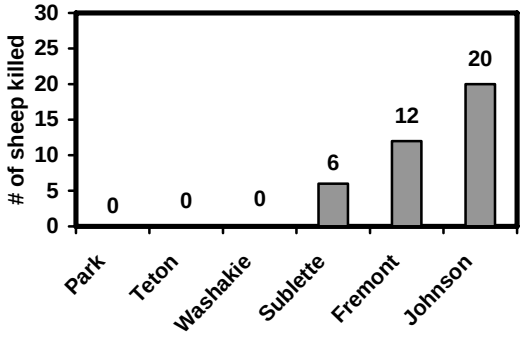

Figure 9. Number of confirmed sheep depredations/county.

Control Actions

Control actions in response to confirmed livestock depredations included trapping and radio collaring wolves; intensive monitoring; increasing riders on grazing allotments; harassing wolves with rubber bullets, lights, and cracker shells; moving livestock to different pastures; lethally removing wolves; and issuing shoot-on-site (SOS) permits. Non-lethal control was routinely considered but was often not applicable in many areas in Wyoming due to: 1) specific wolf packs chronically killing livestock year after year; 2) unpredictable travel patterns and movements by wolves; and 3) very large wolf home ranges that cover vast areas where cattle grazed on public grazing allotments. When non-lethal control methods were not effective, wolves were lethally removed in an attempt to prevent further livestock depredations. Ten SOS permits were issued and livestock producers killed 1 wolf on private property. In 2006, 44 wolves (approximately 17% of the wolf population outside YNP) were lethally removed in control actions (Table 3).

Table 3. Wolves killed in control actions in Wyoming 2001 – 2006.

Year	# Confirmed Depredations	# Wolves Killed	% of Wolf Population
2000	29	2	--
2001	54	1	2
2002	24	4	7
2003	57	18	17
2004	84	29	23
2005	81	41	23
2006	158	44	17
Total:	487	139	18% (mean)

Wyoming Wolf Packs in 2006

The following is a brief summary of wolf packs in Wyoming including confirmed and probable depredations that occurred in 2006 and the subsequent control responses. Pack size and composition are based on our best estimates as of December 31, 2006.

1) Washakie Pack: (7 wolves: 4 adults/3 pups) Wolves from the Washakie Pack have chronically killed livestock in the Dunoir Valley since 1998. In 2006, 4 cattle were killed by wolves. One wolf was killed and 1 wolf (#560m) was trapped, radio collared, and released onsite. In late fall 2006, wolf #560m left the Washakie Pack and dispersed to the adjacent East Fork Pack.

2) East Fork Pack: (8 wolves: undetermined pack composition) The East Fork Pack formed in 2004 and its home range included the East Fork of the Wind River drainage and the Horse Creek drainage. Two calves were killed by wolves in summer 2006. We suspect the pack produced pups in 2006 but we were not able to confirm pup survival in fall or winter.

3) Teton Pack: (3 wolves: 3 adults/0 pups) The Teton Pack consisted of only 3 wolves and did not produce pups in 2006. After the pack lost the alpha male in 2005 and several younger wolves dispersed from the area, the pack's home range shifted to the southern portion of GTNP and the National Elk Refuge. USFWS confirmed that a calf was killed by wolves on a grazing allotment in GTNP, but we could not be absolutely certain which wolves were responsible; however, we suspect the Teton Pack was responsible. No additional depredations by the Teton Pack were reported.

4) Pacific Creek Pack: (9 wolves: 5 adults/4 pups) In 2004, wolves recolonized the Pacific Creek drainage north of Grand Teton National Park. The pack killed 4 cattle in summer 2005. In a proactive effort to minimize wolf/livestock conflicts in 2006, cattle were placed on a different allotment in GTNP. No livestock losses were reported in the area used by the Pacific Creek Pack in 2006.

5) Beartooth Pack: (7 wolves: 5 adults/2 pups) The Beartooth Pack used areas during summer and fall 2006 where very few livestock were grazed. No depredations were reported.

6) Sunlight Basin Pack: (13 wolves: 8 adults/5 pups) Wolves from the Sunlight Basin Pack killed 1 calf during summer 2006. Wolves and cattle in the area were closely monitored, but no additional depredations occurred. Several wolves from the Sunlight Pack were infested with sarcoptic mange in 2003 and 2004, but no mange was seen in Sunlight wolves in 2005 or 2006.

7) Absaroka Pack: (6 wolves: 5 adults/1 pup) Four wolves, all infested with mange, were lethally removed from the Absaroka Pack in response to wolves killing at least 6 calves in 2006. Since 2002, Absaroka wolves have been infested with mange. We suspect *sarcoptic scabiei* mites are prevalent on coyotes in the area used by the Absaroka Pack and wolves will continue to be infested with mange in the future.

8) South Fork Pack: (6 wolves: 2 adults/4 pups) The South Fork Pack formed in the South Fork of the Shoshone River drainage in 2005. Wolves from the South Fork Pack killed 3 calves in summer 2005. Two wolves were trapped, radio collared, and released. No further depredations were reported. In 2006, the South Fork Pack chronically killed livestock. Four wolves were killed in control actions and the USFWS authorized the removal of the entire pack. The livestock producer was issued a S.O.S permit. Despite several attempts to remove the remaining wolves in the pack, the wolves moved into more remote areas within their home range and are still present. The producer lost 19 cattle to wolves. The entire pack will be removed early in the 2007 grazing season if depredations occur.

9) Gooseberry Pack: (4 wolves: 2 adults/2 pups) The Gooseberry Pack (formerly called Wood River pack) killed 1 calf in summer 2005. Wolves and cattle in the area were closely monitored, but no additional depredations occurred. In 2006, 6 wolves from the Gooseberry Pack were removed for killing 6 calves.

10) Greybull River: (8 wolves: 2 adults/6 pups) In 2004, the Greybull River Pack killed at least 4 cattle on private property. Control actions were attempted but were unsuccessful. In 2005, the pack killed at least 5 calves and 1 heifer. Depredations stopped after 2 wolves were killed in control actions. In 2006, the pack killed 2 calves. The wolves and cattle were closely monitored, but no further depredations were reported.

11) Carter Mountain: (7 wolves: 7 adults/0 pups) In 2004, the Carter Mountain Pack killed 4 adult cows. The alpha male was removed and no additional depredations were reported. In 2005, the pack killed at least 6 calves and 1 heifer. Six wolves were killed in repeated control actions in attempt to prevent further depredations. No additional depredations were reported in late fall 2005 and the Carter Mountain Pack consisted of 6 wolves. The Carter Mountain pack began killing livestock again in 2006 and 4 wolves were removed to prevent additional depredations. This winter, the remaining radio collared wolf picked up several other wolves, and the pack consisted of 7 wolves.

12) Rock Creek: (5 wolves: 3 adults/2 pups); *13) Cub Creek:* (5 wolves: 3 adults/2 pups); and *14) Bliss Creek:* (6 wolves: 4 adults/2 pups). These 3 new packs formed in 2006 and used remote areas with no livestock. Efforts will be made to radio collar pack members in 2007.

15) Owl Creek: (5 wolves: 2 adults/3 pups) The Owl Creek Pack began as 3 adult wolves that denned west of Meeteetse, Wyoming in 2004 and produced 4 pups. After chronic livestock depredations the entire pack, except 1 adult female, was killed in early January 2005 in several control actions. Later in winter 2005, the surviving female wolf dispersed from the area and paired with another adult male wolf to form the Gooseberry Pack. In 2006, other wolves came in to the area and re-established the Owl Creek Pack. The pack killed 1 calf in summer 2006.

16) Buffalo: (13 wolves: 6 adults/7 pups) After the Teton Pack lost its alpha male in 2005 and numerous younger wolves dispersed, the remaining 3 pack members spent the winter on the National Elk Refuge. Another pack of wolves, possibly originating from the Yellowstone Delta Pack, moved in to the area. The pack denned and successfully reared 7 pups. The pack killed a horse on private land adjacent to GTNP.

17) Black Butte: (7 wolves: undetermined pack structure) The Black Butte Pack formed in 2006 near the Green River drainage, north of Pinedale, Wyoming. Three of the 5 original wolves were removed after repeated cattle depredations. No further depredations were reported and the pack increased to 7 wolves by the end of fall.

18) Gros Ventre: (6 wolves: 2 adults/6 pups) The Gros Ventre Pack formed again in 2005 and produced 4 pups in 2006. The pack was responsible for 1 confirmed cattle depredation in the Upper Green River drainage.

19) Togwotee: (7 wolves: undetermined pack structure) Wolf #396f dispersed from the Yellowstone Delta Pack and established the Togwote Pack in 2006. Wolf #396f had been in the general area since 2005, but we did not see other wolves or suspect that a pack had formed until 2006. We suspect the pack produced pups but were unable to determine pup survival in December 2006.

20) Snake River: (9 wolves: 2 adults/7 pups) The Snake River Pack denned in 2006 and produced 7 pups. We were not able to document the pack's home range because no wolves in the pack were radio collared. We will attempt to capture and radio collar pack members this winter and spring 2007.

21) Huckleberry: (7 wolves: 3 adults/4 pups) The Huckleberry Pack formed in 2006 north of GTNP. In summer the pack moved south and began using the Snake River drainage in GTNP. We documented another new pack with pups in this drainage (Sage Pack) earlier that spring. We lost contact with the Sage Pack when a GPS radio collar in the pack failed and a second collared wolf dispersed. It is unclear what occurred, but we suspect the 2 packs combined and successfully raised 4 pups.

22) Daniel: (4 wolves: undetermined pack structure) The Daniel Pack was first discovered in 2003 in the Wyoming Range, near Daniel, Wyoming and first began killing livestock in 2003. The pack killed at least 20 livestock (confirmed depredations) and was implicated in another 20 probable depredations. Five wolves were removed in 2004. No further depredations were reported until 3/23/05 when WS confirmed wolves from the Daniel Pack killed 1 cow and severely injured another cow on private property. Due to the pack's history of chronic depredations and the pack's large home range, the USFWS authorized WS to remove the remaining pack members. The livestock owners were issued SOS permits to kill wolves on their private property. On 3/28/05, WS aerial gunned all 5 wolves located at the previous depredation site. No other wolves were seen at that time and no further depredations occurred during spring 2005. The Daniel Pack formed again during summer 2005 and consisted of 8 wolves. Between 7/18/05 and 12/7/05, W.S. confirmed that the Daniel Pack killed at least 4 cows/yearlings and 6 calves. USFWS authorized WS to remove all remaining wolves in the Daniel Pack. In December 2005, 6 wolves were shot from a fixed-wing plane. Further control actions were attempted, but 2 wolves still remain in the area. In 2006, the pack re-established and killed 9 cattle. Despite several attempts to remove the pack, we were not able to locate the uncollared wolves. The pack will be removed early in the 2007 grazing season if depredations occur.

23) Prospect: (4 wolves: undetermined pack structure) An uncollared dispersing male and female wolf denned and produced 6 pups near Farson, Wyoming amongst thousands of ewes and lambs grazing on public and private land in 2005. After the wolves killed at least 13 ewes and 2 lambs, we determined that depredations would continue throughout the summer and the female and 4 pups were killed in control actions. Two pups were later found dead and the male wolf was not located again. In August 2005, 33 dead sheep (14 ewes and 19 lambs) were found on private property at the base of the Prospect Mountains, near Farson, Wyoming. In November 2005, 4 wolves were removed when 4 additional dead ewes were recorded as confirmed wolf-kills. Five wolves were killed in 2006 in response to 22 cattle depredations. USFWS authorized the removal of the entire pack, but the uncollared wolves could not be located. The pack will be removed early in the 2007 grazing season if repeated depredations occur.

Misc. Wolves/Unconfirmed Packs

Flat Creek Pack: The Flat Creek Pack (8 wolves: 3 adults and 5 pups) formed in 2005 north of Jackson, Wyoming. The pack spent most of the summer and fall in areas where no livestock were grazed in GTNP and the National Elk Refuge. No depredations were reported. The radio collared male wolf dispersed, and we lost contact with the pack in 2006. Given that we have not received reports of the pack since last year, it is possible that the pack no longer exists.

Driggs/Teton Pack: The Driggs/Teton Pack (5 wolves) formed in 2005 when a dispersing male wolf from the Teton Pack joined 4 other wolves. The pack spent much of the summer and fall in areas where livestock were grazed; however, no depredations were reported. In winter 2006, wolves from the Driggs/Teton Pack chewed the radio collar off the collared wolf. In summer 2006, the pack killed several livestock and 2 wolves were shot by the livestock producer under the Idaho amended 10j rule. ID WS responded to the livestock depredation by trapping and radio collaring a male wolf (#ID-276m). Wolf #ID-276m died of natural causes later in the fall, and it is unclear if the pack still exists.

Other Depredations (Misc. wolves/Unconfirmed packs): Single wolves or other wolves not associated with known packs in southwest Wyoming were responsible for 8 confirmed cattle depredations. Ten cattle were killed by wolves near Big Piney, Kemmerer, Pinedale/Cora, and Big Horn Mountains.

Packs removed in control actions

Green River Pack: Wolves in the Upper Green River drainage have chronically killed livestock since 2002 when they denned in an area with several thousand cattle grazing on USFS allotments. After repeated depredations, the entire pack was removed in 2004 and again in 2005 when the pack re-formed. In 2006, 4 adult wolves dispersed to the Green River drainage, re-established the Green River Pack, and produced 6 pups. The pack killed >27 cattle in 2006. Due to the chronic depredation history of wolves that have recolonized the Green River drainage, the USFWS authorized lethal control and WS removed the entire pack. If wolves recolonize the area in 2007 and repeated depredations occur, the entire pack will be removed early in the grazing season.

OUTREACH

Outreach in Yellowstone National Park

Yellowstone Wolf Project staff gave >100 talks at scientific conferences and to the general public. Douglas Smith was interviewed 60 times by all media sources about park wolves and research.

For the sixth straight years Smith and USFWS personnel road horseback into outfitter camps adjacent to the park boundary to discuss wolf issues. Rides alternate between the north and south boundary of YNP. This year three camps on the north boundary in Gallatin National Forest were visited. Besides Smith, Gardiner District Ranger Ken Britten and Gardiner District Wildlife Biologist Dan Tyers, and NPS Center for Resources Director Tom Olliff participated in the ride and outreach.

Outreach in Wyoming outside Yellowstone National Park

In 2006, the Wyoming wolf recovery program gave approximately 29 formal presentations to public schools, universities, wildlife symposiums, state and federal management agencies, livestock association meetings, state legislature committees, and environmental groups. We were also interviewed for numerous magazine and newspaper feature stories.

USFWS LAW ENFORCEMENT

Enforcement efforts continue in Wyoming. The Office of Law Enforcement continues to use traditional enforcement along with programs designated to prevent illegal killing of wolves. Fast and appropriate response to wolf problems by the USFWS and Wildlife Services has done much to ensure that individuals do not become frustrated and illegally kill wolves. Currently, the State of Wyoming has no laws to protect wolves.

ACKNOWLEDGEMENTS

We thank all of the Wolf Project volunteers, especially winter study volunteers, without whom we could not carry on the vital research and management of wolves. We also thank donations and support from five major institutions and organizations: an anonymous donor, the Tapeats Foundation, the Perkins-Prothro Foundation, Canon, Inc., and the National Science Foundation grant DEB-0613730. We recognize the above because our work would not be possible without their support and involvement. These are our major donors, and we also are supported by numerous smaller donors, especially ones through the collar sponsorship program, that add significantly and are also necessary for our research, management, outreach, education, and publications. We know that a successful program needs a strong base of support and to all the above we are indebted.

We thank our pilots Gary Lust of Mountain Air Research, Dave Stintson from Sky Aviation, Steve and Lisa Robertson, and Mark Duffy at Central Helicopters. Laboratory work was done by Mattson's Laboratory in Milltown, Montana and Gary Haas of Big Sky Beetle Works in Hamilton, Montana.

Numerous agencies and agency personnel have contributed to the recovery program and we thank Dave Skates and Laurie Connel (USFWS Lander); USFS; Nancy Hall, Dave Cunningham, and Lance Koch at Bridger-Teton National Forest; Shoshone National Forest; Steve Cain and Sarah Dewey from Grand Teton National Park; Barry Reiswig and Eric Cole at the National Elk Refuge; Bureau of Land Management; Wyoming Game and Fish Department; and Howard Quigley and Derek Craighead from Beringia South.

U.S. Fish and Wildlife Service
Northern Rocky Mountain
Recovery Program Update

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NORTHERN ROCKIES FUNDING

Funding of Wolf Recovery and Management in Federal Fiscal Year 2006

Wolf recovery has been almost entirely funded by federal appropriations and private donations. Wolf recovery in the NRM from 1973 through 2006 cost approximately $24,119,000 (rounded to nearest $1,000, with no adjustments for inflation and not including USDA Wildlife Services (WS) costs for investigating reports of suspected wolf damage and problem wolf control beyond the $100,000/year provided by the USFWS to WS from 1992-2004) and the approximately $200,000/year spent on wolf monitoring and research in the National Parks since 1995. If recovery continues at the current rate and management costs remain within predictions, additional cost to federal taxpayers of $2,946,000 [assuming approximately $678,000/year in WS expenditures and $200,000/year in National Park funding] will be incurred each year wolves remain listed. WS reportedly spent $152,000 in Montana, $363,000 in Idaho, and $153,000 in Wyoming for investigations of suspected wolf attacks on livestock and problem wolf control in FY06 for a total of $678,000.

In FY 2006 (October 1, 2005 to September 30, 2006) total USFWS funding for wolf recovery and management issues in the northwestern U.S. (nearly all funding was spent in Montana, Idaho, and Wyoming) was about $2,223,000. Most of that funding was directly allocated to the states of Montana [$316,000] and Idaho [$1,063,000] by Congress in federal appropriations language in the federal budget. It was allocated as follows:

In FY06, funding for wolf recovery was similar to FY05 levels and that expected in FY07. Region 6 of the USFWS (which includes Montana and Wyoming) received about $1,061,000 in FY06. Of that, FY06 Congressional allocations of $318,000 were designed to help fund MFWP for wolf management in Montana. A base USFWS budget of about $711,000 was used to conduct the usual monitoring, management, control, and information program in Montana ($323,000 in base funding was transferred to MFWP) and Wyoming ($255,000 used by the USFWS for wolf management in Wyoming). The USFWS also finalized and published the 12-month finding (FR 71:43419) on Wyoming's petition to delist wolves, a delisting proposal (FR 72:6106), and helped implement a new nonessential experimental population rule for states/tribes with approved wolf management plans (FR 70:1286). R-6 coordinates wolf management issues in the northwestern U.S. and is the lead for supporting the Department of Justice on litigation issues related to wolf recovery involving the northwestern U.S. (see Litigation). FY06 R-6 funding was allocated for overall program coordination and administrative support [$165,000 in Helena, MT], wolf management in Montana [$323,000 to MFWP], and wolf management in Wyoming by the USFWS [$255,000, that includes $52,000 to support a cooperative WS/USFWS position in Cody, WY].

USFWS funding levels Region 1 for FY07 appear similar to those in FY06. In FY06 Region 1 (which includes Idaho) received **$**1,045,000 in Congressional earmarks which were used to fund the NPT ($343,000), the Idaho Governor's Office of Species Conservation and IDFG ($720,000**;** $99,000 of which was distributed to livestock producers for missing livestock and make up the remaining 50% for livestock reimbursed at a 50% value by the private compensation program in ID), and the USFWS Idaho wolf recovery program. Carter Niemeyer the R-1 Wolf Recovery Coordinator for Idaho retired in Jan 2006 and Idaho took over all field management activities.

In addition in FY06 WS maintained a $100,000 Congressional directive for responding to complaints of wolf damage as well as a $1,300,000 directive for Montana, Idaho, and Wyoming for investigating and addressing predator damage, including predation by wolves. It is unknown if those same level of Congressional earmarks will remain in the FY07 budget. This directive recognized and helped fund the increased costs of conducting coyote control in the presence of wolves. Yellowstone National Park maintained their NPS-funded wolf monitoring and research program at about the $168,000 level in FY06 but a majority of field research projects are now funded by private donations.

In addition to federal funding, the private TESF continued to fund the salary and benefits of an experienced wolf field biologist in Bozeman, Montana [valued at $60,000/year]. That biologist is a MFWP volunteer, and logistic and field support and direct supervision are provided by the MFWP (costing about $20,000/year in federal transfer funding). That employee helps MFWP to monitor wolves and resolve conflicts between wolves and private landowners in southwest Montana. Defenders of Wildlife provided a compensation program for livestock killed by wolves, with expenditures of about $700,000 from 1987 through December 2006. During the last 5 years, DOW paid an average of over $84,000/year in compensation to livestock producers in Montana, Idaho, and Wyoming for confirmed and probable wolf-caused damage to livestock and livestock herding and guarding animals. Universities in Idaho, Montana and Wyoming also provided substantial funding and support for their graduate students conducting various wolf research projects.

In FY06 Congress appropriations language contained similar earmarks to the FY05 budget. Funding in FY07 appears likely to be similar to that allocated in FY06.

Funding Sources for Wolf Management for Federal FY2005 and FY2006 [$1,000]

Fiscal Year	**FY 2006**	**FY2007***
USFWS-Region 6	$ 743	$ 740
State of Montana	($323)	($ 320)
USFWS in Wyoming	($255)	($ 260)
Administration	($165)	($ 160)
Montana - Congressional earmark	$ 318	$ 318
Wyoming – Congressional earmark	$ 0	$ 0
USDA Wildlife Services directives	$ 678	$ 678
SUBTOTAL	**$1,739**	**$1,736**
USFWS-Region 1 (Congressional earmarks)	$ 99	$ 99
Idaho Office of Species Conservation	$ 720	$ 720
Nez Perce Tribe	$ 343	$ 343
SUBTOTAL	**$1,162**	**$1,162**
TOTAL	**$2,901**	**$2,898**
* estimated		

NORTHERN ROCKIES PLANNING AND LEGAL ISSUES

Reclassification and Delisting of the Gray Wolf

Wolves, once common throughout North America, became protected under the ESA because human persecution nearly eliminated them from the contiguous United States. By 1974, there were no wolves left in the Northern Rocky Mountains of the United States [NRM]. The ESA prohibited people from harming wolves and mandated that all federal actions seek to conserve and not jeopardize wolves. Ultimately, 3 distinct wolf recovery programs, Midwest, NRM, and Southwest, were initiated. In the NRM, 2006 marked the sixth consecutive year that 30 or more breeding pairs and over 300 wolves were documented. The population of 1,300 wolves in over 86 breeding pairs has fully achieved its biological recovery objectives.

The USFWS can propose delisting of the NRM wolf population when it determines that the population has recovered and it is reasonably assured that wolves would not become threatened again if the ESA protections were removed. The ESA contains several checks and balances to ensure that any decision to delist a species is scientifically sound and will not result in a species being relisted. The ESA requires that all decisions be based on the best scientific data available. The USFWS is mandated to examine all of the factors that may have caused a species to become threatened and to determine that they are not likely to cause the species to become threatened again. Regulating the level of human-caused mortality is the primary factor that must be resolved before delisting could be proposed. The ESA requires that USFWS determine that regulations, other than the ESA, will prevent unchecked human-caused mortality from once again driving wolves toward extinction. Wildlife mortality is typically regulated by state fish and wildlife management agencies and state laws. The USFWS requested that Montana, Idaho, and Wyoming develop state wolf management plans so that wolves would be adequately conserved under state management. In addition, the USFWS believed that state wolf plans would help the public to understand the consequences of delisting and would provide a solid administrative foundation for the final decision. The USFWS provided various degrees of funding and assistance to the states while they developed their wolf management plans. State laws, as well as state management plans, must be consistent with long-term conservation of the wolf population. The links for the state wolf plans for Montana, Idaho and Wyoming are available at http://westerngraywolf.fws.gov.

In early January 2004, the USFWS Director determined that Montana's state wolf management plan was an outstanding professional effort and deserved special recognition. Montana's wolf management plan was clearly adequate as a regulatory mechanism to maintain and conserve a recovered wolf population. Idaho's wolf management plan was also adequate as a regulatory mechanism to maintain its share of a recovered wolf population. The Wyoming state wolf plan called for wolves to be considered "trophy game" in Yellowstone National Park, Grand Teton National Park and contiguous wilderness areas and considered as "predators" throughout the remainder of the state (and as trophy game in a larger area of northwest Wyoming if less than 8 packs were outside the national narks). The combination of large areas of predatory animal status, the alternation between "predatory animal" and "trophy game" status in certain areas and the potentially limited area in which human-caused mortality of wolves could be regulated were major concerns. Wyoming's unique and complex proposed regulatory framework and the

specific direction provided by Wyoming law was contrary to its management plan, did not assure the USFWS that Wyoming's plan will conserve wolves at or above a recovered level in northwestern Wyoming. The USFWS will not propose that portion of the wolf population be delisted until Wyoming state laws and their state plan can assure that Wyoming's portion of the NRM wolf population will remain secure without the ESA protections. In early 2007, Wyoming changed its state law and it and the USFWS are attempting to reach agreement on an approved wolf management plan.

On February 8, 2006 the USFWS published an Advanced Notice of Proposed Rulemaking (50 CFR 17 Vol. 71 No 26:6634-6660). It laid out the USFWS's current thinking about a NRM Distinct Population Segment [DPS] for the gray wolf and what a delisting proposal might resemble if Wyoming had an approved state regulatory framework for wolf management outside the National Parks in Wyoming. It included relevant data, a thorough analysis of USFWS's rationale for the DPS border, and why the USFWS believes all threats to the wolf population, except Wyoming state law, have been resolved. It requested extensive public comment on all those concepts. If Wyoming modified their state law and wolf management plan and they were approved by the USFWS, a delisting proposal would be published and public and peer review comment requested.

On August 1, 2006, the USFWS published its 12-month finding (50 CFR Vol. 71, No. 147:43410-43432) on the state of Wyoming's petition to establish a northern Rocky Mountain distinct Population segment composed of Montana, Idaho and Wyoming, and delist it from the list of endangered and threatened species. The Service determined that Wyoming state law and its wolf management plan do not provide the necessary regulatory mechanisms to assure the Wyoming's numerical and distributional share of the northern Rocky Mountain wolf population would be conserved if the protections of the ESA were removed. Wyoming initiated new litigation over that decision (Civil Action No 06-245J).

On February 8, 2007, the USFWS published a proposed rule (50CFR Vol 72, No. 26:6106-6139) to establish a distinct population segment (DPS) of the gray wolf (Canis lupus) in the Northern Rocky Mountains (NRM) of the United States. The proposed NRM DPS of the gray wolf encompasses the eastern one-third of Washington and Oregon, a small part of north-central Utah, and all of Montana, Idaho, and Wyoming. It also proposed removing the gray wolf in all of the NRM DPS from the List of Endangered and Threatened Wildlife under the Act, because threats will have been reduced or eliminated- if Wyoming adopted a State law and wolf management plan that would adequately conserve wolves. The States of Montana and Idaho have adopted State laws and management plans that would conserve a recovered wolf population into the foreseeable future. However, at that time, Wyoming State law and its wolf management plan were not sufficient to conserve Wyoming's portion of a recovered NRM wolf population.

But in mid-February 2007, Wyoming changed its current law and began to modify its wolf management plan. Therefore, we propose to keep a significant portion of the range in the northwestern Wyoming portion of the NRM DPS listed until the new Wyoming plan can be approved because there currently are not adequate regulatory mechanisms in that area. In this situation, wolves in the significant portion of range in northwestern Wyoming, outside the National Parks, will retain their nonessential experimental status under section 10(j) of the Act.

We will remove the remainder of the NRM DPS from the List of Endangered and Threatened Species and the DPS will longer exist. Any gray wolves in the remainder of Wyoming outside the National Parks and those portions of Washington, Oregon, and Utah in the NRM DPS are not essential to conserving the NRM wolf population and these areas do not constitute a significant portion of the range in the DPS. Therefore these areas will not remain listed. We are also soliciting comments regarding our intention to use ESA section 6 agreements to allow States outside the NRM DPS with Service-approved wolf management plans to assume management of listed wolves, including nonlethal and lethal control of problem wolves. Public comment and peer review is being solicited in early 2007.

After the wolf population is delisted, the ESA requires a mandatory, minimum 5-year post-delisting oversight period. That period, during which the USFWS reviews the implementation of state management plans and wolf population status, providing a safety-net to ensure that the species is able to sustain itself without ESA protection. If wolves became threatened again, the USFWS could relist them by emergency order.

The Experimental Population Rule

The USFWS's February 7, 2005 10j regulation expanded the authority of States and Native American Tribes with USFWS-approved wolf management plans to manage gray wolves in the experimental population areas of CID and GYA. Gray wolves were reintroduced in the Northern Rockies as nonessential experimental populations under the ESA in 1995 and 1996. This designation allowed Federal, State and Tribal agencies and private citizens more flexibility in managing wolves within the experimental population areas. The rule also allowed the states and tribes with FWS-approved wolf management plans to lead wolf management in their states. Only 2 States, Montana and Idaho, where there are about 933 wolves, presently fit that category. At this time, this regulation does not apply to the state of Wyoming because it does not have a USFWS-approved wolf management plan.

In June 2005, the USFWS and MFWP signed a cooperative agreement transferring the decision making authority for all wolf management activities in Montana, including endangered wolves in northern Montana. The state had been managing wolves in northwestern Montana since early 2004 when MFWP signed a cooperative agreement with the USFWS to assume wolf management authorities when USFWS biologist Tom Meier left to take a job with the National Park Service in Alaska. In January 2006, the Governor of Idaho signed a Memorandum of Agreement with the Secretary of the Interior giving Idaho Department of Fish and Game the decision making authority for all wolf management activities in Idaho. Carter Niemeyer the USFWS Recovery Coordinator for Idaho retired in January 2006 and Joe Fontaine the Assistant Wolf Recovery Coordinator and Service Project Leader for wolf Recovery in Montana stopped working on wolf issues in February 2005 and took an Assistant Refuge Manager job in central Mississippi in Feb 2006. As of 2006 all wolf management in the states of Montana and Idaho is being conducted with federal funding but by the state wildlife agencies who hired staff to assume those duties. The USFWS still manages wolves in Wyoming. The entire USFWS wolf program staff are currently Ed Bangs, Wolf Recovery Coordinator in Helena, Montana and Mike Jimenez the Project Leader for Wolf Recovery in Wyoming who is stationed in Jackson, Wyoming.

Litigation

State of Wyoming et al. v. United States Department of the Interior et al., United States District Court for the district of Wyoming, Civil Action No 06-245J. This case involves the USFWS's rejection of Wyoming's petition to establish a NRM DPS for wolves and delist them.

State of Wyoming, et al. vs. United States Department of the Interior, et al., United States District Court for the district of Wyoming, Civil Action No. 04CV01123J. This case involved the USFWS not approving the Wyoming state wolf management plan. The case was expanded by interveners to include alleged failure to properly manage wolves in Wyoming and failure to conduct additional NEPA compliance. A related legal issue between Wyoming and the Department of the Interior also involves Freedom of Information Act issues about the USFWS's withholding of certain documents because they were related to internal deliberations and attorney-client privilege. The Wyoming District Court ruled in the USFWS favor based on procedural grounds in 2005. Wyoming appealed that case to the 10th Circuit Court of Appeals in Denver Colorado, and it is still under consideration. Oral Arguments are scheduled for March 2006. In addition Wyoming filed a petition, dated June 28, 2005 to establish a NRM DPS [solely Montana, Idaho, and Wyoming] and delist it from the ESA. In its 90-day finding the USFWS determined that it contained enough information that further review was warranted and is reviewing their petition more closely. A final Service determination on that petition was made August 1, 2006.

State of Wyoming vs. Michael D. Jimenez, United States District Court for the District of Wyoming, Case No. 04-CR-98J and State of Wyoming vs. Michael D. Jimenez, United States Court of Appeals for the Tenth Circuit. This case involved Park County, Wyoming, allegations that a USFWS biologist violated state law by trespassing and littering (leaving immobilized radiocollared wolves) on private property during a routine wolf capture and radiocollaring operation near Meeteeste, Wyoming, in early 2004. The District Court ruled that Mr. Jimenez was immune from such state charges because he was carrying out his official duties as a federal employee and that state prosecution was a form of retaliation and intimidation in response to an unpopular federal program. Wyoming appealed to the 10th Circuit Court and that Court upheld the District Court ruling. Wyoming appealed to the Supreme Court but it refused to hear the case, finally resolving this issue.

Defenders of Wildlife et al. vs. Gale Norton et al., United States District Court of Oregon, Civil No. 03-1348 JO. This case involved the April 2003 reclassification of the gray wolf, the USFWS's establishment and listing of 3 gray wolf DPS (Eastern, Western and Southwestern), the special 4(d) rules within the Western and Eastern DPS. The Defender's et al. litigation primarily involved the Western DPS. On January 31, 2005, the U.S. District Court in Portland, Oregon, issued a decision that reversed the USFWS's April 2003 reclassification of the gray wolf to threatened status throughout the northern United States, eliminated all 3 DPS's, revoked the delisting of wolves in the southeastern U.S. [original listing was wrong as there were only red wolves in the SE US], and revoked both the 4(d) rules that authorized problem wolf management in the Western DPS and Eastern DPS. Under that ruling wolves outside the experimental nonessential areas are now considered endangered [except Minnesota where they remained threatened] and will be managed according to the authorities and rules in place prior to April

2003. This court order eliminated the special 4(d) rule that allowed landowners outside of the experimental nonessential areas in the northwestern U.S. to legally kill or harass wolves that were seen physically attacking their livestock and dogs on their private land. No wolves had been taken under those provisions in the nearly 2 years they had been in effect. As a result of the court order, wolf control outside the experimental population areas can only be implemented by the USFWS or its designated agents. Outside the experimental population areas private citizens cannot harm or kill wolves. The USFWS immediately began to explore legal and other options/strategies with its state and federal partners.

National Wildlife Federation et al. vs. Gale Norton et al., United States District Court of Vermont, Civil No. 1:03-CV-340. This case also involved the April 2003 reclassification of the gray wolf to threatened status and the USFWS's establishment and listing of 3 gray wolf DPS (Eastern, Western and Southwestern). This litigation was resolved in mid-2005 and like the Oregon District Court, the Vermont District Court determined the USFWS improperly applied the DPS policy and did not conduct the required analysis. That court also vacated the 2003 reclasssification rule as it applied to the Eastern United States. In late 2005 the Service and Justice Department determined they would not appeal either the Oregon or Vermont Federal District Courts rulings.

ABBREVIATIONS AND ACRONYMS

Central Idaho wolf recovery area	CID
Defenders of Wildlife	DOW
Distinct Population Segment	DPS
Endangered Species Act	ESA
Glacier National Park	GNP
Grand Teton National Park	GTNP
Greater Yellowstone wolf recovery area	GYA
Idaho Department of Fish and Game	IDFG
Montana Fish, Wildlife and Parks	MFWP
Montana State University	MSU
Nez Perce Tribe	NPT
Northwest Montana Wolf Recovery Area	NWMT
Northern Rocky Mountains	NRM
Predator Conservation Alliance	PCA
Turner Endangered Species Fund	TESF
University of Montana	UM
USDA/APHIS/Wildlife Services	WS
U.S. Fish and Wildlife Service	USFWS
U.S. Forest Service	USFS
U.S. National Park Service	NPS
Wyoming Game and Fish Department	WYGF
Yellowstone Center for Resources	YCR
Yellowstone National Park	YNP

CONTACTS

For further information or to report wolf sightings, please contact:

Please remember wolf management in Montana and Idaho is conducted by MFWP and IDFG and they should be the first point of contact in each state for everything except law enforcement-

Montana Fish, Wildlife and Parks, Helena, MT:	(406) 444-3242
Montana Fish, Wildlife and Parks, Kalispell, MT:	(406) 751-4586
Montana Fish, Wildlife and Parks, Dillon, MT:	(406) 683-2287
Montana Fish, Wildlife and Parks, Red Lodge, MT:	(406) 446-0106
Montana Fish, Wildlife and Parks, Bozeman, MT:	(406) 994-6371
MFWP, TESF Volunteer, Bozeman, MT	(406) 556-8514
Nez Perce Tribal Wolf Program, McCall ID:	(208) 634-1061
Idaho Fish and Game, Boise, ID	(208) 334-2920
Idaho Fish and Game, Salmon, ID	(208) 756-2271
Idaho Fish and Game, Nampa, ID	(208) 465-8465
U.S. Fish and Wildlife Service, Helena MT:	(406) 449-5225
U.S. Fish and Wildlife Service, Jackson, WY:	(307) 330-5620
U.S. Fish and Wildlife Service, Boise ID:	(208) 378-5639
Yellowstone Center for Resources, YNP WY:	(307) 344-2243

To report livestock depredations:

USDA/APHIS/Wildlife Services, Montana:	(406) 657-6464
USDA/APHIS/Wildlife Services, Wyoming:	(307) 261-5336
USDA/APHIS/Wildlife Services, Idaho:	(208) 378-5077
USDA/APHIS/Wildlife Services toll free:	(866) 487-3297

To report discovery of a dead wolf or information regarding the illegal killing of a wolf:

U.S. Fish and Wildlife Service Special Agent, Billings, MT:	(406) 247-7355
U.S. Fish and Wildlife Service Special Agent, Missoula, MT:	(406) 329-3000
U.S. Fish and Wildlife Service Special Agent, Bozeman, MT:	(406) 582-0336
U.S. Fish and Wildlife Service Special Agent, Casper, WY:	(307) 261-6365
U.S. Fish and Wildlife Service Special Agent, Lander, WY:	(307) 332-7607
U.S. Fish and Wildlife Service Special Agent, Cody, WY:	(307) 527-7604
U.S. Fish and Wildlife Service Special Agent, Boise, ID:	(208) 378-5333
U.S. Fish and Wildlife Service Special Agent, Idaho Falls, ID	(208) 523-0855
U.S. Fish and Wildlife Service Special Agent, Spokane, WA	(509) 928-6050

WEBSITES

USFWS Rocky Mountain weekly and annual wolf updates:
http://westerngraywolf.fws.gov/
USFWS Midwestern gray wolf recovery, national wolf reclassification proposal:
http://midwest.fws.gov/wolf/
USFWS Endangered Species Program:
http://endangered.fws.gov/
USDA/APHIS/Wildlife Services:
http://www.aphis.usda.gov/ws/
National Wildlife Research Center:
http://www.aphis.usda.gov/ws/nwrc/
Nez Perce Tribe Wildlife Program and 2001 progress report:
http://www.nezperce.org/Programs/wildlife_program.htm
Turner Endangered Species Fund:
http://www.tesf.org/
Yellowstone Park Foundation:
http://www.ypf.org/
Yellowstone Wolf Tracker:
http://www.wolftracker.com/
Yellowstone National Park wolf pack data:
http://www.nps.gov/yell/nature/animals/wolf/wolfup.html
Wolf Restoration to Yellowstone:
http://www.nps.gov/yell/nature/animals/wolf/wolfrest.html
Montana Fish, Wildlife and Parks wolf management planning:
http://www.fwp.mt.gov/wildthings/tande/wolf/wolf.html
Montana State University wolf-ungulate research:
http://www.homepage.montana.edu/~rgarrott/wolfungulate/index.htm
Idaho Fish and Game:
http://www.state.id.us/fishgame/
Idaho Office of Species Conservation:
http://www.state.id.us/species/
Wyoming Game and Fish Department:
http://gf.state.wy.us/
Wyoming agricultural statistics:
http://www.nass.usda.gov/wy/
Idaho agricultural statistics:
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People Against Wolves:
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