

Montana Gray Wolf Conservation and Management 2011 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*

*This report presents information on the status, distribution, and management of wolves in the State of
Montana, from January 1, 2011 to December 31, 2011.*

It is also available at: <http://fwp.mt.gov/fishAndWildlife/management/wolf/>
This report may be copied in its original form and distributed as needed.

Suggested Citation: Hanauska-Brown, L., L. Bradley, J. Gude, N. Lance, K. Laudon, A. Messer, A. Nelson, M. Ross, and J. Steuber. 2012. Montana Gray Wolf Conservation and Management 2011 Annual Report. Montana Fish, Wildlife & Parks. Helena, Montana. Pp 54.

TABLE OF CONTENTS

MONTANA EXECUTIVE SUMMARY	1
INTRODUCTION AND BACKGROUND	2
STATEWIDE PROGRAM OVERVIEW.....	3
Overview of Wolf Ecology in Montana.....	4
Monitoring Methods	5
Minimum Statewide Wolf Population and Distribution	6
Border Packs	7
Fair Chase, Regulated Public Hunting.....	10
FWP Wildlife Lab Surveillance of Wolf Mortality and Diseases	11
2011 Documented Statewide Wolf Mortalities.....	11
Wolf –Livestock Interactions in Montana	12
Depredation Incidents in 2011	14
Montana Livestock Loss Reduction and Mitigation Program:	15
AREA SUMMARIES	
Northwest Montana.....	16
Western Montana	18
Southwest Montana.....	20
OUTREACH AND EDUCATION.....	23
LAW ENFORCEMENT.....	24
FUNDING.....	24
PERSONNEL AND ACKNOWLEDGEMENTS	26

LITERATURE CITED28

FIGURES

- Figure 1. Northern Rockies gray wolf federal recovery areas (Montana, Idaho, and Wyoming).
- Figure 2. Minimum estimated number of wolves in Montana (1979-2011).
- Figure 3. Verified wolf pack distribution in the State of Montana, as of December 31, 2011.
- Figure 4. Minimum number of wolf mortalities documented by cause (2005-2011).
- Figure 5. Number of complaints received by USDA Wildlife Services as suspected wolf damage and the percent of complaints verified as wolf damage (FFY97-FFY11).
- Figure 6. Number of wolves removed through agency control and take by private citizens, number of cattle and sheep killed annually (1999-2011.).

APPENDIX 1: MONTANA CONTACT LIST29

APPENDIX 2: GRAY WOLF LEGAL ACTION IN MONTANA (2011)31

APPENDIX 3: RESEARCH, FIELD STUDIES, and PROJECT PUBLICATIONS33

APPENDIX 4: MONTANA MINIMUM COUNTS44

- Figure 1. Minimum estimated number of wolves by recovery area (1999-2011).
- Figure 2. Minimum estimated number of packs by recovery area (1999-2011).
- Figure 3. Minimum estimated number of breeding pairs by recovery area (1999–2011).

APPENDIX 5: MONTANA WOLF PACK TABLES BY RECOVERY AREA46

- Table 1a. Montana’s portion of the Northwest Montana Recovery Area.
- Table 1b. Montana’s portion of the Greater Yellowstone Experimental Area.
- Table 1c. Montana’s portion of the Central Idaho Experimental Area and statewide.

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 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.

In April of 2011, a congressional budget bill directed the Secretary of the Interior to reissue the final delisting rule for Northern Rocky Mountain wolves originally published in April of 2009. On May 5, 2011 the USFWS published the final delisting rule designating wolves throughout the Designated Population Segment, except Wyoming, as a delisted species. Wolves in Montana became a species in need of management statewide under Montana law; state rules and the state management plan took full effect. Using a combination of federal funds and license dollars, FWP implements the state management plan by monitoring the wolf population, directing problem wolf control and take under certain circumstances, coordinating and authorizing research, regulating sport harvest, and leading wolf information and education programs.

The minimum count of Montana wolves increased about 15% from 2010 to 2011. The minimum count in each of three overall management units (corresponding to the three federal recovery areas) increased to some degree from 2010 levels. A total of 130 verified packs of 2 or more wolves yielded a minimum count of 653 wolves in Montana for 2011. Thirty-nine packs qualified as a breeding pair according to the federal recovery definition (an adult male and female with two surviving pups on December 31). In northwest Montana, we documented at least 372 wolves in 85 packs, 23 of which were breeding pairs. In western Montana, we documented at least 147 wolves in 23 packs, 7 of which were breeding pairs. In southwest Montana, we documented at least 134 wolves in 22 packs, 9 of which were breeding pairs.

USDA Montana Wildlife Services (WS) confirmed that 74 cattle, 11 sheep, 2 dogs, and 1 horse were killed by wolves in calendar year 2011 compared to 163 confirmed losses in 2010. Additional losses (both injured and dead livestock) most certainly occurred, but could not be confirmed. Most depredations occurred on private property. The Montana Livestock Loss Board paid \$85,855 for 95 head of livestock that were verified by WS as either confirmed or probable death loss due to wolves in 2011. Sixty-four wolves were killed to reduce the potential for further depredations. Of the 64, 7 were killed by private citizens under either state or federal regulations that allowed citizens to kill wolves seen chasing, killing, or threatening to kill livestock.

Wolf hunting was recommended as a management tool in the final wolf conservation and management plan (FWP 2004) but can only be implemented when wolves are delisted and if more than 15 breeding pairs of wolves existed in Montana the previous year. In 2011, wolf hunting began September 3 under a statewide quota of 220. The quota was partitioned into 14 designated wolf management units (WMUs) across the state. By December 31, 121 wolves had been harvested during the legal take season and quotas had been met in 2 of the 14 WMUs. In addition to other forms of wolf mortality (including wolf removal due to cattle depredation at a rate similar to what was observed in 2010), a harvest equal to the proposed quota level was predicted

to reduce the year-end minimum total wolf numbers 25% from 566 in 2010 to approximately 425 in 2011.

This annual report presents information on the status, distribution, and management of wolves in the State of Montana from January 1 to December 31, 2011. The report and other information about wolves and their management in Montana are available at <http://fwp.mt.gov/fishAndWildlife/management/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 three federal recovery areas: the Northwest Montana Recovery Area (NWMR), the Central Idaho Experimental Area (CIA), and the Greater Yellowstone Experimental Area (GYA) (Figure 1).

The biological and temporal requirements for wolf recovery in the northern Rocky Mountains of Montana, Idaho, and Wyoming were met in December 2002 and in 2003, all three states submitted wolf management plans to the USFWS for review. The USFWS accepted Montana's state plan and it is the document guiding wolf management in the state today.

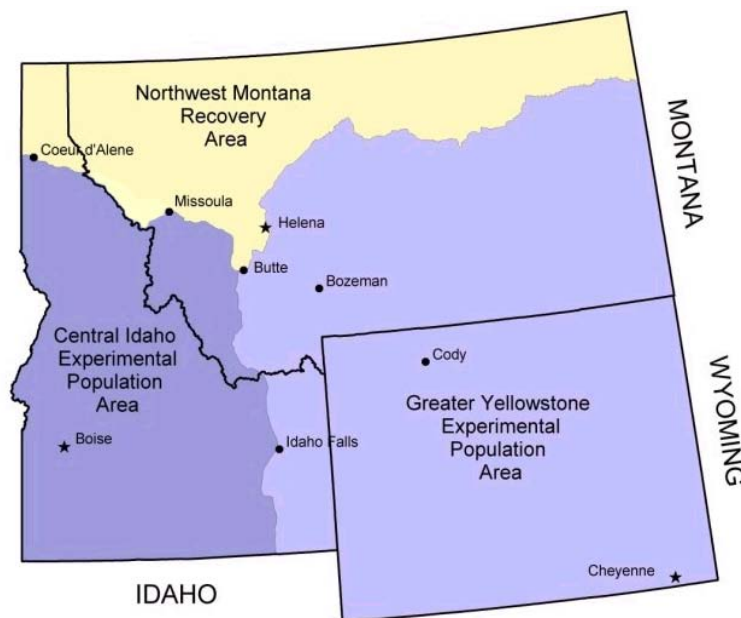


Figure 1. Northern Rockies gray wolf federal recovery area comprised of the states of Montana, Idaho, and Wyoming.

Delisting Efforts (2011)

In April of 2011, President Obama signed the Department of Defense and Full-Year Appropriations Act, 2011. A section of that appropriations act directed the Secretary of the Interior to reissue the final rule published on April 2, 2009, that identified the Northern Rocky Mountain (NRM) population of wolf as a Distinct Population Segment (DPS) and to revise the List of Endangered and Threatened Wildlife by removing most of the wolves in the DPS.

On May 5, the USFWS published the final delisting rule designating wolves throughout the DPS except Wyoming as a delisted species. Wolves in Montana are now classified as a species in need of management statewide under Montana law. State rules and the state management plan are in full effect.

In June, Alliance for the Wild Rockies, Friends of the Clearwater, Wildearth Guardians, Center for Biological Diversity, Cascadia Wildlands, and Western Watersheds Project filed a lawsuit challenging the constitutionality of the Congressional rider under the Separation of Powers clause of the U.S. Constitution. The lawsuit was filed in the Federal District Court in Missoula. FWP submitted amicus curiae briefs.

On August 3, the district court upheld the constitutionality of the Congressional rider. Five days later, the group of plaintiffs composed of the Alliance for the Wild Rockies, Friends of the Clearwater, and Wildearth Guardians filed a notice of appeal to the 9th Circuit on the decision upholding the constitutionality of the Congressional rider. A second group of plaintiffs, Center for Biological Diversity, Cascadia Wildlands, and Western Watersheds Project, filed a notice of appeal to the 9th Circuit on August 12.

In August, The Alliance for the Wild Rockies group of plaintiffs made an emergency motion for an injunction in the 9th Circuit to stop the proposed wolf hunts in Idaho and Montana. The State of Montana and FWP filed an amicus curiae brief in support of the federal Defendants and Appellees opposition to the emergency motion pending appeal.

Wolf hunting began August 30 in Idaho and September 3 in Montana. As of December 31, 2011 all wolves in the NRM except WY remained delisted. Wolves in Montana are classified as a species in need of management statewide under Montana law.

A complete chronology of legal action in 2011 can be found in Appendix 2.

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.

Prior to delisting in May 2011, the legal classification and federal regulations put wolves into two separate categories in Montana – endangered in northern Montana and experimental non-essential across southern Montana. Wolf-livestock conflicts were 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 provided less flexibility to agencies and livestock owners. In contrast, more flexibility was provided through the revised 10(j) regulations (revised in February 2008).

Beginning with delisting in May 2011, the wolf was reclassified as a species in need of management statewide. Montana's laws, administrative rules, and state plan replaced the federal framework.

In the early stages of implementation, a core team of experienced individuals led wolf monitoring efforts and worked directly with private landowners. FWP's wolf team also worked closely with and increasingly involved other FWP personnel in program activities. Montana wolf conservation and management has transitioned to a more fully integrated program since delisting, led and implemented at the FWP Regional level. WS continues to investigate injured and dead livestock, and FWP works closely with them to resolve conflicts.

Overview of Wolf Ecology in Montana

Wolves are distributed primarily in western Montana east to the Beartooth face near Red Lodge inhabiting various habitats on both private and public lands. Montana wolf pack territory size estimates are naturally variable and the calculation of territories is heavily influenced by FWP's ability to collect location data on pack members throughout the year. Our confidence in estimating home territories for packs has decreased as pack numbers, conflict management and staff workloads increase. The maximum territory size calculated for a Montana pack in 2011 was 480 square miles, however, most pack territories were significantly smaller.

Montana pack territories include a combination of public and private lands. The average pack territory in Montana encompasses 27% private land. Thirty packs spent over 50% of their time on private lands with 1 of those spending the entire year on private lands. Private lands include lands under timber company ownership. Sixteen packs spent over 50% of their time in wilderness areas or in Glacier National Park (GNP), with 6 of those spending the entire year in wilderness or GNP. Many other packs live in very remote backcountry areas in rugged terrain along the Montana-Idaho border. The rest live in public land areas with more public access and habitat fragmentation than wilderness areas or GNP. The majority of Montana wolf packs live in areas where mountainous terrain, intermountain valleys, and public/private lands are intermixed.

Dispersal distances in the northern Rockies average about 60 miles, but dispersals over 500 linear miles have been documented. In 2011, at least 2 wolves were confirmed to be present as far as Broadus, in southeastern Montana. One wolf was a 2.5 year old collared black male that was identified to have dispersed at least 300 straight line miles from where it was collared in the Jackson, WY area. Reports of a second gray wolf were confirmed through photos taken near Broadus in the summer of 2011. Although wolves occurring on the landscape this far east is

notable, to date, these occurrences are of limited biological significance, as there has been no evidence of breeding activity, or of a pack maintaining a territory. Another collared male, from a MT-YNP border pack, dispersed a short distance into Montana before dying of natural causes in the fall of 2011.

The size of the average wolf pack with good documentation in Montana is between 6 and 7 wolves. The largest wolf pack documented in Montana in recent years has been 22 animals but packs this large are very rare. There is no significant difference in the average size of wolf packs across the state.

Monitoring Methods

Montana wolf packs are monitored year round. Common wolf monitoring techniques include direct observational counts, howling and track surveys, use of trail cameras, and public wolf reports. FWP seeks to document pack size and breeding pair status of known packs to: verify wolf activity in new areas that can result in new packs forming, document dispersal to the extent possible and assess connectivity, determine pack territories and identify potentially affected private landowners.

FWP conducts ground tracking and flies 1-2 times per month to locate collared animals and determine localized use throughout the year and the number of wolves traveling together. Den sites and rendezvous sites are visited to determine if reproduction has taken place. Additional information is collected, such as identification of private lands used by wolves, identification of public land grazing allotments where conflicts could occur, and common travel patterns. At the end of the year, FWP compiles information gathered through field surveys, telemetry, and public reporting.

FWP estimates the number of individual wolves in each pack when possible. Lone dispersing animals are accounted for when reliable information is available. Through its monitoring program, FWP is required to also tally and report the number of “breeding pairs” according to 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 to maintain the delisted status of wolves. (The state plan calls for the maintenance of at least 15 breeding pairs.) Packs of 2 or more wolves that meet 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.

The total number of packs is determined by counting the number of animal groups with 2 or more individuals holding a territory 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 is not included in the year-end total or displayed on the Montana wolf pack distribution map for that calendar year.

The statewide minimum wolf population is estimated by adding up the number of observed wolves in verified packs + known lone animals as of December 31 each year. This is a minimum count, not a population estimate, and has been reported as such since wolves first began re-

colonizing northwestern Montana in the mid 1980s. Suspected wolf packs are those that could not be verified with confidence. They are not included in the final minimum estimated count.

FWP wolf monitoring data, while not a precise accounting of the number of wolves in Montana, are used to make decisions to address wolf-livestock conflicts, to set wolf hunting and trapping regulations, and to set harvest quotas. These minimum data are also adequate to demonstrate maintenance of a recovered population, such that relisting is not warranted.

In anticipation of an increased work load and declining federal funding, FWP first began considering alternative approaches to monitoring the wolf population in 2007. The capacity for FWP personnel to monitor a growing wolf population is complicated by the robust wolf population growth since about 2006. The traditional field-based methods yield minimum counts that are increasingly conservative and inevitably below the “true” numbers. Preliminary work focused on developing a more reliable method to estimate the number of breeding pairs based on the size of a wolf pack using logistic regression models (Mitchell et al. 2008). Subsequent work focused on finding ways to utilize wolf observations by hunters in a more systematic way. A collaborative research effort with the University of Montana Wildlife Cooperative Research Unit was initiated in 2008. The primary objectives were to find alternative approaches to wolf monitoring that would yield statistically reliable estimates of the number of wolves, the number of wolf packs, and the number of breeding pairs (see Appendix 3.)

Minimum Statewide Wolf Population and Distribution

As the wolf population has increased in size and distribution it has become increasingly difficult to obtain pack counts and to determine the breeding pair status of known packs. FWP increased the amount of field monitoring effort in 2011 with the hiring of a new full time specialist in the Livingston area in late 2010. FWP hired two experienced seasonal field technicians and brought on additional volunteers to help with 2011 monitoring efforts. Recent increases in the wolf population over the last few years have meant that FWP has to verify more new packs, the status of previously verified packs, and determine breeding pair status for as many as possible. Inevitably, some packs are suspected, but not verified and FWP conservatively notes those packs in the narrative. Those suspected packs are not included in the minimum estimate. Similarly, if the breeding pair status is not known with confidence, it is recorded as “not” a breeding pair or “breeding status unknown.” Thus the number of breeding pairs is a minimum known and others certainly exist, but could not be verified using field-based methods without increased effort.

The Montana wolf population is secure well above the 10 breeding pair minimum. Wolves and wolf packs themselves, however, are very dynamic on the Montana landscape. The minimum number of wolf packs has steadily increased from 46 in 2005. A total of 33 new packs were documented between 2010 and 2011. Eleven packs that had existed at some point in 2011 did not make it through to the end of the year for a variety of reasons, including lethal agency control to manage conflicts, other human-caused mortality or disease.

The Montana minimum wolf count increased by about 15%, from a minimum count of 566 in 2010 to a minimum count of 653 in 2011. This is a minimum increase of 87 wolves.

The minimum number of breeding pairs in Montana increased from 35 in 2010 to 39 at the end of 2011. The minimum number of packs statewide increased from 108 in 2010 to 130 at the end of 2011. Pack numbers have steadily increased since the minimum count of 46 in 2005. Packs for which size was known with some confidence at the end of the year ranged between 2 and 21 individuals.

Minimum wolf counts and pack numbers in northwest Montana continue to increase and attribute most to the overall statewide growth in minimum counts. While the minimum number in northwest Montana has increased over the last 5 years, the number of documented breeding pairs has remained relatively constant between 17 and 23. This apparent stability in breeding pairs is likely a reflection more of limited FWP resources and ability to confirm pack breeding status than a reflection on breeding activity. In northwest Montana, the minimum count increased from 326 in 2010 to 372 in 2011. Twenty-three of 85 packs were documented to have met the breeding pair criteria.

Four wolf packs occurred on both the Blackfeet and Flathead Indian reservations for a total of 8 packs (of the 85 total) on reservation lands.

In western Montana, the minimum count increased from 122 in 2010 to 147 in 2011. Seven of 23 packs were documented to have met the breeding pair criteria. There continues to be high turnover in the population in parts of western Montana (e.g. Big Hole Valley) due to livestock conflicts and agency control. Yet, wolves recolonize some areas quite rapidly along the Montana-Idaho border.

In southwest Montana, the minimum count increased from 118 in 2010 to 134 in 2011. Nine of 22 packs were documented to have met the breeding pair criteria.

At the statewide level, wolves were distributed primarily in the western third of the state. A small pack exists in the Little Belts and the Lebo pack still exists at the north end of the Crazy Mountains. Most of Montana's wolf packs live outside of national parks or remote backcountry wilderness areas (Figure 3).

Border Packs

Northern Rocky Mountain wolf program cooperators have agreed that packs will be tallied in the population of the administrative area where the pack denned or spent most of their time. This assures that all packs are accounted for, but none are double-counted in population estimates. Transboundary packs are included in the administrative region in which the animals were counted.

At the end of 2011, 11 packs that straddled the Montana-Idaho border counted toward the Montana portion of the northwest Montana area having denned in Montana. Four other packs that straddled the border denned in Idaho and were counted toward the Idaho population. Four packs straddled the Montana-Canada border, 3 of which were counted toward the Montana population. Eight packs that straddled the Montana-Idaho border counted toward the Montana portion of the Central Idaho area having denned in Montana. Another pack that straddled the

border denned in Idaho but was counted toward the Idaho population. Only 1 pack that straddled the Montana-YNP border counted toward the Montana portion of the Greater Yellowstone Area area having denned in Montana.

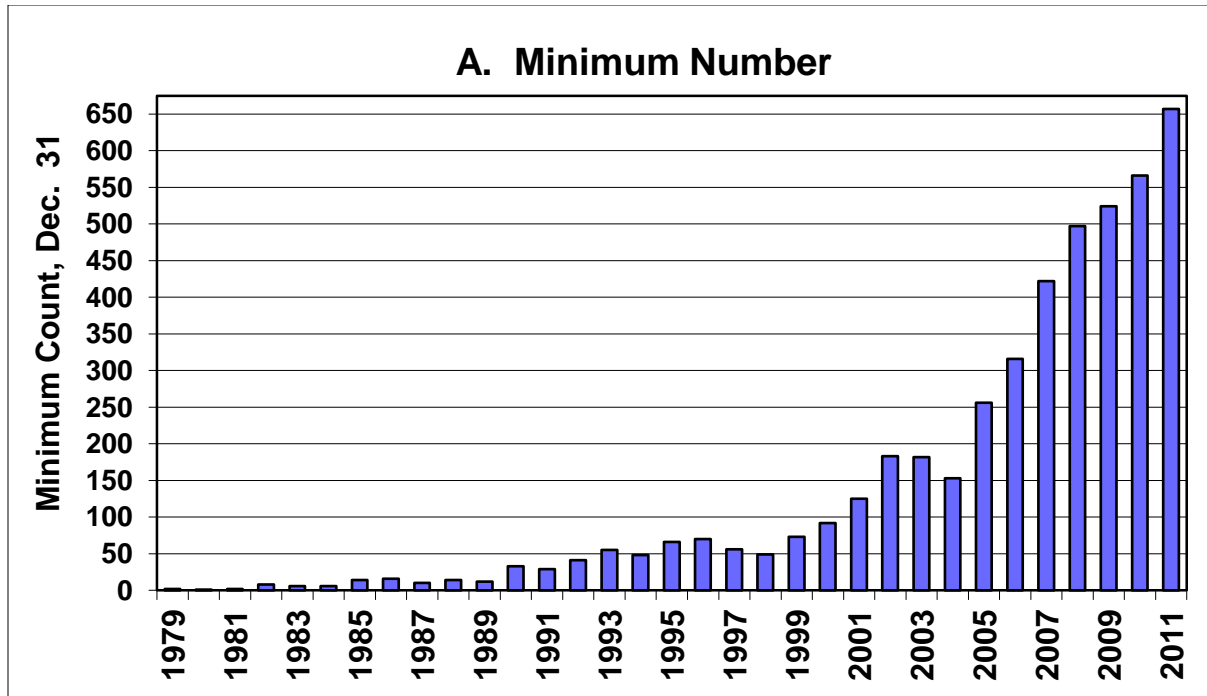


Figure 2: Estimated minimum number of wolves in Montana (1979-2011).

2011 Montana Wolf Pack Locations

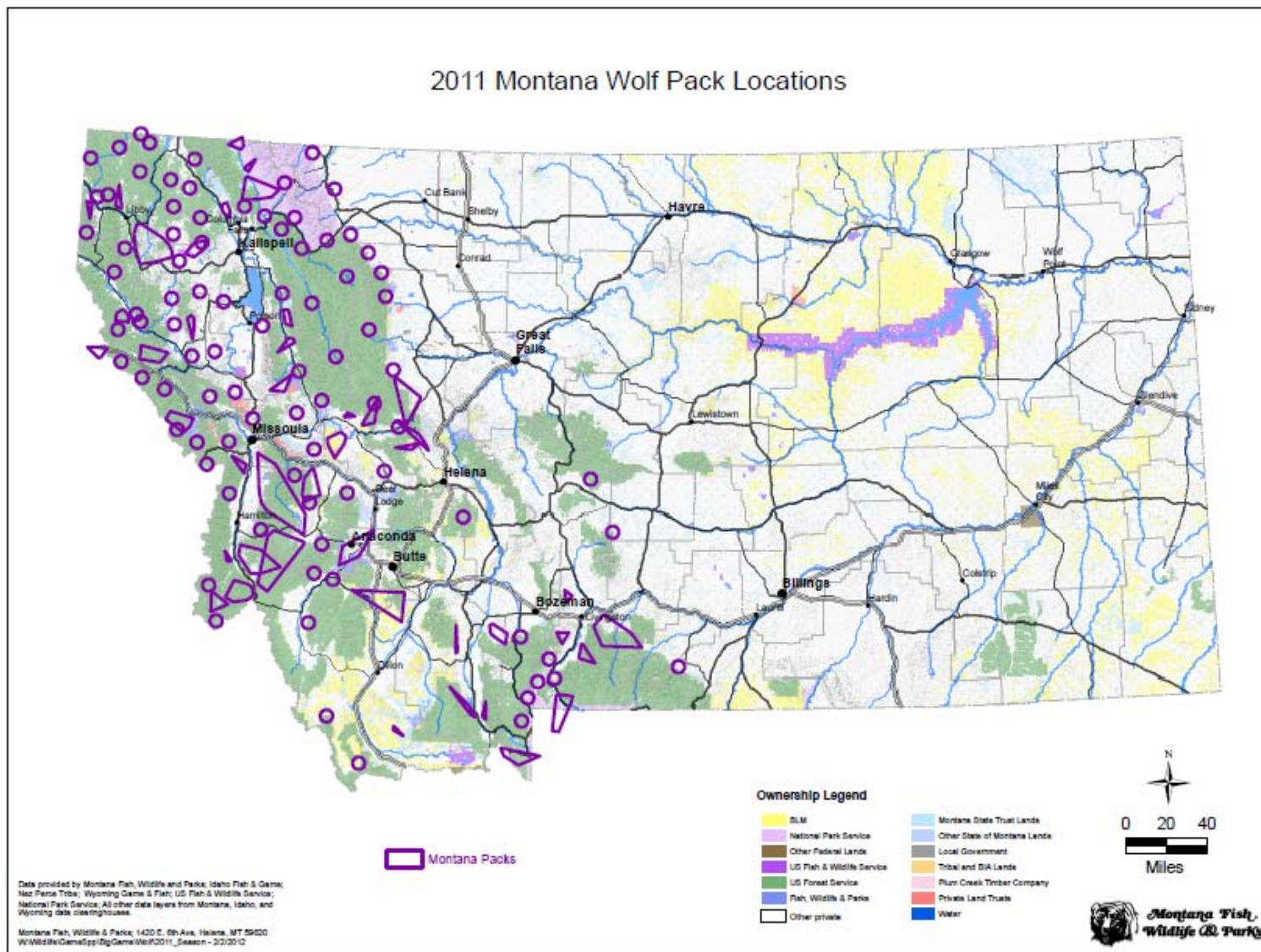


Figure 3. Verified wolf pack distribution in the State of Montana, as of December 31, 2011.

Fair Chase, Regulated Public Hunting

Regulated public harvest of wolves, recommended by the Governor's Wolf Advisory Council in 2000, was included in Montana's final wolf conservation and management plan. In 2001, the Montana Legislature authorized the FWP Commission to reclassify wolves under state law from an endangered species to a species in need of management upon federal delisting. In anticipation of delisting, FWP first began exploring the idea of how to design regulated public hunting and trapping for wolves early in 2007. The 2007 Legislature created a wolf hunting license for residents and nonresidents (SB 372). Other statutes within MCA enable the FWP Commission to adopt rules and regulations pertaining to wolf hunting and trapping as a species in need of management upon delisting. FWP has developed and implemented wolf harvest strategies that maintain a recovered and connected wolf population, minimize wolf-livestock conflicts, reduce wolf impacts on low or declining ungulate populations and ungulate hunting opportunities, and effectively communicate to all parties the relevance and credibility of the harvest while acknowledging the diversity of values among those parties (FWP 2010, FWP 2011). The Montana public has the opportunity for continuous and iterative input into specific decisions about wolf harvest throughout the public season-setting process. Finally, hunting can only be implemented when wolves are successfully delisted and if more than 15 breeding pairs of wolves existed in Montana the previous year.

Following the delisting of wolves in Montana in May 2011, a statewide wolf quota of 220, partitioned into fourteen individual wolf management units (WMUs) was proposed at the May FWP Commission meeting. FWP proposed quotas or subquotas in WMU 150 and in deer/elk hunting districts (HDs) 280 and 313/316 where an early back country rifle wolf season would coincide with the existing early elk back country hunting season. An archery-only wolf season in all WMUs with an allocated harvest potential not to exceed 20% of the WMU quota or subquota was also proposed to coincide with the existing deer and elk archery only season. Any harvest over-run at the WMU scale was proposed to be reduced from adjacent WMU quotas, other WMUs in the region or at the statewide scale to eliminate potential for any harvest over-run. Additional mechanisms to regulate take included rigorous tracking of harvest in each WMU through mandatory harvest reporting and a 24-hour closure notice process. Harvest quotas were proposed to tally only legal hunting harvest. In addition to other forms of wolf mortality (including cattle depredation removal), a harvest equal to the proposed quota level was predicted to reduce the year-end minimum total wolf numbers 25% from 566 in 2010 to approximately 425 in 2011.

By December 31, 121 wolves had been harvested during the legal take season and quotas had been met in only 2 of the 14 WMUs. Total confirmed livestock losses were down considerably in 2011 resulting in markedly fewer dead wolves from agency control. This in combination with not removing the full allowable quota of 220 wolves resulted in a higher 2011 minimum count than the harvest model predicted.

At the November FWP Commission meeting a season extension was proposed in order to increase wolf harvest closer to the statewide quota of 220. That specific proposal extended the 2011 wolf hunting season through January 31, 2012 or until specific WMU quotas were met. The proposed season extension process allowed for public comment through November 28, 2011. The

commission adjusted the season extension end date to February 15, 2012 at the December commission meeting and then adopted that extension.

Fish, Wildlife and Parks Wildlife Lab Surveillance of Wolf Mortality and Disease, 2007-2010

Wildlife health lab personnel carried out routine wolf health and disease surveillance by collecting information from both live and dead wolves in 2011. The lab received 7 carcasses and 33 blood samples. The majority of the carcasses were received for enforcement investigations or for cause of death determinations. Necropsies were conducted and tissues examined grossly, but no lab tests were conducted unless something questionable was observed during the necropsy. Serum samples from live captured wolves are routinely tested for exposure to *Brucella abortus*, *Brucella canis*, canine parvovirus, canine adenovirus, canine distemper virus, canine herpesvirus, neospora, and leptospirosis (8 serovars).

Overall, full necropsies were performed less frequently than in past years as the majority of wolves brought to the lab were brought in as part of law enforcement cases. Baseline information has increasingly become established for wolves so tissue sampling and testing was not conducted unless the specifics of the case warranted testing. Results from 2011 testing are pending.

A more thorough discussion of wolf diseases and previous serology and parasitology sampling results can be found in the 2010 annual report.

2011 Documented Statewide Wolf Mortalities

FWP documented a total of 216 mortalities in 2011 statewide due to all causes. Undoubtedly, additional mortalities occurred but were not detected. Because mortality counts and total population counts are incomplete, actual mortality rates cannot be determined.

The majority of wolf mortality overall in Montana is related to humans: livestock conflict removals, regulated public harvest, car strikes, train strikes, illegal killings, and incidental to other activities (e.g. trapping/snaring). That pattern is similar across time and all of the northern Rocky Mountains, except inside national parks where the majority of wolf mortality is due to intraspecific strife (wolf on wolf aggression) or other natural causes.

Documented total wolf mortality in 2011 was higher than in 2010. Mortalities in 2011 included 121 public harvests but many fewer lethal control removals (141 in 2010, 64 in 2011). Of the 64 wolves removed in 2011 for livestock depredations, 7 were killed by private citizens under the federal 10j regulations or a Montana state law known as the Defense of Property statute. Other mortalities included; 8 illegally killed, 7 vehicle collisions, 1 train collision, 1 electrocution (downed power line) and 1 legal take. In addition, 7 wolves died of natural causes and 5 wolves died of unknown causes.

Mange continues to be documented in southwest Montana. It does not appear to have a detrimental effect on Montana's wolf population as a whole (see Jimenez et al. 2010a).

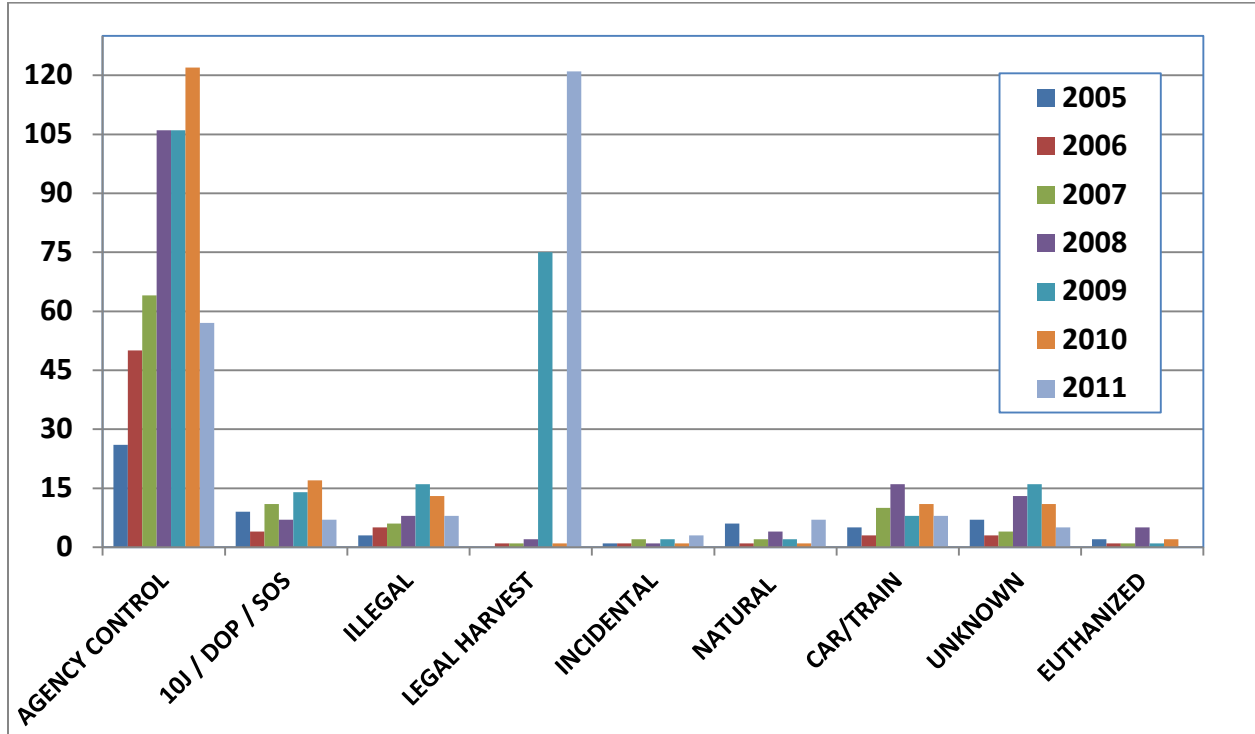


Figure 4. Minimum number of wolf mortalities documented by cause for gray wolves (2005-2011). Total number of documented wolf mortalities in 2011 was 216.

Wolf – Livestock Interactions in Montana

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 2011, the 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 is greater human presence than on remote public land grazing allotments. The magnitude of under-detection of loss on public allotments is unknown. Nonetheless, most cattle depredations occurred in the spring or fall months while sheep depredations occurred more sporadically throughout the year.

USDA Wildlife Service’s workload has increased over the last 10 years as the wolf population increased and distribution expanded. The number of suspected wolf complaints received by WS increased steadily from federal fiscal year 1997 to 2009 (Figure 5). The number of complaints received since those years have steadily declined from 233 complaints in 2009 to 152 in 2011. About 50% of the complaints received by WS are verified as wolf-caused.

Because wolves were listed under ESA for the first four months of 2011, wolf-livestock conflict resolution was guided by a combination of federal regulation, the approved state plan, and the administrative rules of Montana. Federal regulations since 2009 have allowed private citizens to kill wolves seen in the act of attacking, killing, or threatening to kill livestock. In 2009, 14 wolves were taken by private citizens, 17 were taken in 2010 and 7 in 2011. The remainder of wolves killed in control situations were removed by federal agency personnel.

A total of 645 wolves have been killed to help resolve conflicts with livestock since 1987 in Montana (Figure 6). Despite this level of lethal removal, particularly in the early years, the Montana population still increased in number and distribution, due to dispersal and new pack formation.

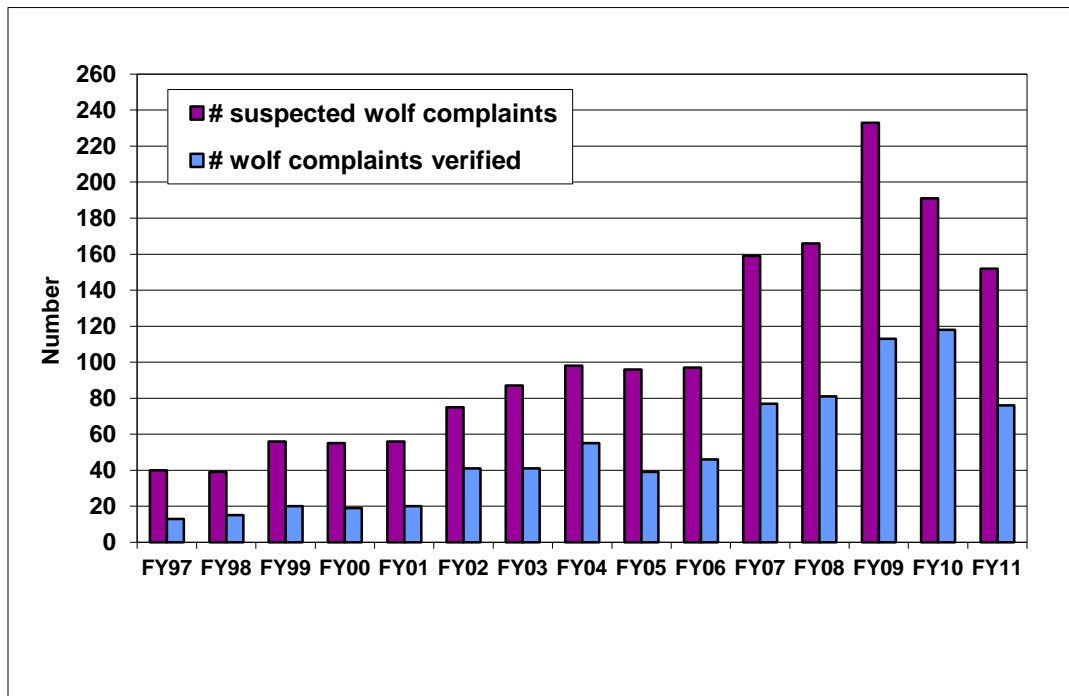


Figure 5. Number of complaints received by USDA Wildlife Services as suspected wolf damage and the percent of complaints verified as wolf damage, FFY 1997 – 2011.

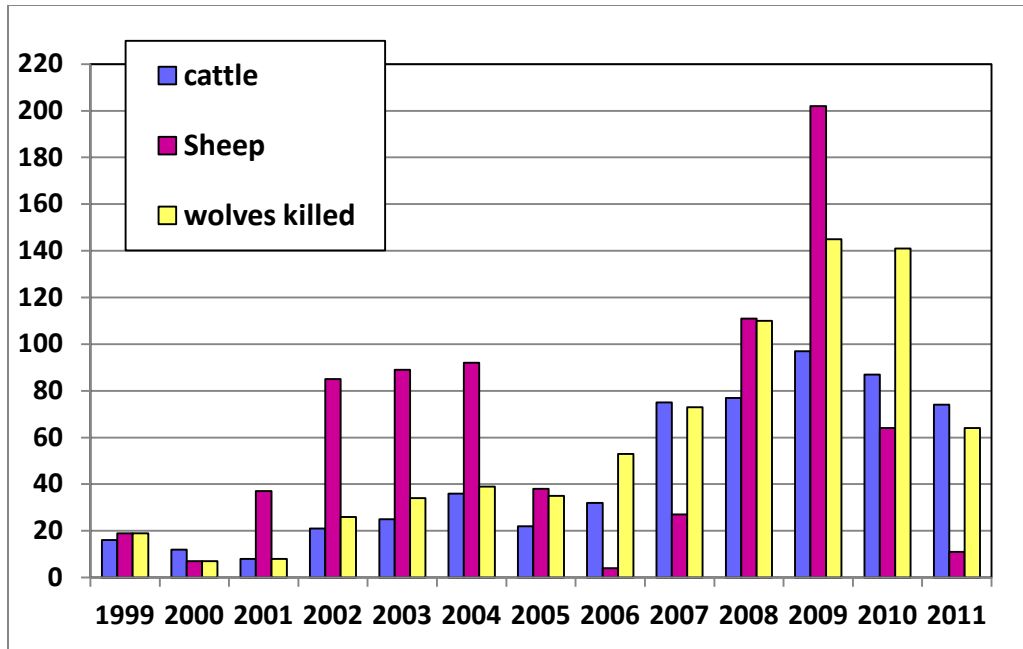


Figure 6. Number of wolves removed through agency control and take by private citizens, number of cattle and sheep killed annually (1999-2011.)

Depredation Incidents in 2011

WS confirmed that, statewide, 74 cattle, 11 sheep, 2 domestic dogs, and 1 horse were killed by wolves in 2011. Total confirmed losses are down considerably from 2010 levels and are the lowest recorded in the last five years. Agency control was markedly lower as a result. This decrease in livestock depredations in 2011 may be a result of several factors. Wolf control in response to livestock depredations in 2009 and 2010 may have decreased wolf numbers in certain chronic areas and led to decreased conflicts in 2011.

WS also confirmed 22 cattle were confirmed injured by wolves. Eighteen dead calves and 1 injured calf were considered probable wolf depredations in 2011. Furthermore, many livestock producers reported “missing” livestock and suspected wolf predation. Others reported indirect losses including poor weight gain and reduced productivity. There is no doubt that there are undocumented losses.

Approximately 17% of the packs that were present at some point during 2011 were confirmed to have killed livestock. This is down from 31% in 2010.

To address livestock conflicts and to further reduce the potential for further depredations, 64 wolves were killed. Seven of the 64 were killed by private citizens when the wolf was seen chasing, killing, or threatening to kill livestock. The others were taken by WS using either ground or aerial based methods. One pack was removed entirely due to chronic livestock conflicts and 3 disbanded after several pack members were lethally removed due to livestock conflicts.

Montana Livestock Loss Board Program: A Montana-Based Reimbursement Program

House Bill 469 introduced during the 2011 Montana Legislative Session clarified and simplified the name of the Montana Livestock Loss Reduction and Mitigation Board to the Montana Livestock Loss Board (MLLB).

The Montana Wolf Conservation and Management Plan called for creation of this Montana-based program to address the economic impacts of verified wolf caused livestock losses. The plan identified the need for an entity independent from FWP to administer the program. The plan also identified that the reimbursement program be funded through sources independent from FWP's wolf management dollars and other FWP funds intended for fish and wildlife management. Two new fundraising approaches came to fruition in 2011 with the development of a specialty motor vehicle license plate and the passage of House Bill 287 authorizing FWP to make wolf carcasses retrieved during management activities available to MLLB for sale or auction.

The purposes of the MLLB 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 proactive livestock management strategies, and provide financial reimbursements to producers for losses caused by wolves based on the program criteria.

The Loss Mitigation element implements a reimbursement payment system for confirmed and probable losses that can be verified by USDA WS. Indirect losses and costs are not directly covered, but eventually 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, llamas, and guarding animals. Confirmed and probable death losses are reimbursed at 100% of fair market value. Veterinary bills for injured livestock that are confirmed due to wolves may be covered up to 100% of fair market value of the animal when funding becomes available.

Preliminary reimbursement totals for 2011 are \$85,855 paid to livestock owners on 95 head of livestock. 2011 cattle losses are comparable to 2010 totals. Sheep losses significantly decreased and horse losses also decreased. Individual animal values in 2011 were substantially higher compared to 2010. See the MLLB for detailed information <http://liv.mt.gov/LLB/default.mcp>.

AREA SUMMARIES

Northwest Montana Summary Montana Portion of the Northwest Montana Endangered Area (NWMT)

Overview

In 2011, we documented a minimum estimate of 372 wolves in 85 packs in the Montana portion of the NWMT recovery area. That is an increase from 326 wolves in 68 packs at the end of the year in 2010. There were 18 newly identified packs in 2011. Some of these packs are believed to be first year packs, and some are likely to have existed the previous year. One pack was removed from the population as a consequence of chronic livestock depredation. Another pack territory has apparently been taken over by neighboring packs.

Thirty-four radio collared wolves in 31 packs, or 36% of the 85 total packs, were monitored in northwest Montana during at least some portion of 2011. This is down from 43% of 68 total packs in 2010. An additional 2 radio collared wolves that had dispersed were monitored at some point during the year and 1 of those was still known to be alive at the end of the year. Radio collared wolves were located from aircraft approximately 1–2 times per month. Twenty-four collared wolves from 23 packs (27% of the 85 total packs) were monitored by the end of the year. One collar is an ARGOS GPS collar furnished by Flathead Valley Community College in a cooperative venture as an educational tool for natural resource students. An additional collar is a store on board GPS collar for research conducted by Oregon State University.

FWP traplines were set in 21 pack territories, and 18 wolves were captured and 14 were collared in 2011. Three were small pups and released without radio collars. USDA Wildlife Services trapped in 6 additional areas and collared 3 wolves. One of these areas was trapped with the cooperation of the Salish Kootenai Tribes on their respective reservations.

FWP surveyed a total of 75 areas for wolf presence and pack status. Nine of those areas resulted in the verification of new packs. Wolf activity was verified in 6 other areas, but it was unclear whether it is a discrete pack or an area used by an adjacent pack. Forty-two of those surveys were conducted to determine pack status in areas of known packs that do not have functioning radio collars. There were 2 areas where definitive wolf sign could not be determined and may be surveyed again in 2011. One new pack was verified by USDA Wildlife Services.

We were able to confirm reproduction in 30 of the 85 packs. Twenty-three of those packs met the criterion as breeding pairs. Breeding pair status could not be documented in some packs either because they were uncollared and therefore more difficult to obtain data, or we were unable to confirm a minimum pup or adult survivorship of 2 each at the end of the year.

One-hundred-seven wolf mortalities were documented in the Montana portion of the NWMT recovery area population in 2011. All but 8 were attributed to some form of human cause including 72 legally harvested, 17 lethally removed in control actions, 6 illegally killed, 2 vehicle collisions, 1 train collision, and 1 legal take. Four wolves died of natural causes. Four wolves died of unknown causes. All control action and legally harvested mortalities are precise numbers,

while the number of mortalities from all other causes is an observed minimum. Because mortality counts and total population counts are incomplete, actual mortality rates cannot be determined.

A total of 7 radio-collared wolves were missing by the end of the year. Missing collars are due to long-range dispersal, collar failure, or other unknown fate.

Three dispersals were recorded. NW774M dispersed from the Silcox pack, and was last known to be 128 miles to the southeast, and was believed to be actively dispersing at the end of the year. NW802M dispersed from the Kootenai South pack, 49 miles to the northwest in British Columbia, where he was legally harvested. It is unknown if he had a new pack affiliation. NW760F dispersed from the Dutch pack, 27 miles west where she was legally harvested. She was known to be traveling with another wolf. NW563F was found with the Sliderock Mountain pack after she dispersed from the Silver Lake pack and had been missing for a year and a half. This is a dispersal of 109 miles to the southeast.

In northwest Montana, the number of confirmed livestock has been on a 2 year decline. Livestock availability varies widely among packs in northwest Montana, and the majority of packs have no or low levels of livestock present within pack home ranges. The number of confirmed packs in 2011 increased 24%, but the number of packs involved in livestock depredations decreased from 17 in 2010 to 8 in 2011. We documented 35 confirmed livestock kills. There were 29 cattle and 6 sheep. An additional 7 calves were ranked as probable kills. Four cattle were confirmed injured. The number of wolves lethally controlled decreased from 61 in 2010 to 17 in 2011. The Selow pack no longer exists likely due to lethal controls from the previous year. These figures only account for verified losses. It is not possible to document unverified losses due to wolves. Unverified losses are losses where the cause of dead or missing livestock is not known. Nonlethal measures ranging from range riders to aversive tools such as Radio Activated Guard Boxes and fladry are routinely deployed where applicable and as available. A range rider was utilized in Arrastra Creek, Garnet, and Ovando Mountain packs. Fladry was used on the Benchmark, Belmont, Monitor Mountain, and Ovando Mountain packs.

Verified Border Packs Counting in Idaho Population Estimate

Calder Mountain: Believed to den and spend most of their time in Idaho.

Copper Fall: Believed to den and spend most of their time in Idaho.

Deception: Believed to den and spend most of their time in Idaho.

Fish Creek: Believed to den and spend most of their time in Idaho.

Verified Border Packs Counting in Canada Population Estimate

Spruce Creek pack: Spends most or all of their time in Canada.

Verified Border Pack with Canada Counting in Montana Population Estimate

Kootenai North: A US-Canada border pack is believed to have denned in the US for the first time since 2004 and is included in the northwest Montana population.

Western Montana Montana Portion of the Central Idaho Experimental Area (CID)

Overview

In 2011, we documented a minimum estimate of 147 wolves and 23 packs in the Montana portion of the Central Idaho Experimental Area. This is an increase from the 119 wolves and 21 packs at the end of 2010. There were 7 newly identified packs in 2011. Some of these packs are believed to be first year packs and some are likely to have existed the previous year.

Previously verified packs that still existed in 2011 were the Alta, Bannack, Big Hole, Divide Creek, East Fork Rock Creek, Flint Creek, Four Eyes, Gird Point, Harvey Creek, Painted Rocks, Pintler, Mt. Haggin, Ross' Fork, Sula, Trapper Peak, Watchtower, and Welcome Creek packs. Newly documented packs in 2011 included Anaconda, Black Pine, Jeff Davis, One Horse, Gash Creek, Sliderock Mountain, and Stewart Mountain. The Bannack, Lake Como and Twin Lakes packs were removed in 2011 due to livestock depredations. The Brooks Creek and Trail Creek packs are believed to no longer exist. The Trail Creek pack was likely eliminated due to a combination of natural and harvest mortality. The Gash Creek pack may be a remnant of the Brooks Creek pack.

During 2011, 13 (46%) of 28 Montana CID verified packs were monitored using ground and aerial telemetry at some point during the year. At the end of 2011, 9 of 23 (39%) Montana CID verified packs were being monitored using ground and aerial telemetry. Ten wolves in 7 packs were captured and radio collared in the Montana portion of the CID in 2011. Four wolves were radio collared during FWP trapping efforts and 4 were radio collared by WS. Two wolves were net-gunned and radio-collared by Quicksilver/FWP in the Bitterroot. Three wolves were trapped by FWP but were too small to collar and were released. Radio collared wolves were located 1- 2 times per month by fixed-wing aircraft when possible. Twelve of 28 packs monitored in the Montana portion of the CID occupied the Montana-Idaho border: Alta, Bannack, Big Hole, Brooks Creek, Gash Creek, Lake Como, One Horse, Painted Rocks, Sula, Trail Creek, Twin Lakes, and Watchtower. In 2011, 1 pack was verified to spend time in Idaho. The others may spend time in Idaho, based on proximity of sightings or telemetry locations near the Montana-Idaho border. Because these 12 packs denned in Montana, or were known to have spent most of their time in Montana, they were counted as Montana packs for 2011. FWP conducts most of the monitoring of these packs in close coordination with Idaho Department of Fish and Game and the Nez Perce Tribe.

Reproduction was confirmed in 12 packs in the CID: One Horse, Gash Creek, Divide Creek, Welcome Creek, Trapper Peak, Alta, Ross' Fork, Sula, Harvey Creek, Stewart Mountain, Pintler, and Anaconda packs. At the end of 2011 a minimum of 27 pups were confirmed and 7 packs

met the breeding pair requirement: One Horse, Gash Creek, Divide Creek, Ross' Fork, Sula, Harvey Creek, and Anaconda. Reproductive status of the Four Eyes, Mt. Haggin, Jeff Davis, Big Hole, Watchtower, East Fork Rock Creek, Flint Creek, Gird Point, and Black Pine packs was unknown.

Two dispersals were documented in the CID in 2011. SW844F dispersed from the Twin Lakes pack and was killed legally during the 2011 hunting season in the Philipsburg area. SW4004 dispersed from the Bannack pack and joined the Stewart Mountain pack. A disperser from the Silver Lake pack (NW563F) in northwest Montana was found southwest of Drummond in the new Sliderock Mountain pack. One wolf was missing at the end of the year and it is unknown whether it dispersed, the collar failed, or it was killed illegally: SW754 (Trail Creek pack).

Nine packs were confirmed to have killed livestock or dogs: Anaconda, Bannack, Divide Creek, Lake Como, Stewart Mountain, Pintler, Trapper Peak, Twin Lakes, and Ross' Fork. Single or unknown wolves were responsible for killing 7 calves and 1 sheep. In total, 21 cattle, 3 sheep, 1 dog and 1 horse were confirmed killed. Four cattle were confirmed injured and 5 calves were documented as probable wolf kills.

Fifty-one wolf mortalities were documented in 2011. All but 2 were attributed to some form of human cause including; 19 legally harvested, 27 lethally removed in control actions (1 of the 27 shot by a private citizen under federal state 10j statutes or under state Defense of Property statutes), 1 killed illegally, and 2 killed in vehicle collisions. One wolf died of natural causes (suspected lion) and 1 cause of death was undetermined. All control action and legally harvested mortalities are precise numbers, while the number of mortalities from all other causes is a minimum observed. Because mortality counts and total population counts are incomplete, actual mortality rates cannot be determined.

Verified Border Packs Counting in Idaho Population Estimate in Montana CID

Beaverhead: Historically this pack has spent time in Montana and was detected in 2011 in Montana.

Pleasant Valley: This pack occasionally uses the area east of Lima Peaks to Monida.

Pyramid: This pack occasionally uses the Twin Lakes area of the Big Hole.

Hughes Creek: This pack occasionally uses the West Fork of the Bitterroot.

Miscellaneous / Lone Individuals in Montana CID

SW118F: SW118F split off from the Divide Creek pack and was found with an uncollared gray male in the upper East Fork of the Bitterroot. It was unknown whether or not they were holding a new territory at the end of the year.

Doran Point/Sula Peak: Two uncollared gray wolves have been seen in the Sula Peak area in the Bitterroot Valley and killed a calf in October.

Stony Creek: A pack of 8 wolves were confirmed west of Philipsburg in early 2012. They were found after the deadline to include new packs in the table and maps for this 2011 report so are counted in the table as miscellaneous wolves only.

Suspected Packs in Montana CID

East Pioneers area: FWP received reports of wolves in several areas of the East Pioneers. Further work is needed to determine whether a new pack is establishing in the area or if dispersers were passing through.

Doran Point: FWP received reports of several gray wolves between Doran Point and Sula Peak and the French Basin area in the East Fork of the Bitterroot. Two gray wolves were confirmed to have killed a calf near Sula Peak in October but it is unknown whether they are holding a territory and if there are more wolves associated with these two.

Miller Creek: FWP received some reports of wolf activity in the Miller Creek and Davis Creek areas that were thought to not be associated with the Welcome Creek pack. Parts of the area were surveyed but it could not be confirmed that a new pack resides in the area.

Other Miscellaneous Information in Montana CID

Grant Area: One buck sheep was confirmed as killed by a wolf. A collar and release and initial response was authorized to learn more about wolf activity in the area.

Kidd Area: Six calves were confirmed as killed by a wolf or wolves in this area. A collar and release and initial response was authorized to learn more about wolf activity in the area.

Mill Creek (Bitterroot): Three wolves were killed by a sheep rancher in the Bitterroot near Mill Creek under state DOP provisions. In one instance, a breeding female wolf was killed after killing a lamb. Two other large pups were killed later in the year when they were caught harassing the sheep. There was a large male wolf killed earlier in the year when it was caught attacking a dog just west of Hamilton. It is unknown whether this male wolf was associated with the others but it seemed likely given the proximity. There was thought to be at least one pup left in the area but by the end of the year there was no known activity. This appeared to have been a new pair with pups trying to establish in the area.

Southwestern Montana Montana Portion of the Greater Yellowstone Experimental Area (GYA)

Overview

Packs in the Montana portion of the GYA were documented from Red Lodge to Dillon. Several packs live on the borders of YNP. Agencies (YNP, FWP), primarily monitor these packs through

flights and ground tracking. The location of the den site and the percent of time in an area determines where that pack will be tallied in the population estimates.

In 2011, the minimum estimate was 139 wolves in 22 verified packs, 10 of which qualified as a breeding pair. This represents a small increase in the minimum population estimate from the 118 wolves and 19 packs in 2010. The number of breeding pairs in 2011 was also higher than the 6 pairs documented in 2010. Eight new packs were documented in 2011. They were: Elephant Rock, Slip n' Slide, Fridley, Steamboat Peak, Hogback, Brackett Creek, Price Creek, and Poison. Packs that were verified in 2010 and still existed in 2011 were: Rosebud, Baker Mountain, Mill Creek, Lebo Peak, Beartrap, Toadflax, Cougar 2, Hayden, Table Mountain, Snowshoe, Wilson Creek, Meadow Creek, Elkhorn, and Madison packs. Efforts to document the Buffalo Fork, Eagle Creek, and the Snowy pack indicated there was not enough evidence to confirm the packs were still intact and maintaining territories.

One border pack was shared with Idaho and YNP (Madison) and counted in the 2011 MT population. This pack shifted its territory from YNP in 2010 and now holds a territory on the YNP-Montana-Idaho borders. Three other border packs are shared with YNP (Quadrant, Cougar2 and Hayden) and are counted in the MT population.

The number of collared wolves and the number of wolf packs with at least 1 member radio collared varies throughout the year as new wolves are collared. Additionally, the total number changes as collared wolves die, radio collars malfunction, or collared wolves disperse and are not relocated. At the end of 2011, 11 of 22 (50%) verified packs were being monitored using ground and aerial telemetry. Radio-collared wolves were located 1-2 times per month by fixed-wing aircraft and ground telemetry.

In 2011, 5 of the total 22 packs that did exist at one time during the year (23%) were confirmed to have killed livestock (Table 1b), resulting in the lethal removal of 20 total wolves. This represents a small decrease in the number of packs involved in depredation incidents from 2010. A total of 24 cattle were confirmed as definite wolf kills, 8 of which were killed by lone/miscellaneous wolves. Of the total sheep death loss confirmed statewide in 2011 (12 total sheep), about 17% of the death loss was attributed to miscellaneous lone wolves in the Montana portion of the GYA (2 sheep total for the GYA). In addition to the 18 wolves controlled, 1 lone wolf with no pack affiliation was killed in defense of property near Hammond, Montana and 1 was killed by a private citizen under the Defense of Property statute (federal 10j). One pack was eliminated due to chronic livestock conflicts (Poison pack), whereas 4 and 3 were eliminated respectively 2010 and 2009. No wolves were killed under shoot on sight permits issued to livestock producers in the GYA.

Fifty-eight total mortalities were documented in 2011. All but 2 were attributed to some form of human cause including: 30 legally harvested, 20 lethally removed in control actions (8 of those 20 were from the Poison Pack that was removed entirely), 1 killed by a hot downed power line (electrocution), 3 killed in vehicle collisions, 2 killed illegally. Two wolves died of natural causes (mange and an injury). All control action and legally harvested mortalities are precise numbers, while the number of mortalities from all other causes is a minimum observed. Because

mortality counts and total population counts are incomplete, actual mortality rates cannot be determined.

Miscellaneous/ Lone individuals in Montana GYA

Broadus area (southeastern MT): At least 2 wolves were confirmed to be present in the area surrounding Broadus in 2011. FWP received reports and photos of a collared black wolf throughout spring and summer of 2011, and conducted a telemetry flight to attempt to locate the radio frequency of this wolf. Though the survey flight did not yield any notable information, in November 2011, what was likely this collared black wolf was legally shot under the defense of property law near Hammond after killing 1 sheep and injuring another that later had to be euthanized. This wolf was identified as a 2.5 year old collared black male that dispersed at least 300 straight line miles from where it was collared in the Jackson, Wyoming area. Separate reports of a gray wolf were confirmed through photos taken near Broadus in the summer of 2011.

Gardiner basin: A collared male from the Quadrant pack (YNP border pack; 695M) dispersed in the fall of 2011, travelling a short distance before dying from complications of an apparent infection around a broken leg bone.

A collared black female loner, originally from the Leopold pack (YNP pack; 470F) died of natural causes and exposure related to mange and poor condition late January of 2011.

Suspected packs in Montana GYA

Adel Mountains: FWP received a small number of reports of wolves in the Adel Mountains. Field efforts are ongoing to determine whether a pack is establishing or if dispersers were passing through.

Big Belts: FWP received a small number of reports of wolves in the Big Belt Mountains. Field efforts are ongoing to determine whether a pack is establishing or if dispersers were passing through.

Highwood Mountains: FWP received a small number of reports of wolves in the Highwood Mountains. Field efforts are ongoing to determine whether a pack is establishing or if dispersers were passing through.

Bull Mountains: FWP received a small number of reports of wolves in the Bull Mountains. Field efforts are ongoing to determine whether a pack is establishing or if dispersers were passing through.

North Little Belts: FWP received a small number of reports of wolves in the north end of the Little Belt Mountains. Field efforts are ongoing to determine whether a pack is establishing or if dispersers were passing through.

Snowy Mountains: FWP received a small number of unverified reports of 1-2 wolves in the Snowy Mountains. Field efforts are ongoing to determine whether a pack is established or wolves in this area are dispersers passing through.

NW Crazy Mountains: FWP received a small number of unverified reports during the 2011 hunting season of 2 wolves in the northwest portion of the Crazies. Investigations into whether this is a new pair of wolves or the existing Lebo pack will be ongoing.

Miscellaneous/ Lone individuals

Other miscellaneous information for the Montana portion of the GYA

Elkhorns: Two calves and 1 cow were confirmed as killed by a wolf or wolves in separate incidents. A collar and release and initial response was authorized to learn more about wolf activity in the area. One lion dog was confirmed as killed by wolves, no action was authorized.

Raynesford: One calf was confirmed as killed by a wolf. A collar and release was authorized to learn more about wolf activity in the area.

Blacktail / Sweetwater: WS investigated 3 depredation events in the upper Blacktail and Sweetwater area. Field efforts are ongoing to determine whether a pack is established or not.

North Gravelly Mountains: WS investigated 2 depredation events in the area of the North Gravelly Mountains. Field efforts are ongoing to determine whether a pack is established or not.

OUTREACH AND EDUCATION

FWP's wolf program outreach and education efforts are varied, but significant. Outreach activities take a variety of forms including; field site visits, phone and email conversations to share information and answer questions, media interviews, formal and informal presentations. FWP also prepared and distributed a variety of printed outreach materials and media releases to help Montanans become more familiar with the Montana wolf population and the state plan. A new "Living with Wolves" pamphlet was developed by wolf program staff.

An increasingly important aspect of outreach is the Internet. In 2011, the FWP website hosted 309 pages with wolf program content. On average these pages were viewed over 600 times a day for a total of more than 250,000 visits. This is a two fold increase since 2010.

The "Report a Wolf" application continued to generate valuable information from the public in monitoring efforts for existing packs and documenting wolf activity in new areas. Several hundred reports were received through the website. Countless more were received via postal mail and over the phone.

Most wolf program staff spent some time at hunter check stations in FWP Regions 1-5 to talk with hunters about wolves, wolf management, and their hunting experiences.

LAW ENFORCEMENT

All wolf mortalities that are not the result of an authorized agency lethal control, a shoot on sight permit, a legal sport harvest, a vehicle/train strike or apparent natural causes, are reported to law enforcement personnel. These mortalities are under investigation until a full determination is made regarding cause of death and any potential criminal activity.

The USFWS Office of Law Enforcement was the lead agency to investigate wolf deaths until delisting in May 2011. Upon delisting, FWP personnel led law enforcement efforts for state-based laws, rules, and FWP Commission regulations including the 2011 wolf hunting season.

Two cases of illegal take during the 2011 hunting season were investigated by FWP enforcement. Criminal charges were filed in both cases and the 2 individuals involved were convicted and fined. A third case for take of a wolf in a closed season is still under investigation.

FUNDING

Montana Fish, Wildlife & Parks

A new five-year funding agreement between the USFWS and FWP was signed in 2011, and \$625,000 was obligated for Federal Fiscal Year 2011 (includes indirect costs). In the 2011 Montana Legislative session, House Bill 363 became law. This law requires that a wolf management account be set up and that all wolf license revenue be deposited into this account for wolf collaring and control. Specifically, it states that subject to appropriation by the legislature, money deposited in the account must be used exclusively for the management of wolves and must be equally divided and allocated for the following purposes:

- (a) wolf-collaring activities conducted pursuant to 87-5-132; and
- (b) lethal action conducted pursuant to 87-1-217 to take problem wolves that attack livestock.

Senate Bill 348 also passed during the 2011 Montana Legislative session. SB 348 requires FWP to allocate \$900,000 toward wolf management. "Management" includes the entire range of activities that constitute a modern scientific resource program, including but not limited to research, census, law enforcement, habitat improvement, control, and education. The term also includes the periodic protection of species or populations as well as regulated taking.

In summary, wolf management funding for state fiscal year 2012 consists of the \$625,000 of federal money from the USFWS cooperative agreement, and \$275,000 of state license dollars, including \$163,000 allocated per House Bill 363.

Funding is and will primarily be used to pay for FWP's field presence to implement population monitoring, collaring, outreach, and livestock depredation response. In addition to the ongoing

efforts by Montana FWP wolf specialists, additional efforts to meet the intent of SB 348 and HB 363 include:

- The addition of a full-time specialist that will be based in Region 4, with direction to increase collaring efforts in wolf packs associated with livestock. The focus will be the Rocky Mountain Front south to Helena, including the Elkhorns and Big Belts. The wolf program will have a total of 5.5+ FTE in fiscal year 2012 (wolf specialists dedicated to wolf management plus seasonal technicians and volunteers).
- The new hire in Region 4 will free up time for the Butte area wolf specialist to increase monitoring, collaring, conflict prevention and conflict management efforts in southwest Montana.
- Additional FTE for technicians in Region 1 and Region 2 to increase collaring efforts in wolf packs associated with livestock.
- Dedicated funding for aerial darting and collaring of wolves in the Madison, Gallatin, and Yellowstone drainages where conflicts with grizzly bears limit trapping and collaring efforts.
- Renewed agreement with Wildlife Services and commitment of \$110,000 towards wolf management efforts.

Other management services provided by FWP include law enforcement, harvest/quota monitoring, legal support, public outreach and overall program administration. Exact cost figures have not been quantified for the value of these services.

USDA Wildlife Services

Wildlife Services is the federal agency which assists FWP with wolf damage management. WS personnel conduct investigations of injured or dead livestock to determine if it was a predation event and, if so, what predator species was responsible for the damage. Based on WS determination, livestock owners may be eligible to receive reimbursement through the Montana Livestock Loss Program. If WS determines that the livestock depredation was a confirmed wolf kill or was a probable wolf kill, the livestock owner is eligible for 100% reimbursement on the value of the livestock killed based on USDA market value at the time of the investigation.

Under an MOU with FWP, WS conducts the control actions on wolves as authorized by FWP. Control actions may include radio-collaring and/or lethal removal of wolves implicated in livestock depredation events. FWP also authorizes WS to opportunistically radio-collar wolf packs that do not have an operational radio-collar attached to a member of the pack.

As a federal agency, WS receives federal appropriated funds for predator damage management activities but no funding directed specifically for wolf damage management. Prior to Federal Fiscal Year (FFY) 2011, the WS Program in Montana did receive approximately \$250,000 through the Tri-State Predator Control Earmark, some of which was utilized for wolf damage management operations. However, that earmark was completely removed from the federal budget for FFY 2011 and not replaced in FFY 2012.

In FFY 2011, WS spent \$311,417 conducting wolf damage management in Montana (not including administrative costs), a \$130,866 decrease from the total spent in FFY 2010. The FFY 2011 expenditure included \$182,995 Federal appropriations, \$110,000 from FWP, and \$18,422 from Montana livestock producers.

PERSONNEL AND ACKNOWLEDGEMENTS

The 2011 FWP wolf team was comprised of Kent Laudon, Mike Ross, Liz Bradley, Nathan Lance, and Abigail Nelson. The wolf team is part of a much bigger team of agency professionals that make up Montana Fish, Wildlife & Parks including regional biologists, game wardens, information officers, front desk staff, and program managers who contribute their time and expertise. FWP Helena and Wildlife Health Lab staff contributed time and expertise including Ron Aasheim, Neil Anderson, Justin Gude, Lauri Hanauska-Brown, Jeff Herbert (retired), Quentin Kujala, Bob Lane, Ken McDonald, Adam Messer, Tom Palmer, Kevin Podruzny, Jennifer Ramsey, and Martha Williams. Laura Geary and Kristina Skogen assisted with the editing and formatting of this report. Carolyn Sime assisted the program in early 2011 by helping complete the 2010 annual wolf report but left the agency mid-year to pursue a law degree.

In 2011, the Montana wolf management program benefited from the contributions of seasonal technicians, Ty Smucker and Alan Whitehead, who excelled at their jobs and contributed enormously. The Montana wolf management volunteer program was very fortunate to have Lynn Evans, Rachael Panning, Geri Werhahn, Janina Bradley, George Smith, and George Rowan. We also want to thank Adam Leiberg and the Northwest Connections for their avid interest and help in documenting wolf presence and outreach in the Swan River Valley. We also want to thank Seth Wilson and the Blackfoot Challenge for their contributions and efforts toward monitoring wolves in the Blackfoot Valley.

Confederated Salish and Kootenai Tribal biologist Stacey Courville and Blackfeet Tribal biologist Dan Carney captured and monitored wolves in and around their respective tribal reservations.

We acknowledge the work of the citizen-based Montana Livestock Loss Board which oversees implementation of Montana's reimbursement program and its coordinator, George Edwards.

USFWS personnel in Montana included wolf recovery coordinator Ed Bangs (retired) and federal law enforcement agents.

USDA APHIS WS investigates all suspected wolf depredations on livestock and under the authority of FWP, carries out all livestock depredation-related wolf damage management activities in Montana. We thank them for contributing their expertise to the state's wolf program and for their willingness to complete investigations and carry out lethal control and radio-collaring activities in a timely fashion. We also thank WS for assisting with monitoring wolves in Montana. WS personnel involved in wolf management in Montana in 2011 included the state director John Steuber, western district supervisor Kraig Glazier, eastern district supervisor Mike Foster, western assistant district supervisor Chad Hoover, eastern assistant district supervisor

Alan Brown, wildlife disease biologist Jerry Wiscomb, helicopter pilots Tim Graff and Eric Waldorf, helicopter/airplane pilot Stan Colton, wildlife specialists Denny Biggs, John Bouchard, Jordan Brinkerhoff, Joe Carpenter, Steve DeMers, Rick Glover, Mike Hoggan, John Maetzold, Dick Marten, Graeme McDougal, Brian Nofsker, Ted North, Jim Rost, Bart Smith, Pat Sinclair, Jim Stevens, Mike Thomas, and Dan Thomason.

The Montana Wolf Management program field operations also benefited in a multitude of ways from the continued cooperation and collaboration 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, Turner Endangered Species Fund, People and Carnivores, Wildlife Conservation Society, Keystone Conservation, Boulder Watershed Group, Big Hole Watershed Working Group, the Madison Valley Ranchlands Group, the upper Yellowstone Watershed group, the Blackfoot Challenge, and the Granite County Headwaters Working 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 situations. They include Joe Rahn (FWP pilot), Greg Thielman (FWP pilot), Trever Throop (FWP pilot), Neil Cadwell (FWP pilot), Jim Pierce (Red Eagle Aviation, Kalispell), Roger Stradley (Gallatin Flying Service, Belgrade), Steve Ard (Tracker Aviation Inc., Belgrade), Lowell Hanson (Piedmont Air Services, Helena), Joe Rimensberger (Osprey Aviation, Hamilton), and Mark Duffy (Central Helicopters, Bozeman).

LITERATURE CITED

- Jimenez, M.D., E. E. Bangs, Carolyn Sime, and V. Asher. 2010. Sarcoptic mange found in wolves in the Rocky Mountains in western United States. *J. Wildlife Disease* 46:1120-1125.
- Mitchell, M. S., D. E. Ausband, C. A. Sime, E. E. Bangs, J. A. Gude, M. D. Jiminez, C. M. Mack, T. J. Meier, M. S. Nadeau, and D. W. Smith. 2008. Estimation of self-sustaining packs of wolves in the U.S. northern Rocky Mountains. *J. Wildlife Management* 72:881-891.

APPENDIX 1

MONTANA CONTACT INFORMATION

Montana Fish, Wildlife & Parks

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

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

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

Abby Nelson
Montana Fish, Wildlife & Parks
Wolf Management Specialist, Livingston
406-600-5150
abnelson@mt.gov

Nathan Lance
Montana Fish, Wildlife & Parks
Wolf Management Specialist, Butte
nlance@mt.gov
406-425-3355

Lauri Hanauska-Brown
Montana Fish, Wildlife & Parks
Nongame/T & E Section Manager
406-444-5209
lhanauska-brown@mt.gov

Quentin Kujala
Montana Fish, Wildlife & Parks
Management Section Manager
406-444-5672
qkujala@mt.gov

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

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

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

Mike Foster
USDA WS East District Supervisor, Columbus
(406) 657-6464 (w)

TO REPORT A DEAD WOLF OR POSSIBLE ILLEGAL ACTIVITY:

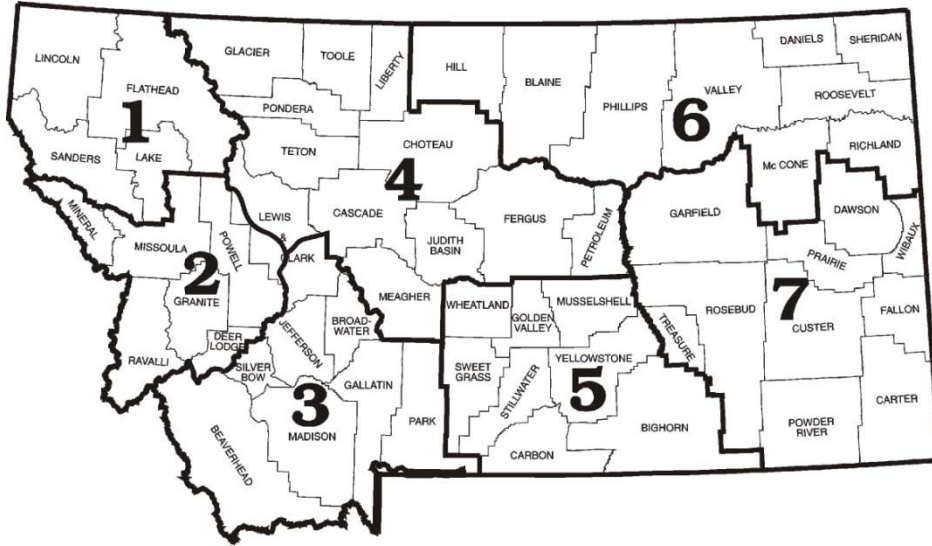
Montana Fish, Wildlife & Parks

- Dial 1-800-TIP-MONT (1-800-847-6668) or local game warden

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

- <http://fwp.mt.gov/fishAndWildlife/management/wolf/>

MONTANA FISH WILDLIFE & PARKS ADMINISTRATIVE REGIONS



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

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

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

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

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

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

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

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

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

APPENDIX 2

Gray Wolf Chronology in Montana

2011

- In April, President Obama signed the Department of Defense and Full-Year Appropriations Act, 2011. A section of that Appropriations Act directed the Secretary of the Interior to reissue within 60 days of enactment the final rule published on April 2, 2009, that identified the Northern Rocky Mountain (NRM) population of gray wolf (*Canis lupus*) as a distinct population segment (DPS) and to revise the List of Endangered and Threatened Wildlife by removing most of the gray wolves in the DPS.
- May 5, the USFWS published the final delisting rule which designates the NRM distinct population segment and delisted the gray wolf throughout the DPS except WY. Wolves in MT are classified as a species in need of management statewide under Montana law; state rules and the state management plan take full effect. The Service and the states will monitor wolf populations in the Northern Rocky Mountain DPS and gather population data for at least five years.
- In May, the FWP Commission proposed regulations for a 2011 take season. Public comment was taken during June.
- In June, Alliance for the Wild Rockies, Friends of the Clearwater, Wildearth Guardians, Center for Biological Diversity, Cascadia Wildlands, and Western Watersheds Project filed a lawsuit challenging the constitutionality of the Congressional rider under the Separation of Powers clause of the U.S. Constitution. The lawsuit was filed in the Missoula Federal District Court. FWP submitted amicus curiae briefs.
- Commission adopted the 2011 wolf quotas in July. The statewide quota was 220.
- August 3, Judge Molloy upheld the constitutionality of the Congressional rider delisting wolves throughout the DPS except WY.
- August 8, the group of plaintiffs composed of the Alliance for the Wild Rockies, Friends of the Clearwater, and Wildearth Guardians filed a notice of appeal to the 9th Circuit.
- August 12, the second group of plaintiffs, Center for Biological Diversity, Cascadia Wildlands, and Western Watersheds Project, filed a notice of appeal to the 9th Circuit challenging Judge Molloy's decision.
- In August, Secretary of the Interior Ken Salazar and U.S. Fish and Wildlife Service Director Dan Ashe announced that the Service had reached an agreement that if implemented would promote the management of a stable, sustainable population of wolves and pave the way for the Service to return wolf management to Wyoming.
- August 8, wolf license sales began in Montana.
- In August, The Alliance for the Wild Rockies group of plaintiffs made an emergency motion for an injunction in the 9th Circuit to stop the wolf hunt.
- In August, The State of Montana and the FWP filed an amicus curiae brief in support of the federal Defendants and Appellees, Ken Salazar, Dan Ashe, and the United States Fish and Wildlife Service (Federal Defendants) opposition to the emergency motion to stop the planned wolf hunting season in Montana and Idaho.
- September 3, archery hunting opens in all of the 14 wolf management units in Montana. Archery and general season hunts scheduled to end December 31 in all 14 units.
- In December, the Montana Fish, Wildlife and Parks Commission extends the wolf season in any units with unmet quotas to February 15, 2012
- December 31, 121 wolves legally harvested in Montana during the 2011 season. Season remains open until February 15, 2012 in all but 2 of the 14 units.

- An estimated minimum of 653 wolves with 39 breeding pairs are counted in Montana. Distribution continues to be primarily in the western one-third of Montana.

APPENDIX 3

RESEARCH, FIELD STUDIES, AND PROJECT PUBLICATIONS

Each year in Montana, there are a variety of wolf-related research projects and field studies in varying degrees of development, implementation, or completion. These efforts range from wolf ecology, predator-prey relationships, wolf-livestock relationships, policy, or wolf management. Additionally, the findings of some completed projects get published. The 2011 efforts are summarized below.

Survival rates in Rocky Mountain wolves

Graduate Student: Jack Massey

Collaborators: Imperial London of College, Northern Rocky Mountains wolf team

Project summary: Datasets were compiled on radio-collared wolf sightings from state-wide studies in Idaho, Wyoming and Montana and from the Yellowstone National Park wolf study. We used data collected from 2005 to present and our results focus on patterns of wolf survival rates over this period. One goal of this work is to link the most recent data to the survival analysis published with data from 1982-2004.

Scat and stable isotope analysis of summer wolf diet

Graduate Student: Jonathan J. Derbridge, University of Montana

Committee Chair: Dr. Paul Krausman, University of Montana

Collaborators: Chris Darimont, Department of Environmental Studies, University of California, Santa Cruz

Wolf (*Canis lupus*) diet can be estimated from undigested remains of prey in scats or through stable isotope analysis (SIA) of wolf hair when distinct $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values of potential diet sources are known. Our objectives were to compare diet analysis methods, to estimate intra-population diet variability, and to determine proportions of prey consumed by wolves. We collected scats of 4 wolf packs in northwest Montana from June to August 2008, and guard hairs of 45 wolves from 12 packs, May to August 2009. We calculated percent biomass of consumed deer (*Odocoileus* spp.), elk (*Cervus canadensis*), moose (*Alces alces*), and other items from scats, and used Pearson's chi-squared tests of proportions to measure differences among packs. We used hierarchical Bayesian stable isotope mixing models to determine diet and scales of diet variation from $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values of wolves and prey. We used bootstrapped scat data, and Markov Chain Monte Carlo simulation data from stable isotopes to estimate confidence intervals of difference between results from each technique for 4 packs with matched samples. Diet results were not consistent between techniques. Deer was the most common prey item based on scats, and moose the most common based on SIA. Wolf diet was significantly different among packs based on scats, and differences among packs explained most variability in diet based on stable isotopes. We sampled 3 times as many packs for less than half the cost with SIA compared to

scat analysis. Experimental data on wolf hair growth period and wolf-specific $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ fractionation values would provide important information for recommending the better technique.

Wolf depredation recurrence after full pack, partial pack, and no lethal removal in MT, ID, and WY

Investigators: Liz Bradley, Carolyn Sime, Kent Laudon, Mike Ross, and Nathan Lance (MT FWP), Hugh Robinson (University of Montana), Ed Bangs and Mike Jimenez (U.S. Fish & Wildlife Service), Todd Grimm (USDA Wildlife Services), Curt Mack (Nez Perce Tribe), Steve Nadeau and Jon Rachel (Idaho Fish & Game).

In prep. This paper examines and compares the efficacy of different management strategies in response to confirmed livestock depredations in Montana, Idaho, and Wyoming. More specifically we compare instances of incremental wolf removal, full pack removal, and no removal by looking at the time interval between confirmed depredations after each treatment. The dataset spans Montana, Idaho, and Wyoming from 1989-2008 and focuses on depredations by established packs. Analysis units are state boundaries and federal recovery areas.

Food Web Complexity in a Large Mammal System (formerly Trophic Cascades Involving Humans, Wolves, Elk, and Aspen in the Crown of the Continent Ecosystem)

Graduate Student: Cristina Eisenberg, Boone and Crockett Club Fellow

Committee Chair: Dr. David E. Hibbs, Oregon State University, Corvallis

Project Summary: We compared trophic cascades dynamics and mechanisms in three Valleys in the Crown of the Continent Ecosystem, which have three different wolf population levels. We measured elk resource selection, elk vigilance, and aspen recruitment within a tri-trophic wolves-elk-aspen (*Canis lupus*; *Cervus elaphus*, *Populus tremuloides*) model. We further examined the effects of human land use on these relationships. We stratified our observations across three spatially distinct areas, the North Fork Valley in the western portion of Glacier National Park (GNP), Montana; the Waterton Valley in the eastern portion of Waterton Lakes National Park, Alberta; and the Saint Mary Valley in the eastern portion of GNP. These Valleys have three different wolf population levels (North Fork: high; Waterton: moderate; Saint Mary: low), which represent three levels of long-term predation risk (the probability of an elk encountering a wolf).

Project Activity in 2011: No further data were gathered in 2011. The year's activities focused on analysis. Dissertation defense scheduled for February 2012.

Results: To examine elk resource selection, we created a set of predictive models that incorporated biotic (bottom-up) and predation risk (top-down) variables. Predation risk variables had a negative effect on elk resource selection, and elk avoided aspen, which suggests a trophic cascade. However, elk spent more time in burned versus unburned sites, regardless of a high wolf population. We further found that bottom-up and top-down forces work together in Valleys that contain a well-established wolf population, and to a lesser degree in a Valley with a low

wolf population. In sum, we conclude that elk show complex responses to long-term risk on multiple levels and that wolf population effects are non-linear.

While we found the highest elk vigilance in the North Fork and the lowest in Saint Mary (high to low wolf numbers), a careful analysis of the factors that can contribute to vigilance revealed a much more complex picture. We deconstructed vigilance by examining the variables that make up predation risk in these Valleys and fitted a model that incorporated those variables. Our findings suggest that at a low level of long-term predation risk (Saint Mary), elk do not respond to drivers of vigilance, and a low wolf population may not be ecologically effective. Where a high wolf population exists (North Fork), elk do not exhibit a uniform or expected response to all factors that can modify predation risk, such as group size, possibly due to adaptive decision-making. Where wolves have a more variable presence (Waterton), elk show a more convincing response to predation risk variables such as group size and impediments to detecting and escaping wolves. Thus, the effects of wolf population and the apparent association between vigilance and some predictors of vigilance are non-linear. While wolves are driving elk vigilance, other factors may be modifying this complex relationship.

Aspen in the three valleys exhibited a gradient in browse, with Saint Mary having the highest proportion of browse. Waterton had less browse than Saint Mary, and the North Fork the least. Browse was not significantly different in proportion within each Valley by stand size, interior versus exterior plots, heat load, or, in the North Fork, in stands with fire vs. stands with no fire. North Fork stands with fire had significantly more recruitment than stands with no fire. While bottom-up processes (e.g., fire) stimulate aspen regeneration, in the North Fork we did not find significantly higher stem density in stands with fire than in stands with no fire, with the exception of recruiting stems. This suggests a trophic cascade, although lack of a significant difference in browse between burned and unburned stands in this Valley may suggest lack of top-down (e.g., wolf) effects on elk. Low aspen recruitment in North Fork stands with no fire but a high wolf population may indicate lack of an ecologically effective wolf population. Further, in this Valley, top-down and bottom-up effects may combine to create a trophic trickle: even a high wolf population may not be indirectly structuring aspen stands via trophic cascades.

Predicting abundance of gray wolves in Montana using patch occupancy models based on hunter surveys and pack observations

Investigators: Lindsey Rich, University of Montana, Montana Cooperative Wildlife Research Unit, Dr. Betsy Glenn, U.S. Fish and Wildlife Service, Dr. Michael Mitchell, Montana Cooperative Wildlife Research Unit

Collaborators: Dr. Robin Russell, U.S. Geological Survey; Kevin Podruzny, Kent Laudon, Justin Gude, and Carolyn Sime, Montana Fish, Wildlife & Parks; David Ausband, University of Montana, Montana Cooperative Wildlife Research Unit; Dr. James D. Nichols, U.S. Geological Survey

Reliable knowledge of the status and trend of carnivore populations is critical to their conservation and management. Methods for monitoring carnivores, however, are challenging to conduct across large spatial scales. In the Northern Rocky Mountains, wildlife managers need a time- and cost-efficient method for monitoring gray wolf (*Canis lupus*) populations. Montana

Fish, Wildlife and Parks (FWP) conducts annual telephone surveys of >50,000 deer and elk hunters. We explored how survey data on hunter's sightings of wolves and known pack size distributions could be incorporated into occupancy models to estimate wolf pack occupancy and predict the abundance and distribution of wolf packs, individual wolves, and breeding pairs in Montana for 2007-2009. We assessed model accuracy by comparing our predictions to FWP minimum known number of wolf packs, wolves, and breeding pairs. We minimized false positive detections by identifying a patch as occupied if 2-25 wolves were detected by ≥ 3 hunters. Overall, occupancy estimates of the distribution of wolf packs were consistent with known distributions. Our predictions of number of wolf packs exceeded FWP minimum counts by 20-45% and our predictions of numbers of wolves and breeding pairs were considerably larger than minimums. Our results indicate occupancy models based on public sightings and known pack sizes can be used to monitor territorial carnivores across large areas where alternative methods may be limited by personnel, time, accessibility, and budget constraints. Additionally, models such as these can be used to monitor population trends, changes in spatial distribution, and to document new individuals or groups.

The economic impacts of wolves on calf production on western Montana cattle ranches: Beyond direct depredation

Graduate Student: Joseph Ramler

Committee Chair: Dr. Derek Kellenberg, University of Montana Department of Economics

Collaborators: Dr. Mark Hebblewhite, Carolyn Sime

Many factors affect calf weight gain efficiency. Some of these factors, such as breed and genetic selection, the use of growth hormones, or other ranch specific husbandry practices are controllable by ranchers. Others, such as changes in annual temperature, snowfall, or rainfall are not controllable by ranchers but can substantially affect the quality and availability of forage that is necessary for productive calf weight gain. Taking these and other measurable factors of calf weight gain into account, this paper looks at whether or not an additional factor, the presence of wolves on ranch grazing allotments, has an effect on yearly average calf weight.

A sample of 18 western Montana cow-calf operations was analyzed over a 16 year (1995-2010) time period. Controlling for calf sex, calf breed, and year fixed effects, a vector of variables that changed both across ranches and over time were used to explain the variation in yearly average calf weaning weights on sample ranches. Many of the predicted variables such as growth hormones, calf age, annual aggregate precipitation, annual aggregate snowfall, annual average temperature, and the standard deviation of NDVI (a measure of the growing season on a particular ranch) were found to be significant factors affecting calf weight gain. In addition, two metrics to account for wolf presence on ranches were also tested. The first measure, based on yearly estimated wolf home range data, was found to have an insignificant effect on average calf weight. The second measure of wolf presence was based on whether or not a sample ranch had at least one Federal Wildlife Service (WS) confirmed wolf depredation on the ranch in a given year. This measure of wolf presence was found to have a significant and negative marginal effect on yearly average calf weight. The results of this research suggest that, all else equal,

ranches that experienced at least one WS confirmed depredation had calf weaning weights that were approximately 20 lbs. lighter per calf than ranches that did not have a WS confirmed wolf depredation in the same year. For the average ranch in the sample, which runs about 260 calves per year, the indirect cost of a 20 lb. per calf loss due to wolf depredation implies an indirect loss in revenue of approximately \$5,980.

The results suggest that among this western Montana sample there is insufficient evidence to conclude that wolves simply being on a ranch have any indirect effects on calf weight gain. However, ranches that have experienced confirmed wolf depredations, indicating aggressive wolf behavior, have experienced statistically significant negative marginal impacts on calf weight gain. Further, the magnitude of this weight loss suggests that the economic impact of these indirect effects may represent a more substantial loss in revenue for ranchers than the cost of the depredation itself.

Anthropogenic mortality, intraspecific competition, and prey availability influence territory sizes of wolves in Montana

Investigators: Lindsey Rich and Dr. Michael Mitchell, University of Montana, Montana Cooperative Wildlife Research Unit, Carolyn Sime and Justin Gude, Montana Fish, Wildlife and Parks

Territoriality in animals is of both theoretical and conservation interest. Animals are territorial when benefits of exclusive access to a limiting resource outweigh costs of maintaining and defending it. The size of territories can be considered a function of ecological factors that affect this benefit-cost ratio. Previous research has shown that territory sizes for wolves (*Canis lupus*) are largely determined by available biomass of prey, and possibly pack size and density of neighboring wolf packs, but has not been interpreted in a benefit-cost framework. Such a framework is relevant for wolves living in the northern Rocky Mountains where conflicts with humans increase mortality, thereby potentially increasing costs of being territorial and using prey resources located near humans. We estimated territory sizes for 38 wolf packs in Montana from 2008-2009 using 90% adaptive kernels. We then created generalized linear models (GLM) representing combinations of ecological factors hypothesized to affect the territory sizes of wolf packs. Our top GLM, which had good model fit ($R^2 = 0.68$, $P < 0.0005$), suggested that territory sizes of wolves in Montana were positively related to terrain ruggedness, lethal controls, and human density and negatively related to number of surrounding packs relative to the size of the territory. We found that the top GLM successfully predicted territory sizes ($R^2 = 0.53$, $P < 0.0005$) using a jack-knife approach. Our study shows territory sizes of group-living carnivores are influenced by not only intra-specific competition and availability of limiting resources, but also by anthropogenic threats to the group's survival, which could have important consequences where these territorial carnivores come into conflict with humans.

Wolf population dynamics in the U.S. Northern Rocky Mountains are affected by recruitment and human-caused mortality

Investigators: Justin Gude and Carolyn Sime, Montana Fish, Wildlife and Parks; Dr. Michael Mitchell, Montana Cooperative Wildlife Research Unit; Dr. Robin Russell and Dr. L. David

Mech, U.S. Geological Survey; Ed Bangs, U.S. Fish and Wildlife Service, and Dr. Bob Ream, Montana Fish, Wildlife and Parks Commission

Reliable analyses can help wildlife managers make good decisions, which are particularly critical for controversial decisions such as wolf (*Canis lupus*) harvest. Creel and Rotella (2010) recently predicted substantial population declines in Montana wolf populations due to harvest, in contrast to predictions made by Montana Fish, Wildlife and Parks (FWP). We replicated their analyses considering only those years in which field monitoring was consistent, and we considered the effect of annual variation in recruitment on wolf population growth. Rather than assuming constant rates, we used model selection methods to evaluate and incorporate models of factors driving recruitment and human-caused mortality rates in wolf populations in the Northern Rocky Mountains. Using data from 27 area-years of intensive wolf monitoring, we show that variation in both recruitment and human-caused mortality affect annual wolf population growth rates and that human-caused mortality rates have increased with the sizes of wolf populations. We document that recruitment rates have decreased over time, and we speculate that rates have decreased with increasing population sizes and/or that the ability of current field resources to document recruitment rates has recently become less successful as the number of wolves in the region has increased. Estimates of positive wolf population growth in Montana from our top models are consistent with field observations and estimates previously made by FWP for 2008–2010, whereas the predictions for declining wolf populations of Creel and Rotella (2010) are not. Familiarity with limitations of raw data, obtained first-hand or through consultation with scientists who collected the data, helps generate more reliable inferences and conclusions in analyses of publicly available datasets. Additionally, development of efficient monitoring methods for wolves is a pressing need, so that analyses such as ours will be possible in future years when fewer resources will be available for monitoring.

Bitterroot elk project

Investigators: Dr. Kelly Proffitt, Craig Jourdonnais, Ben Jimenez, Liz Bradley, Mike Thompson, and Justin Gude, Montana Fish, Wildlife and Parks, Dr. Mark Hebblewhite, Sonja Christiansen, University of Montana

During February 2011, we captured 44 adult female elk and outfitted elk with a radio collar that collects a GPS location every 2-hours and sends a mortality signal if the collar is inactive for 4-hours. Four elk have died and one collar failed shortly after capture. Collars are built to drop-off in mid- January 2012 and location data will be retrieved. Additionally, 20 new GPS collars were deployed on adult female elk in late November, 2011.

During capture, we collected blood samples to determine pregnancy status and screen for exposure to disease. Laboratory results indicated that to date in the upper West Fork, 59 % (n= 22) of females were pregnant. In the East Fork, 90% (n = 40) of females were pregnant. This is consistent with the fact that to date, elk captured in the East Fork have displayed significantly better body condition scores and higher percent ingesta-free body fat percentage estimates than animals captured in the West Fork.

In late-May and early June, we initiated an elk calf survival study with goals of estimating calf survival rates from birth through age 1 and cause-specific mortality in the presence of competing mortality risk. A total of 66 neonatal elk calves were captured in the East Fork and West Fork. As of fall 2011, 42% of the eartags deployed on calves remain active on live calves, 24% have been recovered with no sign of a mortality event (potential tag loss), and 33% have been recovered from confirmed mortalities. Mortality sources include lion predation (n=8), bear predation (n=4), natural causes (n=4), wolf predation (n=1), capture related (n=1), and unknown causes (n=4). The low levels of wolf-caused mortality during summer are not surprising because we expect wolf predation to vary seasonally and increase during the winter period. A complete year of calf survival information is needed to assess cause-specific mortality and determine the relative role of natural causes and different predators on calf recruitment. In this regard, an additional 19 calves were captured and marked in late November, 2011, to boost sample sizes. The boost in sample size was necessary for accurate estimates of the annual wolf-specific mortality rate, because winter is the period during which we expect wolf predation might play a larger role than it has to date.

Blackfoot Range Rider Program Update

Investigators: Seth M. Wilson, Liz Bradley, George Smith, and Ty Smucker

Collaborators: Blackfoot Challenge; Blackfoot area ranchers, landowners and managers; Montana Fish, Wildlife & Parks; U.S. Fish and Wildlife Service; U.S. Forest Service; Bureau of Land Management; Montana Department of Natural Resources and Conservation; The Nature Conservancy, and The University of Montana.

The Blackfoot Challenge has been actively working to reduce the risk of livestock losses to wolves in the Blackfoot watershed since 2007. In addition to livestock carcass removal and electric fencing of calving areas, the Blackfoot Challenge has hired several seasonal range riders to help monitor wolf and livestock activity and to provide non-lethal tools to help reduce the potential for livestock depredations by wolves. These efforts have been carried out in close partnership with Fish, Wildlife and Parks.

The 2011 range rider season in the Blackfoot watershed focused on continuing to increase human presence around livestock herds that were adjacent to concentrations of wolf activity. George Smith was hired as the new full-time range rider for the 2011 field season, while Lyle Pocha and Warren Bignell returned to work part-time as assistant range riders. Several livestock producers also devoted considerable time and effort toward increasing herd monitoring efforts on grazing allotments in the valley. Additionally, Ty Smucker, seasonal technician with FWP, was brought on through a cooperative agreement, to help train range riders and increase wolf monitoring and capture efforts in the watershed. This was the third official year of livestock and wolf monitoring efforts carried out by the Blackfoot Challenge.

Increased livestock monitoring efforts in 2011 helped producers track overall herd health, behavior, and use of grazing allotments. Range riders regularly communicated with producers about the status of their herds and any concerns about cattle. Wolf monitoring efforts focused on the Ovando Mountain, Arrastra Creek, and Garnet Packs whose territories overlap extensively with summer livestock grazing areas. The Ovando Mtn. pack consisted of three adult wolves (one radio-collared in 2010). Monitoring confirmed the presence of four pups in this pack in

June. Although the Ovando Mountain wolves were often in the vicinity of cattle, no livestock depredations were detected in this pack's territory in 2011 and no missing cattle were reported at the end of the season.

The Arrastra Creek pack was monitored more closely in 2011 after a local rancher and range riders located the den site and confirmed the presence of pups in the area. Subsequently, a yearling male in the pack was captured and radio-collared in late June. This pack was frequently located in the vicinity of cattle on allotments, but was also found in the Scapegoat Wilderness on numerous occasions. No depredations were detected in the pack's territory in 2011. However, two calves were reported missing at the end of the grazing season.

The Garnet pack was suspected to be involved in two confirmed calf depredations in the spring of 2011. An adult male was captured and radio-collared and at least two adults and two pups were confirmed in this pack in July. However, the collared male in this pack was killed illegally in early fall, limiting the ability to monitor this pack. Occasional reports of wolves in this pack's suspected territory were received through the fall and an adult cow was injured in October.

2011 Field Season Statistics:

- Completed 6 month field season monitoring livestock and wolves.
- Monitored 650-800 cow/calf pairs per week across 45,000 acres.
- Herd health and behavior were monitored and any issues were reported to producers.
- Range riders and cooperating producers logged over 2100 hours of livestock monitoring.
- Radio telemetry monitoring of three wolf packs documented presence of wolves regularly in the vicinity of livestock during the grazing season.
- Ten wolf packs confirmed in the watershed.
- Three confirmed livestock losses (2 calves, 1 ewe) during the 2011 season.
- No wolves removed for livestock depredations during 2011.

Social Tolerance / Communication Statistics:

- Worked to maintain trust and credibility with over a dozen local landowners and livestock producers whose herds were at greatest risk.
- Maintained regular communication with an additional 40-50 landowners and producers who were at moderate risk of depredations by wolves.
- Maintained regular communication through list-serve and BC website with 150 people.
- Produced 6 *Wolf Activity Reports* for community and project partners.
- Maintained weekly contact with Fish, Wildlife and Parks and partners.
- Made 3 public presentations on wolf issues to approximately 140 people.

Timeline of wolf abundance and livestock interactions for the Blackfoot watershed:

2008:

- 3 confirmed wolf packs (est. 18 wolves)
- 4 confirmed calf losses
- 4 wolves removed

2009:

- 5 confirmed wolf packs (est. 24 wolves including pups)
- 2 confirmed calf losses
- 2 wolves removed

2010:

- 7 confirmed wolf packs (est. 45 wolves including pups)
- 4 confirmed livestock losses (2 calves, 1 cow, 1 horse)
- 8 wolves removed

2011:

- 10 confirmed wolf packs (est. 55 animals including pups)
- 3 confirmed livestock losses (2 calves and 1 ewe)
- No wolves removed by W.S.
- 2 wolves killed illegally

Discussion: The use of intensive herd monitoring or range riding is an important tool that may be helping to decrease the risk of livestock depredation by wolves in the project area. Regular monitoring of wolves and extensive communication networks that have been developed in the project area with the help of ranchers, residents, and our agency partners has been of great benefit. Cultivating trust within the ranching community is essential for documenting actual estimated wolf numbers/packs, understanding wolf pack behavior, and ultimately for developing the willingness by landowners to engage in proactive efforts that reduce livestock depredation risk to both grizzly bears and wolves.

We are hopeful that the combination of livestock carcass removal, electric fences that serve as safe havens for livestock from both bears and wolves, and our range rider project are having a cumulative, positive effect that helps people and wolves coexist in an agricultural landscape.

West Pioneers Range Rider Program Update

Collaborators: Steel Creek Ranch, Huntley Ranch, Lapham Ranch, Montana Fish, Wildlife and Parks, Big Hole Watershed Committee, People and Carnivores, Wildlife Conservation Society, Wildlife Services

Introduction: As part of a broader effort to better explain, reduce conflicts and build tolerance with carnivores and people, Montana Fish Wildlife and Parks (FWP) partnered with the Big Hole Watershed Committee (BHWC), People and Carnivores (P&C), and Wildlife Conservation Society (WCS) to help three ranches in the Big Hole (Steel Creek, Huntley and Lapham): to increase human presence, facilitate timely investigation of injured or dead livestock, increase knowledge about predator activity in the area, detect developing problems more quickly, reduce the risk of livestock-carnivore interactions, and maintain rangeland health on the Forest Service grazing allotments on the Beaverhead-Deerlodge National Forest, including Warm Springs Creek, Cox Creek, South Steel Creek and Stanley Creek as well as adjacent private land.

Funding was provided by Steel Creek Ranch, WCS, P & C and FWP to hire Chet Robertson from Jackson, Montana as a range rider. Between July 11, 2011 and September 31, 2011, Chet

rode on the Forest Service allotments looking for dead or injured livestock, sign of carnivore activity, monitoring cattle behavior, monitoring wildlife activity, and as needed, moving cattle from riparian areas. The rider operated under the direction of FWP.

Goals of the Project

- Increase human presence and monitoring of livestock on summer grazing allotments;
- Detect and report dead or injured livestock in a timely manner for investigation;
- Survey (sightings, tracks, scat) the allotments and private land for presence of large carnivores;
- Interrupt predator/livestock interactions that would result in dead or injured livestock utilizing nonlethal and lethal methods as situations arise as per state regulations allow; and
- Manage livestock consistently with the goal of maintaining rangeland health, by making sure that grazing is in compliance with forest service allotment regulations.

Methods: The rider spent six days per week on allotments utilizing both day and night time patrols. The rider kept a daily journal of his work, travels, and observations and reported to ranchers and FWP as needed. The rider was provided a daily logbook and data sheets to record dead/injured livestock, livestock/predator incidents, livestock behavior and distribution, and general wildlife observations. He filled out a daily log and bi-weekly reports to summarize daily riding activities and share this information with all partners. Whenever the rider saw wolf activity on land of a non-participating landowner, the rider called the landowner to inform him. The rider was also under instruction that in the case of injured or dead livestock or a suspected depredation, to call the livestock owner and FWP immediately and note the GPS location.

Discussion

July: The rider started his duties on July 11, 2011 via ATV and horse and started slowly spending more time on the horse working the allotments. During the first two weeks, shifts mostly involved work during the days. He then increased slowly with night work as well. Steve Primm (P&C), Tanya Rosen (WCS) and Nathan Lance (FWP) spent time with the rider in the field via truck and horseback. Most of the time during the first two weeks was spent on the Huntley allotment and adding in the Steel Creek allotments when the cattle were subsequently moved there. Cattle behavior was normal and the rider rode daily to locate the groups and make sure they were distributed evenly. He also fixed some watering springs to make sure they were functioning appropriately to help alleviate stress on riparian areas. No dead or injured livestock or unusual cattle behavior was witnessed. The rider saw deer, elk, antelope, and moose and their tracks almost daily throughout all the allotments. He also found bear sign fairly regularly as well as signs of coyote activity. On July 13, the rider located one wolf track in the mud that was most likely a week or two old. No vocalizations or other wolf activity were recorded. During the last two weeks of July, the rider continued his duties. He also placed some scent/track points to help with carnivore detection. He continued to detect black bear and coyote activity but no wolf activity. Cattle were evenly spread among the allotments and foraging or resting as normal. The rider attended to watering sources. He also reported that two cows had injuries, none of which were carnivore related. The rider also met with Wildlife Services (WS) regularly. At the end of July, WS confirmed that two yearlings were injured by a wolf in two separate incidents on Steel Creek and Huntley ranches. FWP and WS attempted to place a radio collar on a wolf there.

August: The rider located a dead cow on Huntley's allotments. It was determined by WS that it was not a carnivore-related mortality. The rider also worked on water tanks issues. He noticed a decrease in elk observations and an increase in deer sightings. Black bears and coyotes continued to be spotted. During day and night rotations, no vocalizations were heard but a wolf scat was found. Towards the end of the month, cattle behavior continued to be normal with cattle scattered in groups of 6 to 27. On August 26, Huntley detected the first sign of wolf activity on his ranch. On August 27, three wolves were legally killed by the rancher under the defense of livestock statute. The rider detected wolf activity of 7 wolves on August 27. On August 29 WS confirmed that wolves on Huntley ranch had killed a calf on August 26. FWP and WS attempted to collar a wolf and the rider helped check the traps. The rider continued both day and night patrols.

September: As the rider continued intense patrolling, he detected activity of 3 wolves on the Huntley allotments September 1. He also reported issues with fencing on the allotments. Sightings of deer, moose, antelope, and grouse were recorded. After the detection of initial wolf activity, cattle were distributed evenly and exhibited normal behavior, with groups ranging from just a couple of heads up to larger groups of 40-50 animals. No sightings of wolf activity were recorded. The rider assisted with attempts to trap and collar a wolf. A carcass of just some skeletal remains were discovered and reported to the appropriate parties but was not investigated. The last weeks of the rider project were spent mostly collecting and locating the last of the wandering cattle before moving them off of the allotments. Cattle behavior was normal and groups ranged from approximately 5- 25 heads when located. The rider spoke with hunters who had not seen any wolves. During the last week of September, the rider spotted a pair of black wolves on the Lower Warm Springs allotment. They travelled past the cattle (70-100 yards) but did not engage or stop, just carried on their travel route. Cattle did bunch briefly and faced the wolves but did not run and returned to normal activity fairly quickly.

Project Funding

The rider was employed as an independent contractor by the BHWC. He was also signed up as a volunteer for FWP, which provided funding for workers' compensation. Steel Creek Ranch, P&C and WCS provided additional funding. FWP, WS, WCS, P&C, and Steel Creek/Huntley/Lapham Ranches also contributed in-kind, technical assistance.

Future Directions

While wolf/livestock interactions will continue to be a concern and risk to livestock producers in the West Pioneers we seek to minimize this risk of conflict by working collaboratively with all partners. Collaborators will continue to evaluate wolf/livestock conflict and the rider project for further improvements and search for other tools to minimize risk. After collaborators reviewed the 2011 rider project, all the partners recognized the value in having the rider and remain committed to working together. This work will continue during the summer of 2012. BHWC, FWP and partner ranchers, with support from P&C and WCS submitted a \$15,000 proposal to the US Forest Service Resource Advisory Committee. The proposal was recommended for approval. The partners also plan to apply for additional funding from the Livestock Loss Board.

APPENDIX 4

MONTANA MINIMUM COUNTS BY AREA

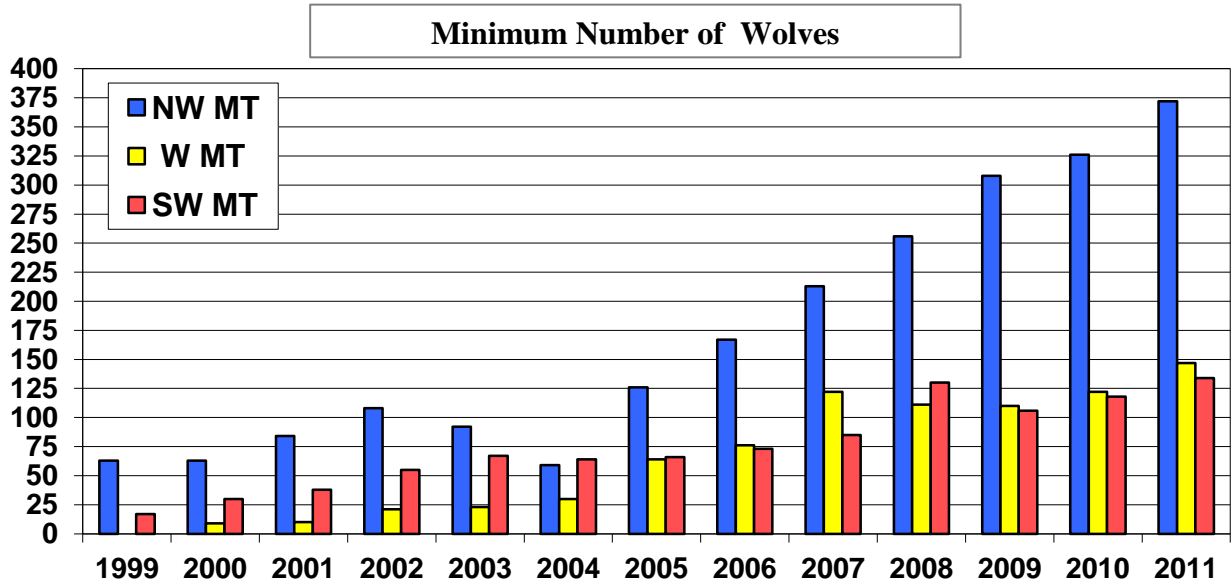


Figure 1. Minimum estimated number of wolves in Montana by recovery area (1999-2011).

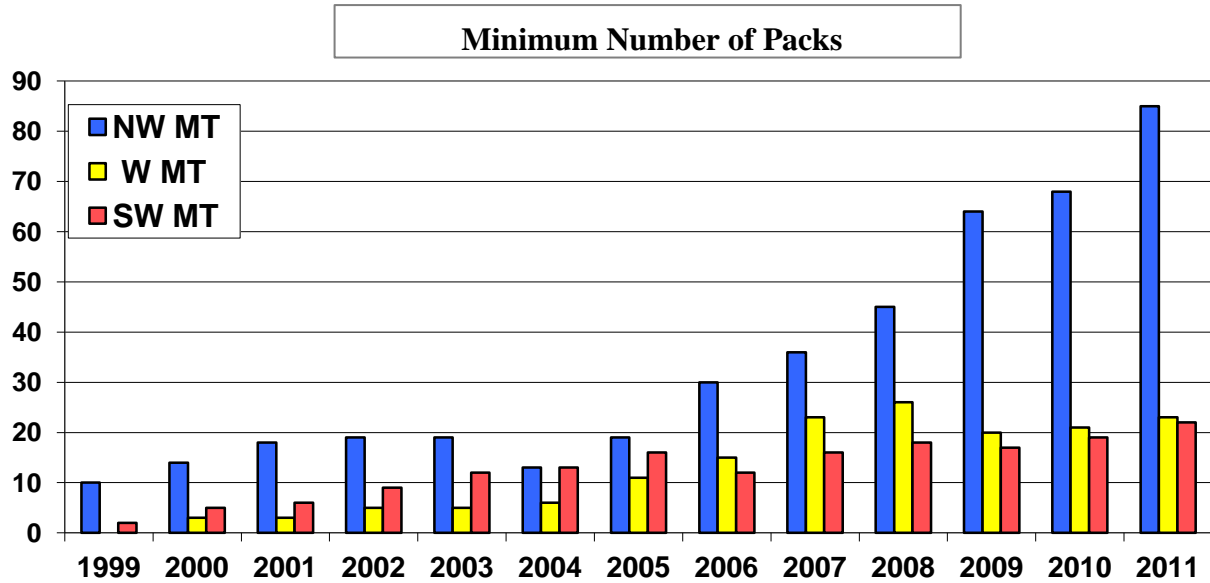


Figure 2. Minimum estimated number of packs in Montana by recovery area (1999–2011).

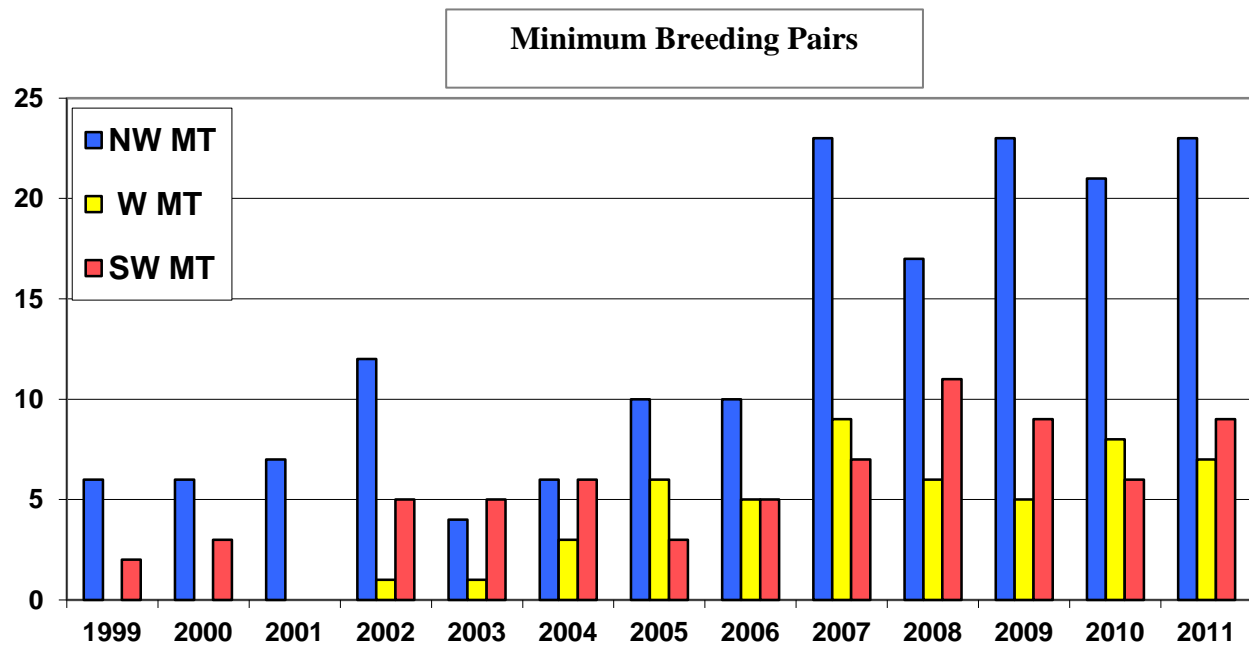


Figure 3. Minimum estimated number of breeding pairs in Montana by recovery area (1999–2011).

APPENDIX 5

NORTHERN ROCKIES WOLF PACK TABLES

Table 1a. Montana wolf packs and population data for Montana's portion of the Northwest Montana Recovery Area, 2011.

Table 1b. Montana wolf packs and population data for Montana's portion of the Greater Yellowstone Experimental Recovery Area, 2011.

Table 1c. Montana wolf packs and population data for Montana's portion of the Central Idaho Experimental Recovery Area and Montana statewide totals 2011.

Table 1a: Montana Wolf Packs and Population Data for Montana's Portion of the Northwest Montana Recovery Area, 2011.

REF #	WOLF PACK ¹	RECOV		MIN. ESTIMATED PACK SIZE DEC 2011	DOCUMENTED MORTALITIES					KNOWN		CONFIRMED LOSSES ⁶					
		AREA	STATE		NATURAL	HUMAN ²	UNKN ³	HARVEST ⁸	CONTROL ⁵	DISPERSED	MISSING ⁴	CATTLE	SHEEP	DOGS	OTHER		
1	Akokala	NWMT	MT	5	1												
2	Arastra Creek	NWMT	MT	7		1		2									
3	Ashley	NWMT	MT	13													
4	Bearfite	NWMT	MT	2		1		3				1					
5	Belmont	NWMT	MT	7				3									
6	Benchmark	NWMT	MT	?													
7	Bennie	NWMT	MT	6				1									
8	Bisson (CSKT)	NWMT	MT	3				1									
9	Bitterroot Range #	NWMT	MT	7													
10	Blue Mountain	NWMT	MT	5													
11	Bugle Mountain	NWMT	MT	7				2									
12	Cabinet	NWMT	MT	2													
13	Cache Creek #	NWMT	MT	11													
14	Canyon Creek	NWMT	MT	2					2							5	
15	Candy Mountain	NWMT	MT	2				2									
16	Chief Mountain (BFN)	NWMT	MT	2													
17	Chippy	NWMT	MT	2		1		1									
18	Cilly	NWMT	MT	5													
19	Condon	NWMT	MT	4				1				1					
20	Cottonwood (CSKT)	NWMT	MT	5													
21	Corona	NWMT	MT	2				2									
22	DeBorgia #	NWMT	MT	5				1									
23	Dog Gun (BFN)	NWMT	MT	5													
24	Dry Forks	NWMT	MT	8				1									
25	Dutch	NWMT	MT	6		1		1			1						
26	Elbow	NWMT	MT	2					8						6		
27	Emma	NWMT	MT	2													
28	Evaro	NWMT	MT	5													
29	Ferry Basin (CSKT)	NWMT	MT	2													
30	Firefighter	NWMT	MT	4								1					
31	Flathead Alps	NWMT	MT	2													
32	Garden	NWMT	MT	2													

Table 1a: Montana Wolf Packs and Population Data for Montana's Portion of the Northwest Montana Recovery Area, 2011.

REF #	WOLF PACK ¹	RECOV		MIN. ESTIMATED PACK SIZE DEC 2011	DOCUMENTED MORTALITIES					KNOWN		CONFIRMED LOSSES ⁶				
		AREA	STATE		NATURAL	HUMAN ²	UNKN ³	HARVEST ⁸	CONTROL ⁵	DISPERSED	MISSING ⁴	CATTLE	SHEEP	DOGS	OTHER	
33	Garnet	NWMT	MT	4		1							2			
34	Good	NWMT	MT	2				1								
35	Granite Butte	NWMT	MT	5				3	2				1			
36	Great Bear	NWMT	MT	2												
37	Great Northern	NWMT	MT	2		1		6								
38	Halfmoon	NWMT	MT	5				3								
39	Heart Butte (BFN)	NWMT	MT	8												
40	Irvine (CSKT)	NWMT	MT	3								1				
41	Kintla	NWMT	MT	6	1		1	1								
42	Kootenai North	NWMT	MT	2		1		1								
43	Kootenai South	NWMT	MT	11				1								
44	Ksanka	NWMT	MT	4				2								
45	Landers Fork	NWMT	MT	4												
46	Lazy Creek	NWMT	MT	4		2		4								
47	Livermore (BFN)	NWMT	MT	3									2			
48	Lookout #	NWMT	MT	5												
49	Lost Peak #	NWMT	MT	4				1								
50	Lydia	NWMT	MT	2				1								
51	Marias	NWMT	MT	6				1								
52	McDonald	NWMT	MT	2												
53	McKay	NWMT	MT	2				1								
54	Mineral Mountain	NWMT	MT	4			1		2				1			
55	Monitor Mountain	NWMT	MT	3									1			
56	Morrell Mountain	NWMT	MT	4				1								
57	Mullan #	NWMT	MT	4				2								
58	Murphy Lake	NWMT	MT	4		1		3								
59	Ninemile	NWMT	MT	6				1								
60	Nyack	NWMT	MT	2												
61	O'Brien	NWMT	MT	2				1								
62	Ovando Mountain	NWMT	MT	7												
63	Pierce	NWMT	MT	2												
	Piper ⁷	NWMT	MT	0												
64	Pistol Creek	NWMT	MT	6												

Table 1a: Montana Wolf Packs and Population Data for Montana's Portion of the Northwest Montana Recovery Area, 2011.

REF #	WOLF PACK ¹	RECOV		MIN. ESTIMATED PACK SIZE DEC 2011	DOCUMENTED MORTALITIES					KNOWN		CONFIRMED LOSSES ⁶			
		AREA	STATE		NATURAL	HUMAN ²	UNKN ³	HARVEST ⁸	CONTROL ⁵	DISPERSED	MISSING ⁴	CATTLE	SHEEP	DOGS	OTHER
65	<u>Preacher #</u>	NWMT	MT	8							1				
66	Pulpit Mountain	NWMT	MT	2			1								
67	<u>Quartz Creek #</u>	NWMT	MT	2			1								
68	Quintonkon	NWMT	MT	2			1				1				
69	Red Shale	NWMT	MT	5			1								
70	Satire	NWMT	MT	6			2								
	Selow (CSKT)⁷	NWMT	MT	0											
71	Silcox	NWMT	MT	2						1					
72	<u>Silver Lake #</u>	NWMT	MT	9			1								
73	Sixmile	NWMT	MT	2					2				15		
74	Sleeping Woman (CSKT)	NWMT	MT	4											
75	Smoky	NWMT	MT	2											
76	Solomon Mountain #	NWMT	MT	2											
77	<u>Spotted Bear</u>	NWMT	MT	7							1				
78	Sundance	NWMT	MT	5											
79	<u>Tallulah</u>	NWMT	MT	8											
80	Teton	NWMT	MT	8											
81	Thirsty	NWMT	MT	2											
82	<u>Twilight #</u>	NWMT	MT	2				3							
83	Union Peak	NWMT	MT	5											
84	<u>Weigel</u>	NWMT	MT	7											
85	Wolf Prairie	NWMT	MT	2											
	Misc/Lone	NWMT	MT	8	1	1		9	1				1	1	
MT in NWMT (Table 1a)		NWMT	MT	372	4	10	4	72	17	2	7	29	6	0	0
ID in NWNMT (Table 3b)		NWMT	ID	59	0	1	0	22	0	0	0	0	0	0	0
NWMT RECOVERY AREA		NWMT	MT/ID	431	4	11	4	94	17	2	7	29	6	0	0

Table 1a

- 1 Underlined packs are counted as breeding pairs toward recovery goals. CSKT = Flathead Indian Reservation; BFN = Blackfeet Indian Reservation.
- 2 Excludes wolves killed in control actions to address livestock depredation and lawful public harvest.
- 3 Does not include pups that disappeared before winter.
- 4 Collared wolves that became missing in 2011.
- 5 Agency lethal control whether under state or federal regulations. Includes wolves killed by private citizens to defend livestock or under terms of a kill permit.
- 6 Includes only domestic animals confirmed killed by wolves.
- 7 Pack did not exist on Dec. 31 2011 and is not displayed on the map.
- 8 Number legally harvested by humans in 2011.
- # Border pack shared with the State of Idaho; dens in Montana.

Table 1b: Montana Wolf Packs and Population Data for Montana's Portion of the Greater Yellowstone Experimental Area, 2011.

REF #	WOLF PACK ¹	RECOV		MIN. ESTIMATED PACK SIZE DEC 2011	DOCUMENTED MORTALITIES					KNOWN	CONFIRMED LOSSES ⁶						
		AREA	STATE		NATURAL	HUMAN ²	UNKN ³	HARVEST ⁸	CONTROL ⁵	DISPERSED	MISSING ⁴	CATTLE	SHEEP	DOGS	OTHER		
86	Baker Mountain	GYA	MT	4													
87	<u>Beartrap</u>	GYA	MT	21				3									
88	<u>Brckett Creek</u>	GYA	MT	6													
	<u>Buffalo Fork</u> ⁷	GYA	MT	0													
89	<u>Cougar2</u>	GYA	MT	6		3		3									
	<u>Eagle Creek</u> ⁷	GYA	MT	0													
90	Elephant Rock	GYA	MT	2													
91	Elkhorn	GYA	MT	4				1									
92	<u>Fridley</u>	GYA	MT	11				1									
93	Hayden	GYA	MT	6				3	1								
94	<u>Hogback</u>	GYA	MT	6				3									
95	Lebo Peak	GYA	MT	2													
96	Madison *	GYA	MT	5													
97	Meadow Creek	GYA	MT	5					7						4		
98	Mill Creek	GYA	MT	4				1									
	<u>Poison</u> ⁷	GYA	MT	0					8						4		
99	<u>Price Creek</u>	GYA	MT	5				1							5		
100	Quadrant #	GYA	MT	2		1					1						
101	Rosebud	GYA	MT	2				1									
102	<u>Slip n' Slide</u>	GYA	MT	11			1	1									
103	Snowshoe	GYA	MT	3													
	<u>Snowy</u> ⁷	GYA	MT	0													
104	Steamboat Peak	GYA	MT	4				4							1		
105	Table Mountain	GYA	MT	3				2	3						2		
106	<u>Toadflax</u>	GYA	MT	9													
107	<u>Wilson Creek</u>	GYA	MT	7													
	Misc/Lone	GYA	MT	6		1	2	6	1					8	2	1	
MT in GYA (Table 1b)		GYA	MT	134		2	6	0	30	20	1	0		24	2	1	0

Table 1b

- 1 Underlined packs are counted as breeding pairs toward recovery goals.
- 2 Excludes wolves killed in control actions to address livestock depredation and lawful public harvest.
- 3 Does not include pups that disappeared before winter.
- 4 Collared wolves that became missing in 2011.

- 5 Agency lethal control whether under state or federal regulations. Includes wolves killed by private citizens to defend livestock or under terms of a kill permit.
- 6 Includes only domestic animals confirmed killed by wolves.
- 7 Pack did not exist on Dec. 31 2011 and is not displayed on the map; see pack narrative.
- 8 Number legally harvested by humans in 2011.
- * Border pack shared with Yellowstone National Park and State of Idaho; dens in Montana.
- # Border pack (non-denning) shared with Yellowstone National Park. Spends more time in Montana.

Table 1c: Montana Wolf Packs and Population Data for Montana's Portion of the Central Idaho Experimental Area, 2011.

REF. #	WOLF PACK ¹	RECOV		MIN. ESTIMATED PACK SIZE DEC 2011	DOCUMENTED MORTALITIES				KNOWN DISPERSE D	MISSING ⁴	CONFIRMED LOSSES ⁶					
		AREA	STATE		NATURA L	HUMAN ²	UNKN ³	HARVEST ⁸			CONTROL ⁵	CATTLE	SHEEP	DOGS	OTHER	
108	Alta #	CID	MT	9												
109	Anaconda	CID	MT	9					3				2	1		
	Bannaack # ⁷	CID	MT	0					1	1		4				
110	Big Hole #	CID	MT	6												
111	Black Pine	CID	MT	5												
	Brooks Creek # ⁷	CID	MT	0												
112	Divide Creek	CID	MT	8				1	4			1				
113	East Fork Rock Creek	CID	MT	5												
114	Flint Creek	CID	MT	5				1								
115	Four Eyes #	CID	MT	6				1								
116	Gash Creek #	CID	MT	7				1								
117	Gird Point	CID	MT	6												
118	Harvey Creek	CID	MT	5		-		1								
119	Jeff Davis	CID	MT	5		-										
	Lake Como # ⁷	CID	MT	0					3			1				
120	Mt. Haggin	CID	MT	6												
121	One Horse #	CID	MT	7												
122	Painted Rocks #	CID	MT	4				1								
123	Pintler	CID	MT	8				3				2				
124	Ross' Fork	CID	MT	9				1	2			1				
125	Sliderock Mtn	CID	MT	4												
126	Stewart Mountain	CID	MT	4					4			3				
127	Sula #	CID	MT	11		1		2								
	Trail Creek # ⁷	CID	MT	0		1		2	1		1					
128	Trapper Peak	CID	MT	2		1		1	2					1		
	Twin Lakes # ⁷	CID	MT	0				1	3	1		2				
129	Watchtower #	CID	MT	2												
130	Welcome Creek	CID	MT	2			1	1								
	Misc/Lone	CID	MT	12		1		2	4			7	1			
	MT Total in CID	CID	MT	147		1	3	1	19	27	2	1	21	3	1	1

Table 1c: Montana Wolf Packs and Population Data for Montana's Portion of the Central Idaho Experimental Area, 2011.

REF. #	WOLF PACK ¹	RECOV		MIN. ESTIMATED PACK SIZE DEC 2011	DOCUMENTED MORTALITIES					KNOWN DISPERSE D	MISSING ⁴	CONFIRMED LOSSES ⁶			
		AREA	STATE		NATURA L	HUMAN ²	UNKN ³	HARVEST ⁸	CONTROL ⁵			CATTLE	SHEEP	DOGS	OTHER
MT in NWMT total (Table 1a)		NWMT	MT	372	4	10	4	72	17	2	7	29	6	0	0
MT in GYA total (Table 1b)		GYA	MT	134	2	6	0	30	20	1	0	24	2	1	0
MT in CID total (Table 1c)		CID	MT	147	1	3	1	19	27	2	1	21	3	1	1
MT STATE TOTAL			MT	653	7	19	5	121	64	5	8	74	11	2	1

Table 1c

- 1 Underlined packs are counted as breeding pairs toward recovery goals.
 - 2 Excludes wolves killed in control actions.
 - 3 Does not include pups that disappeared before winter.
 - 4 Collared wolves that ceased transmitting in 2011.
 - 5 Includes agency lethal control and take by private citizens under state regulations.
 - 6 Includes only domestic animals confirmed killed by wolves.
 - 7 Pack did not exist on December 31, 2011 and is not displayed on the map.
 - 8 Number legally harvested by humans in 2011.
- # Border pack shared with State of Idaho; dens in Montana and majority of time in Montana.