5-YEAR ENVIRONMENTAL MONITORING REVIEW
for

PREDATOR DAMAGE MANAGEMENT IN MONTANA
Fiscal Year 2002 through Fiscal Year 2006

Introduction

The Wildlife Services (WS) program responds to a variety of requests for assistance from individuals, organizations and agencies experiencing damage and other problems caused by wildlife. WS is the Federal program authorized by Congress and directed by law to reduce human/wildlife conflicts (Act of March 2, 1931, as amended [46 Stat. 1468; 7 U.S.C. 426-426c], and the Rural Development, Agriculture, and Related Agencies Appropriations Act of 1988, as amended [Public Law 100-202, Stat. 1329-1331]). Human/wildlife conflict reduction is the alleviation of damage or other problems caused by or related to the presence of wildlife, and is recognized as an integral part of wildlife management (The Wildlife Society 1992).

WS uses an adaptive Integrated Wildlife Damage Management (IWDM) approach (WS Directive 2.105[1]), commonly known as Integrated Pest Management, where a combination of methods may be used or recommended to reduce wildlife damage. IWDM is the application of safe and practical methods to prevent and reduce damage caused by wildlife based on local problem analyses and the informed judgment of trained personnel (Slate et al. 1992). Therefore, wildlife damage management is not based on punishing offending animals but is a means to reduce future damage. The imminent threat of damage or loss of resources is often sufficient for individual actions to be initiated and the need for predator damage management (PDM) or the reduction of human/predator conflicts is derived from the specific threats to resources.

WS is a cooperatively funded, service-oriented program. Before any WS action is taken, a request must be received and an Agreement for Control must be signed by the landowner/administrator, or other comparable documents are in place. As requested, WS cooperates with and assists individuals, organizations and land and wildlife management agencies to effectively and efficiently reduce human/wildlife conflicts according to applicable Federal, state and local laws, regulations, policies, orders, and procedures, including the Endangered Species Act of 1973 (ESA), as amended [16 U.S.C. 1531 *et seq.*] (WS Directive 2.210). None of Montana WS' human/predator conflict reduction activities result in habitat modifications.

Background

In 1997 the Montana WS program completed two Environmental Assessments (EAs) (WS 1997a, 1997b) which addressed the need to conduct PDM and the potential impacts of various alternatives for responding to and reducing human/predator conflicts in Montana. The EAs each identified six Alternatives which were analyzed in detail. Alternative 2, "Integrated Wildlife Damage Management for Multiple Resources and Land Classes" in each EA was selected as the Preferred Alternative and Findings of No Significant Impact (FONSI) were issued and Decisions signed on May 12, 1997 (WS 1997a) and November 11, 1997 (WS 1997b). Monitoring reports for subsequent Federal Fiscal Years (FYs) were prepared to review program activities to determine if the EAs' analyses were accurate and consistent with applicable laws and environmental regulations. Montana WS also issued supplemental analyses and

[1] The WS Policy Manual provides WS personnel guidance in the form of program directives. Information contained in the WS Policy Manual and its associated directives (http://www.aphis.usda.gov/wildlife_damage/ws_directives.shtml) have been used throughout this report, but have not been cited in the Literature Cited.

Decisions/FONSIs for the Eastern and Western Predator Damage Management EAs in 1998 and 2002[2]. Based on those reviews, there was no indication that Montana WS' activities were having a significant impact, individually or cumulatively, on the quality of the human environment. Copies of the EAs, FONSIs, Decisions and monitoring reports are available from the Montana WS State Office, USDA, APHIS, Wildlife Services, P.O. Box 1938, Billings, MT 59103.

Purpose of this Report

The purpose of this report is to summarize and review: 1) the results of WS' PDM activities conducted in Montana during 2002 to 2006 and evaluate the accuracy of the current analyses, 2) review standard operating procedures designed to minimize or avoid potential adverse environmental effects (Appendix A), and 3) provide an opportunity for public review of program activities.

Scope of Predator Damage

The need for action remains as stated in the EA, that the adverse effects of predation on livestock and other resources can be serious. Livestock production in Montana is a sizeable industry, and predation on livestock can represent a large financial loss to individual producers and can have adverse impacts on local economies. According to statewide data compiled during 2002 to 2006 by the Montana Field Office (MFO) of the National Agricultural Statistics Service (NASS), predation was the single largest cause of death loss for Montana sheep producers with 29.6% (5-year average) of the total sheep and lamb deaths attributed to predators (MFO 2002, 2003, 2004, 2005 2006). A 5-year average of 15,860 adult sheep and lambs, valued at an average of $1,157,720, were reported killed annually by predators from 2002 to 2006 (MFO 2002, 2003, 2004, 2005, 2006). Coyotes were responsible for most of the predation, killing an average of 10,700 head of sheep and lambs annually, valued at $766,800. Predation by dogs (domestic and feral/free ranging, bears (grizzly and black), mountain lions, red fox, gray wolves, eagles, and bobcats accounted for most of the other direct predation loss (MFO 2002, 2003, 2004, 2005, 2006). Based on reported sheep inventories and lamb crops, these losses represented a 4.5% annual predation loss for lambs (range from 3.7% to 5.6% during the 5-year reporting period) and a 1.1% loss of adult sheep (range from 0.75% to 1.5%) (MFO 2002, 2003, 2004, 2005, 2006).

NASS collects cattle/calf predator loss information every five years. For Montana, NASS collected cattle/calf predation loss information in 2005. According to statewide data compiled for 2005 by the MFO of NASS, 600 head of cattle, weighing 500 lbs or more and 2,400 calves, weighing less than 500 pounds were killed by predators in Montana in 2005. The total value of the cattle and calves killed by predators in Montana in 2005 was estimated at $1.671 million dollars with the value of calves killed at $994,000. Coyote predation was the single largest cause of calf predator losses with 1,300 calves killed during 2005 in Montana (MFO 2005).

In response to requests for assistance from livestock producers and the public in Montana from FY 2002 to 2006, WS personnel documented an average of 593 adult sheep, 2716 lambs, 38 adult cattle, 639 calves, 63 goats/kids, 142 fowl, (domestic chickens, ducks, geese, turkeys, etc), 7 pets, 18 horses/mules, 8 llamas, and 363 bee hives killed, injured or damaged annually by predators (Management Information System (MIS) 2002, 2003, 2004, 2005, 2006) with an average annual estimated value of $987,131. These losses represent only a fraction of the actual losses that likely occurred, and serve more as an indicator of what kinds of predator damage occurred rather than an indication of damage magnitude (Connolly 1992).

[2] This analysis superseded the original EA analysis that was prepared in 1997 with a Decision and FONSI signed Sept. 11, 1997 for the same analysis area in addition to a Supplemental Decision and FONSI signed February 18, 1999 also for the same analysis area.

Major Issues Analyzed in Detail in the EAs

For the development of the EAs, the cooperating agencies (*i.e.,* USDA-Forest Service, Bureau of Land Management, U. S. Fish and Wildlife Service (USFWS), Montana Department of Fish, Wildlife and Parks (MFWP), Montana Department of Livestock (MDOL), Montana Department of State Lands) helped identify a variety of issues deemed relevant to the analyses. Issues relating to the reduction of wildlife damage were raised during the scoping process for USDA (1997) and during the interdisciplinary approach used to prepare the EAs. These issues were consolidated into the following five issues that were analyzed in detail:

1. Cumulative impacts on the viability of wildlife populations – the potential for the ADC take of predators to cause long-term predator population declines, when added to other mortality.
2. Effectiveness and selectivity of damage management methods – the potential for the ADC methods to take nontarget animals, need for a wide variety of damage management methods, criteria for deciding what methods will be used, and use of "preventative" damage management work.
3. Risks posed by damage management methods to the public and domestic pets.
4. Concern about the ADC impacts on Threatened and Endangered (T/E) species and other species of special concern.
5. Cost-effectiveness of the ADC activities.

Cumulative impacts on the viability of wildlife populations – the potential for the ADC take of predators to cause long-term predator population declines, when added to other mortality.

The principle of sustained yield management is that wildlife populations produce an annual increment of animals that can be removed without causing the abundance to decline. The size of the annual surplus varies by species (factors such as proportion and age of females in the population, litter size and offspring survival) and local conditions (factors such as habitat quality and prey density). Annual harvest is managed at a level corresponding to the capacity of the population to compensate (via reproduction and recruitment).

MFWP is the State agency charged by law with the responsibility for protecting, preserving and perpetuating fish, game and furbearer populations as well as nongame wildlife populations within Montana (MCA §87-1-201). Harvest regulations proposed by MFWP for fish, game and furbearer species are subject to public review and input before being adopted by the MFWP Commission. Harvest regulations are designed to provide public recreation opportunities and reduce conflicts between wildlife and other land uses, while ensuring perpetuation of healthy viable wildlife populations. Trend information on the population status of wildlife taken by sport harvest or by WS indicate that those populations are healthy and are generally stable or increasing throughout the State, with minor fluctuations from year-to-year (Q. Kujala, MFWP, pers. comm. 2007).

<u>Coyote</u>

Coyote predation continues to be the most common predator problem in Montana, and more coyotes were taken than any other predatory species (Table 1). Based on the coyote population estimate used in the 1997 EAs, the average number of coyotes killed annually by all causes in Montana during FY 2002 through 2006 (WS killed an average of 8,549 coyotes per year and an additional 11,505 coyotes were killed annually by sport hunters and trappers, and MDOL authorized county/private aerial hunting activities) is about 7% of the estimated coyote population in Montana. Pitt et al. (2001) used an "individual-based computer model to mimic natural coyote populations and assess impacts to populations in relation to varying degrees of removal. The model did not observe a population decline until more than

60% of the population was removed annually. Even if the cumulative number of coyotes killed in Montana doubled, that level of mortality would still fall below the level where coyote abundance would begin decline (Connolly and Longhurst 1975, Connolly 1995, Pitt et al. 2001). MFWP estimates that the coyote population in Montana is healthy and stable (B. Giddings, MFWP, pers. comm. 2007).

Table 1. WS Lethal Take of Target Species (MIS 2002 – 2006).

Species	FY2002	FY2003	FY2004	FY2005	FY2006
Coyote	9906	8013	9751	6483	8615
Red Fox	418	409	337	334	367
Black Bear	30	30	43	14	11
Mountain Lion	11	7	2	7	4
Gray Wolf	24	25	39	20	40
Grizzly Bear	2	0	0	2	0
Badger	13	11	6	6	4
Bobcat	1	1	2	1	0
Raccoon	12	15	8	21	13
Striped Skunk	25	27	0	20	16
Raven	107	43	35	31	1

Red Fox

Red fox are the most common and well-known species in the genus *Vulpes* and are the most widely distributed nonspecific predator in the world (Voigt 1987). Because of its importance to humans, it has been the subject of much study during the last 30 years. Investigations have revealed that red fox are extremely adaptable with much diversity in their behavior and habitats. Voigt and Earle (1983), Sargeant et al. (1987) and Gese et al. (1996) showed that red fox avoided coyotes but coexisted in the same area and habitats.

The abundance of red fox is difficult to determine because of the secretive and elusive nature of the species. However, the red fox has a high reproductive rate, dispersal capacity similar to coyotes and can withstand high mortality within the population (Allen and Sargeant 1993, Voigt 1987, Voigt and MacDonald 1984, Harris 1979, Pils and Martin 1978, Storm et al. 1976, Andrews et al. 1973, Phillips and Mech 1970). Storm et al. (1976) stated that 95% of the females (43.6% were less than 1 year old) bred successfully in a population in Illinois and Iowa. Rowlands and Parkes (1935) and Creed (1960) reported that male red fox can breed in their first year. Litter sizes averaged about 4.7 for 13 research studies and litters with as many as 14 and 17 offspring have been reported (Storm et al. 1976, Voigt 1987). Ables (1969) and Sheldon (1950) reported that more than one female was observed at the den and suggested that red fox have *"helpers"* at the den, a phenomena observed in coyotes and other canids. Reported red fox population densities have been as high as more than 50/mi^2 (Harris 1977, MacDonald and Newdick 1982, Harris and Rayner 1986) where food was abundant; Ontario population densities are estimated at 2.6 animals/mi^2 (Voigt 1987), and Sargeant (1972) reported one fox den/3 mi^2.

The current Montana statewide red fox population is estimated to be about 50,000 – 70,000 animals (B. Giddings, MFWP, pers. comm. 2007). WS removed 418, 409, 337, 334, and 367 red fox as target animals 2002 through 2006 (Table 1). In addition, WS killed 8, 11, 0, 3, and 0 non-target red fox for the period 2002 through 2006 (Table 2). The total take, sport harvest (from MFWP records) and WS take from 2002 to FY 2006 in Montana of red fox was 2,978, 2476, (2004 sport harvest data not available from MFWP for 2004, 2004 WS take was 337 animals), 2,810, and 3,531 animals, respectively. USDA (1997) determined the allowable harvest level for red fox to be 70% of the total population. Red fox harvest information from MFWP suggests that populations are healthy and stable (B. Giddings, MFWP, pers. comm. 2007).

Black Bear

Black bears occupy forested habitats on both sides of the continental divide. However, the moister forests of the northwest corner of the State are considered the most productive black bear habitat. About 45% of

the State is considered occupied black bear habitat, although black bears are seen occasionally in the eastern part of the State (MFWP 1994).

The age structure of bear populations is one indicator of population health. Because bears are relatively long-lived animals, bears in the older age classes should be found in a healthy population. If a population is over exploited, the older aged bears will not be present or in low proportions. Black bears can live up to 32 years and in Montana, bears as old as 29 and 30 years have been reported in the harvest (MFWP 1994). Juvenile black bear annual mortality ranges from 20% to 70%, with orphaned cubs having the highest mortality; natural mortality of cubs is difficult to document but has been found to vary from 12% to 48% annually (MFWP 1994). Mortality in subadult black bears in northwestern Montana has been reported to be 36.8% (Thier 1990). Researchers have estimated the total adult mortality of black bears between 15% and 27% annually. Thier (1990) recorded an annual mortality rate of 25%, and Jonkel and McT.Cowan (1971) estimated natural mortality rates for adults at 14%.

Black bear movements and densities reflect the scattered nature of important food sources and can be as high as 3.4 bear/mi^2, depending on the quality of habitat. The highest quality black bear foods are typically products of lush vegetative habitats, often productive riparian lands (Schoen 1990), a factor contributing to conflicts with humans and other land uses (MFWP 1994). The current Montana statewide population is estimated to be about 16,000 animals (Q. Kujala, MFWP, pers. comm. 2007) occupying about 65,000 mi^2 of habitat (MFWP 1994).

The allowable harvest (kill) level for black bear described in USDA (1997) is 20% of the population. MFWP manages hunting harvest at a level corresponding to the capacity of the population to compensate for mortality (MFWP 1994). When a high proportion of females are in the total hunting harvest, hunter effort and hunter success rates and mortality from damage management actions are used to evaluate harvest impacts to black bear populations. For black bear, a species that is difficult to census, MFWP estimates that current harvest rates, whether by hunting, damage management, or unknown causes are not causing a decline in the bear population statewide (Q. Kujala, MFWP, pers. comm. 2007). WS' take of black bear during FY 2002 through FY 2006 was 30, 30, 43, 14, and 11, respectively (Table 1). MFWP records indicate that in between 2002 and 2006, statewide, the sport harvest for black bears averaged approximately 1,200 animals. Based on MFWP's midpoint population estimate for black bears at 16,000 animals, the total annual take (including WS take and sport harvest) averaged about 8.3% of the estimated population. Black bear harvest information for MFWP suggest that populations are healthy and stable (Q. Kujala, MFWP, pers. comm. 2007). Therefore, this level of take is within the parameters of "*low magnitude*" of impact established by the MFWP and in the USDA (1997).

Mountain Lion

In Montana, human interactions with mountain lions could occur wherever habitat or food sources overlap with human activities. WS responded to seven instances from 2002 through 2006 where a mountain lion was considered by the MFWP and WS to be a threat to public safety.

Mountain lions have an extensive distribution across North America (Anderson 1983), inhabiting many habitat types from desert to alpine environments, suggesting a wide range of adaptability, including 46 of 56 counties in Montana (MFWP 1996).

Female mountain lions typically breed for the first time between 22 and 29 months of age (Ashman et al. 1983) but initial breeding may be delayed until a territory has been established (Hornocker 1970). Mountain lions breed and give birth year round, but most births occur during late spring and early summer in Montana following about a 92-day gestation period (MFWP 1996). One to six offspring per

litter is possible, with an average of two to three young per litter (Robinette et al. 1961) and young mountain lions stay with the female for 10 to 24 months (MFWP 1996).

Mountain lion densities, based on a variety of population estimating techniques, range from about 1/100 mi^2 to a high of 24/100 mi^2 across the west (Johnson and Strickland 1992). An average density estimate for the western states was 7.5/100 mi^2 (Johnson and Strickland, 1992). In Montana, a typical male mountain lion's territory can overlap those of several females and may range from 50 to 150 mi^2 in size; that of a female is usually less than 50 mi^2. Once young mountain lions leave their mother, generally at 1 to 2 years of age, they may not be able to immediately find an unoccupied territory. In such cases, these younger aged lions become transient, covering very wide areas in search of a territory (MFWP 1996).

Mountain lion management, in Montana, is guided by the *Management of Mountain Lions in Montana EIS* (MFWP 1996), which provides direction, a procedure and broad policies for managing lions, but does not include specific harvest quotas and/or detailed local management plans. In contrast, harvest quotas are adopted annually to respond to changing local lion distribution and densities (MFWP 1996).

Mountain lion populations can sustain relatively moderate to heavy losses of adults and still maintain viable populations. Robinette et al. (1977) reported an annual mortality of 32% in Utah, while Ashman et al. (1983) noted a sustained annual mortality of at least 30% in Nevada. Ashman et al. (1983) believed that under "*moderate to heavy exploitation (30%-50%)*" mountain lion populations on their study area had the recruitment (reproduction and immigration) capability to rapidly replace annual losses. The allowable annual harvest level for mountain lions cited by the USDA (1997) is 30% of the population.

MFWP manages hunting harvest at a level corresponding to the capacity of the population to compensate for mortality (MFWP 1996). The current Montana statewide population is estimated to be about 1,800 animals, (Q. Kujala, MFWP, pers. comm. 2007). The 2002 to 2006 annual sport harvest averaged about 300 animals. The WS take for 2002 through 2006 was 11, 7, 2, 7, and 4 animals, respectively (Table 1). This level of take is within the parameters of "*low magnitude*" of impact established by the MFWP (Q. Kujala, MFWP, pers. comm. 2007) and in the USDA (1997).

Badger

Badger conflicts range from damage to pasture and agricultural lands to losses of equipment and livestock. WS occasionally takes badgers as a target species removing 13, 11, 6, 6, and 4 from 2002 through 2006, respectively (Table 1). WS also occasionally takes badgers accidentally as non-target species taking 4, 9, 5, 2, and 1 from 2002 through 2006, respectively (Table 2). Total target and non-target take was 17, 20, 11, 8, and 5 from 2002 through 2006, respectively. The WS badger take has not increased annually since the EA analysis.

Table 2. WS Lethal Take of Non-Target Species (MIS 2002-2006).

Species	FY02	FY03	FY04	FY05	FY06
Porcupine	5	18	8	3	0
Raccoon	7	10	6	1	0
Deer	2	8	3	1	0
Badger	4	9	5	2	1
Red fox	8	11	0	3	0
Antelope	1	0	1	0	0
Mountain lion	0	1	0	0	1
Bobcat	0	3	1	0	0
Striped skunk	0	0	0	1	4
Gray wolf	2	0	0	0	0
Feral dog	1	2	1	2	0
Feral cat	3	0	1	0	0

Little is known about badger densities other than a few intensely studied populations. Lindzey (1971) estimated that the Curlew Valley on the Utah-Idaho border supported 1 badger/mi^2. Messick and Hornocker (1981) believed that the Snake River Birds of Prey Natural Area and adjacent lands supported badger densities of up to 13/mi^2.

Badger populations can safely sustain an annual harvest rate of 30-40% annually (Boddicker 1980). The MFWP reported an estimated 1012, 1788, not available, 1169, and 1331 badgers were taken by private trappers 2002 through 2006, respectively. Total WS and private take of badgers was 1029, 1808, not available, 1177, and 1336 from 2002 through 2006. MFWP believes the badger population is stable and healthy (B. Giddings, MFWP, pers. comm. 2007). The qualitative determination of the WS cumulative impacts on badger abundance remains low.

Bobcat

Bobcats reach reproductive maturity at about 9 to 12 months of age and may have one to six kittens following a two-month gestation period (Crowe 1975, Koehler 1987). Reported bobcat densities, as summarized by McCord and Cardoza (1982) have ranged 0.1-7.0/mi². Knick (1990) estimated that bobcat densities on his study area in southwestern Idaho ranged from 0.35/mi² during a period of high jackrabbit densities, to about 0.04/mi² during a period of low jackrabbit densities. Bailey (1974) estimated bobcat densities in the same area to average about 0.14/mi². They may live up to 14 years, but annual mortality is as high as 47% (Rolley 1985).

WS' take of target bobcats during the review period was extremely low at 1, 1, 2, 1, and 0 bobcats removed annually 2002 through 2006 (Table 1). In addition WS accidently removed non-target bobcats during the analysis period totaling 0, 3, 1, 0, and 0 during 2002 through 2006 (Table 2). Total WS take including target and non-target bobcats was 1, 4, 3, 1, and 0 from 2002 through 2006. Analysis of Montana bobcat private harvest data determined a private take of 1592, 1680, not available, 2237, and 1799 from 2002 through 2006. Total WS and private harvest of bobcats was 1593, 1684, not available, 2238, and 1799 for 2002 through 2006. The allowable harvest for bobcats in the USDA (1997) was established at 20% of the total population and available data suggests that bobcat populations are healthy and productive, and that current harvest levels are not detrimental to bobcat abundance (B. Giddings, MFWP, pers. comm. 2007).

Raccoon

The raccoon is a member of the family *Procyonidae* that includes ringtail and coati in North America. Raccoons are one of the most omnivorous of animals, feeding on carrion, garbage, birds, mammals, insects, crayfish, mussels, other invertebrates, a wide variety of grains, various fruits, other plant materials, and most or all foods prepared for human or animal consumption (Sanderson 1987).

The allowable harvest level for raccoons found in USDA (1997) was established at 49% of the total population. WS killed a total of 19, 25, 14, 22, and 13 raccoons (both target and non-target) from 2002 through 2006 (Tables 1 and 2).

MFWP believes that raccoon populations are variable in Montana and number can change considerable from one year to the next due to factors such as distemper and other diseases. As a result, any population estimate would be for a given period of time and population levels could change rapidly if disease outbreaks occur. Raccoon harvest information from MFWP for private harvest was 4662, 5936, N/A, 4541, and 4369 from 2002 through 2006. Those harvest levels show that raccoon populations are healthy and stable in spite of the level of total harvest (B. Giddings, MFWP, pers. comm. 2007). The determination of the cumulative impacts on raccoon populations would remain at a low magnitude.

Striped Skunk

Skunk damage primarily consists of odor problems around homes, transmission of health threats such as rabies to humans and rabies and distemper to domestic animals, and they prey on poultry.

The striped skunk is the most common member of the *Mustelidae* family. Striped skunks have increased their geographical range in North America with the clearing of forests; however, there is no well-defined land type that can be classified as skunk habitat (Rosatte 1987). Striped skunks are capable of living in a variety of environments, including agricultural lands and urban areas.

The home range of striped skunks is not sharply defined over space and time, but is altered to accommodate life history requirements such as raising young, winter denning, feeding activities, and dispersal (Rosatte 1987).

During 2002 through 2006 WS killed 25, 27, 0, 21, and 16 striped skunks (Tables 1 and 2). Skunk harvest information from MFWP (1422, 2996, N/A, 2325, and 1933) from 2002 through 2006 indicate populations are healthy (B. Giddings, MFWP, pers. comm. 2007) and stable. MFWP believes that skunk abundance is variable in Montana and species density can change considerably from one year to the next due to factors such as distemper and other diseases. The determination of the WS cumulative impacts on skunk populations remains a low magnitude.

Common Raven

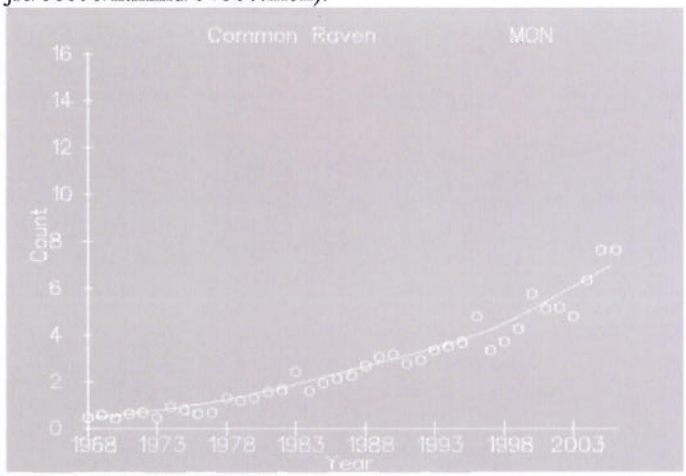
Damage associated to ravens in Montana typically is predation on lambs and goat kids but also includes predation on newborn or partially born calves. Ravens can cause predation on newborn and unborn calves by pecking out the calf's eyes and tongue oftentimes as the calf is being born.

Ravens are widely distributed throughout the Holarctic Regions of the world including Europe, Asia, North America and extends well into Central America (Goodwin 1986). Ravens generally are a resident species but some wandering and local migration occurs with immature and non-breeding birds (Goodwin 1986). Immature birds which have left their parents form flocks with non-breeding adults; these flocks tend to roam and are loose-knit and straggling (Goodwin 1986). Ravens are omnivorous species known to feed on carrion, crops, eggs and birds, small mammals, amphibians, reptiles, fish, and insects (Nelson 1934). Larsen and Dietrich (1970) noted that it is generally acknowledged that ravens are responsible for lamb mortality on spring lambing ranges.

Ravens are protected by the USFWS under the Migratory Bird Treaty Act and can only be taken by permit from the USFWS. WS is permitted by the USFWS to remove ravens that are causing damage to agricultural resources. USFWS allows only a limited take of ravens by WS. During 2002 through 2006, WS killed 107, 43, 35, 31, and 1 raven(s) (Table 1). WS is not aware of any other take of ravens in Montana.

Raven home ranges overlap considerably. During the 1997 analysis, it was believed that a conservative density estimate of

Figure 1. Common Raven Population Trend in Montana (http://www.mbr-pwrc.usgs.gov/cgi-bin/plotpgm0.pl?/sula/jrs/bbs06/htmind/04860.mon).



breeding birds in Montana was one raven/15 mi^2, resulting in a minimum population estimate of about 3,900 breeding birds. That analysis went on to state that if ravens are increasing at an annual rate of just 5%, then about 200 ravens could presumably be removed from the population annually without reducing the abundance. The data used for the 1997 analysis and Breeding Bird Survey (BBS) data for Montana (Figure 1), USFWS Region 6 and the Western BBS region suggests that the WS program conducted in Montana during 2002-2006 did not have an adverse impact on raven abundance in the State or region.

Effectiveness and selectivity of damage management methods - the potential for ADC methods to take non-target animals, need for a wide variety of damage management methods, criteria for deciding what methods will be used, and use of "preventive" damage management work.

Non-target animals killed in Montana during FY 2002 to 2006 ranged from 6 to 62 individuals annually, with an average of 29 per year, which represents about a 99% selectivity for target species (Table 2). This percentage of non-target animals killed falls within the analyses in the 1997 EAs and in USDA (1997) and is not having an adverse impact on non-target species.

Under the current program, all methods are used as effectively and selectively as practically possible, in conformance with the WS Decision Model (Slate et al. 1992) and WS Directives. The selectivity of each method is based, in part, on the application of the method, the skill of WS personnel, and the direction provided by WS Directives.

Effectiveness of the various methods may vary widely depending on circumstances at the time of application. However, along with effectiveness, cost, and social acceptability, risk is an important criterion for selection of an appropriate damage management strategy. Determination of risks to non-target animals, the public, and WS personnel is an important prerequisite for successful application of the IWDM approach. Some methods may be more or less effective, or applicable depending on weather conditions, time of year, biological considerations, economic considerations, legal and administrative restrictions, or other factors. Because these various factors may at times preclude use of certain methods, it is important to maintain the widest possible selection of damage management tools to most selectively and effectively resolve predator damage problems.

To maintain and increase the effectiveness and selectivity of methods used by WS, several "hands-on" training sessions were provided to field employees by WS supervisors and wildlife capture professionals, and WS employees continued to share relevant knowledge and experiences with co-workers throughout the year. Montana WS employees participated in training at five separate state conferences (August 27-30, 2002; August 25-28, 2003; August 23-26, 2004; August 22-25, 2005, August 21-24, 2006) to accrue continuing education credits for chemical immobilization and euthanasia, pesticides, net guns, rockets nets, and other capture techniques.

Risks Posed by Damage Management Methods to the Public and Domestic Pets

PDM conducted by WS in Montana is directed by WS Directives, Cooperative Agreements, MOUs and Federal and State laws. A formal risk assessment of PDM methods used by WS in Montana concluded low risks to humans and pets (USDA 1997, Appendix P). Based on this risk assessment, WS concluded that when WS methods are used in accordance with policies, regulations, and directives, they are highly selective for the target individuals or populations.

On the other hand, public health and safety may be adversely affected by not having an effective PDM program in place to respond to complaints involving threats to human health and safety. Predators such as coyotes, red fox and ravens can present a strike risk to aircraft at airports. This can result in damage and injuries to people. Also, disease, especially diseases like rabies, can be a significant threat to humans

and pets. WS often uses several PDM methods to capture offending animals, depending on the specifics of these types of situation. Additionally, it has been found that without WS services people will resort to the unwise or illegal use of methods to resolve predator problems (Schuler 1993, Allen et al. 1996, USFWS 2003, Porter 2004).

WS uses chemical and non-chemical methods that are deemed appropriate to reduce or minimize a variety of damage problems, and WS personnel are aware of the potential risks to nontarget species and humans. The use of pesticides by WS in all instances is regulated by the U.S. Environmental Protection Agency through the Federal Insecticide, Fungicide and Rodenticide Act, by State law, the Montana Department of Agriculture, and by WS Directives.

During FY 2002 to 2006, the number of animals killed during PDM by WS in Montana ranged from 7,029 to 10,817 annually, with an average of 9,188 animals per year. There were two known incidents of domestic pets being harmed or killed, and no reports were received of injuries to the public resulting from Montana WS' use of PDM methods. When comparing this information with the total usage of PDM methods, overall risk posed to the pubic and domestic pets is considered low.

Concern about WS Impacts on Threatened and Endangered (T/E) Species

A common concern among members of the public and wildlife professionals, including WS personnel, is the effect of PDM on federally designated T/E species and other species of special concern. To help ensure no impact to these species, WS consulted with the USFWS (USFWS 1992, USFWS 1997). A review of the 1997 ESA Section 7 consultation during this review determined that the analysis of potential impacts is still applicable.

Canada Lynx - Lynx occur in the boreal forests of North America where it is highly associated with its primary prey, the snowshoe hare. The species is abundant and common in Canada and Alaska where the core of its range occurs, and suitable lynx habitat consists of montane and subalpine forest ecosystems; lynx currently occur in Montana. The USFWS federally listed the Canada lynx as threatened in its historic range in the lower 48 contiguous states in 2000.

Lynx can potentially be both negatively and positively affected by PDM. WS nationally has only captured one non-target lynx in Idaho in 1991 (pre-listing) in typical non-lynx habitat and it was released alive. From October 1, 2001 to present, Montana WS' PDM activities were performed under the 2000 Interim Policy Guidelines for Canada lynx since a Biological Opinion (BO) or other administrative guidance had not been issued by the USFWS. However, Montana WS is in the formal consultation process with the USFWS to assess potential impacts of PDM activities on lynx in Montana. No lynx were taken by WS during this review period, and therefore, no effect on lynx.

Gray Wolf - The gray wolf was extirpated from much of the lower 48 continental United States by the 1930's; a small population however continued to occupy areas in northwestern Montana. The USFWS released a final Environmental Impact Statement (EIS) in May 1994 (USDI 1994), which led to a nonessential experimental population for reintroduced gray wolves in Yellowstone National Park and central Idaho (Final Rule 50 CFR Part 17.84). The final rule was published in the Federal Register (FR) (59 FR 60252-60281) on November 22, 1994. All wolves located south of Interstate 90 in Montana are considered part of the nonessential experimental population, whereas wolves located north of Interstate 90 were afforded full protection under the ESA. This rule established regulations allowing management of wolves by government agencies and the public to minimize conflicts with livestock and a peer-review process to address impacts on ungulate populations. The USFWS authorized WS to investigate reported wolf predation to livestock and other domestic animals, and to implement corrective measures, including nonlethal and lethal actions to reduce further predation.

On February 8, 2007, the USFWS published a FR notice (72 FR 6106-6139), proposing to establish a distinct population segment (DPS) of the gray wolf in the Northern Rocky Mountains (NRM) of the United States. The proposed NRM DPS encompasses all of Montana. The USFWS also proposed to remove the gray wolf in the NRM DPS from the List of Endangered and Threatened Wildlife under the ESA because threats have been reduced or eliminated; Montana has adopted State laws and management plans that conserve wolves into the foreseeable future, expanding management authority to the State of Montana (*i.e.*, MFWP).

The MFWP has accepted the lead decision-making role for managing wolves in Montana. Wolf abundance and distribution are expected to increase in Montana and the NRM, however MFWP is uncertain of how rapidly the wolf population will grow[3] (MFWP 2003). Wolf management in Montana is oriented toward achieving and maintaining recovery goals while resolving conflicts[4] when and where they occur. However, most conflicts are addressed and resolved after the fact and more conflicts may occur in the future because of higher wolf abundance and wider distribution in Montana.

There are an estimated 422 wolves (73 identified packs of which approximately 39 qualified as a breeding pair according to the federal recovery definition) are present in Montana and during the wolf population in Montana has increased from153 wolves (Dec 2004), 256 wolves (Dec 2005), 316 wolves, (Dec 2006), and 422 wolves (Dec 2007). The population will fluctuate because of management actions, changes in prey density and prey distribution, disease, and intraspecific competition. It is possible that Montanans social tolerance for wolves could lead to management actions that stabilize the population or that the population will grow more slowly than predicted (MFWP 2003). Wolf distribution will probably increase as individual wolves disperse from core areas and colonize new habitats with sufficient prey. In the absence of significant conflict, gray wolves could become established in island mountain ranges, such as the Big and Little Snowies or even in eastern Montana (MFWP 2003) and wolves would be allowed on MFWP Wildlife Management Areas. Connectivity requirements are also met because wolf distribution should provide an adequate number of dispersers that emigrate to Idaho, Canada, or Wyoming (MFWP 2003).

Future wolf population growth in Montana will probably be determined by social conflicts between wolves and humans. At present, there is no reliable method to determine social tolerance. How fast the population grows and where wolves are found will differ because of a spectrum of social tolerance and management approaches. All WS activities to manage wolves will be conducted in accordance with the USFWS approved Montana Gray Wolf Conservation and Management Plan, applicable laws and regulations (MFWP 2003). Since 1998, the wolf population in the Greater Yellowstone Area (GYA) has increased an average of 24%/yr (USFWS et al. 2007); Montana wolf population trend data indicate that wolf abundance is increasing in Montana at about 25% annually over the past ten years and an average of over 41% annually over the past 3 years.

The literature suggests that wolf populations can remain stable despite annual human-caused mortality rates ranging from about 30 to 50% (Keith 1983, Fuller et al. 2003). Mortality rates in unexploited wolf populations average 45% for yearlings and 10% for adults. Since 1995, 53% of documented wolf mortalities in the GYA have been human-caused (Smith and Guernsey 2002). Wolves' productivity, in

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[3] Some newly colonizing wolves in highly productive habitat, such as YNP, have grown rapidly. Other long-established populations, such as in northwestern Montana have increased more slowly. Wolf distribution will be influenced and probably be determined by prey abundance, other natural evidents, such as intraspecific competition, disease and human-caused mortality.

[4] Wolves can be harassed or killed through agency control actions and by private landowners through a special permit in the experimental area. Private citizens can opportunistically harass or intentionally harass by permit wolves in northwest Montana. Private citizens can kill a wolf in the act of biting, wounding, or killing livestock on private property without a permit, but a permit is required to kill persistent problem wolves on public lands.

terms of recruitment and immigration, is what allows it to persist under human harvest (Fuller et al. 2003). In areas where human-caused mortality is low, disease, starvation, and killing by other wolves are the primary causes of wolf mortality. Wolf populations and packs within the NRM DPS are expected to continue to be resilient to regulated mortality because adequate food supplies are available and core refugia provide a constant source of dispersers to replenish breeding vacancies in packs. The NRM DPS continues to increase at about 24% annually (USFWS et al. 2007). These data indicate that the current annual human-caused mortality rate of about 20% in the adult portion of the NRM DPS could be increased without causing the NRM DPS to decline. Wolf populations in Montana are characterized by robust size, high productivity, closely neighboring packs, and many dispersers (C. Sime, MFWP pers. comm. 2007). Wolf populations also occupy most of the suitable wolf habitat in the NRM (USFWS et al. 2007). Because suitable habitat is nearly saturated, core refugia within these populations will continue to produce a large number of "surplus" wolves which will either fill in social vacancies within the core refugia, die, or disperse out of the core refugia. Further, Brainerd et al. (2008) found that, following the removal of wolves for livestock depredation in the NRM DPS, the breeding status of packs was not greatly affected, regardless of the breeding status of individuals or proportion of a pack removed. Population size, proximity of other wolf packs, and the number of dispersing wolves' influence the frequency with which alpha males and females will be replaced (Brainerd et al. 2008). Social vacancies, whether from loss of breeders or nonbreeders, are likely to be quickly filled by dispersing wolves or other wolves within the pack.

WS has the responsibility to investigate reports of wolf predation to livestock and other domestic animals, and to conduct wolf depredation management actions in consultation with and under authority of MFWP. A Memorandum of Understanding (MOU) between MFWP and WS was completed and signed in 2005 and amended in 2007 to clarify WS' role to reduce wolf predation on livestock and other domestic animals.

During FY 2002 through 2006, WS investigated 453 incidents of reported wolf predation to livestock in Montana (Table 3), averaging about 90 investigations per year, but ranging from 75 incidents to 97 per year during this time. More than 52% of the investigations were determined to be confirmed[5] wolf predation. A total of 731 domestic animals (180 cattle, 516 sheep, 11 dogs, 11 llamas, 1 mule, 1 horse, and 11 domestic bison) were determined to be confirmed/probable wolf kills or injuries (Table 3).

Table 3. Number of Wolf Predation Investigations, Investigations that Resulted in Confirmed Wolf Predation, and Number of Livestock and Dogs Killed During FY02-06.

RESULTS	FY2002	FY2003	FY2004	FY2005	FY2006	TOTAL
Investigations	75	87	98	96	97	453
Confirmed/Probable	46	41	58	41	49	235
Cattle Killed/Injured[1]	29	26	61	29	35	180
Sheep Killed/Injured[2]	95	133	132	44	112	516
Dogs Killed/Injured	3[4]	0	0	2[3] 4[4]	2[3]	11

[1] Includes calves and adult cattle.
[2] Includes lambs, ewes and bucks.
[3] Stock/herding dog.
[4] Livestock guarding dog(s).

In response to the wolf predation investigations, WS initiated 191 wolf damage management actions (Table 4) to reduce further predation. As a result of those actions, 146 wolves were killed; 43 were either radio-collared and released on site or freed on site without radio-collaring. All of WS' management activities to kill or radio-collar wolves were authorized by the USFWS and/or MFWP and coordinated with the USFWS, as appropriate. The percent of wolves killed by WS in Montana each Calendar Year

[5] In addition, there were a significant number of livestock killed that were, after detailed field investigations, determined by WS to be probable wolf kills and many more determined to be possible wolf kills.

when compared to the statewide minimum estimated population ranged from 6 to 24% and averaged 15% during the 5-year period (Table 5). Total known wolf mortality in Montana was 56 animals in calendar year (CY) 2005 and 65 in CY 2006 and averaged about 19% of the estimated population for the last 2 years and below the level that caused the population to decline. The estimated population has continued to increase at about 25% during the last 10 years and from 183 animals in CY 2002 to 316 animals in CY 2006.

Table 4. Number of Wolf Damage Management Actions by WS and Results by FY.

RESULTS	FY2002	FY2003	FY2004	FY2005	FY2006	5-YEAR TOTAL
Management Actions[1]	30	32	53	25	51	191
Wolves Killed	22[2]	25	39	20	40	146
Wolves Captured and Released	8	7	12	5	11	43

[1] For the purpose of this Table, Control Actions involve WS implementing 1) trapping as a method to capture a wolf for collaring and releasing and/or euthanizing, 2) shooting from the ground, and 3) the use of aerial operations as lethal methods, but does not include WS use of Radio Activated Guards, less-than-lethal munitions, pyrotechnics, harassment or other nonlethal approaches.

[2] This does not include the two non-target wolves that were killed by WS in 2002 since they were not part of wolf damage management activities

During this review period, only two non-target wolves were killed by WS PDM methods. On September 5, 2002, two wolves in the experimental/nonessential population were discovered by a WS employee near M-44 devices that had been set by WS to reduce coyote damage to livestock. MFWP and USFWS Law Enforcement were immediately notified of the incident and it was determined that "reasonable due care" had been exercised and no violations were committed or warnings issued.

Table 5. Estimate Minimum Montana Wolf Abundance and WS Removal by Calendar Year.

Year	Est. Minimum Abundance	WS Removal
2002	183	22
2003	182	30
2004	153	36
2005	256	16
2006	316	50

[1] This does include the 2 non-target wolves WS removed in FY 2002

The total cumulative mortality of the estimated wolf population in Montana is less than 25% and WS management actions have not added any adverse affects to wolf abundance or distribution in Montana nor adversely affect the health or viability of the population (Montana 2003, C. Sime, MFWP pers. comm. 2007); all wolves removed by WS are done so under authorization from MFWP specific to the requested action. The wolves removed by WS are done so under the close coordination, cooperation and authorization from MFWP and the USFWS, as appropriate. During the period of this review (2002 – 2006) USFWS authorized WS in Montana as sub-permittees on a Federal permit to conduct the following activities in Montana, "pursue, capture, harass, drug, hold, mark, radio tag, transport, relocate, and kill gray wolves as specifically authorized by the USFWS or MFWP as a designated agent of the USFWS." The USFWS also determined that WS' wolf damage management did not adversely affect wolf populations or recovery (E. Bangs, USFWS, pers. comm. 2007).

Grizzly Bear - On July 28, 1975, the grizzly bear was designated as threatened in the conterminous (lower 48) United States (40 FR 31734–31736). In 1981, the USFWS hired a grizzly bear recovery coordinator to direct recovery efforts and to coordinate all agency efforts on research and management of grizzly bears in the lower 48 States. In 1982, the first grizzly bear recovery plan was completed which identified five ecosystems within the conterminous United States thought to support grizzly bears (USFWS 1982). As a result of these and other efforts, the USFWS proposed to designate the GYA population of grizzly bears as a DPS and to remove this DPS from the Federal List of Endangered and Threatened Wildlife (70 FR 69854 November 17, 2005).

The USFWS established a grizzly bear DPS for the GYA and surrounding area and removed this DPS from the List of Threatened and Endangered Wildlife (72 FR 14866 March 29, 2007). The GYA grizzly bear population was no longer determined to be an endangered or threatened population pursuant to the ESA[6], based on the best scientific and commercial data available[7]. Robust population growth, coupled with State and Federal cooperation to manage mortality and habitat, widespread public support for grizzly bear recovery, and the development of adequate regulatory mechanisms brought the GYA grizzly bear population to the point where making a change to its status was appropriate. Grizzly bears have a wide habitat tolerance, but currently exist in expansive, undisturbed mountainous habitat (USFWS 1993). This habitat is not the typical location for PDM activities, however some WS activities do overlap current grizzly bear habitat. WS is authorized to cooperate with MFWP and USFWS to control problem grizzly bears and all WS management actions were closely coordinated with MFWP and USFWS.

Annual allowable mortality limits for each grizzly bear class (independent female, independent male, and dependent young) is calculated annually by the Interagency Grizzly Bear Study Team (IGBST) based on population estimates of each bear class for the current year (IGBST 2005). The IGBST calculates both the total population size and the mortality limits within an area designated by The Conservation Strategy. For independent females, a 9% limit was considered sustainable because simulations have shown that this level of adult female mortality rate allows a stable to increasing population 95% of the time (Harris et al. 2006). For independent males, a 15% limit was considered sustainable because it approximates the level of male mortality in the GYA from 1983 to 2001 (Haroldson et al. 2006), a period when the mean growth rate of the population was estimated at 4 to 7% per year (Harris et al. 2006). Independent males can endure a higher rate of mortality compared to females without affecting the overall stability or trajectory of the population because they contribute little to overall population growth (Mace and Waller 1998, IGBST 2005). Similarly, the 9% limit on human caused mortality for dependent young was chosen because this level of mortality is less than the 15% human-caused mortality documented for each sex of this age group from 1983 to 2001, a period of population growth and expansion (IGBST 2005). These mortality limits cannot be increased above the limits of 9% for independent females, 15% for independent males, and 9% for dependent young, unless such an increase is justified or supported by new scientific findings using the best available science, and the basis for this increase is documented by the IGBST. Any such recommendation to increase mortality limits would be considered an amendment to the Conservation Strategy and would be open for public comment, and require a majority vote by the Coordinating Committee[8] before finalization (USFWS 2007). The IGBST will reevaluate mortality limits every 8 to 10 years, or as new scientific information becomes available (IGBST 2005), or at the request of the Coordinating Committee. Today, grizzly bear distribution is primarily within, but not limited to, the areas identified as Recovery Zones (USFWS 1996; 65 FR 69624, November 17, 2000; USFWS 2000), including the GYA in northwest Wyoming, eastern Idaho, and southwest Montana (9,200 sq mi) at more than 500 bears (IGBST 2006).

When WS becomes involved in capturing a grizzly bear, WS closely coordinated that activity with appropriate USFWS and MFWP personnel. During the entire period of this review, WS worked under

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[6] The delisting of the Yellowstone DPS did not change the threatened status of the remaining grizzly bears in Montana.

[7] The listing procedures described in the ESA allow prompt emergency listings if necessary. An emergency relisting can be pursued independently by the USFWS or in response to a recommendation by the IGBST or Coordinating Committee. This process is adequate to respond to a precipitous decline in the Yellowstone grizzly bear DPS or a significant threat to its habitat in a timely manner and precludes the need for a specific trigger that would begin an emergency response process.

[8] The Interagency Grizzly Bear Committee (IGBC) is made up of upper level managers from all affected State and Federal agencies. Also in 1983, the Yellowstone Ecosystem Subcommittee, a subcommittee of the IGBC, was formed to coordinate efforts specific to the Yellowstone area and to coordinate activities with the IGBC. Members of the Yellowstone Ecosystem Subcommittee are mid-level managers and include representatives from the Shoshone,Custer, Beaverhead-Deerlodge, Bridger- Teton, Gallatin, Targhee National Forest, Yellowstone and Grand Teton National Parks; WDGF, MFWP,IDFG; BLM, the Study Team; county government from each affected State; and the USFWS.

the terms of a permit from USFWS and an MOU with MFWP where WS co-investigates reports of grizzly depredations on livestock with USFWS and/or MFWP bear biologists. WS has lead agency responsibility for capture of grizzly bears responsible for livestock depredations and coordinates those activities closely with USFWS and MFWP, while the MFWP has responsibility for immobilization, handling and release of grizzly bears. All grizzly operations were coordinated with USFWS and MFWP during the period of this review.

Potential risks to grizzly bears from use of the Livestock Protection Collar (LPC) are mitigated by the EPA labeling requirement that WS contact the local USFWS office[9] to obtain written approval before using the LPC in specific areas in Montana. WS did not utilize any LPCs in Montana during the review period.

Potential risks to grizzly bears from the use of M-44s in Montana are mitigated by the restriction disallowing the use of M-44's between March 1 and December 1 within occupied grizzly bear habitat unless specifically authorized by the USFWS. Grizzly bears hibernate during the period of time when M-44's are allowed (December through February).

During FY 2002 to 2006, WS responded to 60 reports of grizzly bear predation on livestock. Predation investigations occurred on livestock grazing allotments in the Beaverhead/Deerlodge, Gallatin, Helena, and Lewis and Clark National Forests. Nineteen investigations involved cattle (15 calf and 10 adult cattle were confirmed grizzly bear predation, 17 calf and 18 adult cattle were probable grizzly bear predation, and 14 calf and 15 adult cattle were inconclusive as grizzly bear predation) and 41 involved sheep (185 sheep confirmed, 8 probable and 1 sheep inconclusive as grizzly bear predation). Thirty-four of the sixty investigations resulted in "no action" by WS for various reasons, but 26 corrective actions occurred after WS contacted the Grizzly Bear Recovery Coordinator, as required in WS' USFWS Section 10 subpermit, and was authorized to live capture the bear for relocation. Equipment was set and 22 grizzly bears were captured. In every case MFWP personnel assisted WS to immobilize, transport and relocate, free or euthanize the bear(s). A total of 4 grizzly bears were killed by WS after confirmation of multiple livestock depredations, after coordinating with the USFWS and MFWP, and after receiving instructions from the USFWS to capture and euthanize the bears. Fourteen grizzly bears were relocated, and four freed on site by WS and MFWP after confirmation of livestock depredations and after being instructed by the USFWS to carry out those specific actions. Montana WS had no adverse effect on the overall grizzly bear population or grizzly bear recovery during this review period (C. Servheen, USFWS, pers. comm. 2007).

Cost-effectiveness of ADC Activities

WS is largely cooperator funded; therefore, the measure of "effectiveness" lies in the satisfaction of those who request and pay for WS assistance. Documentation of the value of resources protected is largely unavailable due to the subjective/arbitrary nature of such estimates. Although "cost effectiveness" is important, it is not the only goal of the WS program. Environmental protection issues, humaneness, and land management goals reduce effectiveness, but are nonetheless important parts of the WS PDM program. During this review, there were no indicators to suggest that the benefit:cost ratio fell below that analyzed in the EAs.

Concerns about Aerial Hunting Activities

[9] WS will continue to rely on information provided by USFWS, the MFWP and local resource managers with the Forest Service to determine where grizzly bears may occur.

Aerial gunning is a very important PDM method used in Montana. The amount of time spent aerial gunning varies depending on the severity of losses and the weather, funding and low-level aerial activities are restricted to visual flight rules and are impractical in high winds or at times when predators are not visible. Further, WS PDM activities, including aerial gunning, are only conducted on those areas where the landowner or lessee has signed an "Agreement for Control" or where work plans have been discussed with appropriate State and Federal land management agencies. During this review period, Montana WS spent a total of 2537, 2505, 2881, 2518, and 2323 hours of aerial gunning in the State from FY 02 through FY06, respectively (Table 6) and averaged 2553 hours per year. This aerial gunning time includes time spent darting (chemical immobilization) wolves to attach radio-collar at the request of the USFWS and/or MFWP. WS conducted aerial gunning on less than 13.5% of the State in any year. The intensity of aerial hunting in FY 06 amounted to 4.9 minutes per square mile under agreement for the entire year.

Table 6. Time and Acres Flown in Montana in FY 02 through FY 06.

Fiscal Year	Fixed wing Hours	Fixed wing acres*	Helicopter Hours	Helicopter acres*	Total Acres Flown **
02	863	4,209,133	1674	11,192,040	12,346,195
03	1086	4,130,975	1419	9,904,018	11,360,219
04	1312	5,879,281	1569	10,791,029	12,096,955
05	1482	4,938,389	1036	7,389,708	9,719,911
06	1006	3,941,330	1317	9,609,654	11,020,916

*Represents total acreage on agreements flown. The actual acreage flown is less than the total, as terrain, vegetation and need do not permit flying each and every acre.
**Acreages flown do not total because some agreements were flown by both fixed wing and helicopter. The total acres flown column represents the total acreage of individual parcels of land upon which aerial hunting was conducted

During FY 2002 to 2006, WS' fixed-wing and helicopter aerial gunning activities did not result in any fuel spills or fires and there were no reports of threats to public health or safety, with the exception of two non-fatal aircraft crashes (one fixed-winged aircraft and one helicopter) that occurred during routine aerial gunning activities on June 25, 2003 and July 15, 2003. The fixed-wing aircraft was a contract aircraft and the helicopter was an agency-owned aircraft; the fixed-wing aircraft was considered a total loss by the insurer and the agency-owned helicopter was heavily damaged. After the crashes, the pilots and crewmembers were transported by private vehicle to a local hospital where they were examined by an emergency room physician and released the same day. The private fixed-wing pilot was uninjured in the accident. The WS fixed-wing crewmember received a back injury. Back surgery was preformed on the employee under an OWCP claim and the employee recovered from surgery. The helicopter pilot and his crewmember fully recovered from their minor injuries and returned to work shortly after the accident. These crashes occurred on private property near Zurich and Big Timber, Montana, respectively and did not result in causing any environmental damage (gas or oil spillage, or fire), other than a few small sagebrush plants were crushed by the aircraft. There were no reports of the public, other WS employees, wildlife or domestic animals being injured from this or any other accident. The aircraft were disassembled and removed from the area a few days after the accident. The helicopter was repaired.

Livestock Protection Collar (LPC) Use

During this review period, Montana WS did not use or transfer any LPCs nor were any LPCs on inventory in the state of Montana.

WS Activities on Public Lands

Wildlife damage management methods were used consistent with MOUs and BLM and National Forest System (Forest Service) work plans, as discussed during work plan meetings (Table 7), and when and where it was determined necessary by WS personnel to resolve or prevent predator problems. The BLM and Forest Service were aware of the areas worked before or immediately after placement of equipment

on new allotments not addressed in the work plan. M-44s and gas cartridges were used according to the label and use-restrictions, and M-44s were removed during bird hunting season.

Table 7 Summary of Montana WS and BLM and Forest Service Work Plan Meetings by FY.

FY	BLM (Date)			Forest Service (Date)				
	Lewistown	Miles City	Butte	Gallatin	Beaverhead	Helena	Lewis & Clark	Custer
2002	2/26/02	2/27/02	4/19/02	4/11/02	4/11/02	4/11/02	4/11/02	3/7/02
2003	4/2/03	3/19/03	4/30/03	1/30/03	2/20/03	2/20/03	3/12/03	3/6/03
2004	3/2/04	3/19/04	3/17/04	2/28/04	1/30/04	1/30/04	3/9/04	2/19/04
2005	3/24/05	3/8/05	2/18/05	2/18/05	2/18/05	2/18/05	2/18/05	2/7/05
2006	4/18/06	4/18/06	5/17/06	3/19/06	5/10/06	5/12/06	5/12/06	4/10/06

Compliance and Monitoring

Montana WS' PDM activities have been conducted in a manner consistent with all applicable environmental regulations, including the ESA and the National Environmental Policy Act. APHIS, WS representatives will continue to meet at least annually with cooperating local officials from the BLM, Forest Service, USFWS, and MFWP, as applicable, regarding conduct of PDM activities. Substantial changes in the scope of work or changes in relevant guidance documents or environmental regulations may trigger the need for further analysis.

RESULTS OF THE 5-YEAR REVIEW

The Montana WS program described in the 1997 EAs and subsequent analyses continued during FY 2002 through 2006 based on this review of PDM activities. The effects of implementing the program have been consistent with the analyses in the EAs and subsequent analyses and are not having a significant impact, individually or cumulatively, on the quality of the human environment, and that the affected environment remains essentially unchanged. Therefore, revision of the EAs is not deemed necessary and the Decisions/FONSIs remain appropriate.

Jeffrey S. Green
Regional Director
Western Region WS Program

5/14/08
Date

Literature Cited and References

Ables, E. D. 1969. Activity studies of red foxes in southern Wisconsin. J. Wildl. Manage. 33: 145-153.

Allen, G. T., J. K. Veatch, R. K. Stroud, C. G. Vendel, R. H. Poppenga, L. Thompson, J. Shafer, and W. E. Braselton. 1996. Winter poisoning of coyotes and raptors with Furadan-laced carcass baits. J. Wildl. Dis. 32: 385-389.

Allen, S. H., and A. B. Sargeant. 1993. Dispersal patterns of red foxes relative to population density. J. Wildl. Manage. 57: 526-533.

Anderson, A. E. 1983. A critical review of literature on puma (*Felis concolor*). Colorado Div. Wildl. Spec. Rep. No. 54, Ft. Collins, CO.

Andrews, R. D., G. L. Storm, R. L. Phillips and R. A. Bishop. 1973. Survival and movement of transplanted and adopted red fox pups. J. Wildl. Manage. 37: 69-72.

Ashman, D., G.C. Christensen, M.L. Hess, G.K. Tsukamoto and M.S. Wickersham. 1983. The mountain lion in Nevada. Nevada Dept. Wildl., Reno. 75pp.

Bailey, T. N. 1974. Social organization in a bobcat population. J. Wildl. Manage. 38: 435-446.

Brainerd, S.M., H. Andren, H., E.E. Bangs, E. Bradley, J. Fontaine, W. Hall, Y. Iliopoulos, M. Jiminez, E. Jozwiak, O. Liberg, C. Mack, T. Meier, C. Niemeyer, H.C. Pedersen, H. Sand, R. Schultz, D.W. Smith, P.Wabakken, A.Wydeven. 2008. The effects of breeder loss on wolves. Journal of Wildlife Management 72:89-98.

Boddicker, M. L. 1980. Trapping Rocky Mountain Furbearers. Colorado Trapp's Association Training Manual, 181 pp.

Connolly, G. E. 1992. Coyote damage to livestock and other resources. Pages 161-169 *in* A.H. Boer, (ed.). Ecology and Management of the Eastern Coyote. Univ. of New Brunswick, Fredericton, N.B., Canada.

Connolly, G. E. 1995. The effects of control on coyote populations: another look. Pages 23-29 *in* D. Rollings, C. Richardson, T. Blankenship, K. Canon, and S. Henke, eds. Coyotes in the southwest: a compendium of our knowledge. Texas Parks and Wildlife Department, Austin, Texas, USA.

Connolly, G. E., and W. M. Longhurst. 1975. The effects of control on coyote populations. Division of Agricultural Sciences, Bulletin 1872. University of California, Davis, USA.

Creed, R. F. S. 1960. Gonad changes in the wild red fox (*Vulpes vulpes crucigera*). J. Physiol. (London) 151: 19-20.

Crowe, D. M. 1975. A model for exploited bobcat populations in Wyoming. J. Wildl. Manage. 39: 408-415.

Fuller, T.K., L.D. Mech, and J.F. Cochrane. 2003. Wolf population dynamics. Pages 161-191 in Wolves: Behavior, Ecology, and Conservation. Eds. L.D. Mech and L. Boitani. University of Chicago Press, Chicago. 448pp.

Gese, E. M., T. E. Stotts and S. Grothe. 1996. Interactions between coyotes and red foxes in Yellowstone National Park, Wyoming. J. Mammal. 77: 377-382.

Goodwin, D. 1986. Raven. Pages 138-145 *in* Crows of the World, British Museum of Natural History, Cornell University Press, Ithaca, NY.

Haroldson, M.A., C.C. Schwartz, and G.C. White. 2006. Survival of independent grizzly bears in the Greater Yellowstone Ecosystem, 1983-2001. Pages 33-43 *in* C.C. Schwartz, M.A. Haroldson, G.C. White, R.B. Harris, S. Cherry, K.A. Keating, D. Moody, and C. Servheen, eds. Temporal, spatial, and environmental influences on the demographics of grizzly bears in the Greater Yellowstone Ecosystem. Wildlife Monographs 161.

Harris, S. 1977. Distribution, habitat utilization and age structure of a suburban fox (*Vulpes vulpes*) population. Mammal Rev. 7: 25-39.

Harris, S. 1979. Age-related fertility and productivity in red fox, *Vulpes vulpes*, in suburban London. J. Zool. 187: 195-199.

Harris, S., and J. M. V. Rayner. 1986. Urban fox (*Vulpes vulpes*) population estimates and habitat requirements in several British cities. J. Anim. Ecol. 55: 575-591.

Harris, R.B., C.C. Schwartz, M.A. Haroldson, and G.C. White. 2006. Trajectory of the Yellowstone grizzly bear population under alternative survival rates. Pages 44-56 *in* C.C. Schwartz, M.A. Haroldson, G.C. White, R.B. Harris, S. Cherry, K.A. Keating, D. Moody, and C. Servheen, eds. Temporal, spatial, and environmental influences on the demographics of grizzly bears in the Greater Yellowstone Ecosystem. Wildlife Monographs 161.

Hornocker, M.G. 1970. An analysis of mountain lion predation upon mule deer and elk in the Idaho primitive area. Wildl. Monogr. No. 21. 39 pp.

Interagency Grizzly Bear Study Team. 2005. Reassessing sustainable mortality limits for the Greater Yellowstone Ecosystem grizzly bear. Interagency Grizzly Bear Study Team, USGS Northern Rocky Mountain Science Center, Montana State University, Bozeman, Montana, USA.

Interagency Grizzly Bear Study Team. 2006. Supplement to Reassessing sustainable mortality limits for the Greater Yellowstone Ecosystem grizzly bear. Interagency Grizzly Bear Study Team, USGS Northern Rocky Mountain Science Center, Montana State University, Bozeman, Montana, USA.

Johnson, G. D., and M. D. Strickland. 1992. Mountain lion compendium and an evaluation of mountain lion management in Wyoming. Western EcoSystems Technology, Inc., Cheyenne, WY.

Jonkel, C. J. and I. McT. Cowan. 1971. The black bear in the spruce-fir forest. Wildl. Monogr. No. 27. 57 pp.

Keith, L.B. 1983. Population dynamics of wolves. Pages 66-77 *in* L.N. Carbyn, ed., Wolves in Canada and Alaska: Their status, biology, and management. Report Series, No. 45. Canadian Wildlife Service, Edmonton, Alberta.

Knick, S. 1990. Ecology of bobcats relative to exploitation and a prey base decline in southwest Idaho. Wildl. Monogr. No. 108. 42 pp.

Koehler, G. 1987. The Bobcat. Pages 399-409 *in* Silvestro, R.L. (ed.) Audobon Wildlife Report, The National Audobon Society, New York, N.Y.

Larsen, K. H. and J. H. Dietrich. 1970. Reduction of a raven population on lambing grounds with DRC-1339. J. Wildl. Manage. 34: 200-204.

Lindzey, F.G. 1971. Ecology of badgers in Curlew Valley, Utah and Idaho with emphasis on movement and activity patterns. MS Thesis. Utah State University, Logan. 50 pp.

MacDonald, D. W., and M. T. Newdick. 1982. The distribution and ecology of foxes *Vulpes vulpes* (L.) in urban areas. Pages 123-135 *in* R. Bornkamm, J. A. Lee, and M. R. D. Seaward, eds. Urban Ecology. Blackwell Sci. Publ., Oxford, U.K.

Mace, R.D., and J.S. Waller. 1998. Demography and population trend of grizzly bears in the Swan Mountains, Montana. Conservation Biology 12: 1005-1016.

McCord, C. M. and J. E. Cardoza. 1982. Bobcat and lynx. Wild Mammals of North America: biology, management, and economics. Pages 728-766 *in* J.A. Chapman and G.A. Feldhamer, (eds.) Johns Hopkins Univ. Press, Baltimore, MD.

Messick, J.P. and M. G. Hornocker. 1981. Ecology of the badger in southwestern Idaho. Wldl. Monogr. No. 76. 53 pp.

MFO (Montana Field Office of the National Agricultural Statistics Service). 2002. Montana Department of Agriculture, Montana Agricultural Statistics Service, Federal Building and U.S. Courthouse, POB 4369, Helena, MT 59604.

MFO. 2003. Montana Department of Agriculture, Montana Agricultural Statistics Service, Federal building and U.S. Courthouse, POB 4369, Helena, MT 59604.

MFO. 2004. Montana Department of Agriculture, Montana Agricultural Statistics Service, Federal Building and U.S. Courthouse, POB 4369, Helena, MT 59604.

MFO. 2005. Montana Department of Agriculture, Montana Agricultural Statistics Service, Federal building and U.S. Courthouse, POB 4369, Helena, MT 59604.

MFO. 2006. Montana Department of Agriculture, Montana Agricultural Statistics Service, Federal building and U.S. Courthouse, POB 4369, Helena, MT 59604.

MFWP. 1994. Final Environmental Impact statement - Management of black bears in Montana. POB 200701, Helena, MT 59620. 184 pp.

MFWP. 1996. Final Environmental Impact statement - Management of mountain lions in Montana. POB 200701, Helena, MT 59620. 138 pp.

MIS (Management Information Syastem). 2002. Montana WS program statewide overview reports for FY2002. USDA, APHIS, Wildlife Services, Montana WS State Office, P.O. Box 1938, Billings, MT 59103.

MIS. 2003. Montana WS program statewide overview reports for FY2003. USDA, APHIS, Wildlife Services, Montana WS State Office, P.O. Box 1938, Billings, MT 59103.

MIS. 2004. Montana WS program statewide overview reports for FY2004. USDA, APHIS, Wildlife Services, Montana WS State Office, P.O. Box 1938, Billings, MT 59103.

MIS. 2005. Montana WS program statewide overview reports for FY2005. USDA, APHIS, Wildlife Services, Montana WS State Office, P.O. Box 1938, Billings, MT 59103.

MIS. 2006. Montana WS program statewide overview reports for FY2006. USDA, APHIS, Wildlife Services, Montana WS State Office, P.O. Box 1938, Billings, MT 59103.

Montana. 2003. Montana Wolf Conservation and Management Plan. Environmental Impact Statement. Sime, ed Montana Fish, Wildlife and Parks, P.O. Box 200701, Helena, MT 420 pp.

Nelson, A.L. 1934. Some early summer food preferences of the American Raven in southeastern Oregon. Condor 36: 10-15.

Phillips, R. L., and L. D. Mech. 1970. Homing behavior of a red fox. J. Mammal. 51: 621.

Pils, C. M., and M. A. Martin. 1978. Population dynamics, predator-prey relationships and management of the red fox in Wisconsin. Tech. Bull. 105, Wisconsin Dept. Nat. Resour., Madison, WI.

Pitt, W. C., F. F. Knowlton, and P. W. Box. 2001. A new approach to understanding canid populations using an individual-based computer model: preliminary results. Endangered Species Update 18: 4.

Porter, S. 2004. Corporation fined for poisoning bald eagle in KY. Wildl. Law News Q. 2: 14.

Robinette, W. L., J. S. Gashwiler, and O. W. Morris. 1961. Notes on cougar productivity and life history. J. Mammal. 42: 204-217.

Robinette, W. L., N. V. Hancock, and D. A. Jones. 1977. The Oak Creek mule deer herd in Utah. Res. Publ. 77-15, Utah Div. Wildl., Salt Lake City, UT.

Rolley, R. E. 1985. Dynamics of a harvested bobcat population in Oklahoma. J. Wildl. Manage. 49:283-292.

Rosatte, R. C. 1987. Striped, spotted, hooded and hog-nosed skunks. Pages 599-613 *in* Novak, J. A. Baker, M. E. Obbard and B. Malloch (eds.) Wild furbearer Management and conservation in North America. Ministry of Natural Resounces, Ontario, Canada. 1150 pp.

Rowlands, I. W., and A. S. Parkes. 1935. The reproductive processes of certain mammals. VIII. Reproduction in foxes (*Vulpes spp.*). Proc. Zool. Soc. London, pp. 823-841.

Sanderson, G. C. 1987. Raccoon. Pp 486-499 *in* Novak, J.A. M.E. Obbard, B. Mallock, (eds.). Wildli Furbearer Management and Conservation in North America. Ministry of Natural Resources, Ontario, Canada. 1150 pp.

Sargeant, A. B. 1972. Red fox spatial characteristics in relation to waterfowl predation. J. Wildl. Manage. 36: 225-236.

Sargeant, A. B., S. H. Allen, and R. T. Eberhardt. 1987. Red fox predation on breeding ducks in midcontinent North America. Wildl. Monogr. 89: 1-41.

Schoen, J. W. 1990. Bear habitat management: a review and future perspective. Int. Conf. Bear Res. and Manage. 8: 143-154.

Schueler, D. G. 1993. Contract killers. Sierra Magazine. November/December.

Sheldon, W. G. 1950. Denning habits and home range of red foxes in New York State. J. Wildl. Manage. 14: 33-42.

Slate, D. A., R. Owens, G. Connolly, and G. Simmons. 1992. Decision making for wildlife damage management. Trans. N. A. Wildl. Nat. Res. Conf. 57: 51-62.

Smith, D.W., and D.S. Guernsey. 2002. Yellowstone Wolf Project: Annual Report, 2001. National Park Service, Yellowstone Center for Resources, Yellowstone National Park, Wyoming, YCR-NR-2002-04.

Storm, G. L., R. D. Andrews, R. L. Phillips, R. A. Bishop, D. B. Siniff, and J. R. Tester. 1976. Morphology, reproduction, dispersal, and mortality of midwestern red fox populations. Wildl. Monogr. 49: 1-82.

The Wildlife Society. 1992. Conservation policies of The Wildlife Society: A stand on issues important to wildlife conservation. The Wildlife Society, Bethesda, Maryland, USA.

Thier, T. J. 1990. Population characteristics and the effects of hunting on black bear in a population of northwestern Montana. M. S. Thesis. Univ. Mont., Missoula, MT. 100pp.

USDA. 1997 (revised). Animal Damage Control Program, final environmental impact statement. USDA-APHIS-ADC [WS] Operational Support Staff, 4700 River Road, Unit 87, Room 2D-07.3, Riverdale, Maryland, USA.

USDI. 1994. The reintroduction of gray wolves to Yellowstone national park and central Idaho: final environmental impact statement. United States Department of the Interior, United States Fish and Wildlife Service, Washington D. C. USA.

USFWS (U.S. Fish and Wildlife Service). 1982. Grizzly bear recovery plan. Denver, Colorado, USA.

USFWS. 1992. Biological opinion [July 28, 1992]. United States Department of the Interior, United States Fish and Wildlife Service, Washington, D.C., USA.

USFWS. 1993. Grizzly Bear Recovery Plan. Missoula, MT. 181 pp.

USFWS. 1996. Bitterroot Ecosystem recovery plan chapter - supplement to the grizzly bear recovery plan. Missoula, Montana, USA.

USFWS. 1997. Informal consultation between USFWS (D. Harms) and WS (L. Handegard). USFWS, Helena, Montana.

USFWS. 2000. Grizzly bear recovery in the Bitterroot ecosystem. Final Environmental Impact Statement. Missoula, Montana, USA.

USFWS. 2003. Service agents issue citations. USFWS News Release Nov. 4, 2003. (http://news.fws.gov). 2pp.

USFWS. 2007. Final Conservation Strategy for the Grizzly Bear in the Greater Yellowstone Area. Available at http://www.fs.fed.us/r1/wildlife/igbc/.

USFWS, Nez Perce Tribe, National Park Service, Montana Fish, Wildlife & Parks, Idaho Fish and Game, and USDA Wildlife Services. 2006 & 2007 [& 2008 in prep.]. Rocky Mountain Wolf Recovery 2005 & 2006 [&2007] Interagency Annual Report. C.A. Sime and E.E. Bangs, eds. USFWS, 585 Shepard Way, Helena, Montana 59601.

Voigt, D. R. 1987. Red Fox. Pages 378-392 *in* M. Novak, J. A. Baker, M. E. Obbard, and B. Mallock, eds. Wild Furbearer Management and Conservation in North America. Ministry Nat. Resour., Toronto, Ontario, Canada.

Voigt, D. R., and B. D. Earle. 1983. Avoidance of coyotes by red fox families. J. Wildl. Manage. 47: 852-857.

Voigt, D. R., and D. W. MacDonald. 1984. Variation in the spatial and social behavior of the red fox, *Vulpes vulpes*. Acta. Zool.Fenn. 171: 261-265.

WS. 1997a. Predator damage management in Western Montana. USDA, APHIS, Wildlife Services, P.O. Box 1938, Billings, Montana 59103.

WS. 1997b. Predator damage management in Eastern Montana. USDA, APHIS, Wildlife Services, P.O. Box 1938, Billings, Montana 59103.

Appendix A

WS' Montana Predator Damage Management EAs Quality Assurance Checklist[10]

Effects on Target Species Populations

- ✓ Management actions were directed toward localized populations or groups and/or individual offending animals, depending on the species and magnitude of the problem.
- ✓ The total number of predators killed did not exceed the quantitative or qualitative levels analyzed in the EAs and Predator Damage Management (PDM) activities are having no significant impact on those species targeted.

Effects on Non-target Species Populations

- ✓ The relatively few non-target animals captured were released at the capture site unless the Wildlife Services (WS) employee determined that they would not likely survive.
- ✓ Impact of PDM on non-target animals is negligible and there has been no significant impact on these species' populations.
- ✓ Traps and snares were set at least 30 feet from exposed carcasses (with the exception of sets made for the capture of mountain lion and black bear) to avoid or minimize risk of capturing scavenging bird species.
- ✓ WS personnel are experienced and trained to select the most appropriate method for taking targeted predators and excluding non-target animals.
- ✓ Breakaway snare locks were implemented into the program to facilitate the self-release of deer or elk that might be inadvertently captured.
- ✓ Pan-tension devices are used on foothold traps and foot/leg snare devices to minimize the likelihood of capturing non-target species unless such use would preclude capture of the intended target animal.

Protecting human safety

- ✓ Conspicuous, bilingual warning signs alerting people to the presence of damage management devices were placed at major access points when devices were set in the field.
- ✓ No injuries or illnesses to members of the public occurred as a result of WS activities.

Use of Pesticides

- ✓ All pesticides used were registered with the Environmental Protection Agency (EPA) and Montana Department of Agriculture (MDA).

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[10] Checklist of Standard Operating Procedures to minimize or avoid adverse environmental effects.

- ✓ To the best of the knowledge of the project or program manager, WS employees followed label directions for pesticide use during the reporting period.

- ✓ No violations of pesticide laws or regulations were noted or documented during field inspections by program or project managers or by State or Federal pesticide regulators.

- ✓ WS employees that used pesticides during the reporting period were trained and, for restricted use pesticides, certified to use such pesticides in accordance with EPA and MDA approved programs and participate in continuing education programs to keep abreast of developments and to maintain their certifications.

- ✓ Pesticide use, storage and disposal conform to label instructions, other applicable laws and regulations and Executive Orders 12898 and 13045.

- ✓ Material Safety Data Sheets for pesticides are provided to all WS personnel involved with specific PDM activities.

- ✓ Most pesticide use is primarily restricted to private property.

Historic Preservation

- ✓ WS determined this program's actions are not the kind of actions with potential to affect historic resources.

- ✓ WS consulted with the State Historic Preservation Office and has determined that the program is not likely to affect historic properties or archeological sites.

Native American Cultural Issues

- ✓ Activities conducted on Native American tribal lands were conducted only at the request of the tribe.

Humaneness

- ✓ Euthanasia procedures (*e.g.*, gunshot to the brain) that minimize pain were used to kill captured target species slated for lethal removal.

- ✓ Pan-tension devices are used on foothold traps and foot/leg snare devices to minimize the likelihood of capturing non-target species that are lighter in weight than the target species, unless such use would preclude capture of the intended target animal.

- ✓ Research continued to improve the selectivity and humaneness of management devices.

Endangered, Threatened and Sensitive Species

- ✓ No non-target take of any listed threatened or endangered species occurred.

- ✓ "Reasonable and Prudent Alternatives" (RPAs) or "Reasonable and Prudent Measures with Terms and Conditions" (RPMs) from the 1992 and 2002 or other Biological Opinion from the U. S. Fish and Wildlife Service (USFWS) were applicable to this action; to the best of the

knowledge of the project or program's manager, all of the RPAs and/or RPMs were met during the reporting period.

- ✓ If foothold traps were used in the immediate vicinity of concentrations of bald eagles, WS personnel conducted daily checks for trapped target individuals.
- ✓ Neck snares were not used for coyotes, black bears or mountain lions in areas occupied by grizzly bears.
- ✓ All foothold traps larger than #3 Soft Catch were checked at least daily in areas identified by the USFWS as "occupied gray wolf range."
- ✓ M-44s were not used in areas identified by USFWS as documented and occupied gray wolf territories.
- ✓ For Federal lands, sensitive species were addressed during the Work Planning process.

Land Management Issues/Conflicts

- ✓ WS developed Work Plans in coordination with the Bureau of Land Management (BLM), U.S. Forest Service (USFS) officials before conducting activities on BLM or USFS lands.
- ✓ Work conducted on BLM or USFS lands was in accordance with the developed Work Plans referenced above.
- ✓ Vehicle access was limited to existing roads or trails unless otherwise authorized by the land management agency.
- ✓ No conflicts with public land recreationists or other users occurred during the reporting period.
- ✓ Actions in Wilderness Study Areas were conducted in accordance with BLM's Interim Management Policy for Lands Under Wilderness Review (H-8550-1, III. G. 5).
- ✓ No pesticides were used in, and no preventive control work was conducted in any wilderness area.

Additional Measures to Minimize Impacts

- ✓ The WS Decision Model was used to identify the most appropriate PDM strategies and their impacts.
- ✓ Preference is given to nonlethal damage management methods when practical and effective.

Jeffrey S. Green, Regional Director
USDA, APHIS, Wildlife Services

5/14/08
Date