ENVIRONMENTAL ASSESSMENT (EA)

FOR

PREDATOR DAMAGE MANAGEMENT IN WESTERN MONTANA

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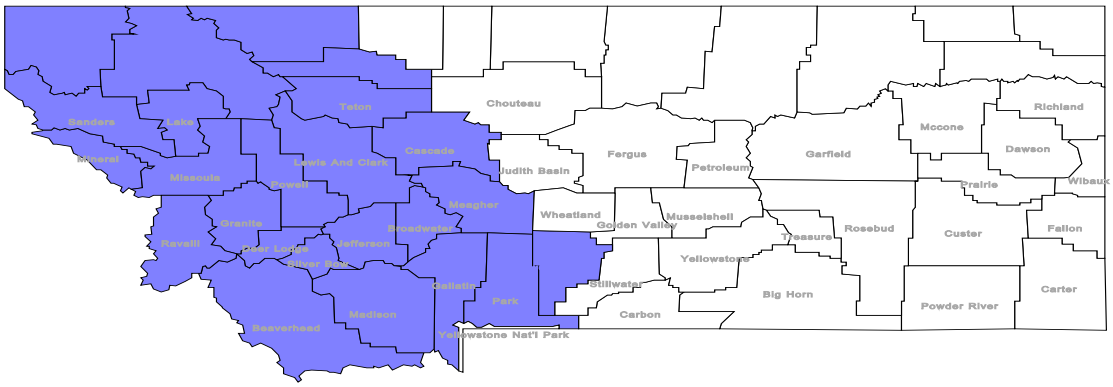

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1. CHAPTER 1: PURPOSE OF AND NEED FOR ACTION

INTRODUCTION

Across the United States, wildlife habitat has been substantially changed as human populations expand and land is used by humans. Some of these changes cause conflicts with wildlife by creating favorable habitat conditions for some wildlife species (e. g., prairie lands to cultivated fields fostered range expansion of some species), and by the movement of humans/human habitation (e. g., recreation and houses) into habitats used by some wildlife. These human uses and needs compete with wildlife, increasing the potential for conflicting human-wildlife interactions. In addition, segments of the public desire protection for wildlife and this protection can create conflicts between human and wildlife activities. The *Animal Damage Control Programmatic Final Environmental Impact Statement* (EIS) summarizes the relationship in American culture of wildlife values and wildlife damage in this way (USDA 1994):

> *"Wildlife has either positive or negative values, depending on varying human perspectives and circumstances . . . Wildlife generally is regarded as providing economic, recreational and aesthetic benefits . . . , and the mere knowledge that wildlife exists is a positive benefit to many people. However, . . . the activities of some wildlife may result in economic losses to agriculture and damage to property . . . Sensitivity to varying perspectives and values are required to manage the balance between human and wildlife needs. In addressing conflicts, wildlife managers must consider not only the needs of those directly affected by wildlife damage but a range of environmental, sociocultural, and economic considerations as well."*

Wildlife damage management is the alleviation of damage or other problems caused by or related to the presence of wildlife in specific areas or situations. APHIS/Animal Damage Control (ADC) is the Federal program authorized to manage animals damaging livestock and other agriculture, natural resources and property, or causing threats to public health and safety. ADC attempts to reduce wildlife damage at socially acceptable levels. While the levels may not be as satisfactory to some members of our society as to others, ADC tries to balance these viewpoints. ADC's authority comes from the Animal Damage Control Act of March 2, 1931, as amended (46 Stat. 1486; 7 U.S.C. 426-426c), the Rural Development, Agriculture, and Related Agencies Appropriations Act of 1988. Given this Congressional directive, efficacy of the program will be evaluated as an issue rather than a need for the program. To fulfill the Congressional direction, the purpose of predator damage management is to prevent or minimize damage to the protected resources. The need for action is derived from the specific threats to the resources and the available methods for responding to those threats.

Normally, according to the APHIS procedures implementing the National Environmental Policy Act (NEPA), planned individual wildlife damage management actions are categorically excluded (7 CFR 372.5(c), 60 Fed Reg. 6,000-6,003, 1995). This environmental assessment (EA) has been prepared to evaluate and determine if any potentially significant impacts to the human environment from the proposed program would occur. Prevention or reduction of wildlife damage, which includes removal of the animals responsible for the damage, is an essential and responsible part of wildlife management and is recognized as an integral component of wildlife management (The Wildlife Society 1992). This EA documents the analysis of potential environmental effects of planned and proposed actions by which ADC's responsibility can be carried out within 24 counties in western Montana (analysis area). The counties are: Beaverhead, Broadwater, Cascade, Deer Lodge, Flathead, Gallatin, Glacier, Granite, Jefferson, Lake, Lewis and Clark, Lincoln, Madison, Meagher, Mineral, Missoula, Park, Pondera, Powell, Ravalli, Sanders, Silver Bow, Sweet Grass and Teton. The analysis area was established to be similar to the ecoregion as described by Bailey (1995), and is also similar to the Montana Department of Fish, Wildlife and Parks (MFWP) Administrative Regions 1, 2, 3, and 4. This analysis relies on existing data contained in research and published documents and the ADC programmatic EIS (USDA 1994) to which this document is tiered.

ADC is a cooperatively funded and service oriented program. Before any predator damage management is conducted on private lands *"Agreements for Control"* must be signed by the landowner/administrator and ADC.

ADC Wildlife Damage Management Work Plans (Work Plans) or Cooperative Agreements would be in place for public lands where ADC wildlife damage management is requested. ADC cooperates with land and wildlife management agencies, as requested, to effectively and efficiently reduce predator damage. Any predator damage management conducted by ADC in the analysis area would be in compliance with applicable Federal, State and local laws regulations, policies, orders and procedures (ADC Directive 2.210).

Notice of the availability of this document will be published in local newspapers, consistent with the agency's NEPA procedures, to allow interested parties the opportunity to obtain and comment on this document.

ADC Program

ADC's mission, developed through its strategic planning process is to: 1) provide leadership in wildlife damage management for the protection of America's agricultural, industrial and natural resources, and property and 2) safeguard public health and safety. This is accomplished through:

- Training of wildlife damage management professionals,
- Development and improvement of strategies to reduce economic losses and threats to humans from wildlife,
- Collection, evaluation, and dissemination of management information,
- Develop cooperative wildlife damage management programs,
- Inform and educate the public on how to reduce wildlife damage,
- Provide data and a source for management materials and equipment, including pesticides. (USDA 1989)

The most effective approach to resolving wildlife damage is to integrate the use of several methods simultaneously or sequentially. Integrated Wildlife Damage Management (IWDM) is the application of safe and practical methods for the prevention and reduction of damage caused by wildlife based on local problem analyses and the informed judgement of trained personnel. The ADC Program applies IWDM, commonly known as Integrated Pest Management (IPM) (ADC Directive 2.105) to reduce damage through the ADC Decision Model (Slate et al. 1992) discussed on page 3-4 of this EA.

1.1 NEED FOR ACTION

The need for action is based on the necessity for a program to protect livestock, wildlife, natural resources, property, and safeguard public health and safety. Therefore, predator damage management is not based on punishing offending animals but as one means of reducing future damage, and would be used as part of the ADC Decision Model (Slate et al. 1992) described in the programmatic EIS (pages 2-23 to 2-36). The imminent threat of damage or loss of resources is often sufficient for individual actions to be initiated. The need for action is derived from the specific threats to the resources and the available methods for responding to those threats. In a recent District Court decision (U.S. District Court of Utah 1993), the court ruled that " . . . *the agency need not show that a certain level of damage is occurring before it implements an ADC program*." and "*Hence, to establish need for an ADC, the forest supervisors need only show that damage from predators is threatened*."

Purpose

In order for ADC to fulfill their legal responsibilities (Animal Damage Control Act of March 2, 1931, as amended (46 Stat. 1486; 7 U.S.C. 426-426c), the Rural Development, Agriculture, and Related Agencies Appropriations Act of 1988), wildlife damage management is conducted to prevent or reduce damage to resources while complying with strict measures to ensure public safety as well as the protection of domestic animals, nontarget animals and threatened and endangered (T&E) and sensitive species on public and private lands in western Montana. The purpose and need for the proposal results from the economic, environmental, social, and administrative factors of predator damage to public and private resources. The primary purpose of the proposal is to reduce the damage and resultant financial, social and cultural losses to requestors on both private and public lands. These govern the application of a predator damage management program and limit it to those areas with demonstrated or imminent

needs. Livestock producers (cooperators), businesses, residents and other agencies area depend on ADC to reduce the number of livestock killed, injured or harassed by predators, reduce property damage, protect designated wildlife, and help maintain the economic viability of the local communities. ADC proposes to conduct an IWDM program in the analysis area, including lethal and non-lethal methods to protect property, livestock, public health and safety, designated wildlife and T&E species when requested on private and public lands. ADC has been conducting a predator damage management program in western Montana since the beginning of the century when Congress first appropriated funding in 1915. The ADC program conducts predator damage management with the cooperation of Federal and State agencies, tribes, county administrators and private landowners. This EA analyzes and reveals the effects of the proposed ADC predator damage management to resources on Federal, State, tribal, county, municipal and private lands.

The area considered in this EA encompasses about 59,000 mi^2 (Rand McNally 1993) in western Montana. The analysis area includes lands under the jurisdiction of the U.S. Forest Service (Forest Service), Bureau of Land Management (BLM), National Park Service (NPS) and U.S. Fish and Wildlife Service (USFWS), Montana Department of State Lands (MDSL), American Indian Reservation lands, and county, municipal and private lands. In 1995, ADC had active agreements to conduct predator damage management on about 5.6 million acres (8,750 mi^2) of State and private lands or about 14.8% of the analysis area (MIS 1995) (MIS data year corresponds to the Federal fiscal year). There were 3.45 million acres or about 9% of the total area of State and private lands worked by ADC in 1995 (MIS 1995). Also in 1995, ADC had authorization to conduct predator damage management on Forest Service and BLM lands that equaled about 6% of the total public land area in Montana.

Within western Montana, livestock are permitted to graze on Federal lands under the jurisdiction of the Forest Service and BLM, and on State lands under the jurisdiction of the MDSL. In 1995, 1185 active private agreements existed for individuals participating in the cooperative ADC program for the protection of property and livestock on private lands.

Currently, ADC conducts predator damage management on Forest Service, BLM, USFWS, MDSL and private lands and upon a decision, this EA would replace portions of existing National Environmental Policy Act (NEPA) documentation as related to ADC; no predator damage management has been requested on NPS lands. ADC currently conducts predator damage management in the analysis area on two BLM Districts (Butte, western portion of the Lewistown), on the Beaverhead, Helena and Lewis and Clark National Forests, and the National Bison Range. These activities are currently covered under existing NEPA documents. This EA would replace existing predator damage management NEPA documents and allow ADC predator damage management on other public lands where there is a need and request and as coordinated with the appropriate management agency(ies).

1.1.1 Summary of Proposed Action

The proposed action is to conduct an IWDM program for the protection of property, agricultural resources, wildlife resources, public health and safety, and T&E and sensitive species on private and public lands in western Montana. Currently, predator damage management occurs on Federal and State lands administered by the Forest Service, BLM, USFWS and MDSL. An IWDM program would allow the use of all legal techniques and methods, either singly or in combination, to meet the requestor's needs. Livestock producers would be provided information regarding the use of effective non-lethal techniques. Methods used by ADC could include calling and shooting, shooting, aerial gunning, trapping, snaring, M-44s, denning, dogs, Livestock Protection Collar (LPC) and DRC-1339. Predator damage management would be allowed in the western Montana analysis area, when requested, on all land classes where there are Work Plans for planned activities, signed Agreements for Control or Cooperative Agreements. No predator damage management would be conducted in areas with legal or policy restrictions. All management activities would comply with appropriate Federal, State and local laws. An ADC Work Plan would be developed cooperatively and reviewed periodically with each National Forest and BLM District where predator damage management is conducted. (Chapter 3 contains a more detailed description of the current program and the proposed action)

1.1.2 Need for Predator Damage Management to Protect Livestock and Poultry, and the Contribution of Livestock to the Economy

Agriculture is one of Montana's largest industries, with receipts from marketing sales generating $1.86 billion in 1994. Livestock production, primarily cattle and sheep, is one of the primary agricultural industries and accounted for about 46.6% of the $1.86 billion in cash receipts (MASS (Montana Agricultural statistics Service) 1995).

Livestock production in western Montana contributes significantly to the economy of Montana. Livestock inventories in 1995 from the 24 western counties represented by this EA included about 1,018,000 head of cattle and calves (38% of the state total) and 103,800 sheep and lambs (21% of the state total) which together were valued at about $700 million (MASS 1995). Using these same percentages, the gross income in 1994 for sheep, lambs and wool was about $6.04 million and about $283.67 million for all cattle and calves (MASS 1995).

Scope of Losses

Coyotes (*Canis latrans*) are facultative predators that do not depend upon one major prey species. They successfully use many foods, including rodents, lagomorphs, fruits, insects, birds, carrion, reptiles, livestock and wildlife ungulates (Voigt and Berg 1987). Many studies have shown that coyotes can inflict high predation rates on livestock (O'Gara 1983, Henne 1977, Munoz 1977, Nass 1977). Coyotes accounted for 93% of all predator-killed lambs and ewes on nine sheep bands in shed lambing operations in southern Idaho and did not feed on 25% of the kills (Nass 1977). Coyotes were also the predominant sheep predator throughout a Wyoming study and essentially the only predator in winter (Tigner and Larson 1977). In addition, the question of whether or not all coyotes kill sheep may be of little relevance, since a depredating coyote may readily gain access and kill sheep in another coyote's territory (Shivik 1996). Therefore, management that selectively leaves territorial non-sheep killing coyotes in a population would not necessarily safeguard against sheep kills by other coyotes. The beneficial secondary effects of leaving territorial non-sheep killing coyotes within a population may be negligible because they do not necessarily prevent access by other coyotes (Shivik 1996).

In the analysis area, 67.1% ($105,790) of the value of all livestock verified by ADC as killed by predators were killed by coyotes during FY 1995 (MIS 1995) and 74.0% ($416,147) of the value of all livestock reported to ADC as killed by predators were killed by coyotes (MIS 1996). Also, according to MASS (1995), 67.3% ($1,276,100) of the value of sheep and lambs reported to be killed by all predators statewide in 1994 were killed by coyotes. Coyotes were responsible for 60.5% ($16,020,000) of the value of cattle and calves reported to be killed by predators in 1995 in mountain and western states (NASS (National Agricultural statistics Service) 1996). In Montana during 1995, coyotes were responsible for 61.1% ($385,000) of all calves killed by predators (NASS 1996).

In the analysis area, 3.5% ($5611) of the value of all livestock verified by ADC as killed by predators were killed by red fox (*Vulpes vulpes*) (MIS 1995) and 4.4% ($25,015) of the value of all livestock reported to ADC as killed by predators were killed by red fox (MIS 1996). According to MASS (1995), 12.9% ($244,100) of the value of sheep and lambs reported to be killed by all predators statewide in 1994 were reported to have been killed by red fox.

Other predators that depredate on cattle, calves, sheep and lambs in the analysis area are black bear (*Ursus americanus*), grizzly bear (*U. arctos horribilis*), mountain lion (*Puma concolor*), gray wolves (*C. lupus*), bald eagles (*Haliaeetus leucocephalus*), golden eagles (*Aquila chrysaetos*), and feral or free-roaming dogs (*C. familiaris*).

Cattle and calves are most vulnerable to predation at calving time and less vulnerable as they get older and

larger (Shaw 1977, 1981, Horstman and Gunson 1982). Because calving occurs at lower elevations in late winter and early spring, the vulnerability of cattle and calves to mountain lions and black and grizzly bears is reduced. Calves remain vulnerable to these predators during the spring through autumn if they are grazed in higher elevations that have more suitable habitat for mountain lions and bears. Sheep and lambs remain vulnerable to predation throughout the year, particularly from coyotes, mountain lions and bears whenever they spend time in habitats of these predators (Henne 1977, Nass 1977, 1980, Tigner and Larson 1977, O'Gara et al. 1983, Shaw 1987). Lambs are vulnerable to red fox predation in the spring, primarily at the lower elevations.

Black bear and mountain lion predation on livestock, especially sheep, and black bear predation on beehives[1] can be severe on an individual basis as these predators sometimes make multiple kills or destroy many beehives (NASS 1995, 1996, MIS 1994, 1995, 1996). Bears and mountain lions are occasionally responsible for catastrophic incidents or large losses of sheep and lambs (Collinge 1996a, MIS 1996, Nelson 1996, Shaw 1987). This is sometimes called *"surplus killing"* when only selected tissues or parts are consumed or the carcasses are not fed on at all. Bears or mountain lions may also frighten an entire flock of sheep as it attacks, resulting in a mass stampede. These stampedes sometimes result in many animals suffocating as they *"pileup"* on top of each other in a confined area, such as along thick willow growth in the bottom of a drainage, or in corrals or pens.

Mountain lion and bobcat (*Lynx rufus*) predation accounted for the reported death of 200 cattle and 100 calves in Montana during 1995, valued at about $161,000 to livestock producers (NASS 1996). Mountain lion and bobcat predation accounted for the reported death of 1,200 sheep and lambs in 1993 valued at $59,200 and 1,300 sheep and lambs valued at $67,800 in 1994 in Montana (MASS 1995). Producer reported losses to ADC for FY 1995 showed that mountain lions were responsible for the death of 44 cattle and calves valued at $19,900 and 99 sheep and lambs valued at $8360 (MIS 1996).

Eagle predation in 1993 accounted for the reported death of 2,500 sheep and lambs at a cost to producers of $102,700 and in 1994, eagle predation accounted for 5,300 sheep and lambs, valued at $216,000 (MASS 1995). The producer reported losses to ADC in 1995 showed that eagle depredation accounted for the death of 131 sheep and lambs valued at $10,480 (MIS 1996).

Dogs are responsible for considerable predation to livestock and wildlife. The NASS (1996) reported that 200 calves valued at $70,000 were killed by dogs in Montana during 1995, and MASS (1995) reported that 1,700 sheep and lambs valued at $78,700, and 1,000 sheep and lambs valued at $53,100 were killed by dogs in 1993 and 1994, respectively. Dog predation reported to ADC for FY 1995 included 45 sheep and lambs valued at $3595 and one cow valued at $450 (MIS 1996).

Connolly (1992a) determined that only a fraction of the total predation attributable to coyotes is reported to or confirmed by ADC. He also stated that based on livestock loss surveys from the NASS in comparison to ADC reported losses, ADC only receives reports on about 19% of the total adult sheep and 23% of the lambs killed by predators. In western Montana, about 26.8% of the sheep and lambs and 35.2% of the calves reportedly killed were confirmed by ADC personnel (MIS 1995, 1996). ADC personnel do not attempt to find every head of livestock reported to be killed by predators, but rather to verify losses to determine whether a problem exists that requires management action.

Although it is impossible to accurately determine the amount of livestock saved from predation by ADC, it can be estimated. Scientific studies reveal that in areas without some level of predator damage management, losses of adult sheep and lambs to predators can be as high as 8.4% and 29.3%, respectively (Henne 1975, Munoz 1977, O'Gara et al. 1983). Conversely, other studies show that sheep and lamb

[1] Bees and apiaries are classified as livestock as per Montana Code Annotated (MCA) 15-24-921.

losses are much lower where predator damage management is applied (Nass 1977, Tigner and Larson 1977, Howard and Shaw 1978, Howard and Booth 1981, DeCalesta 1987, DeLorenzo and Howard 1977).

Loss of Livestock and Poultry

The MASS (1995) reported that in 1994 predators killed 42,900 sheep and lambs valued at $1,900,000 in Montana and NASS (1996) reported that in 1995 predators killed 2,300 cattle and calves valued at $945,000 in Montana. Calves lost to all predators in Montana during 1995 totaled 1800 head ($630,000) and represented 3.2% of the total calf deaths (NASS 1996).

In the analysis area, the verified losses and the reported losses to all classes of livestock from coyote predation are higher than the corresponding verified and reported losses caused by all other predators combined. Coyote predation accounted for about 67.1% of the verified value of all livestock during 1995 (MIS 1995) and 74.0% of the reported value (MIS 1996). Also in 1995, the value of black bear verified losses were 14.8%, mountain lion was 8.9%, red fox was 3.5%, feral dog was 2.4%, grizzly bear was 1.4%, gray wolf was 0.9% and eagle was 0.1% (MIS 1996). The corresponding reported losses were 12.0% for black bear, 5.0% for mountain lion, 4.4% for red fox, 1.9% for eagle, 0.9% for grizzly bear, 0.8% for wolves, and 0.7% for dog (MIS 1996).

In the analysis area, ADC personnel verified that predators killed or injured 120 calves, 243 adult sheep, 644 lambs, four horses, 88 beehives and 310 other livestock and poultry in the analysis area in 1995 for a total value of $157,659 (MIS 1995). The corresponding reported livestock losses for 1995 were one cow, 310 calves, 719 adult sheep, 2508 lambs and 237 beehives for a total loss of $562,407 (MIS 1996). These losses occurred in spite of predator damage management efforts by producers, who often incur substantial indirect costs (Jahnke et al. 1987), and ADC program personnel.

1.1.3 Need for Predator Damage Management to Protect Game Populations

Revenue derived from recreation, especially recreation related to wildlife and the outdoors, is increasingly important to the economy of western Montana. Southwick (1994) estimated the total economic impact from deer hunting alone in the United States in 1991 to be $16.6 billion. In Montana, Southwick estimated the total economic impact of hunting was $526.4 million and generated 9,440 jobs in local economies in 1991. As a result, the management of wildlife populations is important to the people of Montana and to the MFWP who have the responsibility for managing wildlife for the benefit of the State of Montana. Predator damage management may periodically be requested by the MFWP to protect big game, upland game, or the USFWS to protect migratory birds, and T&E species, to reduce predation to achieve management objectives. These requests may result from efforts to reintroduce species, intensively manage small critical habitats, or to temporarily assist species recovery. Long-term or widespread predator removal for the protection of wildlife species is not an objective of the MFWP or the USFWS, but a strategy used to achieve management objectives.

Research shows that predator damage management has the potential to benefit populations of both game and non-game wildlife. Predator damage management undertaken to protect livestock could augment wildlife management objectives set by the MFWP or the USFWS. Conversely, a lack of predator damage management could adversely affect certain wildlife species (Connolly 1978a).

Predation on game species is well documented and can adversely impact survival and recruitment of individuals into a population, especially when environmental factors (i.e., weather influences, forage conditions, prey populations, etc.) are poor and do not favor the prey species (for additional discussion of predator/prey relationships see 2.3.1). Factors such as predator densities, alternate prey densities, weather conditions, deer, antelope or other game species densities, vegetative cover and vulnerability can influence survival and recruitment of a species in a population. Under certain conditions, predators, primarily

coyotes, have been documented as having a significant adverse impact on deer (*Odocoileus spp*.), pronghorn antelope (*Antilocapra americana*), bighorn sheep (*Ovis canadensis*), game bird populations and T&E species, and this predation is not necessarily limited to sick or inferior animals (Pimlott 1970, Bartush 1978, USDI 1978, 1995, Hamlin et al. 1984, Neff et al. 1985, Wehauser 1996). Connolly (1978a) reviewed 68 studies of predation on wild ungulate populations and concluded that, in 31 cases, predation was a limiting factor. These cases showed that coyote predation had a significant influence on some populations of white-tailed deer (*O. virginianus*), black-tailed deer (*O. hemionus columbianus*), pronghorn antelope and bighorn sheep. Based on research and experience, many wildlife management agencies have found that coyote damage management can increase deer, pronghorn antelope fawn and game bird survival where predation is affecting the ability of these populations to maintain or increase their recruitment. Under an existing Memorandum of Understanding (MOU) with ADC, MFWP could request predator damage management for the protection of designated wildlife species. Predator damage management would be requested when the MFWP determined predation was detrimental to management objectives. Only after the MFWP has requested assistance would ADC respond.

Deer Predation

Mackie et al. (1976) documented high winter losses of mule deer (*Odocoileus hemionus*) due to coyote predation in north-central Montana and stated that coyotes were the cause of most overwinter deer mortalities. Hamlin et al. (1984) in a study of mule deer fawn mortality in Montana observed that a minimum of 90% summer mortality of fawns was a result of coyote predation. Mackie et al. (1976) suggested that predation by coyotes ranked high as a probable cause of loss of mule deer fawns in the fall, while direct evidence of coyote predation during winter suggested this to be the proximal cause in the loss of fawn and adult mule and white-tailed deer. Trainer et al. (1981) reported that heavy mortality of mule deer fawns during late fall and winter was limiting recruitment to the deer population in Oregon. Garner (1976), Garner et al. (1976), and Bartush (1978) determined the mortality of radio-collared white-tailed deer fawns in the Wichita Mountains of Oklahoma to be 87.9 to 89.6% with predators being responsible for 88.4 to 96.6% of the mortality. Garner (1976) further stated that inter-specific behavioral observations indicated that coyotes may find fawns by thoroughly searching near single does. Beasom (1974a) stated that predators were responsible for 74% and 61% of the fawn mortality for two consecutive years on his study area. Teer et al. (1991) documented that coyote diets contain nearly 90% deer during May and June. They concluded from work conducted at the Welder Wildlife Refuge, Texas that, "*Unequivocally coyotes take a large portion of the fawns each year during the first few weeks of life*." Cook et al. (1971) stated that, *"Apparently, the neonatal period is a critical one in the life"* of white-tailed deer. Remains of 4 to 8 week old fawns were also common in coyote scats (feces) in studies from Steele (1969), Cook et al. (1971), Holle (1977), Litvaitis (1978), Litvaitis and Shaw (1980). Other researchers have also observed that coyotes are responsible for the majority of fawn mortality during the first few weeks of life (Knowlton 1964, White 1966, Cook et al. 1971, Salwasser 1976, Trainer et al. 1981). During other studies, designed to examine the impact of coyote predation on deer recruitment or coyote food habits, similar observations were noted (Steele 1969, Cook et al. 1971, Holle 1977, Litvaitis 1978, Litvaitis and Shaw 1980).

Coyote Damage Management Results

Guthery and Beasom (1977) demonstrated that after coyote damage management, the deer fawn production was 70% greater after the first year and 43% greater after the second year on their study area. Stout (1982) increased deer production on three areas in Oklahoma by 262%, 92%, and 167% the first summer following coyote damage management and increased production 154% for the three areas. Mule deer fawn survival was significantly increased and more consistent inside a predator-free enclosure in Arizona (LeCount 1977). Garner (1976), Garner et al. (1976), LeCount (1977), Teer et al. (1991) stated that predator damage management may increase annual deer recruitment and survivability, but that impacts from other causes (drought, disease, hunting, livestock grazing, etc.) play a major role in achieving management objectives.

Knowlton and Stoddart (1992) reviewed deer productivity data from the Welder Wildlife Refuge following coyote reduction. Deer densities tripled compared with those outside the enclosure, but without harvest

management, ultimately returned to original densities due primarily to malnutrition and parasitism.

Pronghorn Antelope Predation

Nearly five decades ago, Jones (1949) believed that coyote predation was the main limiting factor of pronghorn antelope in Texas. More recently, Neff and Woolsey (1979, 1980) determined that coyote predation on pronghorn antelope fawns was the primary factor causing fawn mortality and low pronghorn antelope densities on Anderson Mesa, Arizona. Neff et al. (1985) concluded from a 5-year radio tracking study that most of the coyotes that killed pronghorn antelope fawns on Anderson Mesa were residents. This means that most of the depredating coyotes were present on the fawning grounds during fawning times. A 6-year radio telemetry study of pronghorn antelope in western Utah showed that 83% of all fawn mortality was attributed to predation (Beale and Smith 1973). Trainer et al. (1983) concluded that predation was the leading cause of pronghorn antelope fawn loss, accounting for 91% of the mortalities that occurred during a 1981-82 study in southeastern Oregon. They also stated that most pronghorn antelope fawns were killed by coyotes and that known probable coyote kills comprised 60% of fawn mortality. Major losses of pronghorn antelope fawns to predators have been reported from other radiotelemetry studies (Barrett 1978, Beale 1978, Bodie 1978, Von Gunten 1978, Tucker and Garner 1980).

Coyote Damage Management Results

Arrington and Edwards (1951) observed that following coyote damage management in Arizona, an increase in pronghorn antelope populations occurred to the point where antelope were again huntable, whereas on areas without coyote damage management this increase was not noted. Coyote damage management on Anderson Mesa, Arizona increased the herd from 115 animals to 350 in 3 years, and peaking at 481 animals in 1971 (Neff et al. 1985). After coyote damage management was discontinued, the pronghorn fawn survival dropped to only 14 and 7 fawns/100 does in 1973 and 1979, respectively. Initiation of another coyote damage management program began with the removal of an estimated 22% of the coyote population in 1981, 28% in 1982, and 29% in 1983. As a result, fawn production increased from a low of 7 fawns/100 does in 1979 to 69 and 67 fawns/100 does in 1982 and 1983, respectively. Antelope population surveys on Anderson Mesa conducted in 1983 indicated a population of 1008 antelope, exceeding 1000 animals for the first time since 1960. In addition, a coyote reduction study in southeastern Oregon documented that in 1985, 1986 and 1987 an estimated reduction of 24%, 48%, and 58% of the spring coyote population in the study area resulted in an increase in antelope fawns from 4 fawns/100 does in 1984 to 34, 71, and 84 fawns/100 does in 1985, 1986, and 1987, respectively (Willis et al. 1993). Similar observations of improved pronghorn antelope fawn survival and population increases following coyote damage management have been reported by Riter (1941), Udy (1953), and Hailey (1979).

Table 1-1. Mortality estimates for antelope fawns at the NBR[1]

Year	Estimate #* Fawns Born	# of Fawns at Weaning	% Mortality	Coyotes** Removed
1981	104	22	79	0
1982	96	5	95	0
1983	130	13	90	0
1984	130	1	99	0
1985	122	18	85	4
1986	124	28	77	5
1987	124	23	81	1
1988	130	11	92	0
1989	108	6	94	0
1990	108	26	76	7
1991	114	5	96	2
1992	122	5	96	1
1993	110	1	99	4
1994	106	6	94	3
1995	96	42	56	14

* Estimated # of fawns born is based on a 200% birth rate
** Coyotes removed were from pronghorn habitat in the spring

[1] Byers, J. A. 1997. The American Pronghorn: Social Adaptations and the Ghosts of Predators Past. Univ. Of Chicago Press, Chicago, Illinois.

Coyote predation was a leading cause of antelope fawn mortality on the National Bison Range (NBR) at Moiese, Montana. Table 1-1 shows the fawn mortality each year from 1981 to 1995 as it compares to the number of coyotes removed just before and during the antelope fawning period for each respective year (Byers 1997), however, the table does not reveal additional coyotes taken by refuge personnel. Between 1985 and 1994, there were at least some years that a total of 15 coyotes were removed from the refuge (D. Wiseman, USFWS, NBR, 1996, pers. comm.). Some of these coyotes, however, were removed at a time of the year when their removal may not have been significantly beneficial to antelope fawn survival. When coyotes are removed before the coyote breeding season, another pair of coyotes could reoccupy this territory, breed and den, and thereby present another potential for antelope fawn predation. The USFWS and O'Gara (1994) conducted an aerial gunning operation on the NBR in 1985 that resulted in an increase in antelope fawn survival for several years and eventually dropped in subsequent years. Limited aerial gunning of coyotes was again conducted on the NBR in 1992 and in 1993 primarily on the big horn sheep range for the protection of lambs and to a lesser degree on the adjacent antelope habitat. However, these aerial gunning operations were conducted after coyotes had denned and very little follow-up coyote damage management was conducted during the crucial period of antelope fawning and big horn lambing. The autumn antelope fawn survival was 8.2 fawns per 100 does in 1992, dropping to 1.8 fawns per 100 does in 1993 and 11.3 fawns per 100 does in 1994. In 1995, ADC conducted a limited aerial gunning operation before most coyote denning activity and followed up with limited ground control to remove coyotes in big horn sheep habitats during lambing and in antelope fawning areas during the fawning period. Coyote movements and activity overlapped between the big horn sheep habitat and the antelope habitat. The autumn antelope fawn survival for 1995 was 87.5 fawns per 100 does and the best survival of twins that had ever been documented on the NBR.

Coyote damage management for the protection of antelope was also cost effective in pronghorn antelope

management, as shown by Smith et al. (1986).

Migratory Birds

Johnson et al. (1989) found that rates of predation on duck nests early in the nesting season increased with the abundance of red fox, badgers (*Taxidea taxus*), and American crows (*Corvsus brachyrhynchos*) and late in the season with the abundance of red fox and striped skunk (*Mephitis mephitis*). The red fox has also been identified by Duebbert and Lokemoen (1976), Higgins (1977), Sargeant et al. (1984), Sargeant et al. (1993), and Klett et al. (1988) as a major predator of ducks and duck eggs. In the prairie pothole region, which includes areas of Montana, Sargeant et al. (1993) stated that coyote, red fox, and mink (*Mustela vison*) were numerous or common in one or more study areas.

Sargeant et al. (1993) stated that the abundance of red fox has a profound effect on the survival of adult ducks in the prairie pothole region, however, coyotes probably also prey extensively on adult ducks. Coyote, red fox and mink are the primary mammal species affecting duckling survival (Sargeant et al. 1973, Sargeant et al. 1993). At Agassiz National Wildlife Refuge in Minnesota, Korschgen et al. (1996) found predation to be the number one factor of known mortality in 59% of the females and 60% of the male canvasback ducklings. Mink were the single greatest cause of mortality accounting for 39-100% each year (Korschgen et al. 1996).

In a study of waterfowl nesting success in Canada, researchers found that eggs in most nests were lost to predators, including red fox, coyote, striped skunk, raccoon (*Procyon lotor*), Franklin's ground squirrel (*Citellus franklini*), badger, black-billed magpie (*Pica pica)* and American crow (Johnson, et. al. 1989). Cowardin et al. (1985) determined that predation was by far the most important cause of nest failure in mallards (*Anas platyrhynchos*) on their study area. Various studies have shown the skunks and raccoons are major waterfowl nest predators resulting in poor nesting success (Keith 1961, Urban 1970, Bandy 1965). On the Sterling Wildlife Management Area in southern Idaho, striped skunks, red fox and black-billed magpies were documented as common predators of nesting ducks, with magpie predation identified as the most significant factor limiting waterfowl production (Gazda and Connelly 1993).

Nesting colonies of wading birds can be rapidly destroyed by mammalian predators, such as red fox, gray fox (*Urocyon cinereoargenteus*) and raccoon both through preying on nest contents and by causing the abandonment of nests, not directly affected (Burger and Hahn 1977, Southern and Southern 1979, Rodgers 1980, 1987, Frederick and Collopy 1989). Frederick and Collopy (1989) stated that mammals and snakes accounted for 43% of nest failures in a wading bird colony and suggested that raccoons were the primary mammalian predator.

All predators discussed in this EA prey on duck eggs, although mink prey primarily in wetlands (Sargeant and Arnold 1984, A. B. Sargeant unpublished data as cited in Sargeant et al. 1993). Among egg eating predatory mammals, the striped skunk and red fox have the greatest effect on nesting success of ducks in uplands and raccoons have the greatest effect on the nests success of ducks that nest over water (Sargeant et al. 1993).

Upland Game Birds

Dumke and Pils (1973) reported that ringed-neck pheasant (*Phasianus colchicus*) hens were especially prone to predation during the nest incubation period. In Minnesota, pheasant hatching success and brood production was more than doubled with an intensive reduction of predators (Chessness et al. 1968).

Thomas (1989) and Speake (1985) reported that predators were responsible for more than 40% of nest failures of wild turkeys (*Meleagris gallopavo*) in New Hampshire and Alabama, respectively. Everret et al. (1980) reported that predators destroyed 7 of 8 nests on his study area in northern Alabama. Lewis (1973) and Speake et al. (1985) reported that predation was also the leading cause of mortality in turkey

poults, and Kurzejeski et al. (1987) reported in a radiotelemetry study that predation was the leading cause of mortality in hens. Wakeling (1991) reported that the leading natural cause of mortality among older turkeys was coyote predation, with the highest mortality rate for adult females occurring in winter. Other researchers report that hen predation is also high in spring when hens are nesting and caring for poults (Speake et al. 1985, Kurzejeski et al. 1987, Wakeling 1991).

Threatened and Endangered Species

Predation can have a major impact on threatened and endangered species. Predation has been documented in black-footed ferret (*Mustela nigripes*) reintroductions in Wyoming, South Dakota and Montana (E. Stukel, SD Game, Fish and Parks pers. comm. 1995; USDI 1995). Massey (1971) and Massey and Atwood (1981) found that the presence of predators alone can prevent least terns (*Sterna antillarum*) from nesting and cause them to abandon previously occupied sites. Mammalian predators were found to have significantly impacted the loss of least tern eggs on sandbars and sandpits (Kirsch 1996). Skunk (Massey and Atwood 1979), red fox (Minsky 1980), coyote (Grover and Knopf 1982), and raccoon (Gore and Kinnison 1991) are common predators of least terns. During a two-year study, coyote predation accounted for 25% to 38.5% of the nesting interior least tern (Grover 1979). In Massachusetts from 1985-1987, predators destroyed 52-81% of all active piping plover (*Charadrius melodus*) nests (MacIvor et al. 1990). Red foxes accounted for 71-100% of the nests destroyed by predators at the site (MacIvor et al. 1990). Drewien et. al. (1985) found predation by coyotes and red fox on endangered whooping crane eggs and chicks was common during a whooping crane cross-fostering experiment at Grays Lake National Wildlife Refuge. Predator control measures were implemented in response to this finding, and the authors concluded that predator control was effective in reducing mortality of whooping cranes and other avian species nesting at Grays Lake.

Coyote Damage Management Results

In documenting an extensive study of the effects of red fox predation on waterfowl in North Dakota, researchers concluded that reducing high levels of predation was necessary to increase waterfowl production (Sargeant, et. al. 1984). Greenwood (1986) and Williams et al. (1980) reported that a 72% hatching success of eggs following a predator poisoning campaign, but only 59% when predators were not poisoned.

Predator damage management could be an important tool in maintaining migratory waterfowl. Gilbert et al. (1996) stated that waterfowl nest losses to predators were variable with 16.6%, 33.7%, and 25.1% of all nests predated during the periods of 1964-1970, 1971-1980, and 1981-1990, respectively. The lowest predation during the period of 1964-1970 was attributed to a combination of poison bait, trapping, and aerial gunning to control predators (Gilbert et al. 1996). In 1994 and 1995, Delta Waterfowl Foundation funded a predator (red fox, raccoon, striped skunk, badger, and mink) removal study on 1-2 mi^2 study areas in northeastern North Dakota to determine if duck nesting success could be improved (Garrettson and Rowher 1994, Garrettson et al. 1995). Predators were removed with traps and snares, and occasionally shooting. Data from 1994 indicated that the removal of predators resulted in a duck nesting success rate of 51.7% versus 5.5% nesting success on areas without predator removal (Garrettson and Rowher 1994). Data from 1995 also showed an increased duck nesting success rate (52%) on predator removal areas versus non-removed areas (6% nesting success).

Trautman et al. (1974) stated that during a 5-year study in South Dakota, there was a 19% increase in ring-necked pheasant populations on areas with fox only predator control. During a second 5-year study in South Dakota, ring-necked pheasant populations increased 132% on areas with fox, raccoon, badger, and skunk control (Trautman et al. 1974). Trautman et al. (1974) concluded that a single species predator control program showed some promise for enhanced pheasant populations, but that a multispecies predator control program should substantially increase ring-necked pheasant populations.

Balser et al. (1968) determined that predator damage management resulted in 60% greater production in

waterfowl in areas with damage management areas as compared with areas without damage management. He also recommended that when conducting predator damage management, to target the entire predator complex or compensatory predation may occur by a species not under control, a phenomena also observed by Greenwood (1986).

Clearly, under some circumstances, predator damage management would be an important tool in maintaining specific wildlife production and management objectives. If predator damage management is undertaken in the analysis area specifically to protect wildlife, it would be at the request of MFWP or the U.S. Fish and Wildlife Service (USFWS) to meet their management objectives.

1.1.4 Need for Predator Damage Management for Wildlife Determined to be a Nuisance or Threat to Public Safety.

MFWP is responsible for responding to bear and mountain lion complaints relating to nuisance and public safety and ADC responds to livestock damage requests. Within the analysis area, human interactions with bears and mountain lions could occur wherever habitat or food sources overlap with human activities. 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. Mountain lion populations are estimated to be increasing (A. Dood, MFWP, pers. comm. 1995). Increasing mountain lion observations, road kills and damage complaints indicate the statewide mountain lion population has increased substantially.

When black bears and grizzly bears, or mountain lions damage property or threaten public health and safety, immediate action is taken. Normally, MFWP responds to nuisance bear and mountain lion complaints and public health and safety threats. ADC responds to livestock related black and grizzly bear, and mountain lion problems when requested by producers, and at times, respond to black and grizzly bear and mountain lion threats to public health and safety situations when requested by the MFWP. When the MFWP or ADC receives a reported grizzly bear depredation on livestock, they contact the other agency and conduct a joint investigation. Relocations of bears by MFWP between *grizzly bear ecosystems* is done following State and Federal laws, regulations, and policy. Handling and control of nuisance grizzly bears is governed by the grizzly bear special rule (50 CFR 17.40) and guidance provided by the Interagency Grizzly Bear Guidelines (IGBC 1986). Damage management actions are designed to capture and remove the specific target bear(s).

The MFWP *"Guidelines for Controlling Nuisance Black Bears"* states that the MFWP utilizies three major strategies for addressing human/black bear conflicts (MFWP 1987). These are: 1) hunting seasons are implemented in areas where black bear populations are healthy enough to sustain harvest, 2) public information efforts are directed at people to foresee and minimize the conflicts, and 3) removal of a black bear from a situation is sometimes required by either the nature of the bear's offense or the response of the people involved. Montana State Statutes (MCA 87-1-225, 87-1-232, 87-1-233, 87-1-234, 87-3-127, 87-3-130, 87-7-101, 87-7-102) gives the MFWP authority and direction for dealing with complaints about black bears. MFWP policy/guideline stemming from Montana laws requires that black bears that: 1) attack humans or livestock[2] resulting in injury or death would be destroyed; 2) display a potential threat to human safety, the area will be signed or the bear would be trapped, marked and relocated for the first offense; adult and subadult males would be destroyed or harvested by hunters for the second offense; no bears would be relocated a third time, 3) use human or livestock foods, garbage, game meat or carrion, efforts would be made to remove the attractant, if this is not possible the bear would be trapped and relocated or the bear may be harvested by a hunter. All bears relocated would be marked with nuisance bear ear tags or permanently marked in a manner so they can be identified in subsequent captures. Release

[2] Under Montana law, bees are classified as livestock.

sites of nuisance bears would preferably be at least 50 miles away, in a different mountain range, in an area of low bear density with low potential for livestock interaction.

Mountain lion attacks on humans in the western United States and Canada have increased markedly in the last two decades, primarily due to increased mountain lion populations and human use of mountain lion habitats (Beier, 1992). Recorded instances of mountain lions attacking humans, stalking people and having to be removed from threatening situations has increased in Montana over the last 10 years. ADC responded to one instance within the analysis area in 1995 where mountain lions were considered by the MFWP and ADC to be a public safety threat. A boy was killed while riding a bike near Evaro, Mt. in 1989 by a mountain lion and another mountain lion attacked and injured a child within the Lake McDonald picnic area of Glacier National Park in 1990. The recent fatal attacks in California, Colorado and British Columbia also emphasize the need for awareness.

The disease outbreaks and threat from mesopredators have occurred in Montana and could occur again anytime. ADC has, and would continue, to respond to requests for assistance from State, and county agencies and private individuals to reduce such threats (MIS 1996).

1.2 RELATIONSHIP OF THIS ENVIRONMENTAL ASSESSMENT TO OTHER ENVIRONMENTAL DOCUMENTS

1.2.1 ADC Programmatic EIS. ADC has issued a final EIS and Record of Decision on the National APHIS-ADC program (USDA 1994). The Record of Decision (ROD) for the EIS was published on March 7, 1995. This EA is tiered to that EIS and will be evaluated for consistency with the ROD.

1.2.2 National Forest Land and Resource Management Plans (LRMPs). The National Forest Management Act (NFMA) requires that each National Forest prepare a Land and Resource Management Plan (LRMP) for guiding long-range management and direction; activities conducted on the forest are to be consistent with the LRMP. A careful review of the LRMPs for the National Forests in the analysis area found that predator damage management was discussed only in the LRMP for the Beaverhead-Deerlodge National Forest. However, this silence does not necessarily denote inconsistency with the *"Forest Plans."*

1.2.3 National Forest EAs for Predator Damage Management. The Beaverhead National Forests has an EA for predator damage management related to the protection of livestock (USFS 1988). The ADC Predator Damage Management in Montana EA incorporates by reference all of the applicable site-specific documentation of need and site-specific analysis of impacts from the EA prepared by the Beaverhead National Forest. ADC is conducting predator damage management on National Forest System lands with EAs, categorical exclusions and under emergency control. Any future predator damage management efforts would be conducted according to the decisions made from this EA. Work Plans would be developed by ADC on National Forest System lands where predator damage management activities are planned or anticipated and discussed during work plan meeting(s) with the Forest Service, ADC and MFWP personnel.

1.2.4 BLM Resource Management Plans/Environmental Impact Statements (RMP/EISs). The BLM currently uses RMP/EISs to guide management on lands they administer. RMP/EISs generally replace older land use plans known as Management Framework Plans. Two Montana BLM Districts (Butte, western portion of the Lewistown) lie within the jurisdiction of this EA. Work Plans would be developed by ADC and discussed during the work plan meeting with BLM, ADC and MFWP personnel.

Other BLM Land Use Plans

Predator damage management is not specifically addressed in other BLM management plans within the analysis area. However, livestock grazing is permitted under these land use plans. Predator damage management would be open to consideration, in support of livestock grazing management, unless otherwise

prohibited. For example, predator damage management would be prohibited where it would jeopardize any Federally listed T&E species. An informal Section 7 Consultation has been conducted with the USFWS to determine if ADC actions would adversely affect a listed species.

1.2.5 BLM EAs for Predator Damage Management. The BLM has prepared an EA for predator damage management in Montana (BLM 1994). This EA addresses agency responsibilities, guidance and restrictions for various management objectives and land classes. The ADC Predator Damage Management in Western Montana EA incorporates by reference all of the applicable site-specific documentation of need and site-specific analysis of impacts from the EA prepared by the BLM. Predator damage management would continue on the Butte and Lewistown BLM Districts according to the 1994 EA and the ADC Work Plan until officially superseded by the final decision from this EA. Additional NEPA documentation would be required to conduct wildlife damage management that is outside the scope of this EA, should the need arise.

1.2.6 Final EIS on The Reintroduction of Gray Wolves to Yellowstone National Park and Central Idaho. Part of the analysis area falls within the nonessential experimental population areas identified for Central Idaho and Yellowstone National Park and part within the naturally recovering population. The Final *Reintroduction of Gray Wolves to Yellowstone National Park and Central Idaho EIS* and 50 CFR 17.84 provide guidance on when, where, and how gray wolf damage management would be conducted. Any decision made because of this EA process would be consistent with that guidance.

1.2.7 Guidelines for Determining Grizzly Bear Nuisance Status and for Controlling Nuisance Grizzly Bears in Montana. The IGBC Guidelines and the Grizzly Bear Special Rule (50 CFR 17.40) address when and how management of nuisance grizzly bears would occur in Montana, defines agency roles and responsibilities, and per discussions and/or resulting agreements between IGBC member agencies and APHIS. Any decision made because of this EA process would be consistent with guidance in the IGBC Guidelines.

1.3 DECISION TO BE MADE

Based on agency relationships and legislative directives and responsibilities, ADC is the lead agency for this EA and therefore responsible for the scope, content and decisions made. As cooperating agencies, the Forest Service, BLM, USFWS, MFWP, MDOL and MDSL provided input and made recommendations to ADC on when and where predator damage management would be conducted on National Forest System, BLM, USFWS and State and private lands, and ensured that proposed activities are consistent with Forest Plans (LRMPs), BLM RMPs, and Federal and State policies. The USFWS and MFWP would ensure that the proposed activities are consistent with T&E Species recovery plans. Work plans for planned predator damage management activities would be reviewed by the Forest Service and BLM personnel to ensure activities meet LRMPs and RMPs, and terms of the MOUs. Forest Supervisors and District Managers would provide input and cooperate with ADC in conducting predator damage management.

Based on the scope of this EA, the decisions to be made are:

- Should predator damage management as currently implemented be continued in the western Montana analysis area?
- Should predator damage management as currently implemented be conducted on all land classes in the western Montana analysis area as requested? (The "proposed" alternative)
- If not, how should ADC fulfill their legislative directions and responsibilities.
- Might the proposal have significant impacts needing an EIS.

1.4 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT

1.4.1 Actions Analyzed. This EA evaluates predator damage management to protect livestock, designated wildlife species, property and natural resources against predator damage in the western Montana analysis area. This EA also analyzes dangerous human encounters or disease threats caused by predators to human health and safety. Protection of other resources and other program activities will be addressed in other NEPA documents. Cultural and archeological concerns are considered and addressed in this document as they relate to the proposed action.

1.4.2 Wildlife Species Potentially Protected by ADC. MFWP may request ADC assistance to achieve management objectives for mule deer, white-tailed deer, pronghorn antelope, big horn sheep, game birds, and State or Federally listed T&E species. If MFWP identifies additional species in need of protection, a determination would be made on a case-by-case basis if additional NEPA analysis is needed. NEPA analysis of predator damage management for species under the jurisdiction of other agencies (i.e., migratory birds and T&E species) would be conducted on a case-by-case basis and a determination would be made if additional NEPA analysis is needed.

1.4.3 American Indian Lands and Tribes. Presently, the Confederated Salish-Kootenai, Blackfeet, Assiniboine, Sioux and Crow Tribes, and the Fort Belknap Indian Community of Montana have MOUs with ADC for predator damage management.

1.4.4 Period for Which this EA is Valid. This EA would remain valid until ADC and other appropriate agencies determine that new needs for action or new alternatives having different environmental effects must be analyzed. At that time, this analysis and document would be supplemented pursuant to NEPA. Review of the EA would be conducted each year during the annual planning process by ADC and cooperating agencies to ensure that ADC actions continue to be in compliance with the EA and Finding of No Significant Impact (FONSI).

1.4.5 Site Specificity. This EA analyzes the potential impacts of predator damage management and addresses activities on public and private lands under MOU, Cooperative Agreement, Agreement for Control or ADC Work Plans in the analysis area. These lands are under the jurisdiction of the Forest Service, BLM, USFWS, MDSL, Tribes, counties, municipalities and private ownership. It also addresses the impacts of predator damage management on areas where additional agreements may be signed in the foreseeable future. Because the proposed action is to reduce predator damage and because the program's goals and direction are to provide service when requested, within the constraints of available funding, technology and workforce, it is conceivable that additional predator damage management efforts could occur. Thus, this EA anticipates this potential and analyzes the impacts of such effort as part of the program. The EA emphasizes significant issues as they relate to specific areas whenever possible; however, many issues apply wherever wildlife damage and resulting management occur, and are treated as such. The standard ADC Decision Model (USDA 1994, Chap 2, Pg. 23) (Slate et al. 1992) and ADC Directive 2.105 will be the site-specific procedure for individual actions conducted by ADC in the analysis area (See Chapter 3 for the ADC Decision Model and its application).

1.4.6 Public Involvement

1.4.6.1 Due to interest from the public concerning ADC damage management and the fact that several T&E species are in the analysis area, ADC solicited input from the public through an "*invitation for public comment*" letter in the EA process. An invitation for public comment letter containing the issues, preliminary alternatives and a summary of the need for action, was sent to 604 individuals, organizations and agencies who had identified an interest in ADC, Forest Service or BLM projects, and legal notices were published in seven newspapers throughout Montana (some newspapers in which the notice was published have statewide distribution).

1.4.6.2. Summary of Public Involvement Efforts - Issues related to the proposed action were identified

during the public involvement process with members of the livestock industry, environmental interest groups, the general public, American Indians, BLM and Forest Service resource specialists, county agencies, and other State and Federal agencies.

Public involvement responses were documented from letters, FAXes and telephone calls. The responses represented a wide range of opinions, both supporting and opposing the proposal. Interest groups were the Predator Project, Humane Society of the U.S., Wildlife Damage Review, Upper Missouri Breaks Audubon Society, Rosebud Audubon Society, Defenders of Wildlife, Alliance for the Wild Rockies, Valley County Sportsman's Club, Yellowstone Valley Audubon Society, Southeastern Montana Sportsmen Association, The Ecology Center, Biodiversity Associates and Friends of the Bow, and the Montana Wool Growers Association. All comments are maintained in the administrative file.

A group of resource specialists with expertise in range management, wildlife biology, wildlife damage management, cultural and social resources, resource planning and environmental coordination evaluated the issues identified in the public involvement process and provided expertise during the preparation of this EA. Issues determined to be significant and relative to the analysis are discussed in Chapter 2 and evaluated in Chapter 4.

Other Agency Involvement

To assure that the concerns of other Federal and State agencies have been addressed, the Forest Service, BLM, USFWS, MFWP, MDOL and MDSL were asked to participate on the Multi-Agency Team of reviewers and consultants, and are cooperating agencies in the development of this EA. In addition, the Pre-Decision EA was circulated to each National Forest in western Montana, the Forest Service Regional Office, BLM's State and District Offices, the National Bison Range (NBR) and Charles M. Russell National Wildlife Refuge. American Indian Tribes in the analysis area were provided a copy of the Pre-Decision EA and asked to review and comment.

1.5 AUTHORITY AND COMPLIANCE

1.5.1 Authority of Federal and State Agencies in Wildlife Damage Management in Montana[3]

ADC Legislative Authority

The primary, statutory authority for the ADC program is the Animal Damage Control Act of 1931, as amended (46 Stat. 1486; U.S.C. 426-426c) which provides that:

"The Secretary of Agriculture is authorized and directed to conduct such investigations, experiments, and tests as he may deem necessary in order to determine, demonstrate, and promulgate the best methods of eradication, suppression, or bringing under control on national forests and other areas of the public domain as well as on State, Territory or privately owned lands of mountain lions, wolves, coyotes, bobcats, prairie dogs, gophers, ground squirrels, jackrabbits, brown tree snakes and other animals injurious to agriculture, horticulture, forestry, animal husbandry, wild game animals, furbearing animals, and birds, and for the protection of stock and other domestic animals through the suppression of rabies and tularemia in predatory or other wild animals; and to conduct campaigns for the destruction or control of such animals. Provided that in carrying out the provisions of this Section, the Secretary of Agriculture may cooperate with States, individuals, and public and private agencies, organizations, and institutions."

Since 1931, with the changes in societal values, ADC policies and its programs place greater emphasis on

3 Detailed discussion of the legal directives, responsibilities and relationships of pertinent Federal wildlife and land management entities, and key legislation pertinent to wildlife damage management are found in Chapter 1 of USDA 1994.

the part of the Act discussing "*bringing (*damage*) under control*," rather than "*eradication*" and "*suppression"* of wildlife populations. In 1988, Congress strengthened the legislative responsibility of ADC with the Rural Development, Agriculture, and Related Agencies Appropriations Act. This Act states, in part:

"That hereafter, the Secretary of Agriculture is authorized, except for urban rodent control, to conduct activities and to enter into agreements with States, local jurisdictions, individuals, and public and private agencies, organizations, and institutions in the control of nuisance mammals and birds and those mammal and bird species that are reservoirs for zoonotic diseases, and to deposit any money collected under any such agreement into the appropriation accounts that incur the costs to be available immediately and to remain available until expended for Animal Damage Control activities."

Montana Department of Fish, Wildlife and Parks (MFWP)

The 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. This is accomplished by using State license revenues collected for that purpose, except Federally listed T&E species, regardless of the land class on which the animals are found (MCA 87-1-201, 87-5-103). Harvest regulations proposed by the 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 recreational opportunity and reduce conflicts between wildlife and other land uses, while ensuring perpetuation of healthy viable wildlife populations. The MFWP is also authorized to cooperate with ADC and the MDOL for controlling predatory animals (MCA 87-1-201, 87-1-225). Montana state law allows a landowner or lawful occupant to take any wildlife that is causing damage to persons or livestock without first obtaining a permit from MFWP (MCA 87-3-130). The law, however, does require the landowner to notify MFWP of the methods used, and species and number of animals taken within 72 hours.

In Montana, black bear, grizzly bear and mountain lion management is the responsibility of the MFWP. Generally, either the MFWP or ADC receives requests to handle wildlife damage to livestock. However, the current MOU between the MFWP and ADC authorizes ADC to independently respond to livestock damage caused by black bear and mountain lion. MFWP is responsible for responding to non-livestock complaints involving grizzly bears, black bears and mountain lions. All non-livestock complaints would be forwarded to MFWP. Upon notification of a livestock depredation where grizzly bears may be involved, the receiving party would contact the other party and a joint investigation would be conducted. Grizzly bear damage management would follow the procedures for determining bear nuisance status and for controlling nuisance grizzly bear according to the IGBC Guidelines and 50 CFR 17.40 (b), whereby MFWP will be responsible for the disposition of the animal.

Montana Department of Livestock (MDOL)

The State of Montana Department of Livestock is mandated to conduct the destruction, extermination and control of wild animals predatory in nature and capable of killing, destroying, maiming or injuring domestic livestock or domestic poultry. The MDOL is delegated this authority under MCA (81-7-101 through 605) and through the Administrative Rules of Montana 32.22.101 through 32.22.106. This statutory requirement is primarily accomplished by use of aerial hunting techniques through interagency agreements with ADC, MFWP and local government entities as required or allowed by MCA 81-7-103(3). The MDOL is responsible for the issuance of aerial hunting permits per the Fish and Wildlife Act of 1956, as amended, and for administering a program to reduce damage caused by predatory animals (MCA 81-7-501, 81-7-502, 81-7-505). Coyotes and "*other animals causing depredation upon livestock*" are not protected in Montana and are classified as predatory animals under MCA 81-7-101 and 81-7-102, administered by the MDOL. The MDOL is also authorized to enter into Cooperative Agreements with

ADC and local entities for controlling predator damage (MCA 81-7-102(3)). The MDOL currently has an MOU and Cooperative Agreement with ADC. These documents establish a cooperative relationship between ADC and MDOL, outline responsibilities, and sets forth annual objectives and goals of each agency for resolving wildlife damage in Montana.

Montana Statutes - Animal Control Laws

Under Montana state law (MCA 81-7-401) dogs may be killed by the livestock owner or their agent/employee, or the dog owner if the dog is caught in the act of killing, injuring or harassing livestock. MCA 81-7-402 states that any owner of a dog found in the act of killing or injuring livestock is liable for damages to the livestock. In Montana, dog control is generally the responsibility of local governmental agencies. Local animal control officials or county sheriffs are responsible for dealing with dogs that threaten, damage, or kill livestock. ADC policy provides for ADC to assist at the written request of the local sheriff upon approval of the ADC State Director.

U. S. Fish and Wildlife Service (USFWS)

The USFWS has the statutory authority to manage Federally listed T&E species through the Endangered Species Act of 1973 (ESA) (16 U.S.C. 1531-1543, 87 Stat. 884). Authorization, under Section 10 of the ESA, allows for wolf damage management according to the USFWS's Interim Wolf Control Plan, and through MOU and Interagency Agreement, ADC has been authorized to assist the USFWS in controlling wolf depredation on livestock on private and public land in the Northern Rocky Mountains. The Northern Rocky Mountain Wolf Recovery Plan (USDI 1987) indicates that, if necessary, lethal damage management could be used to stop depredations.

U.S. Forest Service and Bureau of Land Management

The Forest Service and BLM have the responsibility to manage Federal lands for multiple uses including livestock grazing, timber production, recreation and wildlife habitat, while recognizing the state's authority to manage wildlife populations. Both the Forest Service and BLM recognize the importance of managing wildlife damage on lands and resources under their jurisdiction, as integrated with their multiple use responsibilities. For these reasons, both agencies have entered into MOUs with ADC to facilitate a cooperative relationship. On BLM and National Forest System lands, maps are available at the appropriate Federal office for public review that delineate restricted areas and areas closed to predator damage management on those lands.

1.5.2 COMPLIANCE WITH OTHER FEDERAL LAWS. Several other Federal laws regulate ADC wildlife damage management. ADC complies with these laws, and consults and cooperates with other agencies as appropriate.

National Environmental Policy Act (NEPA). Environmental documents pursuant to NEPA must be completed before work plans consistent with the NEPA decision can be developed and implemented. Before 1994, generally each National Forest and each BLM District would prepare its own NEPA document. This resulted in different requirements and procedures for different agencies, and omitted analysis of ADC activities on private lands. This EA, with ADC as the lead agency, is the first time that all land classes under Cooperative Agreements, Agreements for Control and ADC Work Plans will be analyzed in a comprehensive manner in the analysis area.

ADC also coordinates specific projects and programs with other agencies. The purpose of these contacts is to coordinate any wildlife damage management that may affect resources managed by these agencies or affect other areas of mutual concern.

Endangered Species Act (ESA) It is Federal policy, under the ESA, that all Federal agencies shall seek to conserve T&E species and shall utilize their authorities in furtherance of the purposes of the Act (Sec.2(c)). ADC conducts Section 7 consultations with the USFWS to use the expertise of the USFWS to ensure that "*any action authorized, funded or carried out by such an agency . . . is not likely to jeopardize the continued existence of any endangered species or threatened species . . . Each agency shall use the best scientific and commercial data available*" (Sec.7(a)(2)).

Migratory Bird Treaty Act The Migratory Bird Treaty Act provides the USFWS regulatory authority to protect species of birds that migrate outside the United States. The law prohibits any "*take*" of these species, except as permitted by the USFWS; therefore, the USFWS issues permits for managing wildlife damage situations.

Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) FIFRA requires the registration, classification, and regulation of all pesticides used in the United States. The Environmental Protection Agency (EPA) is responsible for implementing and enforcing FIFRA. All chemical methods integrated into the ADC program in Montana are registered with and regulated by the EPA and the Montana Department of Agriculture, and used by ADC according to labeling procedures and requirements.

National Historical Preservation Act (NHPA) of 1966 as amended The NHPA requires: 1) Federal agencies to evaluate the effects of any Federal undertaking on cultural resources, 2) consult with the State Historic Preservation Office regarding the value and management of specific cultural, archaeological and historic resources, and 3) consult with appropriate American Indian tribes to determine whether they have concerns for traditional cultural properties in areas of these Federal undertakings.

1.6 PREVIEW OF THE REMAINING CHAPTERS IN THIS EA

The remainder of this EA is composed of four (4) chapters and three (3) appendices. Chapter 2 discusses and analyzes the issues and affected environment. Chapter 3 contains a description of each alternative, alternatives not considered in detail, mitigation and standard operating procedures. Chapter 4 analyzes the environmental impacts associated with each alternative considered in detail and determines consistency with Forest Service LRMPs and BLM RMPs, and determines the economic impacts of each alternative. Chapter 5 contains the list of preparers, reviewers and consultants for this EA.

2.0 CHAPTER 2: ISSUES AND AFFECTED ENVIRONMENT

INTRODUCTION

Chapter 2 contains a discussion of the issues, including issues that will receive detailed environmental impacts analysis in Chapter 4 (Environmental Consequences), issues used to develop mitigation measures and standard operating procedures, and issues that will not be considered in detail, with the rationale. Pertinent portions of the affected environment will be included in this chapter in the discussion of issues used to develop mitigation measures. Additional affected environments will be incorporated into the discussion of the environmental impacts in Chapter 4 and the description of the current program (the "*no action*" alternative) in Chapter 3.

2.1 ISSUES ANALYZED IN DETAIL IN CHAPTER 4

Issue 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.

Issue 2. Effectiveness and selectivity of damage management methods - the potential for 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 "preventive" damage management work.

Issue 3. Risks posed by damage management methods to the public and domestic pets

Issue 4. Concern about ADC impacts on T&E species.

Issue 5. Cost-effectiveness of ADC activities.

2.2 ISSUES USED TO DEVELOP MITIGATION

2.2.1 Predator Damage Management in Special Management Areas on Federal Lands

A number of different types of areas exist on Federal lands within the analysis area that currently have a special designation and/or require special management consideration. These include Wilderness Areas (WAs) or Primitive Areas (PAs), WSAs, Research Natural Areas (RNAs), Outstanding Natural Areas (ONAs), Areas of Critical Environmental Concern (ACECs), and Wild and Scenic Rivers (WSRs) in the analysis area. The special management required for these different areas varies considerably by designation, land administrator, and are governed by different legal mandates.

ADC has conducted some predator damage management in special management areas in the past. Recreationists and others interested in special management areas (particularly WAs) may consider these activities to be an invasion of solitude and that it may adversely affect the aesthetic quality of the wilderness experiences.

Predator damage management is conducted by ADC (and is proposed to continue in the future) only in limited instances, when and where a specific need is identified, only when allowed under the provisions of the specific wilderness designation, and with the concurrence of the land managing agency. ADC activities in special management areas have historically been, and are expected to continue to be a minor part of the overall ADC program. Restrictions on activities in WAs and WSAs are listed in Chapter 3 under Mitigation.

<u>National Forest System Lands Special Management Areas</u>

WAs: WAs are areas designated by Congress to be managed for the preservation of wilderness values. Wildlife and Fish Damage Management in Wilderness Areas follows direction in FSM 2151, FSM 2323, and FSM 4063 for management of wildlife or fish damage in wilderness and RNAs. Animal damage management is permitted in wilderness only when it was used before wilderness designation; when it conforms with direction in FSM 2323.33 on resources management in wilderness; and when it is needed for the recovery of Federally listed T&E species. Two WAs currently exist on the Beaverhead-Deerlodge, three on the Bitterroot, two on the Flathead, two on the Gallatin, one on the Kootenai and four on the Lolo National Forest (Table 2-1).

RNAs: RNAs are Federal lands managed for the protection of unusual, scientific, or special interest natural characteristics for research and education. *Establish Records* have been approved to establish those RNAs listed in Table 2-2 for each respective National Forest. The RNA's would be managed according to the direction provided for RNA's in the Lewis and Clark National Forest Plan (Management Area M 3-60,61). Walling Reef is wholly within the Bob Marshall Wilderness and would be managed as wilderness. The management goal is to maintain these areas in their natural conditions, to be used for non-manipulative research and observation.

ONAs: ONAs are defined by 43 CFR 2071.1 as, *"Areas of outstanding scenic splendor, natural wonder, or scientific importance that merit special attention and care in management to ensure their preservation in their natural condition. These usually are relatively undisturbed, representative of rare botanical, geological or zoological characteristics of principal interest for scientific and research purposes."* The four ONAs located west of Choteau (Ear Mountain, Deep Creek, Blindhorse Creek and Chute Mountain) have restrictions placed on predator damage management because of high recreation use and the presence of T&E species. ADC would not be authorized to use toxicants (M-44s) and has special timing restrictions on checking traps in these ONAs.

Table 2-1. Forest Service WAs in the Analysis Area

LOCATION	ACRES
Beaverhead-Deerlodge NF	
Anaconda-Pintler	124,543
Lee Metcalf	101,429
Bitterroot NF	
Anaconda-Pintler	41,000
Frank Church River of No Return	194,000
Selway Bitterroot	508,000
Flathead NF	
Bob Marshal and Great Bear	996,381
Mission Mountain	73,573
Gallatin NF	
Absaroka-Beartooth	
Lee-Metcalf	
Kootenai NF	
Cabin Mountain	94,360
Lolo NF	
Scapegoat	74,832
Welcome Creek	28,184
Rattle Snake NRA &WA	31,479
Selway-Bitterroot	1,340,681

WSRs: WSRs are rivers and streams that must be free-flowing and with its adjacent land area, must possess one or more *"outstandingly remarkable*" values. Scenic, geologic, historic, cultural, ecologic, or fish and wildlife habitat are examples of such values. *Wild River areas* are those rivers or sections of river that are free of impoundments, generally accessible only by trail, with the watershed or shorelines essentially primitive and water unpolluted. *Scenic River areas* are those rivers or sections of river that are free of impoundments, with shorelines and watersheds still largely primitive and shorelines largely undeveloped but accessible in places by roads. Recreational river areas are those rivers or sections of rivers that are readily accessible by roads, have some development along their shorelines and may have some history of impoundment or diversion. The analysis area has several of these rivers with WSR designations (Table 2-3). The Lewis and Clark National Forest has eight rivers that are eligible for further study under the WSR Act: five rivers with a potential designation of wild and three rivers with a potential designation of scenic (Table 2-3).

Table 2-2 Forest Service RNAs in the Analysis Area

LOCATION	ACRES
Beaverhead- Deerlodge NF	
Basin Creek	1,014
Bernice Experimental Station	451
Cattle Gulch (proposed)	640
Cave Mountain	4,513
Cliff Lake	2,301
Cottonwood creek	128
Dexter Basin	1,109
Dry Mountain	507
Elkhorn Lake (proposed)	1,664
Goat Flat (proposed)	1,376
Horse Prairie	196
Lost Park	618
Sapphire Divide	1,399
Skull-Odell	2,543
Thunderbolt Mountain	792
Windy Ridge	235
Bitterroot NF	
Sapphire Divide	628
Flathead NF	
Coram	839
East Shore, Woods Bay	495
Tuchuck	1,592
Hidden Lakes	142
Swan River (proposed)	640
Gallatin NF	
Black Butte	510
East Fork of Mill Creek	882
Mount Ellis	1,290
Obsidian Sands	390
Wheeler Ridge	640
Palace Butte	1,350
Passage Creek	1,097
Pioneer Mountain	400
Sliding Mountain	1,200
LeBeau (proposed)	5,500
Helena NF	
Cabin Gulch	2,200
Granite Butte	408
Indian Meadows	1,060
Red Mountain	1,901
Kootenai NF	
Hoskin Lake	300
Pete Creek Meadows	155
Ulm Peak	690
Wolf Weigel	250
Big Creek	190
Lewis and Clark NF	
Wagner Basion	965
Walling Reef	835
Paine Gulch	2.405

BLM Special Management Areas

WSAs: WSAs are areas studied for their potential to qualify as components of the National Wilderness Preservation System and are currently awaiting action by Congress on whether or not they will be designated. WSAs on BLM lands are managed according to the BLM's Interim Management Policy for Lands Under Wilderness Review H-8550-1 in a manner that does not diminish their wilderness values (BLM 1995). However, this interim management does allow for continuation of most prior (non-land disturbing) activities and does not preclude predator damage management, except on the Bear Trap Canyon Unit of the Lee Metcalf Wilderness, due to the large number of recreationists. There are 16 BLM WSAs in the analysis area (Butte District and portions of the Lewistown District) (Table 2-4). In a report to Congress, the BLM recommended that all or parts of 13 WSAs (in the analysis area) are suitable for wilderness designation. If Congress does act on final designation, it is likely that some of

TABLE 2-3 WILD AND SCENIC RIVERS

	POTENTIAL CLASSIFICATION	MILES
Gallatin NF		
Boulder	Recreational	22
Yellowstone	Recreational	16
Gallatin	Recreational	39
Madison	Recreational	8
Helena NF		
Spellr	Recreational	5.0
Little Blackfoot	Wild	6.0
Little Blackfoot	Recreational	5.0
Beaver Creek	Recreational	4.5
Missouri River	Scenic	2.5
Lewis and Clark NF		
Smith River	Scenic	11.8 of FS lands
North Badger Creek	Scenic	7.3
Tenderfoot Creek	Scenic	4.6 of FS lands
Dearborn	Wild	18.1 most within Scapegoat Wilderness
North Fork of the Sun River	Wild	25.4 all within Bob Marshall Wilderness
South Fork of the Sun River	Wild	25.5 most is within Bob Marshall Wilderness
Green Fork of Straight Creek	Wild	4.5 all in the Scapegoat Wilderness
North Fork of Birch Creek	Wild	6.6

the acreage currently in WSA status will be released back into multiple use management. Those lands officially designated would then be managed according to the BLM's Wilderness Management Policy (BLM, 1981). Currently, there are no WSAs where predator damage management is being conducted.

RNAs. BLM policy does not exclude predator damage management within RNAs.

ACECs: ACECs are BLM lands for which special management was deemed necessary. However, it should be noted that the legal mandate for designation and management for ACECs comes from the Federal Land Policy and Management Act (FLPMA) and is considerably different from either RNAs or wilderness designations. FLPMA defines an ACEC as an area "*within the public lands where special management attention is required (when such areas are developed or used or where no development is required) to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards*." ACECs can be and are designated for many special management situations ranging from maintaining near pristine scenic quality, to the management of a hazardous waste dump. ACECs can be and are often designated for multiple uses.

ACEC designation does not, by itself, preclude predator damage management, instead, the individual management prescriptions for a given ACEC management plan determine what is allowable. Currently, there are four ACECs on BLM lands within the analysis area (Table 2-5).

Historically, predator damage management has been allowed within most ACECs. It would not be expected that predator damage management would negatively affect resource values that prompted ACEC designation. Therefore, such activities will continue unless specifically excluded by a management plan.

WAs: Predator damage management would be prohibited in the Bear Trap WA based on the high number of recreationists that frequent the area.

The National Guard Training Area (NGTA). The NGTA is west of Townsend, Montana and identified as a human safety zone. However, ADC would be allowed to conduct damage management after permission is

granted from the National Guard, and the BLM is notified when damage management would be conducted.

Table 2-4. Montana BLM Wilderness Recommendations

WSA Name	WSA Number	Acres Recommended for Wilderness
Wales Creek	MT-074-150	11,580
Hoodoo Mountain	MT-074-151A	11,380
Quigg West	MT-074-155	520
Sleeping Giant/ Sheep Creek	MT-075-111	10,454
Black Sage	MT-075-115	5,926
Ruby Mountains	MT-076-001	26,661
Blacktail Mountains	MT-076-002	17,479
East Fork, Blacktail Deer Creek	MT-076-007	6,230
Hidden Pasture Creek	MT-076-022	15,509
Bell/Limekiln Canyons	MT-076-026	9,650
Henneberry Ridge	MT-076-028	9,806
Farlin Creek	MT-076-034	1,139
Axolotl Lakes	MT-076-069	7,804
Centennial Mountains	MT-ISA-002	27,691
Humbug spires	MT-ISA-003	11,175
Yellowstone Island	MT-075-133	53

2.2.2 Humaneness of methods used by ADC

The issue of humaneness, as it relates to the killing or capturing of wildlife is an important but very complex concept that can be interpreted in a variety of ways. Humaneness is a person's perception of harm or pain inflicted on an animal, and people may perceive the humaneness of an action differently. The issue of humaneness has two aspects in relation to the proposed action:

1. Animal welfare organizations and individuals are concerned that some methods used to manage wildlife damage exposes animals to unnecessary pain and suffering. Kellert (1980) in a survey of American attitudes toward animals related that 58% of his respondents, *" . . . care more about the suffering of individual animals . . . than they do about species population levels."* Research suggests that with some methods, such as restraint in leghold traps, changes in the blood chemistry of trapped animals indicate "*stress.*" Blood measurements showed similar changes in foxes chased by dogs for about five minutes as those restrained in traps (USDA 1994, Chap 3, pp. 81). However, such research has not yet progressed to the development of objective, quantitative measurements of pain or stress for use in evaluating humaneness.

2. Humaneness, as perceived by the livestock industry and pet owners, requires that domestic animals be protected from predators because humans have bred the natural defense capabilities out of domestic animals. It has been argued that man has a moral obligation to protect these animals from predators (Glosser 1993). Predators frequently do not kill larger prey animals quickly, and will often begin feeding on them while they are still alive and conscious (Wade and Bowns 1982). The suffering apparently endured by livestock or pets damaged in this way is unacceptable to many livestock producers and pet owners.

Table 2-5. BLM ACEC Status

ACEC Name	Acres
Sleeping Giant	11,609
Rattler Gulch Limestone Cliffs	20
Squaw Rock	640
Bear Creek Flats	564

Schmidt (1989) indicated that vertebrate pest control activities in the name of societal benefits could be compatible with animal welfare concerns, if *" . . . the reduction of pain, suffering, and unnecessary death is incorporated in the decision making process."*

Suffering has been described as a *" . . . highly unpleasant emotional response usually associated with pain and distress.*" However, suffering *" . . . can occur without pain . . . ,*" and *" . . . pain can occur without suffering . . . "*(AMVA 1987). Because suffering carries with it the implication of a time frame, a case

could be made for *" . . . little or no suffering where death comes immediately . . . "*(CDFG 1991), such as ADC lethal control techniques of shooting and M-44s.

Defining pain as a component in humaneness of ADC methods appears to be a greater challenge than that of suffering. Pain obviously occurs in animals. Altered physiology and behavior can be indicators of pain, and identifying the causes that elicit pain responses in humans would *" . . . probably be causes for pain in other animals . . . "*(AMVA 1987). However, pain experienced by individual animals probably ranges from little or no pain to significant pain (CDFG 1991). Some ADC control methods such as leghold traps and body snares, may thus cause varying degrees of pain in different animal species for varying time frames. At what point pain diminishes or stops under these types of restraint has not been measured by the scientific community.

Pain and suffering as it relates to a review of ADC damage management methods to capture animals, has both a professional and lay point of arbitration. Wildlife managers and the public would both be better served to recognize the complexity of defining suffering, since *" . . . neither medical or veterinary curricula explicitly address suffering or its relief"*(CDFG 1991).

Thus, the decision-making process involves tradeoffs between the above aspects of pain and humaneness. An objective analysis of this issue must consider not only the welfare of a wild animal caught in a leghold trap, but also the welfare of the domestic animals that may continue to be injured or killed if the leghold trap were not being used. The challenge in coping with this issue is how to achieve the least amount of animal suffering with the constraints imposed by current technology and funding.

ADC has improved the selectivity and humanness of management devices through research and development of pan-tension devices, electronic trap monitors and device modifications such as breakaway snares. Research is continuing to bring new findings and products into practical use. Until new findings and products are found practical, a certain amount of animal suffering will occur when lethal predator damage management is used in those situations where nonlethal damage management methods are not practical or ineffective. Furthermore, if quantifying suffering were possible, it is possible that the actual

net amount of animal suffering would be less under the proposed action (or any other alternative involving the use of lethal methods) than under no action since suffering of livestock preyed upon by predators would be reduced if the action is successful.

Montana ADC personnel in the analysis area are experienced and professional in their use of management methods so that they are as humane as possible under the constraints of current technology, workforce and funding. Mitigation measures/standard operating procedures used to maximize humaneness are listed in Chapter 3.

2.2.3 The public's concern about use of chemicals/toxicants and toxicants should be banned

Much of the public concern over the use of toxicants for predator damage management is based on an erroneous perception that ADC uses nonselective, outdated chemical methodologies. However, chemical methods currently used and proposed for use by ADC have a high degree of selectivity (see section 4.2.2). Currently, the use of toxicants by ADC in all instances is regulated by the EPA through the FIFRA, by MOUs with other agencies, and by ADC Directives. Based on a thorough Risk Assessment, APHIS concluded that, when ADC program chemicals are used following label directions, they are very selective for target individuals or populations, and such use has negligible impacts on the environment (USDA 1994, Appendix P). A decision to ban toxicants is outside the scope of ADC's authority. ADC could elect not to use toxicants, but those registered for use in Montana are an integral part of IWDM and their selection for use follows criteria in the ADC Decision Model (see Chapter 3 p 3-4).

2.2.4 American Indian Concerns

2.2.4.1 ..... Cultural Resources

The NHPA of 1966, as amended, requires Federal agencies to evaluate the effects of any Federal undertaking on cultural resources and to consult with appropriate American Indian Tribes to determine whether they have concerns for cultural properties in areas of these Federal undertakings. The Native American Graves and Repatriation Act of 1990 provides for protection of American Indian burials, and establishes procedures for notifying Tribes of any new discoveries.

In consideration of American Indian cultural and archeological interests, the Montana ADC program solicited input from the following Tribes within the analysis area:

Confederated Salish-Kootenai Tribes of Montana
Blackfeet Tribe of Montana

Each Tribe was requested to comment and identify concerns relating to the proposed ADC program. One Tribe responded with concerns, the Confederated Salish and Kootenai Tribe. Concerns were expressed about the implementation of livestock producer methods and ADC methods, long-term solutions to predator problems, and the cost of predator damage management. Potential ground disturbance activities were not specifically identified.

Some areas proposed for predator damage management on the Lewis and Clark National Forest are in areas of high sensitivity for cultural resources. The Little Badger Allotment in the Badger-Two Medicine area is one such area. It does have the potential to be designated a cultural property and nominated the National Register of Historic Places. All other mountain ranges on the Forest have been used by American Indians and their evidence has been discovered. However, no other areas have been recommended for nomination. Concurrence of no impact to properties on or eligible

for the National Registry of Historical Places relative to the current program and the proposed action has been received from the Montana State Historical Preservation Office. In most cases, predator damage management has little potential to cause adverse effects to sensitive cultural resources. The areas where predator damage management would be conducted are small and pose minimal ground disturbance. Mitigation measures developed to avoid impacts to these sites are listed in Chapter 3.

2.3 ISSUES NOT CONSIDERED IN DETAIL WITH RATIONALE

2.3.1 ADC's impact on Biodiversity and Predator/Prey Relationships (Potential for ADC's take of predators to result in population increases of rodents and rabbits, which might then increase agricultural damage.)

No ADC wildlife damage management is conducted to eradicate a native wildlife population. ADC operates according to international, Federal and State laws and regulations enacted to ensure species viability. Several State statutes direct agencies to consider biological sustainability when making management decisions. Montana's range management statutes require management based on ecological principles (MCA 76-14-103) the MFWP is in the process of designing a native species initiative that would take an ecosystem approach to more fully account for nongame species (MCA 87-5-501). Montana's Natural Areas Act contains a statement recognizing the importance of and the need to protect ecosystems (MCA 76-12-103). Any reduction of a local population or group would be temporary because migration from adjacent areas or reproduction would replace the animals removed (Connolly and Longhurst 1975, Henke 1992). The impacts of the current ADC program on biodiversity are not significant nationwide, statewide, or in the analysis area (USDA 1994, Chap 4). The ADC take of any wildlife species is insignificant to the viability and health of the total population as analyzed in Chapter 4.

The relationship between predators and rodent and rabbit population (predator/prey relationship) has been summarized in USDI (1979).

Rabbit and rodent populations normally fluctuate substantially in multi-year cycles. There are two basic schools of thought as to the factors responsible for these fluctuations. One is that rodent and rabbit populations are self-regulated through behavior, changes in reproductive capacity due to stress, or genetic changes (Chitty 1967, Myers and Krebs 1983). The other is that populations are regulated by environmental factors such as food and predation (Pitelka 1957, Fuller 1969).

Keith (1974) concluded that: 1) during cyclic declines in prey populations, predation has a depressive effect and as a result, the prey populations may decline further and be held for some time at relatively low densities, 2) prey populations may escape this low point when predator populations decrease in response to the reduced food base, and 3) since rabbit and rodent populations increase at a faster rate than predator populations, factors other than predation must initiate the decline in populations.

Wagner and Stoddart (1972) and Clark (1972) independently studied the relationship between coyote populations and jackrabbit *(Lepus californicus)* populations in northern Utah and southern Idaho. Both noted that coyote populations increased as jackrabbit numbers increased, but with a 1-2 year delay, suggesting that the prey population controlled the predator population, rather than the reverse.

In two studies conducted in south Texas (Beasom 1974b, Guthery and Beasom 1977), intensive short-term predator removal was employed to test the response of game species to reduced coyote abundance. At the same time, rodent and rabbit species were monitored. A marked reduction in

coyote numbers apparently did not affect the populations of rabbits or rodents in either study. Similarly, Neff et al. (1985) noted that reducing coyote populations on their study area in Arizona to protect pronghorn antelope fawns did not affect the rodent or rabbit population. At the levels of predator removal currently being sustained (see Section 4.1.1), it is unlikely that overall rodent or rabbit populations would increase in response to predator removal.

2.3.2 Livestock losses are a tax "write off"

There is a belief that livestock producers receive double benefits by having a partially publicly funded program to resolve predation problems and receive deductions as a business expense on tax returns. The Internal Revenue Service tax code (Internal Revenue Code, Section 1245, 1281) does not allow for livestock losses to be *"written off"* if the killed livestock were produced on the ranch. About 75.6% (MIS 1995) of predation and injuries occurs to young livestock (lambs and calves) in western Montana. Many ewes and cows are added to herds as young livestock as replacements for breeding stock, and if lost to predation they cannot be *"written off"* since they were not purchased. These factors limit the ability of livestock producers to recover against economic losses. Producers do not receive double benefits by having a Federal program to manage wildlife damage and Federal tax deductions for predation losses.

2.3.3 Disturbance of wildlife and recreationists through aerial hunting activities.

Disturbance of big game herds could conceivably induce stress that might negatively affect these animals. ADC avoids flying in these areas, and if big game herds are encountered in other areas, flight crews move away if the animals are reacting to the aircraft.

The MFWP annually conducts big game survey flights by airplane and helicopter. Survey flights require flying close enough and for long enough that observers can accurately count and identify sex of the animals present. The MFWP has not monitored this situation to determine whether these flights may be negatively impacting those animals being surveyed because that would require intentionally stressing the animals, but the decisions of whether, under what conditions, from what altitude, and to what extent a particular group of animals or wildlife will be surveyed from the air is a biological and ethical judgement call that the responsible MFWP and ADC employee must routinely make. MFWP believes it is easy for an experienced wildlife observer to assess the potential to unduly stress an animal - or group of animals - on the basis of animal behavior in response to the presence of the aircraft, within the context of cumulative weather and ground conditions.

While conducting aerial hunting operations on lands with cooperative agreements, ADC flight crews avoid disturbing game animals, but have occasionally witnessed coyotes chasing deer in deep snow conditions. To the extent that aerial hunting activities remove coyotes that might otherwise stress or kill wintering big game animals, this activity may have a beneficial effect on big game herds.

Aerial hunting activities on public lands are also coordinated with the land management agency, in part, to alleviate disturbances to recreationists. ADC restricts its activities on public lands to times when and areas where predator problems are occurring or are predicted to occur, and tries to avoid areas where recreationists are present.

2.3.4 Appropriateness of preparing an EA (instead of an EIS) for such a large area and an EIS has to be prepared because of controversy

Some individuals questioned whether preparing an EA for an area as large as 59,000 mi^2 would

meet the NEPA requirements for site specificity and that an EIS should be prepared because of controversy of the ADC program. If in fact a determination is made through this EA that the proposed action would have a significant environmental impact, then an EIS would be prepared. In terms of considering cumulative impacts, one EA covering the entire analysis area would provide a better analysis than multiple EAs covering smaller zones within the analysis area. The EA assess impacts within the analysis area to better assess cumulative and significant impacts from an ecosystem perspective. The proposed action would not have an impact on unique characteristics such as historical or cultural resources, park lands, prime farmlands, wetlands, WSRs, or ecological critical areas, and it will not adversely affect public health and safety. No accidents associated with ADC predator damage management are known to have occurred in the analysis area. The effects on the quality of the human environment are not highly controversial. Although there is opposition to predator damage management, this action is not controversial in relation to size, nature or effects. Mitigation measures adopted as part of the proposed action, minimize any risk to the public, prevent adverse effects on the human environment and reduce uncertainty and risks.

2.3.5 No wildlife damage management at taxpayer expense; wildlife damage management should be fee based.

During public involvement, some respondents felt that wildlife damage management was a government subsidy and should not be provided at the expense of the taxpayer or that it should be fee based. Funding for ADC comes from a variety of sources besides Federal appropriations. The livestock producers in Montana contribute funds through a livestock head tax paid to the MDOL and cooperating counties. MFWP funds are also applied to the ADC program under a Cooperative Agreement with ADC, and funds are received from requesters for individual or special projects and used to provide services as requested. ADC was established by Congress as the program responsible for providing wildlife damage management to the people of the United States. Federal, State and local officials have decided that ADC should be conducted by appropriating funds. Additionally, wildlife damage management is an appropriate sphere of activity for government programs, since wildlife management is a government responsibility. The protection of livestock will always be conducted by someone, a Federal ADC program not only provides a service to the livestock producers but also protects property, natural resources and public health and safety, and conducts an environmentally and biologically sound program in the public interest (Schueler 1993).

2.3.6 Relocation (rather than killing) of problem wildlife.

Relocation may be appropriate in some situations (i.e., if the problem species' population is at very low levels, there is a suitable relocation site, and the additional dollars required for relocation can be obtained.) However, those species that often cause damage problems (i.e., coyotes, red fox, black bears, mountain lions) are relatively abundant in much of the suitable habitat in the analysis area, and relocation is not necessary for the maintenance of viable populations. Any decisions on relocation of predators are coordinated with MFWP officials. Relocation of predators implicated in livestock depredation may result in future depredations if the predator encounters livestock again, and the MFWP would be liable for any further damage caused by a relocated animal(s). MFWP consults with appropriate land management agencies and land users before transplanting or relocating any black bear or mountain lion.

The American Veterinary Medical Association, The National Association of State Public Health Veterinarians, and the Council of State and Territorial Epidemiologists all oppose the relocation of mammals because of the risk of disease transmission, particularly for small mammals such as raccoons or skunks (Center for Disease Control 1990). Although relocation is not necessarily

precluded in all cases, it would in many cases be logistically impractical and biologically unwise.

2.3.7 Need for public awareness and education.

Some individuals suggested that there was a need to educate the public regarding ADC activities and the need for wildlife damage management. Although this is a recognized need, ADC does not require each State administered program to undertake efforts to promote public understanding of this issue. Montana ADC personnel, however, make presentations to elementary and high school classes on wildlife damage management, and conduct informational and instructional sessions as requested by individuals or organizations. ADC maintains information and literature on the use of effective nonlethal mechanical methods and livestock guarding animals, and provides this information to any publics that request it.

2.3.8 Livestock losses are a cost of doing business and the need to consider a threshold of loss.

Some commenters felt that livestock producers should expect some level of loss as a cost of doing business, and that ADC should not initiate any damage management actions until economic losses reach some predetermined *"threshold"* level. Although some losses of livestock and poultry can be expected and tolerated by livestock producers, ADC has a legal responsibility to respond to requests for wildlife damage management, and it is program policy to aid each requester to minimize losses. If damage management efforts are not initiated soon after a damage problem is detected, losses may sometimes escalate to excessive levels before the problem is solved.

In the Southern Utah Wilderness Alliance, et al. vs. Hugh Thompson, Forest Supervisor for the Dixie National Forest, et al., the United States District Court of Utah denied plaintiffs' motion for a preliminary injunction. In part, the court found that a forest supervisor need only show that damage from predators is threatened to establish a need for wildlife damage management (U.S. District Court of Utah 1993).

2.3.9 Management agencies should use hunters/trappers to conduct wildlife damage management

The MFWP has the option to increase hunting quotas and seasons to provide for more harvest and opportunities for sportsmen and women for some of the predator species that cause problems. However, most of the predator damage management conducted by ADC involves coyote damage (page 1-5), and currently there is no regulated season or limit on the coyote take in Montana. Bounty systems have also been tried in the U.S. for hundreds of years and have generally proved ineffective. A bounty system encourages harvest of the bountied species at times and places when they are easiest and cheapest to harvest and many damage problems occur at times and in places where it is difficult to remove offending animals.

2.3.10 Wildlife should not be manipulated for hunters and recreation

During public involvement, a respondent felt that wildlife populations should not be manipulated to benefit hunters and recreationists. This is an individual perception; the jurisdiction for managing resident wildlife rests with the MFWP, and MFWP may request ADC's assistance in achieving management objectives.

2.3.11 ADC must consider cumulative impacts from surrounding states.

The Montana ADC Program coordinates its activities with the Forest Service, BLM, USFWS and the MFWP to insure no cumulative effects to any wildlife populations or other resources managed by these agencies. Montana ADC conducted a Section 7 Consultation with the USFWS to insure

no adverse or cumulative impacts to T&E species, and Montana ADC has consulted with the Montana Historical Preservation Office and American Indian tribes to insure no adverse impacts to historical or cultural resources. The intent of this coordination and consultation is to draw on the expertise of other agency and tribal personnel to insure there are no cumulative impacts, in Montana or surrounding states from ADC predator damage management.

2.3.12 Appropriateness of using rancher-supplied data to quantify livestock losses.

Some individuals felt that ranchers often intentionally overestimated the extent of their livestock losses to justify more damage management work. Pearson (1986), however, reported on several studies that indicated little or no bias occurred in rancher reported losses, and Shelton and Klindt (1974) found that some ranchers underestimated their losses due to some husbandry practices. Schaefer et al. (1981) investigated sheep predation and determined that: 1) producers correctly assessed the cause of livestock death more than 94% of the time, and 2) the results of two types of loss surveys yielded similar results. Losses attributed to predation by Montana sheep producers in 1993 and 1994 amounted to about 37% and 41.2%, respectively, of the total reported death loss (MASS 1995). Through intensive monitoring conducted during a study on three typical range sheep operations in southern Idaho, Nass (1977) found that predators were responsible for 56% of the total death losses. This data suggests that attributing an average of 37% and 41.2% of total death losses to predation is realistic, and may even suggest that Montana sheep producers are *under*estimating their predation losses.

2.3.13 ADC work on private versus public lands.

Some individuals expressed concern about how ADC activities would be conducted on private versus public lands. ADC activities on private lands are carried out only after the landowner/ lessee has requested services from ADC and after an *Agreement for Control* has been signed. This agreement stipulates which methods may be used on the property. ADC activities that are planned on public lands are only carried out after development of site specific work plans or other comparable documents between ADC and the respective land management agencies. These plans stipulate any restrictions that may be deemed necessary to ensure public safety or resource protection on those public lands. ADC activities on public lands are typically carried out under more restrictions than on private land to mitigate the likelihood of conflicts with users of public lands.

2.3.14 Rancher responsibility to protect their own livestock through use of husbandry methods.

Although no law or policy requires livestock producers to employ good husbandry practices to protect their livestock, most Montana sheep producers do employ a variety of husbandry practices to protect their sheep as a matter of good business.

Sheep producers in Montana employ a number of nonlethal damage management measures to protect their livestock from predation. In 1995, ADC personnel determined that 631 sheep producers utilized 16 different nonlethal methods totaling 3626 separate occurrences (ADC 1996). Therefore, requests for ADC assistance to protect sheep from predation in Montana in 1995 came from producers who were already using an average of 5.74 nonlethal methods on each operation, but still experienced predation problems in spite of these practices. The more frequently used nonlethal methods were: 1) conventional/barrier fencing, 98.4%; 2) shed lambing, 90.0%; 3) husbandry, 74.4%; 4) night penning, 66.6%; 5) guard dogs, donkeys and llamas, 60.6% and 6) harass/shooting, 59.4%. ADC policy is to respond to all requests for assistance within program authority and responsibility. If improved husbandry practices would likely reduce a predation problem, ADC makes recommendations regarding these practices.

2.3.15 Wildlife populations need to be monitored

ADC's proposed action is to reduce or minimize damage to livestock, property and designated wildlife, and to safeguard public health and safety caused by wildlife in the analysis area. The Montana ADC program, in cooperation with the MFWP, would monitor the impact on target species under the jurisdiction of the MFWP in the analysis area and statewide to determine if the total take is within allowable harvest levels.

2.3.16 ADC Causes Genetic Loss in the Subspecies of Coyotes Found in Montana

To assess the concern about coyote subspecies and loss of genetic material, it is necessary to understand what a "subspecies" is. A subspecies is a morphologically distinguishable group whose members are at least partially isolated geographically, but interbreed successfully with members of other subspecies of the same species where their ranges overlap. Scientists often use other terms, such as race and variety, as synonyms for the word "subspecies" (Connolly 1994). If crossbreeding occurs in nature in places where the geographic ranges of two kinds of mammals meet, the two kinds are considered to be subspecies of one species. If no crossbreeding occurs, the two kinds are regarded as two distinct, full species.

Coyotes are regarded as predators with generalized feed habits that allow them to inhabit wide variety of habitat types. They are considered widely distributed throughout most of North America and highly mobile, migrating over large areas, and it is generally recognized that interbreeding of subspecies occurs, invalidating subspecies classifications (Voigt and Berg 1987). In other words, the animals are morphologically indistinguishable and so much alike that trained wildlife biologists could not to tell one subspecies from another (Connolly 1994). Young and Jackson (1951) wrote of the great amount of individual color, size and cranial characteristics variations of coyotes, and stated that the actual limits of the geographic range of any subspecies cannot be indicated by sharp and fast lines. They also suggested that, within the range of one subspecies, individual coyotes will be found that are typical of other subspecies. Dispersal of *"surplus"* animals is the main factor that keeps coyote populations distributed throughout their habitat. Such dispersal of subdominant animals removes surplus animals from higher density areas and repopulates areas with lower densities. There are two subspecies of coyotes found in Montana, *Canis latrans latrans* (Plains coyote) and *C. l. lestes* (Mountain coyote). The mountain coyote is one of the most widely distributed subspecies, occurring throughout the Great Basin of the U. S. and north into British Columbia and Alberta (Connolly 1994). Young and Jackson (1951) stated that, *"The subspecies <u>lestes</u> shows clear intergradation with all races adjoining it distributionally, and often borderline specimens are difficult to determine over a considerable range."* This means that the average person looking at a coyote on or near the edges of the published geographic range of the mountain coyote would find it difficult or impossible to tell if the animal was, in fact, a mountain coyote, or a member of another subspecies.

The ADC take of coyotes is limited to areas where Cooperative Agreements or Work Plans are in place in specific livestock grazing areas. Montana ADC removal of coyotes, as analyzed in Chapter 4 of this EA, does not nor has not had an impact on genetic variability of the coyote population. There is no indication that either coyote subspecies occurring in Montana is scarce or rare.

2.3.17 Removing Coyotes in an Area Causes Younger, More Aggressive Coyotes to Inhabit the Area, Thus Causing Greater Livestock Losses

Two studies (Connolly et al. 1978, Gese and Grothe 1995) investigated the predatory behavior

and social hierarchy of coyotes, and determined that the more dominant (alpha) animals were the ones that initiated and killed most of the prey items. Connolly et al. (1978) concluded from pen studies, with known aged coyotes, that the proclivity of individuals that attacked livestock seemed related to their age and relationship with conspecifics. The coyotes that attacked sheep most frequently were the dominant males and females paired with these males, with the males responsibility for most of the attacks and kills. Gese and Grothe (1995) concluded from observing wild coyotes that the dominant pair was involved in vast majority of predation attempts. The alpha male was the main aggressor in all successful kills, even when other pack members were present. Submissive, younger and less dominant animals scavenged on carcasses of animals killed by the more dominant animals, other carcasses as found or apparently had diets that, in part, consisted of other small food items. Windberg et al. (in press) demonstrated that coyotes from unexploited coyote populations readily kill livestock and selectively preyed on smaller goat kids. They determined that 41% of the kid goats exposed during the study were killed by predators. This remarkably high predation rate occurred despite no recent (>7 years) exposure to goats or sheep as prey on their study area. Thus, it appears the above concern is unfounded because removal of local territorial (dominant) coyotes, removes the individuals that are most likely to kill livestock and generally results in the immigration of subdominant coyotes that are less likely to kill livestock.

2.3.18 Increased Coyote Damage Management will Increase Red Fox Densities and Increase Waterfowl Predation

Predator damage management, or reducing predation, as analyzed in this EA, would not impact predator populations except possibly in localized areas in the short-term (Youmans 1996). In the long-term, predator damage management as described in this EA and analyzed in Chapter 4 would not significantly impact the coyote or red fox populations, thus it would not impact predation statewide or in the analysis area. The take of coyotes is well below the level that would impact any existing wildlife populations, and therefore, fox populations would not increase unchecked (Youmans 1996).

2.4 Additional Issues not Considered Because They are Outside the Scope of this Analysis.

1. Private vs. ADC Predator Damage Management
2. Relocation of Grizzly Bears and Gray Wolves.
3. Hunting Grizzly Bears.
4. Establishing/Increasing Hunting Quotas.
5. Beaver damage management.
6. Overgrazing in Yellowstone National Park.
7. Big game damage.
8. Threatened and Endangered Species Reintroduction, particularly Gray Wolves and Grizzly Bears.
9. Public land grazing.
10. Require Livestock Producers to Have Insurance for Livestock Losses.
11. Urbanization, Habitat Preservation, and Land Development.

3.0 CHAPTER 3: ALTERNATIVES

INTRODUCTION

This chapter consists of four parts: 1) an introduction, 2) description of alternatives considered and analyzed in detail including the Proposed Action (Alternative 2), 3) a description of alternatives considered, but eliminated from detailed study, and 4) a discussion of mitigating measures and Standard Operating Procedures. Six alternatives were recognized, developed, analyzed in detail and reviewed by ADC, BLM, Forest Service, MFWP, MDOL and MDSL; five alternatives were considered but not analyzed in detail (see Section 3.3 for supporting documentation). The six alternatives and options analyzed in detail are:

1) Alternative 1 - Continue the Current Western Montana Analysis Area ADC Program: (No Action Alternative). This alternative consists of the current program of technical assistance and operational Integrated Wildlife Damage Management (IWDM) (ADC Directive 2.105) by ADC on BLM, National Forest System, USFWS, State, county, municipal and private lands under Cooperative Agreement, Agreement for Control, and Work Plans with ADC.

2) Alternative 2 - Current Program Plus Additional Activities on Public Lands as Requested: (Proposed Alternative) This alternative consists of the current program, and similar operational activities on other public lands as requested by permittees or the managing agency and conducted according to Work Plans.

3) Alternative 3- A Corrective Only Predator Damage Management Program: (No Preventive Control). This alternative would require that livestock depredation occur before the initiation of lethal damage management. No preventive lethal control would be allowed.

4) Alternative 4 - Non-lethal Control Required Prior to Lethal Control. This alternative would require that livestock owners conduct non-lethal control before the initiation of ADC lethal control.

5) Alternative 5 - Technical Assistance Program: (ADC Non-lethal Only). Under this alternative, ADC would not conduct predator damage management in analysis area. The entire program would consist of only technical assistance.

6) Alternative 6 - No Predator Damage Management in the Western Montana Analysis Area. This alternative would terminate the Federal program for predator damage management in western Montana.

3.1 DESCRIPTION OF THE ALTERNATIVES

3.1.1 Alternative 1 - Current Western Montana Analysis Area ADC Program: (No Action)

The No Action alternative is a procedural NEPA requirement (40 CFR 1502.14(d)), is a viable and reasonable alternative that could be selected and serves as a baseline for comparison with the other alternatives. The No Action Alternative, as defined here, is consistent with CEQ's definition (CEQ 1981).

The No Action alternative would continue the current ADC IWDM program in the

western Montana analysis area. The current program is a collection of cooperative programs with other Federal, State and local agencies, and private individuals and associations to protect livestock and wildlife, property, and public health and safety (described in Chapter 1). The analysis area ADC program conducts technical assistance, and preventive (in response to historical loss) and corrective (in response to current loss or hazard) operational predator damage management on authorized BLM, the Forest Service and USFWS, State, county, municipal, and private lands under MOU, Cooperative Agreements or Agreement for Control or work plans. All wildlife damage management is based on interagency relationships and intraagency policies, which require close coordination and cooperation because of overlapping authorities and legal mandates.

On BLM and National Forest System lands, ADC Work Plans describe the wildlife damage management that would occur. During the ADC planning process with the BLM and Forest Service, in conjunction with the MFWP or the USFWS, plans are prepared which describe and delineate where predator damage management would be conducted, which methods would be used and where there are areas with special management restrictions (i.e., human safety zones). Before management is conducted on private lands, *Agreements for Control on Private Property* are signed with the landowner or administrator that describe the methods to be used and the species to be managed. Management is directed toward localized predator populations or groups and/or individual offending animals, depending on the species and circumstances.

3.1.2 Alternative 2 - Current Program Plus Additional Activities on Public Lands as Requested (Proposed Alternative)

This alternative is the current program as described in Alternative 1, with additional approval for ADC to conduct predator damage management on other public lands within the analysis area as **requested** by the permittee or the land management agency. All predator damage management would be outlined in ADC Work Plans with the appropriate agency(ies) before any activities occur and would be based on close cooperation and coordination with the agency (ies). Program activities would be conducted as described in Alternative 1 after concurrence with the appropriate agencies.

Integrated Wildlife Damage Management: Same as Alternative 1 with activities on other public lands under the provision of an MOU and Work Plans between ADC and the appropriate agency.

Management Methods and Restrictions: Same as Alternative 1 with activities on other public lands under the provision of an MOU and Work Plans between ADC and the appropriate agency.

Use of Chemical Toxicants: Same as Alternative 1 with activities on other public lands under the provision of an MOU and Work Plans between ADC and the appropriate agency.

3.1.3 Alternative 3 - A Corrective Only Predator Damage Management Program (No Preventive Predator Damage Management).

This alternative would provide for the use of the same predator damage management methods but only in places where livestock depredations are occurring. Incumbent in this alternative is ADC verification of the loss and the species responsible. Producers could still implement any legal non-lethal and/or lethal

methods they determine to be practical and effective. Lethal damage management by ADC would be limited to an area near the loss to maintain the integrity of the corrective only situation. The full variety of mechanical and chemical damage management methods described for Alternatives 1 would be available, once losses have occurred and are verified by ADC.

Integrated Wildlife Damage Management: Same as Alternative 1 with predator damage management conducted only after damage has occurred.

Management Methods and Restrictions: Same as Alternative 1 with predator damage management conducted only after damage has occurred.

Use of Chemical Toxicants: Same as Alternative 1 with predator damage management conducted only after damage has occurred.

3.1.4 Alternative 4 - Non-lethal Control Required Prior to Lethal Control.

This alternative would require non-lethal damage management methods before the use of lethal damage management efforts by ADC. Non-lethal methods selected by producers would include livestock husbandry, habitat modification and animal behavior modification methods. Verification of the methods used would be the responsibility of ADC. No standard exists to determine producer diligence in applying these methods, nor are there any standards to determine how many non-lethal applications are necessary before the initiation of lethal controls. Thus, only the presence or absence of non-lethal methods can be evaluated. The mechanical and chemical methods described in Alternative 1 would apply, where appropriate, once the criteria for non-lethal control have been met. Consideration of wildlife needs would not be included with the producer implemented non-lethal methods, nor would ADC base damage management strategies on the needs of designated wildlife for predator protection.

Integrated Wildlife Damage Management: Same as Alternative 1, with predator damage management conducted only after nonlethal damage fails to reduce damage to acceptable levels.

Management Methods and Restrictions: Same as Alternative 1, with predator damage management conducted only after nonlethal damage fails to reduce damage to acceptable levels.

Use of Chemical Toxicants: Same as Alternative 1, with predator damage management conducted only after nonlethal damage fails to reduce damage to acceptable levels.

3.1.5 Alternative 5 - Technical Assistance Only

This alternative, would eliminate ADC operational predator damage management in the western Montana analysis area. ADC would provide technical assistance and make recommendations when requested. Private landowners or others could conduct their own predator damage management on Federal, State, county and private lands.

This "*technical assistance only*" alternative would place the immediate burden of operational control work on State agencies, individuals and requesters. Individuals experiencing wildlife damage would, independently or with ADC recommendations, carry out and fund control activities. Individual producers could implement predator damage management as part of the cost of doing business, or a State agency could assume a more active role in providing operational predator damage management.

If Alternative 5 was selected, predator damage management would be left to State agencies and individuals. Some agencies or individuals may choose not to take action to resolve wildlife damage. Other situations

may warrant the use of legally available management methods because of public demands, mandates, or individual preference. Methods and control devices could be applied by people with little or no training and experience, and with no professional oversight or monitoring for effectiveness. This in turn could require more effort and cost to achieve the same level of problem resolution, and could cause harm to the environment, including a higher take of nontarget animals; illegal use of pesticides could be greater than present (Schueler 1993).

3.1.6 Alternative 6 - No ADC Program

This alternative would eliminate all ADC predator damage management (operational and technical assistance) on all land classes. However, State and county agencies, and private individuals could conduct wildlife damage management. ADC would not be available to provide technical assistance or make recommendations to requesters. In some cases, control methods applied by non-agency personnel could be used contrary to their intended or legal use, or in excess of what is recommended or necessary; illegal use of pesticides could increase (Schueler 1993).

A "*no control*" alternative was analyzed by the USFWS (USDI 1979) and was dismissed as an invalid alternative. However, due to interest in this option, an analysis of this alternative has been included. A "no control" alternative was also evaluated in the ADC Programmatic EIS (USDA 1994).

3.2 Predator Damage Management Strategies and Methodologies used by ADC in the Western Montana Analysis Area.

The strategies and methodologies described below are common to Alternatives 1, 2, 3 and 4 of this EA. Under Alternative 5, ADC personnel would only make technical assistance recommendations to requesters based on practical and legal strategies that are supported by the ADC Decision Model (USDA 1994). Alternative 6 would terminate both ADC technical assistance and operational predator damage management by ADC.

3.2.1 Integrated Wildlife Damage Management (IWDM)

During more than 80 years of resolving wildlife damage problems, ADC has considered, developed, and used numerous methods of managing damage problems (USDA 1994, 2-15). The efforts have involved the research and development of new methods and the implementation of effective strategies to resolve wildlife damage.

The most effective approach to resolving wildlife damage is to integrate the use of several methods simultaneously or sequentially. Integrated Wildlife Damage Management (IWDM) is the implementation and application of safe and practical methods for the prevention and reduction of damage caused by wildlife, based on local problem analyses and the informed judgement of trained personnel. The ADC Program applies IWDM, commonly known as Integrated Pest Management (IPM) (ADC Directive 2.105), to reduce damage through the ADC Decision Model discussed on page 3-4.

The philosophy behind IWDM is to implement effective management techniques, in a cost-effective manner while minimizing the potentially harmful effects to the public, target and nontarget species, and the environment. IWDM draws from the largest possible array of options to create a combination of techniques appropriate for the specific circumstances. IWDM may incorporate cultural practices (i.e., animal husbandry), habitat modification, animal behavior (i.e., scaring), local population reduction, or any combination of these, depending on the characteristics of the specific damage problems. In selecting management techniques for specific damage situations[4] consideration is given to the:

[4]The cost of management may sometimes be secondary because of overriding environmental, legal, public health and safety, animal

- Status of wildlife species in the area
- Species responsible
- Magnitude of the damage
- Geographic extent of damage
- Duration and frequency of the damage
- Prevention of future damage (lethal and nonlethal techniques)
- Legal and administrative conditions

IWDM Strategies used in the western Montana analysis area consist of:

- **Technical Assistance Recommendations** (implementation is the responsibility of the requestor): ADC personnel provide information, demonstrations and advice on available predator damage management techniques. Technical assistance includes demonstrations on the proper use of management devices (propane exploders, cage traps, etc.) and information on animal husbandry, habits and habitat management, and animal behavior modification. Technical assistance is generally provided during an on-site visit or verbal consultation with the requestor. Generally, several management strategies are described to the requestor for short and long-term solutions to damage problems; these strategies are based on risk, need and practical application. Technical assistance may require substantial effort by ADC personnel in the decision making process, but the actual management is generally the responsibility of the requester.

- **Direct Control Assistance** (activities conducted or supervised by ADC personnel): Direct control assistance is implemented when technical assistance did not work or is not appropriate and when Cooperative Agreements provide for ADC direct control assistance. The initial investigation defines the nature and history of the problem, extent of damage, and the species responsible for the damage. Professional skills of ADC personnel are often required to effectively resolve problems, especially if restricted pesticides are proposed, or the problem is complex requiring the direct supervision of a wildlife professional. ADC considers the biology and behavior of the damaging species and other factors using the ADC Decision Model (Slate et al. 1992). The recommended strategy (ies) may include any combination of preventive and corrective actions that could be implemented by the requestor, ADC or other agency personnel, as appropriate. Two strategies are available:

  1. **Preventive Damage Management.** Preventive damage management is applying predator damage management strategies before damage occurs, based on historical damage. As requested and appropriate, ADC personnel could provide information and conduct demonstrations, or take actions to prevent these historical problems from recurring. For example, in areas where substantial lamb depredations have occurred on lambing grounds, ADC may provide information about guarding dogs, fencing or other husbandry techniques, or conduct predator damage management before lambing based on the situation. Preventive damage management could take place on private, county and State lands without special authorization. In addition, when conducting predator damage management on Federal lands, ADC must receive a request from the livestock owner or individual that is experiencing the damage. Management areas and techniques are reviewed during the work plan meeting between the appropriate agencies.

  The rationale for conducting preventive damage management to reduce coyote damage differs little in principle from holding controlled hunts for deer or elk in certain areas where agricultural

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welfare, or other concerns.

damage has been a historic problem. By reducing the number of deer near agricultural fields, or the number of coyotes near a band of sheep, the likelihood of damage is reduced.

Shelton and Klindt (1974) documented a correlation between coyote densities and levels of sheep loss in Texas, and Robel et al. (1981) found a similar correlation in Kansas. In southeastern Idaho, Stoddart and Griffiths (1986) documented an increase in lamb losses followed by a decrease in lamb losses as coyote populations rose and fell. Stoddart (1984) observed a correlation between coyote densities and livestock predation that rose and fell with coyote densities and suggested that removing coyotes from small areas at the appropriate time can protect vulnerable livestock and wildlife and that immigration of coyotes from the surrounding area would replace the animals removed. Gantz (1990) concluded that late winter removal of territorial coyotes from mountain grazing allotments would reduce predation on sheep grazing on those allotments the following summer.

Wagner (1997) determined that aerial hunting 3 to 6 months before sheep are grazed on an area was cost effective when compared with areas without aerial hunting. Wagner also determined that in areas where preventive aerial hunting was conducted that fewer hours of subsequent ground work were required, and concluded that, *"The reduction of device nights as a result of aerial hunting represents a potentially significant reduction in the risk to non-target species because species other than coyotes can fall prey to traps, snares and M-44s."*

2. **Corrective Damage Management** Corrective damage management is applying predator damage management to stop or reduce current losses. As requested and appropriate, ADC personnel provide information and conduct demonstrations, or take actions to prevent additional losses from recurring.

For example, in an area where confirmed and documented lamb depredations are occurring by coyotes, ADC may provide siren/strobe predator frightening devices or propane exploders to the livestock producer or advise that the livestock be tightly herded or penned at night, if appropriate. Then, the ADC Specialist may use other appropriate techniques and personal experience to remove the depredating individual (s) from the area. The ADC Specialist may typically use traps, snares, calling and shooting, M-44s or aerial hunting until depredations cease to occur. Coyotes are highly adaptive, and the sooner an individual that has learned to prey on livestock can be removed from the population, the less likely that other losses would occur.

3.2.2 ADC Decision Making

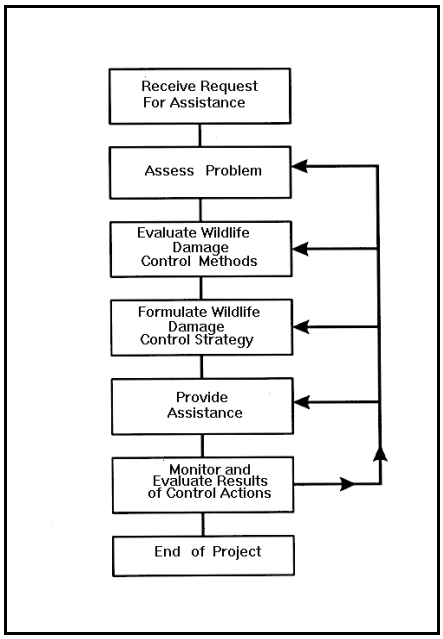
The ADC Programmatic EIS describes the procedures used by ADC personnel to determine management strategies or methods applied to specific damage problems (USDA 1994 pp. 2-13, 2-20 to 31 and Appendix N).

As depicted in the Decision Model (Figure 1), consideration is given to the following factors before selecting or recommending damage management methods and techniques[5]:

- Species responsible for damage
- Magnitude, geographic extent, frequency, and duration of the problem
- Status of target and nontarget species, including T&E species
- Local environmental conditions
- Potential biological, physical, economic, and social impacts

[5] The cost of the management may sometimes be a secondary concern because of overriding environmental, public health and safety, animal welfare or other concerns.

C Potential legal restrictions



The ADC decision making process is a procedure for evaluating and responding to damage complaints. ADC personnel are frequently contacted **only** after requesters have tried nonlethal techniques and found them to be inadequate for reducing damage to an acceptable level. ADC personnel evaluate the appropriateness of strategies, and methods are evaluated for their availability (legal and administrative) and suitability based on biological, economic and social considerations. Following this evaluation, the methods deemed to be practical for the situation are formed into a management strategy. After the management strategy has been implemented, monitoring is conducted and evaluation continues to assess the effectiveness of the strategy. If the strategy is effective, the need for management is ended. The EIS provides detailed examples of how the ADC Decision Model is implemented for coyote predation to sheep on public and private lands (USDA 1994, pg. 23-35).

On most ranches, predator damage may occur whenever vulnerable livestock are present because no cost-effective, socially acceptable method or combination of methods that permanently stops or prevents predation are legally available. When damage continues intermittently over time, ADC personnel and the rancher monitor and reevaluate the situation frequently. If one method or combination of methods fails to stop damage, a different strategy is implemented.

In terms of the ADC Decision Model, most damage management efforts consist of a continuous feedback loop between receiving the request and monitoring the results with the damage management strategy reevaluated and revised periodically.

3.2.3 Predator Damage Management Methods used in the Western Montana Analysis Area.

Producer-Implemented Methods:

1. **Livestock producer practices** consist primarily of nonlethal preventive methods such as animal husbandry, habitat modification and animal behavior modification. Livestock husbandry and other management techniques are implemented by the livestock producer. Producers are encouraged to use these methods, based on the level of risk, need, and practicality. ADC offers technical assistance to producers on nonlethal methods and provides sources for guard dog procurement. Livestock producer practices recommended by ADC include:

   Animal husbandry generally includes modifications in the level of care or attention given to livestock that may vary depending on the age and class of the livestock. Animal husbandry practices include but are not limited to techniques such as guard dogs, herders, shed lambing, night penning and carcass removal.

   Habitat modification alters habitats to attract or repel certain wildlife species, or to separate livestock from predators. Habitat modification practices would be encouraged when practical, based on the type and extent of the livestock operation. For example, clearing brushy or wooded areas in or adjacent to lambing or calving pastures may be appropriate to reduce available cover

for predators[6].

Animal behavior modification refers to tactics that alter the behavior of wildlife and reduce predation. Animal behavior modification may use scare tactics or fencing to deter or repel animals that cause loss or damage to livestock, apiaries or property [7]. Some but not all devices used to accomplish this are:

Predator-proof fences
Electronic guards
Propane exploders
Pyrotechnics
Platforms

Mechanical Management Methods:

Mechanical management methods consist primarily of tools or devices used to repel, capture or kill a particular animal or local population of wildlife to prevent continued resource damage. Mechanical methods may be nonlethal such as barrier fencing or frightening devices such as the siren/strobe device or the propane cannon or lethal such as the M-44 device, shooting or snares. If ADC personnel apply mechanical damage management methods directly on private lands, an *Agreement for Control on Private Property* must be signed by the landowner or administrator, authorizing the use of each damage management method. On BLM and National Forest Service lands, a work plan would be submitted to each land management agency that identifies areas where and times when damage management requests may be expected, based on livestock use and historic documentation of losses. Federal lands managers are responsible for identifying areas where other multiple use priorities may conflict with predator damager management activities.

1. **Leghold traps** are used in the analysis area by ADC personnel for preventive and corrective damage management where signed *Agreements for Control on Private Property* are in place, or on Federal lands, according to ADC Work Plans. Leghold traps can be used effectively to capture a variety of mammals, but are used most often within the analysis area to capture coyotes and red fox. Two primary advantages of the leghold trap are that they can be set under a wide variety of conditions, and that pan-tension devices can be used to reduce the incidence of capturing smaller nontarget animals. Effective trap placement by trained personnel also contributes to the leghold trap's selectivity. An additional advantage is that leghold traps can allow for the on-site release of some nontarget animals and the relocation and release of animals.

   Disadvantages of using leghold traps include the difficulty of keeping traps operational during rainy, snowy or freezing weather. In addition, they lack selectivity where nontarget species are of a similar or heavier weight than the target species. The use of leghold traps requires more workforce than some methods, but they are indispensable in resolving some depredation problems.

2. **Cage traps**, typically constructed of wire mesh, are sometimes used or recommended to capture smaller animals like raccoons or skunks. Larger cage traps constructed of sections of culvert pipe are sometimes use to capture black bears or grizzly bears. Cage traps pose minimal risk to the

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[6] The BLM nor Forest Service will permit the clearing of brush, trees nor build fences or lambing sheds on lands they administer, therefore, this is only an option on private lands.

[7] Scare devices will often only produce the desired result for a short time period until wildlife individuals become accustomed to the disturbance (Pfeifer and Goos, Conover 1982).

public, pets and other nontarget animals, and they allow for chemical immobilization, marking and relocation of the problem animals. Cage traps, however, cannot be used effectively to capture more wary species such as red fox, coyotes or gray wolves.

3. **Snares**, like traps, may be used as either lethal or live-capture devices. Snares may be used wherever a target animal moves through a restricted area (i.e., crawl holes under fences, trails through vegetation, etc.). They are easier to keep operational than leghold traps during periods of inclement weather. Snares set to catch an animal by the neck can be a lethal use of the device, whereas snares positioned to capture the animal around the body or leg can be a live-capture method. Careful attention to details in placement of snares and the use of a "*stop*" on the cable can also allow for live capture of neck-snared animals. When resolving black bear and mountain lion problems, ADC personnel typically use a spring-activated foot snare.

4. **Ground shooting** is entirely selective for target species and may involve the use of spotlights, decoy dogs and predator calling. Ground shooting is used to manage livestock depredation problems and public health and safety hazards when lethal methods are determined appropriate. Removal of one or two specific animals by shooting in the problem area can sometimes provide immediate relief from the predation problem. Shooting is often used as one of the first options because it offers the potential for solving a problem more quickly and selectively than some other options, but it does not always work. Shooting may sometimes be one of the only management options available if other factors preclude setting of equipment.

5. **Hunting dogs** are essential to the successful tracking and capture of problem black bears and mountain lions to alleviate livestock depredation problems or for public health and safety threats. Dogs are also trained and used for coyote damage management to alleviate livestock depredation (Rowley and Rowley 1987, Coolahan 1990). Trained dogs are used primarily to find coyotes and dens, and to pursue or decoy problem animals.

6. **Denning** is the practice of finding coyote or red fox dens and eliminating the young, adults, or both to stop ongoing predation or prevent future depredation on livestock. Till and Knowlton (1983) documented denning's cost-effectiveness and high degree of efficacy in resolving predation problems due to coyotes killing lambs in the spring. Coyote and red fox depredations on livestock often increase in the spring and early summer due to the increased food requirements for rearing and feeding litters of pups. Removal of pups will often stop depredations even if the adults are not taken. When adults are taken and the den site is known, the pups are usually killed to prevent their starvation. Pups are typically euthanized with carbon monoxide in the den through use of a registered gas fumigant cartridge. (See discussion of gas cartridge under *Chemical Management Methods*.)

7. **Aerial hunting,** the shooting of predators from fixed-winged aircraft or helicopters, is used on all lands where authorized and determined appropriate. Aerial hunting consists of visually sighting target animals in the problem area and shooting them with a shotgun from the aircraft. Local depredation problems can often be resolved quickly through aerial hunting. Cain et al. (1972) rated aerial hunting as "*very good*" in effectiveness for problem solving, safety, and lack of adverse environmental impacts. Smith et al. (1986) cited cost-effectiveness and efficacy as benefits of aerial hunting for protection of pronghorn antelope from coyote predation. Connolly (1987) documented the efficacy of aerial hunting in taking confirmed sheep-killing coyotes. Wagner (1997) stated that aerial hunting may be an especially appropriate tool as it reduces risks to non-target animals and minimizes contact between damage management operations and recreationists, and is an effective method for reducing livestock predation.

Good visibility and relatively clear and stable weather conditions are necessary for effective and

safe aerial hunting operations. Summer conditions limit the effectiveness of aerial hunting as heat reduces coyote activity, and visibility is greatly hampered by vegetative ground cover. High temperatures, which reduce air density, affect low-level flight safety and may further restrict aerial hunting activities. Cold temperatures and windy conditions in winter months can also restrict aerial hunting.

Chemical Management Methods:

All chemicals used by ADC are registered under the FIFRA and administered by the EPA and Montana Department of Agriculture (MDA), Pesticide Division. All analysis area ADC personnel are certified as pesticide applicators by the MDA; the MDA requires pesticide applicators to adhere to all certification requirements set forth in the FIFRA. No chemicals are used on public or private lands without authorization from the land management agency or property owner or manager (see Mitigation page 3-16 for a more detailed explanation). The chemical methods used and/or available for uses in the analysis area are:

1. **Sodium cyanide in the M-44 device** - The M-44 is a spring-activated ejector device developed specifically to kill coyotes. The M-44 consists of a capsule holder wrapped in an absorbent material, an ejector mechanism, a capsule containing about 0.9 grams of a powdered sodium cyanide mixture, and a 5-7 inch hollow stake. To set an M-44, a good location is found, the hollow stake is driven into the ground, and the ejector unit is cocked and fastened into the stake by a slip ring. The wrapped capsule holder containing the cyanide capsule is then screwed onto the ejector unit and a bait, attractive to coyotes, is applied to the capsule holder. A warning sign is placed within 25 feet to warn of the device's presence. A canid attracted to the bait will try to bite and pick up the baited capsule holder. When the M-44 is pulled, the spring-activated plunger propels sodium cyanide into the animal's mouth, resulting in a rapid death. Coyotes killed by M-44s present no secondary poisoning risks (USDA 1994, Appendix P).

   The M-44 is selective for canids because of the attractants used and the unique requirement that the device be triggered by pulling upward on the capsule holder. Connolly (1988), in an analysis of M-44 use by the Montana ADC personnel from 1975-1986, documented a 99.5% selectivity rate for target species. Dogs are susceptible to M-44s, and this limits the areas where the devices can be safely used. The 26 EPA use restrictions also preclude use of the M-44 in areas where it may pose a danger to T&E species.

   M-44s are used for corrective and preventive management on private lands where previous predation has occurred and authorized by a landowner agreement, and on Federal lands where authorized by Work Plans. ADC personnel comply with the EPA label and 26 use restrictions (see USDA 1994, Appendix Q).

   Sodium cyanide is used for many purposes in the United States, including agricultural, pharmaceutical, mining, and for industrial dyes. Sodium cyanide is odorless when completely dry, emits an odor when dampened, is strongly alkaline, and rapidly decomposes in the environment. In 1989, about 215 million pounds of sodium cyanide were used in North America, of which the ADC Program nationwide used about 0.0001% (Knudson 1990). In 1995, about 1.9 pounds of sodium cyanide were used in the analysis area (MIS 1996). Sodium cyanide is freely soluble in water and a fast acting nonspecific toxicant inhibiting cellular respiration. Low concentrations of cyanide have been detected and are frequently found in normal human blood (Feldstein and Klendshof 1954). The M-44 cyanide ejector is a selective device for use to reduce coyote, red fox, gray fox and feral dog predation (EPA Reg. No. 56228-15), and for protecting T&E species and for certain public health uses (Thomas 1986, Connolly 1988).

2. **The Livestock Protection Collar (LPC), containing sodium fluoroacetate**, is registered with the EPA (EPA Reg. No. 56228-22) for producer or ADC use nationwide. Before use in individual states, the registrant must receive approval from the agency within the state that oversees pesticide usage; ADC has approval to use to LPC from the MDA. Use of the LPC would follow EPA registration and MDA requirements, and is restricted to specially trained and certified ADC employees.

   Sodium fluoroacetate (Compound 1080), has been used since World War II. Sodium fluoroacetate has been a subject of wide research in the United States and elsewhere and has been widely used as a toxicant for pest management programs in many countries. Fluoroacetic acid and related chemicals occur naturally in plants in many parts of the world and are not readily absorbed through intact skin (Atzert 1971). Sodium fluoroacetate is discriminatingly toxic to predators, being many times more lethal to them than to most nontarget species (Atzert 1971, Connolly and Burns 1990). Sodium fluoroacetate is a white powder soluble in water and is very stable in solution; it would only be used in the LPC. Sodium fluoroacetate kills by disrupting the Krebs Cycle, which is the energy producing process for cells. Many EPA imposed restrictions apply to the use of LPCs.

   The individual small and large collars contain 1.1 oz. (30.4 grams) of a 1% solution of sodium fluoroacetate and 99% inert ingredients. The LPC is worn around the neck of lambs, and kills only the animal attacking collared lambs (Connolly et al. 1978, Johnson 1984, Burns et al. 1988). When LPCs are used, sheep or goats are made susceptible to attack to prompt target predators to attack collared animals (Blakesley and McGrew 1984, Scrivner and Wade 1986, Connolly and Burns 1990). LPCs consist of two pouches that are punctured when a collared livestock are attacked and bitten on the throat by a predator. Upon puncturing the pouches, the offending animal ingests a small volume of the solution and dies a short time later. In this usage, sodium fluoroacetate has virtually no risk of secondary poisoning (USDA 1994, Appendix P).

3. The **gas cartridge** is registered as a fumigant by the EPA (EPA Reg. No. 56228-21) and is comprised of 35% charcoal and 65% sodium nitrate. When ignited, the cartridge burns in the den of an animal and produces large amounts of carbon monoxide, a colorless, tasteless poisonous gas. The combination of carbon monoxide exposure and oxygen depletion kills the animals in the den. This technique is used on State, county, private and Federal lands, in the analysis area, where livestock killing can be attributed to food procurement for young (Till and Knowlton 1983, Till 1992).

3. **DRC-1339** (a 3-chloro-4-methylbenenamine hydrochloride) is a slow acting avian toxicant that is rapidly metabolized and/or excreted. Because of the rapid metabolism of DRC-1339 in the body, it poses little risk of secondary poisoning to nontarget animals (Cunningham et al. 1979, Schafer 1981, Knittle et al. 1990). This compound is also unique because of its relatively high toxicity to most pest birds, but low-to-moderate toxicity to most predatory birds and almost no toxicity to mammals (DeCino et al. 1966, Palmore 1978, Schafer 1981).

   DRC-1339 is registered with the EPA (EPA Reg. No. 56228-29) to control ravens, American crows, black-billed magpies and starlings (*Sturnus vulgaris*). ADC would use DRC-1339 in the analysis area by incorporating it into baits where ravens are killing or injuring livestock (Larsen and Dietrich 1970). The feeding habits of the ravens would be observed before placing any treated baits in an area to reduce the risks to nontarget animals. Ravens are opportunistic feeders and by determining when and where the birds are feeding, the baits would be found more quickly and easily, thereby reducing the risks to nontarget animals. Selective management can be applied because ravens learn to exploit a readily available food source, they continue to focus on that source until the availability declines.

4. **Chemical Immobilization/Euthanasia**. Several chemicals are authorized for immobilization and euthanasia by ADC (ADC Directive 2.430). Selected analysis area personnel received training in the safe use of all authorized immobilization/euthanasia chemicals from a wildlife veterinarian and are certified by ADC. This training involves hands-on application of state-of-the-art techniques and chemicals.

Telazol™ and Ketaset™ are the immobilizing agents most used by Montana ADC personnel, and are approved by the Food and Drug Administration (FDA) (NADA 106-111 and NADA 45-290, respectively). Telazol and Ketaset are rapid acting, non-narcotic, non-barbiturate injectable anesthetic agent, having a wide margin of safety. Both Telazol and Ketaset produce unconsciousness known as "*dissociative*" which in general terms means reflexes needed to sustain life (breathing, coughing, swallowing, etc.) are not affected by the drugs. These agents are used to immobilize live-trapped animals for relocation or administered before euthanasia. As other drugs are approved by the FDA and ADC, they may be incorporated into the analysis area program.

Telazol is a combination of equal parts of tiletamine hydrochloride and zolazepam hydrochloride. The product is generally supplied sterile in vials, each containing 500 mg of active drug and when dissolved in sterile water has a pH of 2.2 to 2.8. Telazol produces a state of unconsciousness in which protective reflexes, such as coughing and swallowing, are maintained during anesthesia. Schobert (1987) listed the dosage rates for many wild and exotic animals. Before using Telazol, the size, age, temperament, and health of the animal are considered. Following a deep intramuscular injection of Telazol, onset of anesthetic effect usually occurs within five to 12 minutes. Muscle relaxation is optimum for about the first 20 to 25 minutes after the administration, and then diminishes. Recovery varies with the age and physical condition of the animal and the dose of Telazol administered, but usually requires several hours.

Ketaset is supplied as a slightly acidic solution (pH 3.5 to 5.5) for intramuscular injection. Ketaset also produces a state of unconsciousness that interrupts association pathways to the brain and allows for the maintenance of the protective reflexes, such as coughing, swallowing, pedal and corneal. Ketaset is detoxified by the liver and excreted by the kidney.

Following administration of recommended doses, animals become immobilized in about five minutes with anesthesia lasting from 30 to 45 minutes; depending on dosage, recovery may be as quick as 4 to 5 hours or may take as long as 24 hours; recovery is generally smooth and uneventful.

Xylazine is a sedative that produces a transitory hypertension followed by prolonged hypotension, and respiratory depression. Recommended dosages are administered through intramuscular injection allowing the animal to become immobilized in about 5 minutes and lasting from 30 to 45 minutes.

Capture-All 5 is a combination of **Ketaset** and **Xylazine**, and is regulated by the FDA as an investigational new animal drug. The drug is available, through licensed veterinarians, to individuals sufficiently trained in the use of immobilization agents. Capture-All 5 is administered by intramuscular injection; it requires no mixing, and has a relatively long shelf life without refrigeration, all of which make it ideal for the sedation of various species.

Potassium chloride, a common laboratory chemical, is injected by ADC personnel as a euthanizing agent after an animal has been anesthetized (ADC Directive 2.430).

3.3 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL, WITH RATIONALE

Several alternatives were considered but not analyzed in detail. Provided below is the rationale for dismissing the alternatives.

3.3.1 Compensation for Wildlife Damage Losses

A Compensation alternative would direct all ADC program efforts and resources toward the verification of losses from predators, and providing monetary compensation to the resource owners. ADC services would not include any direct operational wildlife damage management nor would technical assistance or nonlethal methods be available.

This option is not currently available to ADC because ADC is directed by Congress to protect American agricultural, natural resources, property, and safeguard public health and safety (Animal Damage Control Act of 1931, and Rural Development, Agricultural and Related Agencies Appropriation Act 1988). Analysis of this alternative in USDA (1994 Chap 2 and 4) shows that it has many drawbacks:

- It would require larger expenditures of money and workforce to investigate and validate all losses to determine and administer appropriate compensation.
- Compensation would most likely be below full market value.
- It is difficult to make timely responses to all requests to assess and confirm losses, and many losses could not be verified.
- Compensation would give little incentive to resource owners to limit predation through improved animal husbandry practices and other management strategies.
- Not all ranchers would rely completely on a compensation program and unregulated lethal control of predators would most likely continue as permitted by State law.
- Congress has not appropriated funds to compensate for predation or other wildlife damage to agricultural products.

3.3.2 The Humane Society of the Unites States (HSUS) Alternative

The HSUS proposed an alternative that requires: 1) "*permittees evidence sustained and ongoing use of nonlethal/husbandry techniques aimed at preventing or reducing predation prior to receiving the services of the ADC Program*"; 2) "*employees of the ADC Program use or recommend as a priority the use of appropriate nonlethal techniques in response to a confirmed damage situation*"; 3) "*lethal techniques are limited to calling and shooting and ground shooting, and used as a last resort when use of husbandry and/or nonlethal controls have failed to keep livestock losses below an acceptable level*"; and 4) "*establish higher levels of acceptable loss levels on public lands than for private lands*."

The components of this proposed alternative by the HSUS have been analyzed in detail in the alternatives contained in this EA and through court rulings. The HSUS alternative would not allow for a full range of IWDM techniques to resolve predator damage management problems. In addition, ADC is directed by Congress to protect American agriculture, natural resources, property, and safeguard public health and safety, despite the cost of damage management. Further, the Southern Utah Wilderness Society, The Wilderness Society et al. vs. Hugh Thompson et al. U.S. Forest Service (U.S. District Court of Utah 1993) the court clearly states that, "*The agency need not show that a certain level of damage is occurring before it implements an ADC program. . . .Hence, to establish need for an ADC, the forest supervisors need only show that damage from predators is threatened*." In other words, it is not necessary to establish a criterion, such as percentage of loss of a herd to justify the need for wildlife damage management. The alternatives and option selected for detailed analysis in this EA include many of the suggestions in the HSUS proposal, and it is believed that inclusion of this alternative would not contribute new information or options for consideration and analysis that are not already being considered and available in IWDM as used by ADC.

3.3.3 Bounties

Bounties are payment of funds for killing predators (bounties) suspected of causing economic losses. They have typically proven ineffective in reducing predator damage and not supported by Montana State agencies such as MFWP and MDOL. ADC concurs with these agencies because:

- ADC does not have the authority to establish a bounty program
- Bounties are generally not as effective or practical in controlling damage
- Circumstances surrounding take of animals is completely unregulated
- No process exists to prohibit taking of animals from outside the damage management area for compensation purposes or the use of illegal methods
- Enormous expense and cumbersome administrative logistics

A bounty system encourages harvest of predators at times and places when coyotes are easiest and cheapest to harvest. However, the measure of success in not in how many coyotes are killed, but in how much damage is reduced. Many damage problems occur at times and in places where it is difficult to remove depredating predators.

3.3.4 Extermination and Suppression

An extermination and suppression alternative would direct all ADC program efforts' toward planned, total elimination of native predator species.

Extermination of unprotected predators, such as coyotes, is legal in Montana (MCA 81-7-102) but not supported by MFWP or MDOL. This alternative will not be considered by ADC in detail because:

- ADC opposes extermination of any native wildlife species.
- MFWP opposes extermination of any native Montana wildlife species.
- MDOL opposes extermination of any native Montana wildlife species.
- The extermination of a native species or local population would be extremely difficult if not impossible to accomplish and cost prohibitive.
- Extermination is not acceptable to most members of the public.

Suppression would direct ADC program efforts toward managed reduction of certain wildlife populations or groups.

In localized areas where damage can be attributed to predation by specific groups, MFWP has the authority to increase hunting seasons and hunter tag quotas; the MDOL has the authority to control unprotected predators, such as coyotes. When a large number of requests for predator damage management are generated from a localized area, ADC would consider suppression of the local population or groups of the offending species, if appropriate.

It is not realistic, practical, or allowable under present ADC policy to consider large-scale population suppression as the basis of the ADC program. Typically, ADC activities in the analysis area would be conducted on a very small portion of the area.

3.3.5 Threshold of Loss and Livestock Losses are a Cost of Doing Business

Concern was raised during public involvement that ADC should not conduct predator damage management until economic losses became unacceptable. Although some losses of livestock and poultry can be expected and tolerated by livestock producers, ADC has the legal responsibility to respond to requests for predator damage management, and it is program policy to aid each requester to minimize losses. ADC

uses the Decision Model, discussed on page 3-4, to determine an appropriate strategy.

In the Southern Utah Wilderness Society, The Wilderness Society et al. vs. Hugh Thompson et al., Forest Supervisor for the Dixie NF, U.S. Forest Service (U.S. District Court of Utah 1993), the court clearly states that, "*The agency need not show that a certain level of damage is occurring before it implements an ADC program. . . .Hence, to establish need for an ADC, the forest supervisors need only show that damage from predators is threatened*." In other words, it is not necessary to establish a criterion, such as percentage of loss of a herd to justify the need for wildlife damage management.

3.3.6 Management Techniques Not Considered for Use in the Integrated Wildlife Damage Management Strategy

Lithium Chloride as an Aversive Agent

Lithium chloride has been tested as a taste aversion agent to condition coyotes to avoid livestock, especially sheep. Despite extensive research, the efficacy of this technique remains unproven (Conover et al. 1977; Sterner and Shumake 1978; Burns 1980, 1983; Horn 1983; Johnson 1984; Burns and Connolly 1980, 1985). In addition, lithium chloride is not currently registered as a predacide with the EPA or MDA, and therefore cannot legally be used or recommended for this purpose.

3.4 MITIGATION AND STANDARD OPERATING PROCEDURES FOR PREDATOR DAMAGE MANAGEMENT TECHNIQUES

3.4.1 Mitigation in Standard Operating Procedures (SOPs)

Mitigation measures are any features of an action that serve to prevent, reduce, or compensate for impacts that otherwise might result from that action. The current ADC program, nationwide and in Montana, uses many such mitigation measures and these are discussed in detail in Chapter 5 of USDA (1994). Some key mitigating measures incorporated into ADC's SOPs include:

- The ADC Decision Model is designed to identify effective predator damage management strategies and their impacts.
- Traps and snares are not set within 30 feet of exposed carcasses to prevent the capture of scavenging birds. The exception to this is for the capture of mountain lion and bear because the weight of these target animals allows foot snare tension adjustments to exclude the capture of smaller nontarget animals.
- Leghold traps under pan-tension devices are used throughout the program to reduce capture of nontarget wildlife that weighs less than the target species.
- Nontarget animals captured in leghold traps or foot snares are released unless it is determined by ADC personnel that the animal would not survive.
- Conspicuous, bilingual warning signs alerting people to the presence of traps, snares and M-44s are placed at major access points when they are set in the field.
- Reasonable and prudent alternatives are identified by the USFWS and implemented to avoid impacts to T&E species.
- EPA-approved label directions are followed for all pesticide use.
- DRC-1339 is not applied if nontarget species are present that could be attracted to the bait materials.
- All analysis area ADC personnel, who use restricted chemicals and immobilization/euthanasia drugs, are trained and certified by program personnel or others who are experts in the safe and effective use of these materials.
- The M-44 sodium cyanide devices, gas cartridge, LPC and DRC 1339 are used following EPA label requirements (see USDA 1994, Appendix Q).

Some additional mitigating measures specific to the analysis area include:

- ADC Work Plans and maps are developed which delineate the areas where predator damage management would occur and the methods used for Federal lands.
- Management actions would be directed toward localized populations or groups and/or individual offending animals, dependent on the species and magnitude of the problem.
- The use of traps and snares conform to current rules and regulations administered by MFWP.
- M-44s would not be used on Federal lands without authorization of the BLM or Forest Service.
- No predator damage management would be conducted within public safety zones (one-quarter mile or appropriate buffer zone around any residence, community, or developed recreation site), except as authorized by the land management agency to protect public health and safety.

3.4.2 Additional Mitigation specific to the issues

The following is a summary of additional mitigation that are specific to the issues found in Chapter 2 and Alternatives found in Chapter 3 of this document.

Mitigation Measures

Alternatives

	1	2	3	4	5/6
Activities in Wilderness and Special Management Areas (BLM and National Forest System Lands)					
Predator damage management would follow guidelines as specified and agreed upon in ADC Work Plans.					
Vehicle access would be limited to existing roads unless authorized by the land management agency.					
Predator damage management would be conducted only with the concurrence of the land management agency.					
Predator damage management would be conducted only when and where a need exists.					
No aerial hunting would be conducted in any WAs unless authorized by the land management agency.					X
No toxicants would be used in any WA or other special management area unless authorized by the land management agency.				X	X
No preventive control work would be conducted in any WA unless authorized by the land management agency.					X
Should any of the BLM's or Forest Service's existing WSAs be officially designated as WA, predator damage management would be performed according to BLM and Forest Service Wilderness Management Policy					
Animal welfare and humaneness of methods used by ADC					
Research would continue to improve the selectivity and humaneness of					

	1	2	3	4	5/6
management devices.					
Pan-tension devices would be used to reduce the incidence of nontarget animal capture in leghold traps.					
Breakaway snares have been developed and implemented into the program. (Breakaway snares are designed to break open and release with tension exerted by larger nontarget animals such as deer, antelope and livestock.)					
Chemical immobilization/euthanasia procedures that do not cause pain are used.					
Traps and snares would be checked at intervals consistent with State of Montana regulations.					
Safety concerns regarding ADC's use of toxicants, traps and snares					
All pesticides used by ADC are registered with the EPA and MDA.					
EPA-approved label directions are followed by ADC employees for all chemicals used in the analysis area.					
The ADC Decision Model, designed to identify the most appropriate wildlife damage management strategies and their impacts, is used for ADC activities.					
ADC employees that use pesticides are trained to use each specific material and are certified to use pesticides under EPA approved certification programs.				X	
ADC employees who use pesticides participate in continuing education programs to keep abreast of developments and to maintain their certifications.				X	
Traps and snares would be placed so that captured animals would not be readily visible from any designated recreation road or trail shown on Forest Transportation Maps, or from Federal, State, or county roads.					
Warning signs would be posted on main roads and/or trails leading into any areas where traps, snares or M-44s were being used. These signs would be removed at the end of the control period.					
In addition to area warning signs, individual warning signs would be placed within 25 feet of each M-44 device.				X	
No M-44 devices would be used on public lands, designated as bird hunting areas, during the regular upland bird hunting seasons.					
No traps, snares, or M-44s would be allowed within ¼ mile of any residence, community, or developed recreation site, unless requested by the owner of a privately-owned property or an official from the appropriate land management agency.					

	1	2	3	4	5/6
Concerns about impacts of ADC's activities on T&E species, other species of special concern, and cumulative effects					
ADC has consulted with the USFWS regarding the nationwide program and would continue to implement all applicable measures identified by the USFWS to ensure protection of T&E species.					
ADC consulted with the USFWS on the impacts of the program to T&E species in the analysis area and adopted reasonable and prudent measures related to the analysis area.	X	X	X	X	
ADC personnel are directed to resolve depredation problems by taking action against individual problem animals, or local populations or groups.	X	X	X	X	
ADC's kill is considered with the statewide *"Total Harvest"* (ADC take and sport harvest) when estimating the impact for a wildlife species. These data are used to assess cumulative effects to maintain a magnitude of harvest below the level that would affect the viability of a population.	X	X	X	X	
All leghold traps would be checked at least daily in areas identified by the USFWS as "*occupied gray wolf range*."					
M-44s would not be used in areas identified by USFWS as "*occupied gray wolf range*."					
ADC would initiate informal consultation with USFWS within at least 5 days after exceeding the *"incidental take"* of a gray wolf.					
Only ADC personnel trained in wolf identification would be used as aerial gunners in areas where gray wolves may be encountered.					
The LPC would not be used in areas identified by the USFWS as occupied gray wolf or grizzly bear areas without prior approval from the USFWS.	X			X	
No leghold traps or snares would be set within 30 feet of any exposed bait or animal carcass (except when attempting to catch bears or mountain lions) to preclude capture of eagles or other raptors.					
Leghold traps or foot snares set near exposed baits to capture bears or mountain lions would incorporate tension devices to preclude capture of eagles and other nontarget species.					
ADC personnel would contact the appropriate land management agency to determine eagle nest and roost locations where ADC activities are proposed.					
If nesting bald eagles are encountered during aerial gunning operations, the aircraft would leave the vicinity immediately. If wintering big game are encountered during aerial hunting operations and					

	1	2	3	4	5/6
begin reacting to the aircraft, the aircraft would leave the area.					
Bear, lion, and wolf damage management would be restricted to offending individuals.	X	X	X	X	
The use of non-lethal methods such as guard dogs, scare devices, llamas, and other methods that may become available, would be encouraged when appropriate.					X
The appropriate land manager and the USFWS would be notified as soon as possible, and always within at least 5 days, if a gray wolf is caught or killed.					
Cultural Resources/American Indian concerns ADC solicited input from American Indian tribes in the analysis area This EA will be provided to the American Indian tribes in a Pre-Decisional form to determine if all cultural issues have been addressed. The Montana State historical Preservation Office has reviewed ADC's activities in relationship to archeological interests.	X	X	X	X	

3.4.3 Consultation with other agencies

The ADC program in the analysis area consults with the USFWS, Federal land management agencies, MFWP and other appropriate agencies regarding program impacts. Frequent contact is maintained with the BLM and the Forest Service when ADC is conducting predator damage management on public lands administered by these agencies. The BLM and Forest Service are interested in the levels of livestock killed, injured and harassed by predators and the predator damage management methods used to stop or limit losses. The ADC program maintains close coordination with the MFWP and MDOL that have authority to manage wildlife species causing damage.

The ADC program in the analysis area is conducted under Cooperative Agreements and MOUs with Federal and State agencies. National MOUs with the BLM and Forest Service delineate expectations for wildlife damage management on public lands administered by these agencies. ADC Work Plans are developed with BLM Districts and National Forests to detail the activity, target species and mitigation measures (i.e., human safety zones, high recreation use areas) to be implemented on allotments where predator damage management is needed.

4.0 CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

Introduction

Chapter 4 provides information needed for making informed decisions on the predator damage management program outlined in Chapter 1 and the issues and affected environment addressed in Chapter 2. The chapter consists of: 1) analyses of the environmental consequences of each alternative and 2) the economic analysis of predator damage management in the analysis area.

4.1 Alternative Consistency with Forest Service LRMPs and BLM RMPs/MFPs.

Before an Alternative can be considered for implementation on Forest Service or BLM lands, it must be consistent with the land management and/or resource management plans. These are termed Land and Resource Management Plans (LRMP) or more commonly *"Forest Plans."* On BLM lands, the equivalent documents are called Resource Management Plans (RMP) or in some cases, older Management Framework Plans (MFP). If the Alternative is consistent with the LRMP or RMP/MFP, no additional action would be necessary by the Forest Service or BLM should that alternative be selected.

If an alternative that is inconsistent with the LRMP or RMP/MFP is selected in the decision process, the Forest Service or BLM District could amend the LRMP or RMP/MFP to be consistent with the EA. The decision would not be implemented on the Forest or BLM District until the inconsistency is resolved either through amendment of the LRMP or RMP/MFP or modification of the alternative(s). Any inconsistencies would be identified and resolved before the wildlife damage management project is conducted. A work plan would be developed by ADC with each National Forest and BLM District before any wildlife damage management would be conducted, or in the rare instance, predator damage management would be conducted under *emergency only control*.

The following is a review of the consistency of each LRMP, RMP/MFP in the analysis area:

The Beaverhead-Deerlodge National Forest LRMP and the proposed action are consistent with the direction in the Beaverhead-Deerlodge Forest Plan.

The Bitterroot National Forest LRMP is silent on animal damage control because it was a non-issue during Forest Plan development and it remains a non-issue today. The fact that the LRMP does not cover wildlife damage management does not necessarily indicate inconsistency.

The Flathead National Forest LRMP does not address wildlife damage management, outside of restrictions in place to protect the endangered gray wolf. The fact that the LRMP does not cover other wildlife damage management does not necessarily indicate inconsistency.

The Gallatin National Forest LRMP sets no specific direction for wildlife damage mange. The fact that the LRMP does not cover wildlife damage management does not necessarily indicate inconsistency and would be allowed if it is compatible with other resource goals/objectives.

The Helena National Forest LRMP does not specifically address predator damage management in the Helena LRMP. *Predator damage management is not inconsistent with the goals/objectives/standards in the LRMP and the proposed action is consistent with the Forest-Wide Management Standards for Wildlife under the Helena National Forest Plan*.

The Lewis and Clark National Forest LRMP and the proposed action are consistent with the

Forest-Wide Management Standards for wildlife under the Lewis and Clark National Forest Plan.

The Lolo National Forest LRMP and the proposed action in the EA are consistent.

The Kootenai National Forest LRMP does not address wildlife damage management and would be compatible when conducted within the parameters outlined in this EA.

The Butte BLM District RMPs/MFPs: The *Garnet RMP* (May 1986-ROD Approved 1/86) - All predator damage management activities would be coordinated with the APHIS-ADC, MFWP, and in the case of aerial gunning requests, with the MDOL. *Headwaters RMP* (November 1983-ROD approved 7/84) - Predator management activities would be coordinated with the APHIS-ADC and, in the case of aerial gunning requests, with the MDOL. *Dillon MFP* (September 1979) - It was decided that aerial predator management would be the preferred means by which predatory animals would be removed from BLM land between the town of Lima and Bloody Dick Creek. Aerial hunting would only be conducted by ADC personnel.

The Lewistown BLM District (western portion) RMP: *Judith/Valley/Phillips and West High Line RMP* (September 1994) - BLM would allow predator damage management within the planning area. The methods used could include all the predator damage management methodologies and techniques discussed in Chapter 3 of this EA. Predator damage management could be conducted on BLM lands by ADC.

4.2 Environmental Consequences

This section analyzes the environmental consequences using Alternative 1 (the current program) as the baseline for comparison with the other alternatives to determine if the real or potential impacts are greater, lesser or the same. Table 4.13 summarizes a comparison of the issues and impacts of each Alternative.

The following resource values within the analysis area (soils, geology, minerals, water quality/quantity, flood plains, wetlands, visual resources, air quality, prime and unique farmlands, aquatic resources, timber and range, and cultural, archeological, and historic resources) would not be significantly impacted by any of the alternatives analyzed. These resources will not be analyzed further.

Social and Recreational Concerns: Social and recreational concerns are discussed throughout the document as they relate to issues raised during public involvement, and they are discussed throughout the EIS (USDA 1994).

Cumulative and Unavoidable Impacts: Cumulative and unavoidable impacts are discussed in relationship to each of the key wildlife species and the environmental impacts are analyzed in this chapter. This EA recognizes that the total annual removal of individual animals from wildlife populations by all causes is the cumulative mortality. It is not anticipated that the proposed action would result in any adverse cumulative impacts to T&E species populations, or to WSAs or WAs.

Target and Nontarget Wildlife Species: Cumulative impacts to potentially affected wildlife species are addressed in detail under section 4.2.1.

Irreversible and Irretrievable Commitments of Resources: Other than relatively minor uses of fuels for motor vehicles and electrical energy for office maintenance, no irreversible or irretrievable commitments of resources. Based on these estimates, the analysis area program

produces negligible impacts on the supply of fossil fuels and electrical energy.

4.3 Issues Analyzed in Detail

4.3.1 Cumulative impacts on 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 population 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 according to local conditions (factors such as habitat quality and population density). Annual harvest is managed at a level corresponding to the capacity of the population to compensate (via reproduction and recruitment). Analysis of this issue will be limited to those species most often taken during ADC's predator damage management activities. The species most often taken are: coyotes, red fox, black bears, mountain lions, striped skunks, badgers, raccoons, and bobcats. Although ADC has not typically targeted ravens for lethal damage management in the analysis area, raven damage management is included as a potential component of the current program and the proposed action, and potential impacts to populations of these species are addressed as well.

Table 4-1. Hunter/Trapper Harvest Recorded by MFWP - 1994/1995

1994 Harvest

Species	West[1]	Statewide
Coyote	5021	10079
Red Fox	2174	6872
Black Bear	1073	1140
Mtn Lion	503	604
Bobcat	686	1182
Raccoon	1431	4392
Badger	432	929
Skunk	821	3219

1995 Harvest

Species	West	Statewide
Coyote	3247	5495
Red Fox	1262	3573
Black Bear	1188	1246
Mtn Lion	401	530
Bobcat	534	795
Raccoon	1085	4687
Badger	369	491
Skunk	529	1784

[1] West column values refers to MFWP Administrative Regions 1, 2, 3, and 4

The 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 opportunity and reduce conflicts between wildlife and other land uses, while ensuring perpetuation of healthy viable wildlife populations. Hunter/trapper sport harvest within the analysis area and statewide is shown in Table 4-1. **Except for the black bear, the MFWP has stated that the number of individuals taken by ADC personnel of each species each year (coyote, red fox, mountain lion, bobcat, raccoon, badger, skunk) to be insignificant with regard to local or Statewide population viability.** In the case of the black bear, a long lived species that reproduces slowly, removal of several black bears from a local geographic area could impact, or even remove, a local bear population (Youmans 1996). Trend information on the population status of wildlife taken by sport harvest or by ADC indicate that those populations are healthy and are generally stable or increasing throughout the State, with minor fluctuations from year-to-year (MFWP

1996a) (see Appendix C of the EA).

BLM and Forest Service sensitive species considerations and any special management restrictions or mitigation in the habitats of these species would be addressed in the ADC Work Plan.

The analysis for magnitude of impact generally follows the process described in the ADC EIS (USDA 1994, Chap. 4). Magnitude is described in the EIS as *" . . . a measure of the number of animals killed in relation to their abundance."* Magnitude may be determined either quantitatively or qualitatively. Quantitative determinations are based on population estimates, allowable harvest levels, and actual harvest data. Qualitative determinations are based on species distribution, population trends, modeling or harvest data when available. When population estimates are used to make a quantitative determination, conservative estimates are used to better ensure that impacts of predator removal are adequately assessed. Allowable harvest levels were determined from research studies cited in the EIS (USDA 1994, Table 4-2) or harvest levels used by the MFWP. *"Other Harvest"* includes the known fur harvest, sport harvest, and other information obtained from the MFWP[8]. *"Total Harvest"* is the sum of the ADC kill and the *"Other Harvest."*

4.3.1.1 Alternative 1 - Continue the Current Western Montana Analysis Area ADC Program: (No Action Alternative).

Coyotes were responsible for about 67% of the verified and 74% of the reported dollar loss of livestock in the analysis area in 1995 (MIS1995). ADC County Summary Reports (MIS 1996) show that the coyote is reported to be the primary predator, in terms of value, on sheep (85%), lambs (83%), and calves (80%). The total reported loss to ADC form coyotes in the analysis area was valued at $416,147 (MIS 1996).

Coyote Population Information

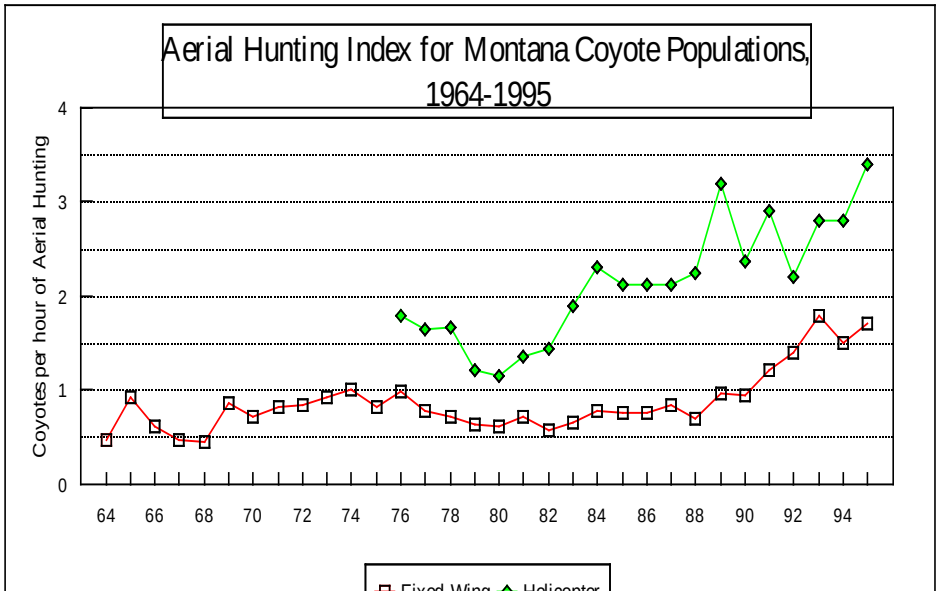
To discuss the impacts of various environmental constraints and external factors on coyote populations and density, understanding the basic mechanisms that play a role in the coyotes' response to constraints and actions is essential. The unique resilience of the species, its ability to adapt and its perseverance under adverse conditions is commonly recognized among biologists and rangeland managers. Despite intensive historical damage management efforts in livestock production areas, and despite sport hunting and trapping for fur, coyotes continue to thrive and expand their range, occurring widely across North and Central America (Miller 1995).

Determinations of absolute coyote densities are frequently limited to educated guesses (Knowlton 1972). The cost of studies to accurately determine absolute coyote densities over large areas would be prohibitive (Connolly 1992b) and would not appear to be warranted for this EA given the coyote's relative abundance. ADC's statewide take of coyotes per hour of aerial hunting effort, however, may represent some of the best information available on the relative abundance of coyotes in Montana. For purposes of this analysis, data on ADC's take of coyotes per hour of aerial hunting effort was assembled from historical program records (Figure 4-1). Minor year-to-year variation in the index may be attributable to differences in aerial hunting conditions (i.e., in years with more snow cover, the average number of coyotes taken per hour might be higher than in years with less snow cover).

[8] It is recognized that unreported "Other Take" of some predators occurs (i.e., road kills, disease etc.) but no system exists for recording this information.

The primary value of this information is in viewing it over time as a relative indicator of coyote abundance. Coyote abundance in the analysis area appears to be somewhat cyclical. This is consistent with the conclusion of Stoddart (1984) that coyote densities in an area of southeast Idaho appeared to increase and decrease in response to changes in blacktail jackrabbit abundance. The data in Figure 4-1 suggests that Montana coyote densities are higher today than they were back in the '50s, '60s and '70s when toxicants were used extensively to reduce coyote populations.

Figure 4-1.



Coyote populations in Montana appear to be increasing.

Coyotes are highly mobile animals with home ranges (territories) that vary by sex and age of the animal and season of the year (Pyrah 1984, Althoff 1978, Todd and Keith 1976). Coyote population densities will vary depending on the time of year, food abundance, and habitat. The literature on coyote spatial organization shows variability in group size, composition and social structure complexities (Windberg and Knowlton 1988, Messier and Barrette 1982). The presence of unusual food concentrations and nonbreeding helpers at the den can influence coyote densities, and complicate any effort to estimate abundance (Danner and Smith 1980). A positive relationship was established between coyotes densities in mid-late winter and the availability of dead livestock (Roy and Dorrance 1985).

Each occupied coyote territory may have several non-breeding helpers at the den during whelping (Allen, et al. 1987, Bekoff and Wells 1982). Therefore, each defended coyote territory may have more than just a pair of coyotes. Messier and Barrette (1982) reported that during November through April, 35% of the coyotes were in groups of three to five animals and Gese et al. (1988) reported that coyote groups of 2, 3, 4, and 5 comprised 40%, 37%, 10% and 6% of the resident population, respectively.

Coyote Population Impact Analysis

During 1994 and 95, ADC took an average of 3,215 coyotes annually in the analysis area. The annual private predator trapper/hunter harvest in the analysis area (MFWP Trapping Districts 1, 2, 3, and 4) for 1994 was 5,021 and 3,247 coyotes in 1995; the average annual private aerial hunting take of coyotes reported from 1992-1994 was about 315 coyotes (1995 data are not yet available) (Table 4-2). Sport hunting undoubtedly accounts for more coyotes taken every year, but exact numbers on this take are not available because the reporting of coyotes killed is not required. Coyote harvest information for MFWP Administrative Districts 1, 2, 3, and 4, and statewide suggest that the population is healthy and stable to increasing (Appendix C). The ADC effort to reduce coyote damage has remained relatively consistent from 1986 to 1995 while the ADC take indicates that the coyote population is stable to increasing (Figure 4-2).

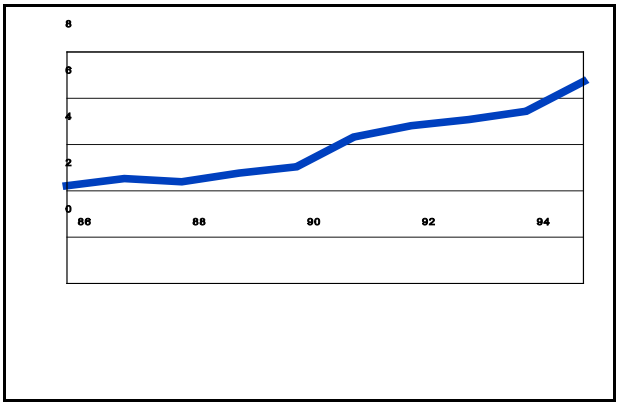
	Analysis Area	Montana
ADC Take	3,021	7,438
Other Take	5,336	10,079
Total Take	8,357	17,517

1995 Harvest

	Analysis Area	Montana
ADC Take	3,410	8,720
Other Take	3,562	5,495
Total Take	6,972	14,215

Connolly and Longhurst (1975) determined that, *"If 75% of the coyotes are killed each year, the population would be exterminated in slightly over 50 years."* The authors further say that their *"Model suggests that coyotes through compensatory reproduction can withstand an annual control level of 70%."* To further demonstrate the coyote's recruitment (reproduction and immigration) ability, if 75% control occurred for 20 years, coyote populations would regain precontrol densities by the end of the fifth year after control was terminated. Furthermore, immigration, not considered in the Connolly/Longhurst model can result in occupancy of vacant territories (Windberg and Knowlton 1988). Henke (1992) noted that in his study area, coyote densities returned to pre-removal levels within 3 months following removal efforts. Connolly (1978a) noted, coyotes have survived and even thrived in spite of early century efforts to exterminate it. Based on this information, ADC's impact on the coyote population, even with possible *"Other Harvest"* under reported, would not adversely affect the coyote population in Montana or the analysis area.

<u>Red Fox Population Information</u>



Red fox predation in the analysis area is primarily to lambs and poultry. Verified damage for 1994 and 1995 amounted to $3,753 and $ 5,611, respectively. Damage reported to ADC for 1994 and 1995 amounted to $8,255 and $ 25,015, respectively (MIS 1996).

Red foxes 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). Foxes are regarded as nuisance predators in many regions, preying on wildlife and livestock, and have become notorious in many areas of the world as carriers of diseases (Ables 1969, Andrews et al. 1973, Richards 1974, Tabel et al. 1974, Tullar et al. 1976, Pils and Martin 1978, Sargeant 1978, Voigt 1987, Allen and

Sargeant 1993). Because of its importance to humans, it has been the subject of much study during the last 20 years. Investigations have revealed that red foxes 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 foxes avoided coyotes but coexisted in the same area and habitats.

The density of red fox populations is difficult to determine because 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, and 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 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 suggest 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 1 fox den/3 mi^2.

Red fox dispersal serves to replace and equalize fox densities over large areas and over a wide range of population densities. Annual harvests in localized areas in one or more years would likely have little impact on the overall population in subsequent years, but may reduce localized predation (Allen and Sargeant 1993). Phillips (1970) stated that fox populations are resilient and in order for fox control operations by trapping to be successful, pressure on the population must be almost continuous. Phillips (1970) and Voigt (1987) further states that habitat destruction that reduces prey numbers, water and cover would impact fox populations to a greater extent than a short-term over harvest.

	Analysis Area	Montana
ADC Take	453	1,315
Other Take	2,174	6,872
Total Take	2,627	8,187

1995 Harvest

	Analysis Area	Montana
ADC Take	511	1,335
Other Take	1,262	3,573
Total Take	1,773	4,908

Red Fox Population Impact Analysis

USDA (1994) determined the allowable harvest level for red fox to be 70% of the total population. Statewide during 1994 and 1995, 1315 and 1335 red fox were captured by ADC (Table 4-3). The *"Total Take"* of red fox in 1994 was 8187 animals statewide and 2627 in the analysis area; the *"Other Take"* of red fox was 6872 animals statewide and 2174 in the analysis area. The *"Total Take"* of red fox in 1995 was 4,908 animals statewide and 1,773 in the analysis area; the *"Other Take"* of red fox was 3,573 animals statewide and 1,262 in the analysis area. Red fox harvest information for MFWP Administrative Districts 1, 2, 3, and 4, and statewide suggest that populations are healthy and stable (Appendix C).

Black Bear Population Information

The 1995 reported black bear predation in the analysis area included 76 sheep, 37 lambs, eight calves and 237 beehives valued at $67,440 (MIS 1995); 1995 verified black bear predation was 18

sheep, 16 lambs, one calf, 88 beehives valued at $23,300, and six captive native game animals valued at $11,000 (MIS 1995).

Black bears occupy forested habitats on both sides of the continental divide. The moist forests of the northwest corner of the State are considered the most productive black bear habitat (Figure 4-3). From the northwest to the south and east, habitat quality and bear densities decline coincidently with the precipitation gradient. About 45% of the State is considered occupied black bear habitats, although black bears are seen occasionally in the eastern part of the State, it is not considered occupied black bear habitats (MFWP 1994a). Bears can present problems concerning livestock predation, property damage, and threats to public safety and nuisance situations anywhere in the analysis area.

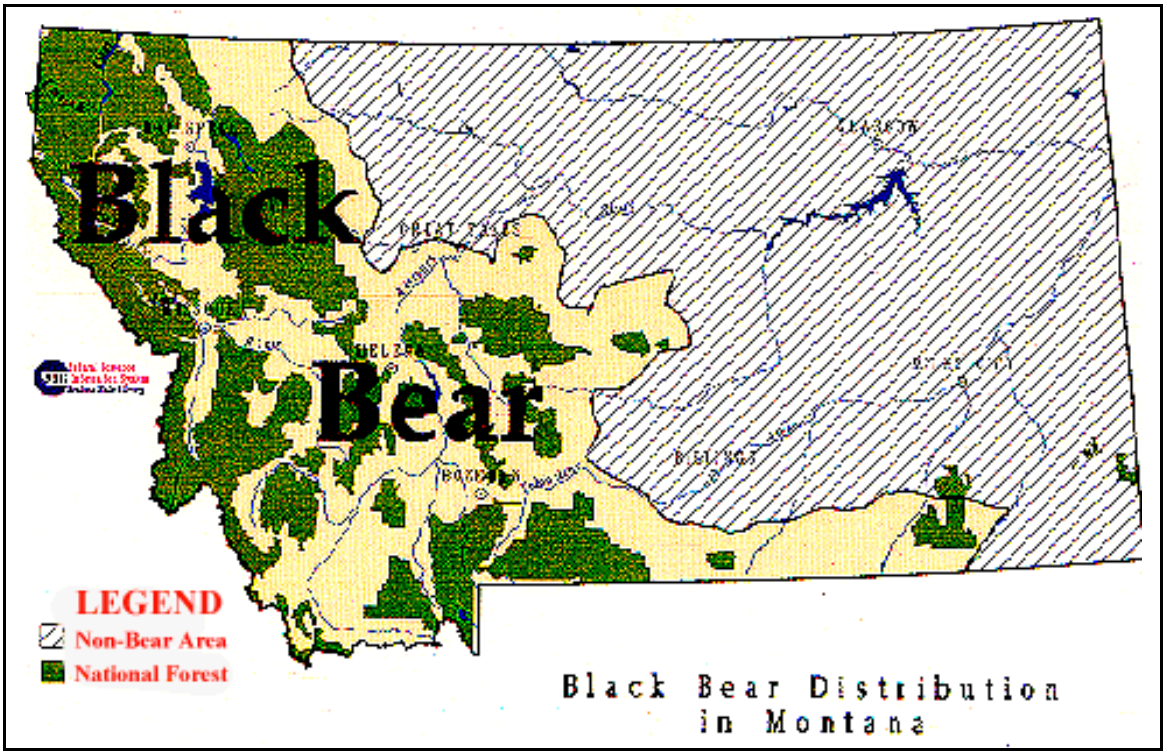


Figure 4-3. (Source: MFWP Final EIS Management of Black Bears in Montana)

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 1994a).

In Montana, female black bears generally reach reproductive maturity at about 4½ years of age but may not breed successfully until 6 or 7 years of age and produce a litter in three-year intervals (MFWP 1994a). Following a 7-8 month gestation period (about 220 days), black bears can produce from one to five cubs, with 1.7 young per litter being the average in Montana. 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 1994a). Mortality in subadult black bears in northwestern Montana has

been reported to be 36.8% (Thier 1990). Researchers have estimated 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 habitats. 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 1994a). Published density estimates in western Montana range from about 0.17 to 0.8 bears/mi^2 (Thier 1990, Jonkel and McT. Cowan 1971). More recent black bear estimates, from mark-recapture estimates, suggest that there are about 1.0 black bears/mi^2 in northwestern Montana (R. Mace, 1996, MFWP per. comm.) The current Montana statewide population is estimated to be about 13,000 animals, (G. Erickson, MFWP, pers. comm.1996) occupying about 65,000 mi^2 of habitat (MFWP 1994a). Much of the analysis area lays within the medium to high density black bear habitats of Montana.

Black Bear Population Impact Analysis

Statewide, the black bear population was estimated by USDA (1994) at between 25,000 and 30,000 and about 13,000 (G. Erickson, MFWP, pers. comm.1996).

The allowable harvest (kill) level for black bear described in USDA (1994, Table 4-2) is 20% of the population. MFWP manages hunting harvest at a level corresponding to the capacity of the population to compensate for mortality (MFWP 1994a). 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 this analysis we will use the more conservative number to assess impact to the black bear population to better ensure the impact to the black bear population is minimal.

	Analysis area	Montana
ADC Take	17	25
Other Take	1,073*	1,140
Total Take	1,090	1,165
ADC Take; % of population	0.14	0.19
Other Take % of population	8.82	8.77
Total Take % of population	8.96	8.96

Within the analysis area, human interactions with bears could occur wherever habitat or food sources overlap with human activities. 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. MFWP records indicate (Table 4-4) that in 1994 and 1995, statewide, the total known black bear kill was about 1,165 and 1,271 black bear or about 8.96% and 9.77%, respectively of the estimated population. This level of take is within the parameters of "*low magnitude*" of impact established by the MFWP and in the USDA (1994).

1995 Harvest

	Analysis area	Montana
ADC Take	16	25
Other Take	1,188*	1,246
Total Take	1,204	1,271
ADC Take % of population	0.13	0.19
Other Take % of population	9.66	9.58
Total Take % of population	9.79	9.77

* Analysis area for black bear includes harvest in MFWP Regions 1, 2, 3, and 4.

It should be noted that although ADC's take is minimal compared with the overall black bear population, the effort is considered quite important by ADC and MFWP: 1) in resolving black bear damage to livestock and property, and 2) protecting public safety. In 1994 and 1995, analysis area ADC personnel killed 17 and 16 black bear, respectively and released one; all the bears killed were taken to protect apiaries and other livestock. ADC killed 25 black bear statewide in 1994 and 1995. Black bear harvest information for MFWP Administrative Districts 1, 2, 3, and 4, and statewide suggest that populations are healthy and stable to increasing (Appendix C). The population trend appears unchanged and the 1994 and 1995 ADC kill and "*Other Take*" would be a *low magnitude* of impact.

Mountain Lion Population Information

ADC verified mountain lion predation on 48 sheep and lambs, one llama, one calf, two goats, two captive elk, and mountain lions injured four horses in the analysis area in 1995 for a total value of $20,510. (MIS 1995). The number of livestock depredations reported to ADC has also shown a growing trend during the same period (MIS 1995). In Montana, the values placed on livestock lost to mountain lions between 1984 and 1993 ranges from $640 to $12,875 and have averaged $3,825 during the 10-year period. The value of livestock killed by mountain lions has increased more than 60% between 1992 ($8,542) and 1995 ($13,750) (MIS 1992, 1995). In 1995, all

mountain lion predation reported to and verified by ADC personnel in the analysis area was to livestock, except one public health and safety incident.

Within the analysis area, human interactions with mountain lions could occur wherever habitat or food sources overlap with human activities. Recorded instances of lions attacking humans, stalking people and having to be removed from threatening situations has increased in Montana over the last 10 years. ADC responded to one instance within the analysis area in 1995 where a mountain lion was considered by the MFWP and ADC to be a threat to public safety. A fatal attack on a child occurred within the Flathead Indian Reservation near Evaro, Montana in 1989 and another lion attacked and injured a child within the Lake McDonald picnic area of Glacier National Park in 1990.

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 (Figure 4-4) and all of the analysis area (MFWP 1996b).

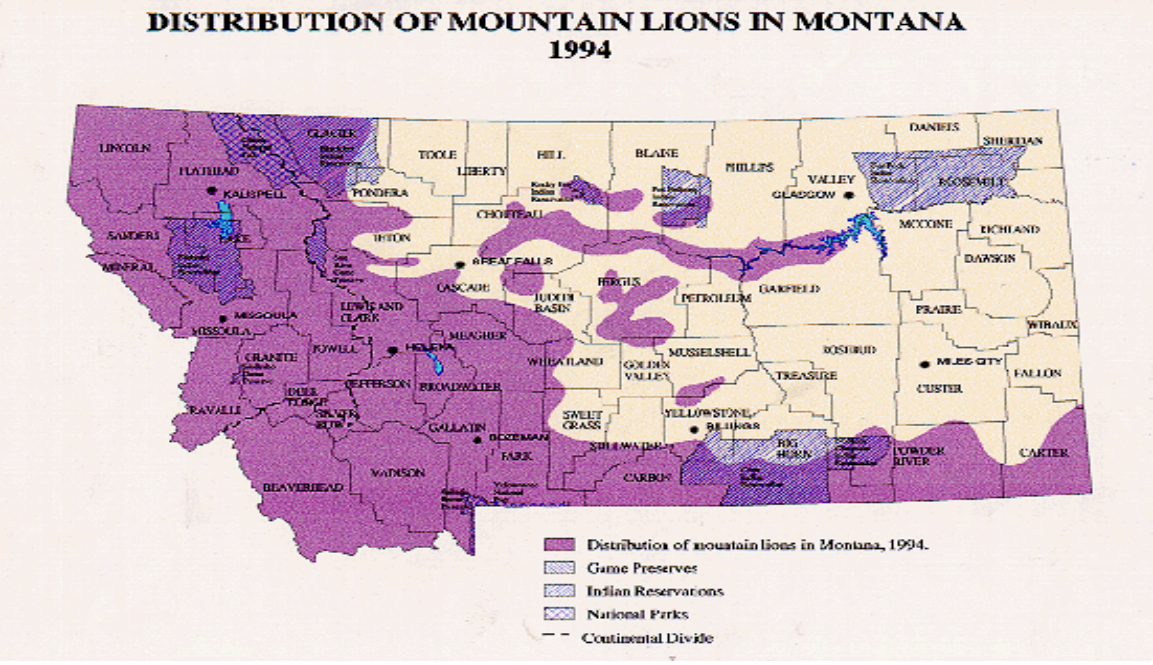
Female mountain lions typically breed for the first time between 22 and 29 months of age (Ashman et al. 1983) but initial breeding may be delayed until a territory has been established (Hornocker 1970). Mountain lions breed and give birth year round, but most births occur during late spring and early summer in Montana following about a 92-day gestation period (MFWP 1996b, Ashman et al. 1983, Seidernsticker et al. 1973, Robinette et al. 1961). 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 1996b).

Mountain lion densities in other states, based on a variety of population estimating techniques, range from about 1/100 mi^2 to a high of 24/100 mi^2 (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 to occupy (MFWP 1996b).

In Montana, mountain lion harvest rates have increased steadily over the years (MFWP 1996b) from 52 animals harvested during the winter of 1971-72 to 352 in 1992-1993, 424 in 1993-1994 and 604 during the 1994-1995 season (MFWP 1996b). Analysis of harvest data, number of sightings, increased non-hunting mortality, depredation complaints and human conflicts suggest that mountain lion populations are increasing throughout Montana (MFWP 1996b).

Figure 4-4. (Source: MFWP Final EIS Management of Mountain Lions in Montana)

Mountain lion management, in Montana, is guided by the *Management of Mountain Lions in Montana EIS* (MFWP 1996b), which provides direction, a procedure and broad policies for managing lions, but does not include specific harvest quotas and/or detailed local management



plans. Specific harvest quotas would be adopted annually to respond to changing local lion distribution and densities (MFWP 1996b).

Mountain Lion Population Impact Analysis

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 (1994) is 30% of the population.

The 1994 and 1995 annual sport harvests in the analysis area were 503 and 401 animals, the ADC take for 1994 and 1995 was two and eight mountain lions, respectively (Table 4-5). Sport mountain lion harvest information for MFWP Administrative Districts 1, 2, 3, and 4, and statewide suggest that populations are healthy and are stable (Appendix C).

Bobcat Population Information

When bobcat predation is reported or verified it is primarily on lambs and poultry. In 1994, reported predation to ADC accounted for 55 lambs and seven head of poultry valued at $3,620. During 1995, no verified or reported bobcat predation on livestock was reported from the analysis area.

	Analysis Area	Montana
ADC Take	2	3
Other Take	503	604
Total Take	505	607

1995 Harvest

	Analysis Area	Montana
ADC Take	8	9
Other Take	401	530
Total Take	409	539

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 between 0.1-7.0/mi^2. They may live up to 14 years, but annual mortality is as high as 47% (Rolley 1985). Analysis of Montana bobcat harvest data suggests that populations are healthy and productive, and that current harvest levels are not detrimental to bobcat populations (MFWP 1994b). Knick (1990) estimated that bobcat densities on his study area in southeastern Idaho ranged from 0.35/mi^2 during a period of high jackrabbit densities, to about 0.04/mi^2 during a period of low jackrabbit densities. Bailey (1974) estimated bobcat densities in the same area to average about 0.14/mi^2.

Bobcat Population Impact Analysis

The allowable harvest for bobcats in the USDA (1994) was established at 20% of the total population. The 1994 and 1995 ADC analysis area take of bobcats were two and 0 animals, respectively (Table 4-6). The analysis area *"Total Take"* was 688 and 534 animals in 1994 and 1995, respectively. In 1995, ADC personnel captured eight bobcats, of which six were released. No nontarget bobcats were killed in the analysis area during 1995 (MIS 1995) and the 1995 *low magnitude* of impact is unchanged from 1994. Bobcat harvest information for MFWP Administrative Districts 1, 2, 3, and 4, and statewide suggest that populations are healthy and stable to increasing (Appendix C).

Raccoon Population Information

The depredation from raccoons is primarily to poultry and other fowl. Verified ADC losses from raccoons in 1994 were valued at $947 and 1995 in $1,083 (MIS 1994, 1995).

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).

Raccoon Population Impact Analysis

The allowable harvest level for raccoons found in USDA (1994) was established at 49% of the total population. ADC killed a total of nine raccoons in the analysis area in 1994 and 11 in 1995 (Table 4-7).

MFWP believes that raccoon populations are variable in Montana and numbers can change considerably 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 point in time and population levels could change rapidly if disease outbreaks occur. Raccoon harvest information for MFWP Administrative Districts 1, 2, 3, and 4, and statewide indicate that populations are health and stable in spite of the present level of *"Total Harvest,"* (Appendix C). The determination of the cumulative impacts on raccoon populations would be of a *low magnitude*.

Table 4-7. Raccoon Harvest Data

	Analysis Area	Montana
ADC Take	2	5
Other Take	686	1182
Total Take	688	1,187

1995 Harvest

	Analysis Area	Montana
ADC Take	0	2
Other Take	534	795
Total Take	534	797

Allowable Harvest

=49%

1994 Harvest

	Analysis Area	Montana
ADC Take	9	28
Other Take	1,431	4,392
Total Take	1,440	4,420

1995 Harvest

	Analysis Area	Montana
ADC Take	11	32
Other Take	1,085	4,687
Total Take	1,096	4,719

Badger Population Information

Badger damage within the analysis area ranges from damage to pasture and agricultural lands to losses of equipment and livestock. During 1994 and 1995, ADC verified badger damage to pasture and rangeland was valued at of $100. ADC occasionally takes badgers as a target species, but they are more often captured as a nontarget species when attempting to capture coyotes in leghold traps. The badger is classified as a nongame wildlife species within Montana.

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.

Table 4-8. Badger Harvest Data
Allowable Harvest = 30%

1994 Harvest

	Analysis Area	Montana
ADC Take	2	10
Other Take	432	929
Total Take	434	939

1995 Harvest

	Analysis Area	Montana
ADC Take	20	39
Other Take	369	491
Total Take	389	530

Badger Population Impact Analysis

Badger populations can safely sustain an annual harvest rate of 30-40% annually (Boddicker 1980). The MFWP reported an estimated 929 and 491 badgers were taken by private trappers statewide in 1994 and 1995, respectively (Table 4-8). An estimated 432 and 369 badgers, or 46% and 70% of the statewide harvest in 1994 and 1995 occurred within the analysis area, respectively (MFWP 1994b). ADC removed a total of 22 badgers in the analysis area during 1994 and 1995. The combined private trapping harvest and ADC harvest of badgers within the analysis area was about 434 and 389 in 1994 and 1995, respectively. Badger harvest information for MFWP Administrative Districts 1, 2, 3, and 4, and statewide indicate that populations are healthy, but: 1) maybe decreasing, or 2) the number of sport trappers is low and therefore the harvest is low (Appendix C). The qualitative determination of the ADC cumulative impacts on badger populations, however, would be of a *low magnitude*.

Striped Skunk Population Information

Skunks primarily cause odor problems around homes, transmit 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 in 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). Home ranges reported in the literature averaged between 0.85 to 1.9/mi^2 for striped skunks in rural areas (Houseknecht 1971, Storm 1972, Bjorge et al. 1981, Rosatte and Gunson 1984). The range of skunk densities reported in the literature was from 0.85 to 67/mi^2 (Jones 1939, Ferris and Andrews 1967, Verts 1967, Lynch 1972, Bjorge et al. 1981). Many factors may contribute to the widely differing population densities. Type of habitat, food availability, disease, season of the year, and geographic area are only but a few of the reasons (Storm and Tzilkowski 1982).

Table 4-9. Skunk Harvest Data

1994 Harvest

	Analysis Area	Montana
ADC Kill	27	61
Other Take	821	3,219
Total Take	848	3,280

1995 Harvest

	Analysis Area	Montana
ADC Kill	41	66
Other Take	529	1,784
Total Take	570	1,850

Striped Skunk Population Impact Analysis

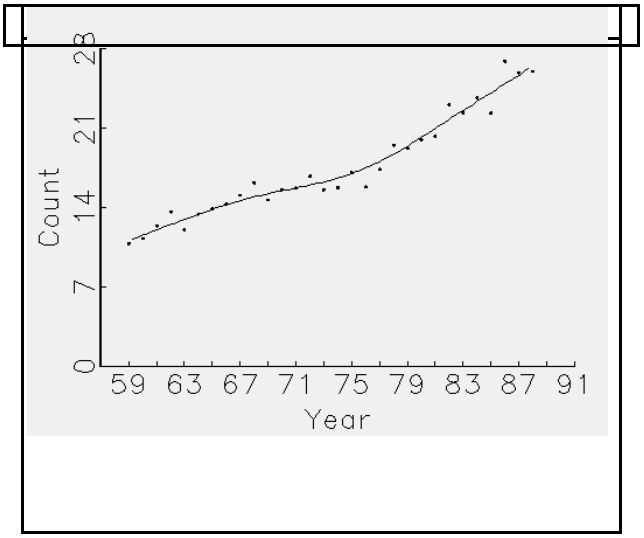
During 1994 and 1995, ADC personnel in the analysis area killed 68 skunks (Table 4-9). Skunk harvest information for MFWP Administrative Districts 1, 2, 3, and 4, and statewide indicate that populations are healthy, and are stable to decreasing, however: 1) the number of sport trappers is low, and 2) therefore the harvest is low (Appendix C). It is believed by professional wildlife biologists that *"Total Take,"* although unknown, is not impacting the population compared with the total population and the species distribution is sufficient for species viability. MFWP believes that skunk populations are 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 ADC cumulative impacts on skunk populations, however, is of a low magnitude.

Common Raven Population Impact Analysis

During 1994, ADC personnel verified 20 sheep and one calf killed or injured by ravens at a value of $1,905 (MIS 1994). No sheep, lambs or calves were reported as killed or injured by ravens during 1995 (MIS 1995).

American crows, ravens, and black billed magpies are the most well known species in the family *Corvidae*. 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.

Information on actual raven densities in the analysis area is not available, but population trend information is available from two different sources. Breeding Bird Survey (BBS) data maintained by the USFWS and National Audubon Society Christmas Bird Count (CBC) data both suggest that raven populations in Montana are increasing. CBC data (1959-1991) (most recent years that data is available) shows a trend of raven numbers increasing at about 6.5% in Montana (Figure 4-5). Data from the BBS data from 1966 to 1994 confirmed the observed increases from the CBC.



The number of ravens in Montana and the analysis area can be estimated from other research and census studies. Stiehl (1978) reported raven nesting densities in the Harney Basin of Oregon at one pair/16.2 mi^2. Stiehl (1978) also marked 266 ravens during this study and reported individuals as far away as 173 miles from the study area, suggesting considerable mobility in the population. Stiehl (1978) also reported that raven numbers vary seasonally, peaking in the winter. Knight and Call (1981) summarized a number of studies on common raven territories and home ranges in the west. Nesting territories ranged in size from 3.62 mi^2 to 15.7 mi^2 in Wyoming and Oregon and home ranges varied from 2.53 mi^2 to 3.6 mi^2 in Utah and Oregon. Linz et al. (1990) found nest densities of one/1.7 mi^2 in their Camp Pendleton, California study area. Raven home ranges overlap considerably and it is believed that a reasonable density estimate of breeding birds in the analysis area is one raven/15 mi^2, resulting in a population estimate of about 3,900 breeding birds. If raven populations are increasing at an annual rate of just 5%, then about 200 ravens could presumably be removed from the population annually without reducing the current population level.

Raven Population Impact Analysis

Ravens are a protected species under the Migratory Bird Treaty Act and can only be taken by permit from the USFWS. During 1994, ADC personnel killed 18 ravens statewide using DRC-1339 and by shooting, of which three were from the analysis area. ADC did not kill any ravens in the analysis area or statewide during 1995. ADC is not aware of any *"Other Take"* of ravens in the analysis area or statewide. The data used for this analysis suggest that the ADC program conducted in the analysis area is not having an adverse impact on raven population.

4.3.1.2 Alternative 2 - Current Program Plus Additional Activities on Public Lands as Requested: (Proposed Alternative).

Alternative 2 would authorize ADC predator damage management on other public lands as requested and needed, and where there are work plans in place for areas of planned wildlife damage management activities, as coordinated with the land management agency. The actual area where ADC services would be requested are unknown and could vary from year to year, based on needs and levels of predation. However, the actual area that would be worked in any one year would be small, probably less than 1% to 2% additional public land in the analysis area.

ADC estimates that predator damage management conducted under this alternative could slightly increase the kill of coyotes, red fox, black bear and mountain lion, but probably would not exceed 3% of the current program. A 3% increase, based on 1995 data, would mean the kill of an additional 100 coyotes, 15 red fox, and less than one black bear or mountain lion. The MFWP has determined that the additional take of coyotes, red fox and mountain lions by ADC would not

have any adverse impact on the respective predator populations. A 3% increase in black bear killed in the analysis area by ADC would maintain the total analysis area-wide ADC take at 0.13%. The magnitude of impact would remain below the 10% level.

4.3.1.3 Alternative 3 - A Corrective Only Predator Damage Management Program: (No Preventive Control):

The current program conducts predator damage management on bear and mountain lion on a corrective only basis, this does not represent a change from the current program. The total numbers of coyotes and red fox taken by ADC could decrease under this alternative, and impacts to coyote and red fox populations could be reduced to some degree. But because ADC's take of coyotes and red fox under the current program results in a low level of impact, the impacts on coyote and red fox populations resulting from implementation of a "*corrective control only*" alternative would not likely differ significantly from the impacts of the current program. Impacts to other predators would not be expected to differ significantly from impacts of the current program.

4.3.1.4 Alternative 4 - Non-lethal Control Required Prior to Lethal Control:

As noted earlier in the document, Alternative 4 does not substantially differ from the existing program because on the average, 5.75 nonlethal methods are used by livestock producers that cooperate with ADC (ADC 1996). The impacts on wildlife populations under Alternative 4 would not be substantially different from Alternative 1. The impacts of Alternative 4 would be similar to the impacts of Alternative 1.

4.3.1.5 Alternative 5 - Technical Assistance Program, and Alternative 6 - No Predator Damage Management in Western Montana Analysis Area.

Because neither of these alternatives would provide for any operational ADC activities, there would be no ADC impacts on the viability of any wildlife populations. There could be increased impacts on some wildlife populations, particularly coyotes, from other sources, when addressing damage problems. This could be from increased private aerial hunting or other control efforts by individual livestock producers, and/or the establishment of organized State, county, or private predator control programs. Because ADC's current activities result in a low magnitude of impact on the viability of wildlife populations, it is not expected that these other compensatory forms of wildlife damage management would result in significantly different impacts.

A thorough review of the potential impacts of these two alternatives can be found in USDA (1994). The USDA EIS (1994) summarized the biological impacts of the no Montana ADC program alternative as follows:

"Biological impacts that would be expected under the No Action Alternative (No ADC Program Alternative in this EA) *include all impacts that occur under the Current Program Alternative* (No Action Alternative in this EA*) plus impacts that relate to the reasons listed previously. Taking of target species would be more variable (i.e., lower for some species in some areas and higher in other areas). However, taking of nontarget species probably would be higher, and for some small populations, could become biologically significant. This would be especially important if the species was threatened or endangered. Species diversity could be significantly affected. The indirect impacts on nontarget species affected through the food chain or by uncontrolled releases of toxicants into the environment also could increase. In some areas, people could use unapproved chemical methods. Misuse of chemicals could increase and thereby adversely affect certain (*nontarget*) wildlife populations and public health and safety."*

How predator damage management would be handled without ADC can only be speculated, although several obvious effects can be identified. State agencies and private individuals would not be subject to the same restrictions and operating policies used by Montana ADC, such as the requirements of NEPA, and coordination and planning with the BLM and Forest Service. We assume that a State agency such as MFWP or MDOL would administer a program, but there would be an interim period while funds were secured and an organization was established where livestock producers would have limited or no assistance and would conduct needed control by whatever means available to them. Any State assumption of predator damage management would probably dilute resources needed for other wildlife management and State functions.

4.3.2 Effectiveness and selectivity of damage management methods.

Chapter 3 includes discussion about the relative effectiveness and selectivity of the various methods used by Montana ADC personnel and that discussion will not be repeated here. Under the current program, all methods are used as effectively and selectively as practically possible, in conformance with the ADC Decision Model (Slate et al. 1992) and ADC Program Directives. The selectivity of each method is based, in part, on the application of the method, the skill of ADC personnel, and the direction provided by ADC Directives and policies. The humaneness of each method is based on the perception of the pain or anxiety caused by the method. How each method is perceived often differs, depending on the person's familiarity and perception of the issue as discussed in Chapter 2.

The effectiveness and selectivity of each alternative are based on the methods employed under that alternative. ADC personnel are trained in the use of each method and are certified by the MDA as pesticide applicators for each pesticide used during damage management activities. Effectiveness of the various methods may vary widely depending on circumstances at the time of application. 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 discussed below. 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.

4.3.2.1 Alternative 1 - Continue the Current Western Montana Analysis Area ADC Program: (No Action Alternative).

Several methods employed under the current program are typically 100% selective for target species. These methods include aerial hunting, shooting from the ground, and denning. Cage trapping may capture a few nontarget animals, but these animals can typically be released unharmed. DRC-1339, for controlling depredating corvids, is very selective for the target species because prebaiting and baiting procedures ensure that nontarget species are unlikely to be exposed to the baits. If by some remote chance a nontarget mammal was exposed to DRC-1339 meat or egg baits, risks are very low because of the product's low toxicity to mammals (DeCino et al. 1966, Schafer 1981).

While the methods discussed above are typically near 100% selective in capturing/killing only the target species, other methods such as leghold traps and snares are somewhat less selective (Table 4-10).

ADC uses leghold traps with offset jaws to reduce injuries, pan-tension devices to make them more selective, and checks traps according to MFWP regulations. Pan-tension devices increase the amount of weight required to set off the trap, and are successful in significantly reducing the incidence of capturing smaller nontarget species (Turkowski et al. 1984, Phillips and Gruver

1996). Pan-tension devices are always used by ADC unless their use would preclude capture of the intended target species. ADC personnel often try to reduce the need for setting traps or snares by trying to first remove target animals by shooting. If shooting is not successful or feasible, then equipment would be placed to try to resolve the problem. Nontarget animals captured in traps or snares are released whenever it is judged that they would survive after release.

As used by ADC in the analysis area, snares are more selective than leghold traps (Table 4-10). The selectivity of snares is largely a function of how and where they are set. Break-away snare locks are used to provide for the release of larger animals that would be accidentally caught.

Use of livestock guarding dogs by sheep producers has been proven effective in preventing some predation losses (Green and Woodruff 1987), and use of guard dogs is generally perceived as a selective form of nonlethal control. But use of guard dogs may also involve deaths of target and nontarget animals. Timm and Schmidt (1989) documented that guard dogs in their study regularly killed deer fawns, and anecdotal evidence from ADC personnel and livestock producers suggest that guard dogs sometimes kill coyote and red fox pups and deer fawns and elk calves. Llamas have also been advocated as effective livestock guarding animals (Franklin and Powell 1994), but some degree of nontarget hazard may also exist from the use of llamas for this purpose. Llamas are sometimes carriers of paratuberculosis (Johne's disease) which may be transmissible to native ungulates or domestic livestock (Wildlife Management Institute 1995). This disease involves a chronic wasting of the intestinal tract and associated lymphoid tissues, and no known cure is available.

Target to non-target capture rates for less skilled trappers, or trappers that do not use pan-tension devices contribute to the perception that leghold traps are not selective. However, traps are selective as used by ADC personnel because of their skill, mitigation measures and ADC trapping policy restrictions. In 1993, 1994 and 1995 combined, 2,329 target animals were trapped with 85 non-target animals trapped with twenty-two of the 85 non-target captured animals were released.

Use of dogs can be highly selective, not only for the offending species but for offending individuals. Dogs are moderately expensive to use due to expenses required for feeding and maintaining the dogs, but they can be utilized several ways which increase damage management effectiveness.

Denning is the practice of finding the den, of the targeted individuals, and asphyxiating the young with a gas cartridge that produces carbon monoxide when ignited. Denning is very selective because positive identification of the species is possible, and effective for reducing predator losses (Till and Knowlton 1983, Till 1992).

The current program uses the preceding methods to manage predator damage in the State and analysis area. Non-capture methods (aerial hunting, call and shoot, shooting, denning, M-44s and dogs) accounted for 2,846 coyotes taken in the analysis area, or 83.5% of the coyotes taken in 1995 (MIS 1995). Capture methods (leghold traps and neck snares) accounted for 564, or 16.5% of the coyotes taken in 1995 (MIS 1995).

Table 4-10. Selectivity of Leg-hold Traps, Snares and M-44s by ADC in the Analysis Area during 1993-1995 .

	Traps[1]	Snares[1, 2]	M-44s
Target			
Coyote	695	995	1646
Red Fox	125	354	351
Striped skunk	57	12	
Badger	14	9	
Bobcat			
Raccoon	1	18	
Black Bear	2	36	
Mountain	3	5	
Lion		2	
Beaver		1	
Porcupine			
3-Year Total	897	1432	1997
Non-Target			
Red Fox	5	16	7
Striped	19	1	
Skunk	7	1	2
Badger	1	12	
Porcupine		3	
Bobcat	1	1	1
Dog		7	
Raccoon		1	
Feral Cat	1	1	
Mountain			
Lion		5	
Gray Wolf		2	
Mule Deer			
		1	
White-tailed			
Deer			
Mountain			
Lion			
3-Year Total	34	51	10
% Selectivity	96.3	96.6	99.5

[1] These figures refer only to lethal take of animals caught in leg-hold traps and snares. Nontarget animals caught and released are not included in these totals.

[2] These figures refer primarily to animals caught in neck snares, but also include bears and mountain lions caught in foot snares.

4.3.2.2 Alternative 2 - Current Program Plus Additional Activities on Public Lands as Requested: (Proposed Alternative).

Alternative 2 would be as selective as Alternative 1 but more effective owing to the increased ability to conduct predator damage management when and where it is requested and deemed necessary on other public lands. The policies and methods for reducing damage caused by predators would not change. Producer implemented non-lethal control methods use would remain the same. The cost of implementing Alternative 2 would be similar to Alternative 1 or slightly less expensive as damage management time frames could be reduced due to increased effectiveness.

4.3.2.3 Alternative 3 - A Corrective Only Predator Damage Management Program: (No Preventive Control):

Under Alternative 3, ADC would still be able to respond with all the methods included under

Alternative 1, but would not be authorized to employ any of these methods under a lethal preventive damage management strategy. Selectivity of methods would be similar to Alternative 1, but ADC would be less effective at keeping livestock losses down. By restricting corrective control to the immediate vicinity of predation losses, ADC would be unable to effectively resolve some depredation problems. Till (1992), for instance, found that depredating coyotes traveled an average of 2 miles and as far as 6 miles from their den site to the sheep flocks where they were killing lambs. Shivik (1996), by using radiotelemetry, documented that coyotes will travel up to 7 kilometers, and through other coyote territories to kill lambs.

ADC would likely be less effective at reducing coyote predation on spring and summer livestock grazing areas. Decreased effectiveness is tied to the logistics of getting to these areas and having to use less effective coyote damage management methods during the summer months. Till and Knowlton (1983) noted that the coyotes most likely to kill sheep are the ones raising pups, and Gantz (1990) suggested that late winter aerial hunting of coyotes on summer sheep grazing allotments removes coyotes that otherwise likely would have produced pups. By conducting preventive damage management in late winter or early spring, the likelihood of transient coyotes reoccupying and establishing their own territories in time to produce pups is greatly reduced. Gantz (1990) concluded that late winter aerial hunting of coyotes on summer sheep range was an effective method to reduce coyote predation. Wagner (1997) determined that aerial hunting 3 to 6 months before sheep are grazed on an area was cost effective when compared to areas without aerial hunting. Wagner concludes that preventive aerial hunting reduced the number of traps, snares and M-44s needed in the field to reduce coyote predation and therefore, a potentially significant reduction in risk to non-target species.

Alternative 3 would be considered slightly more selective than Alternative 1, due to increased use of aerial hunting and calling and shooting. The cost of predator damage management would increase under Alternative 3, because more intensive predator damage management would be required without preventive damage management. Livestock loss to predators would be expected to increase under Alternative 3 as compared to Alternatives 1 and 2 because damage management would only occur after a livestock loss was verified as predation.

4.3.2.4 Alternative 4 - Non-lethal Control Required Prior to Lethal Control.

As noted earlier in the document, Alternative 4 is similar to the existing program in that livestock producers are on the average currently using about 5.75 non-lethal methods (ADC 1996). The selectivity of Alternative 4 would not be substantially different from Alternative 1. However, requiring livestock producers to use additional non-lethal methods would reduce effectiveness because additional livestock would be killed before lethal action could be taken.

4.3.2.5 Alternative 5 - Technical Assistance Program, and Alternative 6 - No Predator Damage Management in Western Montana Analysis Area.

Under both Alternative 5 and Alternative 6, no Federal operational predator damage management would exist, therefore no methods would be employed by ADC personnel and selectivity and effectiveness of methods used by ADC would not be an issue. Livestock producers or State and local agencies would likely conduct predator damage management, and possibly the use of methods under these programs would be less selective due to their lack of training, experience, adequate time to devote to predator problems, and fewer regulation. Illegal use of pesticides could occur, along with indiscriminant trapping. State law currently provides that red fox and coyotes may be taken by livestock producers without a license or season restrictions. This provision would allow for the killing of a bear or mountain lion that had not killed livestock. Without the Federal ADC program, producer implemented non-lethal methods would likely

decrease, as producers focus their attention on lethal methods.

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

Predator damage management conducted by ADC in the analysis area is directed by ADC Directives, Cooperative Agreements, MOUs and Federal and State laws. Effects on public health and safety include potential benefits caused by ADC fostering a safer environment from threatening predators and potential negative effects that might result from the exposure of the public to damage management methods. ADC uses chemical and non-chemical methods that are deemed appropriate to reduce or minimize a variety of damage problems, and ADC personnel are aware of the potential risks to nontarget species and humans. The use of toxicants by ADC in all instances is regulated by the EPA through the FIFRA, by State law, the MDA, and by ADC Directives. 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 ADC personnel is thus an important prerequisite for successful application of the IWDM approach. Based on a thorough Risk Assessment (USDA 1994, Appendix P), APHIS concluded that, when ADC program methods are used according to Directives, policies and laws, and when chemicals are used according to label directions, they are selective for target individuals or populations, and such use has negligible impacts on the environment.

4.3.3.1 Alternative 1 - Continue the Current Western Montana ADC Program: (No Action Alternative):

The current Montana ADC predator damage management program is based on an IWDM approach to protect livestock, property, natural resources and safe guard public health and safety on public and private lands as described in Chapter 3 of this EA. Based on the risk assessment from USDA, Appendix P (1994), the environmental and public health and safety risks associated with ADC's damage management is low. The four chemical methods used in predator damage management (sodium cyanide in the M-44, the gas cartridge, sodium monofluoroacetate in the LPC and DRC 1339) posed possible risks, but USDA (1994) noted that the risks associated with these methods were mitigated through specific direction provided by ADC program policies. Risks identified in the evaluation process for these chemicals were primarily environmental risks addressed by the EPA rather than safety or health risks to the public. The greatest risks to public health and safety from ADC's use of chemical methods are incurred by the ADC personnel who apply the methods. Likewise, the greatest risk to public health and safety from ADC's use of mechanical damage management methods are incurred by the ADC personnel who use methods such as aerial hunting. The EPA use restrictions preclude use of the M-44 in areas where it may pose a danger to T&E species. M-44s, the LPC, gas cartridge and DRC 1339 do not present secondary poisoning risks to other animals that may scavenge on the carcass of an animal killed by these methods (USDA 1994, Appendix P, pp. 269-271). During the 1994 through 1995 analyses period, no injuries to ADC personnel or members of the public related to ADC's use of any chemical or mechanical damage management method in the analysis area were reported. Mitigation measures that address safety concerns about ADC's use of management methods are listed at the end of Chapter 3.

Of the non-chemical wildlife damage management methods used by ADC, leghold traps and neck snares pose the greatest risk to nontarget species. However, domestic pets that may be captured in these devices and accompanied by humans can be released unharmed. ADC limits the use of leghold traps and snares on public lands during bird hunting seasons, and warning signs are always posted in those areas where these devices are set on public or private lands.

Of the chemical methods available for used by ADC, M-44s and the LPC are the only methods that may present some degree of risk to the public or free roaming dogs. As discussed in Chapter 3,

these risks are mitigated by restricting their use. M-44s would not be placed on designated public lands during the regular bird hunting seasons or any other time when exposure to the public or pets is probable, and by placing warning signs in the general area and adjacent to each M-44 device whenever M-44s are used. The LPC would only be used on privately owned lands and after consultation with the USFWS for T&E species considerations. The risks posed to the public and domestic pets from ADC methods is low.

4.3.3.2 Alternative 2 - Current Program Plus Additional Activities on Public Lands as Requested: (Proposed Alternative).

Analysis is the same as Alternative 1; the impacts to public health and safety and domestic pets would be similar to Alternative 1 because of the ADC policies and directives, MOUs, EPA restrictions and mitigation for methods use on public lands.

4.3.3.3 Alternative 3 - A Corrective Only Predator Damage Management Program: (No Preventive Control).

The analysis for Alternative 3 would be similar to the analysis for Alternatives 1 and 2. The risks posed by corrective control only would be no different than the risks posed by the same methods used under a strategy that included preventive damage management.

4.3.3.4 Alternative 4 - Non-lethal Control Prior to Lethal Control.

As noted throughout the document, Alternative 4 is not significantly different from Alternative 1. The impacts of Alternative 4 on public health and safety and domestic pets would be the same as those identified for Alternative 1.

4.3.3.5 Alternative 5 - Technical Assistance Program and Alternative 6 - No Predator Damage Management in Western Montana Analysis Area.

Both alternatives would result in no Federal operational predator damage management program in the analysis area. Therefore, the use of methods would be at the discretion of individuals or agencies that conduct the activity. The low risks associated with Federal use of damage management methods could be different under these alternatives. ADC would make recommendations (Alternative 5), but implementation of the recommendation would be by another entity. Increased use of the same methods by less skilled trappers or livestock producers, and greatly reduced restrictions on how predator damage management is conducted could result in an increased risk to the public. No program would be available to the MFWP or the Montana Department of Health in case of black bear or mountain lion threats to human safety or disease threats caused by wildlife. This Alternative would likely result in increased risks to public health and safety over those identified in Alternative 1.

4.3.4 Concerns about ADC's Impact on T&E Species.

ADC has consulted with the USFWS regarding the nationwide program and would continue to implement all applicable reasonable and prudent measures identified by the USFWS to ensure protection of T&E species. Endangered species consultations with the USFWS have been completed on those species for which a *"may affect determination"* has been made as listed in the EIS (USDA, 1994). Where applicable, the Reasonable and Prudent Alternatives for these species have been implemented. Chapter 3 lists mitigation measures and standard operating procedures that would be implemented to insure that no T&E species would be adversely affected by the program.

4.3.4.1 Alternative 1 - Continue the Current Western Montana Analysis Area ADC Program: (No Action Alternative).

Montana ADC has conducted an informal Section 7 consultation with the USFWS regarding the potential impacts of the current analysis area program and the proposed action. The USFWS has concurred with Montana ADC's assessment that neither the current program nor the proposed action is likely to adversely affect any T&E species that may occur within the analysis area. Mitigation measures to address concerns about impacts to T&E species listed in the mitigation measures at the end of Chapter 3.

4.3.4.2 Alternative 2 - Current Program Plus Additional Activities on Public Lands as Requested: (Proposed Alternative).

The analysis is similar to Alternative 1.

4.3.4.3 Alternative 3 - Corrective Only Predator Damage Management Program (No Preventive Control).

The analysis for Alternative 3 would be similar to the analysis for Alternatives 1 and 2. The risks posed by corrective control only would be similar to the risks posed by the same methods used under a strategy that included preventive damage management.

4.3.4.4 Alternative 4 - Non-lethal Control Required Prior to Lethal Control.

As noted earlier in the document, Alternative 4 is not significantly different from Alternative 1. The impacts of Alternative 4 on T&E species are the same as those identified for Alternative 1.

4.3.4.5 Alternative 5 - Technical Assistance Program (ADC Non-lethal Only) and Alternative 6 - No Predator Damage Management in Western Montana Analysis Area.

No operational ADC activities would exist under either of these alternatives, and therefore no risks to T&E species from ADC actions. Some type of damage management would most likely be implemented by livestock producers or private predator control programs, however, and these activities could pose greater risks to T&E species than ADC's activities. Damage management efforts by individuals with limited training and experience would be more likely to take nontarget species, including T&E species. Without the Federal assistance available from ADC, some livestock producers may be motivated to consider use of more economical forms of control than those practiced by ADC. Illegal use of toxicants represents one of the cheapest forms of predator removal, but it also presents the greatest threat to the environment, nontarget wildlife, domestic animals and human safety. Risks to T&E species would probably be greater under Alternatives 5 and 6 than from any other alternative.

4.3.5 Cost-effectiveness of ADC activities.

NEPA does not require preparation of a specific cost-benefit analysis, and consideration of this issue would not be essential to making a reasoned choice among the alternatives being considered. However, cost-effectiveness of ADC's activities was a common concern among many commenters during the public involvement process. Therefore, a specific cost-benefit analysis of a major component ADC's activities was prepared.

A cost-benefit analysis of ADC activities as conducted in the decades of widespread toxicant use would likely show a much higher benefit per unit cost than predator damage management programs as currently practiced. Although toxicants were cheap and very effective at keeping predator numbers and predator losses low, concerns were expressed about some environmental impacts of their use. Our social value system has essentially established limits on how cost-effectively predator damage management could be conducted. As other considerations, (i.e., humaneness, selectivity, safety to humans and animals) are incorporated into a damage management strategy, the use of damage management methods increases and the cost-effectiveness of damage management is reduced.

4.3.5.1 Alternative 1 - Continue the Current Western Montana Analysis Area ADC Program: (No Action Alternative).

This cost-benefit analysis is limited to quantifiable values, and does not consider a number of values that would be difficult to measure. When sheep on rangelands are repeatedly harassed by predators, for example, they become extremely *nervous* and do not disperse and feed normally. Therefore, they would not find the quality and quantity of feed that they would have if unstressed, resulting in lower lamb weights at the end of the grazing season. This is a form of predator damage, but it would be difficult to quantify. Jahnke et al. (1987) and Wagner (1988) discussed additional examples of indirect predator damage, including increased labor costs to find sheep scattered by predators and producer efforts, and range damage related to the tighter herding required in response to the presence of predators. This analysis likewise does not consider the value that some individuals may place on being able to see or hear coyotes more often when they visit Montana rangelands, nor does it consider the unintentional harm or indirect benefits to certain wildlife species.

Cost-effectiveness of ADC's predator damage management activities can be assessed by looking at the difference between: 1) the value of actual losses with the program in place, plus the cost of the program, and 2) the value of what losses could reasonably be expected to be without the program in place. This cost-benefit analysis is limited specifically to ADC's efforts to protect sheep in the State because: 1) a critical part of the determination of cost-benefit is the estimation of what losses might reasonably be expected to be without of a damage management program and 2) sheep are the only class of livestock for which studies have been specifically conducted to look at this issue.

USDA (1994) cited four studies where sheep losses to predators were documented with no damage management program in place (Henne 1975, Munoz 1977, McAdoo and Klebenow 1978, and Delorenzo and Howard 1976 (Table 4-11). Annual predation loss rates during these studies varied from 1.4 to 20.8% for adult sheep and 6.3-29.3% for lambs. The unweighted average rate of loss to predators was about 4.5% for sheep and 17% for lambs. For purposes of this analysis, we will assume that loss rates for sheep and lambs could reasonably be expected to be 4% and 15% without a damage management program.

Source	Location	Year	Sheep	Lambs
Henne (1977)	Montana	1974/1975	20.8%	29.3%
Munoz (1977)	Montana	1975/1976	>16%	24.4%
McAdoo and Klebenow (1978)	California	1976	Losses were not reported	6.3%
Delorenzo and Howard (1977)	New Mexico	l974	0%	15.6%
Delorenzo and	New			

Data provided by the MASS (1995) suggests that actual predator losses in Montana in 1994 (the last year for which data is available) were 6,600 adult sheep and 36,300 lambs, valued at $1,897,000. Based on expected predation loss rates without a damage management program, the projected losses for sheep producers in Montana in 1994 would be nearly $5 million. ADC expenditures for predator damage management to protect sheep in Montana in 1994 were estimated to be $795,185. This figure includes salaries and benefits for field, supervisory, and administrative staff, vehicle and aircraft expenses, supplies and equipment, and overhead for all activities to protect sheep and lambs in Montana. The difference between: 1) the value of 1994 losses (26,720 lambs @ $54.00[9] and 4,858 sheep @$65.00= $1,758,650) plus the cost of the damage management program ($795,185) ($1,758,650 + $795,185 = $2,553,835) and 2) the value estimated losses without a damage management program ($4,909,487) yields a positive cost:benefit (Table 4-12).

Table 4-12 Actual and Hypothetical Sheep and Lamb Losses to Predators in Montana for 1994[10]

	Actual losses w/ ADC (% predation)	Projected losses w/o ADC (% predation)	Difference	Avg. 1994 $ Value/Head[1]	Total Saved$
Sheep	4,858	18,703 (5.0)	13,845	$65.00	$899,925
Lambs	(1.3)	68,403 (20.0)	41,683	$54.00	$2,250,893
	26,720 (7.8)				
Total	31,578	87,106	55,427		$3,150,818

1 Value based on a 80 lb marketed lamb valued at $0.67/lb

4.3.5.2 Alternative 2 - Current Program Plus Additional Activities on Public Lands as Requested: (Proposed Alternative).

This alternative is the current program, as described in Alterative 1, plus authorization to conduct wildlife damage management on specified and specific areas of additional public lands. The initial costs associated with conducting additional activities on public lands should not

9 Value is based on an 80 lb marketed lamb @ $0.67/lb

10 Excludes data for Carter, Powder River, McCone, Richland and half of Dawson Counties.

significantly increase the costs of the program and should reduce the number of livestock killed by predators, thus a greater positive cost:benefit should result.

Predation would decrease on public lands and adjacent private lands in the analysis area with the implementation of Alternative 2. Howard and Shaw (1978) found that ranchers who had at least one boundary fence that faced land not used for livestock production reported a higher rate of predation than did ranchers surrounded by other producers implementing wildlife damage management.

The amount of program cost increase and economic benefits to livestock producers, and those costs and benefits associated with the *"wildlife experience"* are undetermined. However, the data supports a conclusion that a favorable cost:benefit could be expected.

4.3.4.3 Alternative 3 - A Corrective Only Predator Damage Management Program: (No Preventive Control)

Under this alternative, ADC's costs would be lower, but producers' losses to predation would likely be higher. Losses of all livestock to mountain lion and bear are currently on a corrective control only basis and would not be expected to change. Losses of lambs might approach the levels described in the literature and in Table 4-11, as often lamb losses go undetected until the lambs are large enough that carcass remains may be readily found. Adult sheep losses would increase, although not to the extent suggested in Table 4-11. While speculative, adult sheep losses could be about 3.5% and lamb losses could be about 15%. Calf losses would be expected to be between 2-3%. Using the estimated losses under a corrective only program, the 1994 livestock losses would result in $4,182,474 in livestock losses in Montana annually, or an increased economic loss of $1,628,639 over the current program.

As with the current program, Alternative 3 would provide little direct protection for wildlife. Incidental benefits could occur to wildlife living in areas where livestock protection is afforded, but this would be less than in Alternative 1. No direct economic benefit to wildlife would be attributed to Alternative 3. The economic costs of administering a corrective control only program would be expected to increase, due to increased aerial hunting and increased costs associated with confirming losses prior to initiating wildlife damage management techniques.

If preventive damage management is one of the most cost-effective components of the current program (Wagner 1997), then the overall cost-benefit ratio for Alternative 3 (corrective only) would probably be lower than for Alternative 1.

4.3.5.4 Alternative 4 - Non-lethal Control Required Prior to Lethal Control.

Under this alternative, ADC's costs would be lower, but producers' losses to predation would likely be higher. There is at least some evidence to suggest that preventive damage management on summer sheep grazing areas would provide a positive cost-benefit, as discussed under Alternative 1 (Gantz 1990, Wagner 1997). Packham (1973) documented the results from studies done on four different areas in Idaho. His data suggests that for every dollar spent for helicopter damage management to remove coyotes on the study areas, an average of $5.20 worth of sheep and lambs were saved. A similar cost-benefit seemed apparent when comparing increased helicopter aerial hunting on the Caribou National Forest in the winter of 1994-95 with the reduced level of coyote predation on sheep in the summer of 1995. By spending an additional $16,500 in cooperator-supplied dollars for helicopter aerial gunning in the winter of 1994-95, losses to coyote predation were about $89,000 lower than they had been the previous summer. Numbers of sheep present were similar during both summers. This suggests that for every additional dollar spent by

sheep producers for preventive damage management saved $5.40 worth of sheep and lambs (Collinge 1996b).

If preventive damage management is one of the most cost-effective components of the current program, then the overall cost-benefit for Alternative 4 would probably be lower than for Alternative 1.

4.3.5.5 Alternative 5 - Technical Assistance Program: (ADC Non-lethal Only).

Costs to implement this alternative would be much lower than the current program. Numbers of ADC personnel could be reduced to only those needed to provide technical assistance and make recommendations to landowners or permittees wishing to conduct their own control work. No monies would be spent for operational activities. Program costs would probably decrease by at least two-thirds. Livestock owners would likely have to absorb the cost of hiring private control agents or doing the work themselves. Losses to predators would probably increase substantially, and some sheep operations would probably not be able to stay in business.

4.3.5.6 Alternative 6 - No Predator Damage Management in Western Montana.

The economic effects of implementing this alternative would be similar to implementation of Alternative 5 with regard to impacts on livestock producers. No Federal funds would be expended on ADC, so cost-effectiveness of the Federal program would not be an applicable issue, however without predator damage management, losses could be expected to be about $5 million.

4.3.6 Summary of ADC's Impacts

Table 4.13 presents a relative comparison of the anticipated impacts of each of the six alternatives as they relate to each of the five major issues identified in Chapter 2.

Table 4-13 Relative Comparison of Anticipated Impacts From Alternatives

Issues/ Impacts	*Alt. 1 Current Program*	*Alt 2 Additional Public Land*	*Alt. 3 Corrective Control*	*Alt. 4 Nonlethal Control*	*Alt. 5 Tech. Asst. Only*	*Alt. 6 No Program*
Cumulative impacts on wildlife	low	low	low	low	low	low
Effectiveness and selectivity of methods	good effectiveness and selectivity	best effectiveness and selectivity	similar selectivity as Alt. 1&2 but lower effectiveness	similar selectivity as Alt. 1&2, but less effectiveness	lower than Alt.1-4	lower than Alt. 1-4
Risks to public and pets	low risks	low risks	low risks	low risks	probably greater risks than Alt. 1-4	probably greater risks than Alt. 1-4
Impacts to T&E species	low risks	low risk	low risks	low risks	probably greater overall risks than Alt. 1-4	probably greater overall risks than Alt. 1-4
Cost-effective			lower than	lower than	not	

Issues/ Impacts	*Alt. 1 Current Program*	*Alt 2 Additional Public Land*	*Alt. 3 Corrective Control*	*Alt. 4 Nonlethal Control*	*Alt. 5 Tech. Asst. Only*	*Alt. 6 No Program*
ness	good	best	Alt. 1 or 2	Alt. 1 or 2	applicable	not applicable

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APPENDIX A

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APPENDIX B.
ACRONYMS AND GLOSSARY

ACRONYMS

ACEC ..... Area of Critical Environmental Concern.....
ADC Animal Damage Control
APHIS Animal and Plant Health Inspection Service
BLM Bureau of Land Management
CEQ Council on Environmental Quality
CFR Code of Federal Regulations
EA Environmental Assessment
EIS Environmental Impact Statement
EPA U.S. Environmental Protection Agency
ESA Endangered Species Act
FIFRA ..... Federal Insecticide, Fungicide, and Rodenticide Act
FLPMA Federal Land Management and Policy Act
HSUS Humane Society of the United States
IPM Integrated Pest Management
IWDM Integrated Wildlife Damage Management
LPC Livestock Protection Collar
LRMP ..... Land and Resource Management Plans
MASS ..... Montana Agricultural Statistics Service
MCA Montana Code Annotated
MDOL Montana Department of Livestock
MDSL ..... Montana Department of State Lands
MIS Management Information System
MFP Management Framework Plan
MFWP Montana Department of Fish, Wildlife and Parks
MOU Memorandum of Understanding
NADA New Animal Drug Application
NASS National Agricultural Statistical Service
NBR National Bison Range
NEPA ..... National Environmental Policy Act
NFMA National Forest Management Act
NGTA ..... National Guard Training Area
NHPA ..... National Historical Preservation Act
ONA Outstanding Natural Areas
PA Primitive Area
ROD Record of Decision

RMP Resource Management Plan
RNA Research Natural Areas
SOP Standard Operating Procedure
T&E Threatened and Endangered Species
USDA .....U.S. Department of Agriculture
USDI U.S. Department of Interior
USFS U.S. Forest Service
USFWS U.S. Fish and Wildlife Service
WA Wilderness Area
WSA Wilderness Study Area
WSR Wild and Scenic River

GLOSSARY

Abundance: The number of individuals in a population of a species in a given unit of area

Allotment: A specific area of public lands within which grazing by one or more livestock operators is authorized.

Animal Behavior Modification: The use of scare tactics/devices to deter or repel animals that cause loss or damage to resources or property. It includes the use of electronic distress sounds, propane exploders, pyrotechnics, lights, scarecrows.

Animal/Livestock Husbandry: The use of livestock management practices, such as shed lambing, night penning, or employing herders to reduce mortality from weather, predation or other causes.

Animal Rights: A philosophical and political position that animals have inherent rights comparable to those of humans.

Animal Welfare: Concern for the well-being of individual animals, unrelated to the perceived rights of the animal or the ecological dynamics of the species.

Behavior Modification: see "Animal Behavior Modification"

Canid: A coyote, dog, fox, wolf or other member of the dog (Canidae) family.

Carnivore: A species that primarily eats (member of the Order Carnivora).

Carrying Capacity: The number of animals a given unit of habitat can support.

Compensation: Monetary reimbursement for loss of agricultural resources.

Confirmed Losses: Wildlife-caused losses or damages verified by APHIS-ADC. These figures usually represent only a fraction of the total losses.

Corrective Damage Management: Management actions applied when damage is occurring or after it has occurred.

Denning/Den Hunting: The process of finding burrows where predators (primarily coyotes) have their young and then euthanizing the pups. The adult predators may also be euthanized.

Depredating Species: An animal species causing damage to or loss of crops, livestock, other agricultural or natural resources, or wildlife.

Depredation: The act of killing, damaging or consuming animals, crops, other agricultural or natural resources, or wildlife.

Direct Control: Administration or supervision of wildlife damage management by ADC, often involving direct capture or intervention to take depredating animals.

Diversity: The distribution and abundance of living organisms.

Draw Station: A livestock carcass, bone pile, or scented control area for attracting target species, particularly coyotes.

Endangered Species: Federal designation for any species that is in danger of extinction throughout all or a significant portion of its range.

Environment: The surrounding conditions, influences, or forces that affect or modify an organism or an ecological community and ultimately determine its form and survival.

Environmental Assessment (EA): An analysis of the impact of a planned action to the human environment to determine the significance of that action and whether an EIS is needed.

Environmental Impact Statement (EIS): A document prepared by a Federal agency to analyze the anticipated environmental effects of a planned action or development, compiled with formal examination of options and risks.

Eradication: Elimination of specific wildlife species, generally considered pests, from designated areas.

Forage: Food for animals, especially when taken by browsing or grazing.

Furbearer: An administrative or legal grouping of mammal species harvested for their fur.

Habitat: An environment that provides the requirements (i.e., food, water, and shelter) essential to development and sustained existence of a species.

Habitat Modification/Management: Protection, destruction or modification of a habitat to maintain, increase or decrease its ability to produce, support, or attract designated wildlife species.

Harvest Data: An estimate of the number of animals removed from a population.

Harvest Rate/Level: For any given wildlife species, a harvest ceiling established by wildlife management specialists to regulate the harvest of a species. This value represents a proportion of the population that can be taken without adversely impacting the long-term maintenance of the population.

Humaneness: The perception of compassion, sympathy, or consideration for animals from the view point of humans.

Integrated Pest Management (IPM): The procedure of integrating and applying practical management methods, to keep pest species from reaching damaging levels while minimizing potentially harmful effects of pest management measures on humans, non-target species, and the environment, incorporating assessment methods to guide management decisions.

Integrated Wildlife Damage Management: (See Integrated Pest Management) The IPM approach modified to the objective of managing damage rather than pest animal populations.

Lethal Management Methods/Techniques: Wildlife damage management methods that result in the death of animals (e.g., M-44s, aerial shooting, calling and ground shooting, and denning).

Local Population: The population within an immediate specified geographical area causing damage to human health and safety, to other wildlife, or to forest, range, and agricultural resources.

Long-Term: An action, trend, or impact that affects the potential of an event over an extended period of time.

Magnitude: Criteria used in this EA to evaluate the significance of impacts on species abundance. Magnitude refers to the number of animals removed in relation to their abundance.

Non-Lethal Control Methods/Techniques: Wildlife damage management methods or techniques that do not result in the death of target animals (e.g., live traps, repellents, fences, etc.).

Non-Target Species/Animal: An animal or local population that is inadvertently captured, killed, or injured during wildlife damage management. The same species may be either a target or non-target animal, depending on the damage management.

Offending Animal/Species: The individual animal or animals within a specified area causing damage to public health and safety, to other wildlife, or to forest, range and agricultural resources.

Omnivore/Omnivorous: An animal that eats both animal and plant matter; a generalist, opportunistic feeder that eats whatever is available.

Open Range: Unfenced grazing lands.

Pesticide: A chemical substance used to control pest animals.

Pesticide Use Proposal (PUP): A procedure whereby, a petition is submitted to government agency(ies), and must be approved by the agency(ies), before a pesticide, in a specific formulation and purpose can be used.

Population: A group of organisms of the same species that occupies a particular area.

Predacide: A toxicant used to control or manage predators or damage caused by predators.

Predator: An animal/species that kills and/or consumes another animal.

Preventive Damage Management: Management applied before damage begins.

Prey: An animal that is killed and consumed by a predator.

Public Land: Land that is owned and controlled by a government agency (i.e., Federal, state, regional, county or municipal jurisdiction).

Pyrotechnics: Fireworks or projectiles used to frighten wildlife.

Range Lambing: Lambs born on the open-range or pasture situation.

Rangeland: Land on which the natural plant cover is made up primarily of native grasses, forbs, or shrubs

valuable for forage.

Raptors: Carnivorous bird species (e.g., owls, hawks, falcons) that prey on other birds, amphibians, reptiles, and mammals.

Registered Chemical: A chemical that has been approved by the appropriate governmental agency(ies), such as the EPA or MDA, for use in a specific formulation and for a specified purpose.

Repellent: A substance with taste, odor or tactile properties that discourages specific animals or species from using a food or place.
Requester: Individual(s) or agency(ies) that requests wildlife damage management assistance from ADC.

Selectivity: Damage management methods that affect specific animals or animal species responsible for damage without adversely affecting other species.

Sensitive Species: Species designated, usually in cooperation with the state agency responsible for managing the species, as sensitive. Sensitive species are those that: 1) are under status review by the USFWS/NMFS; or 2) whose numbers are declining so rapidly that Federal listing may become necessary; or 3) typically have small and widely dispersed populations; or 4) inhabit ecological refuge or other specialized or unique habitats. Sensitive species are managed under the same criteria as T&E species pending formal listing as a T&E species or until it is delisted.

Shed Lambing: Housing ewes and newborn lambs in pens or sheds to provide food, shelter, and medical care during and immediately after birth.

Short-Term: An action, trend, or impact that does not have long lasting affects to the reproductive or survival capabilities of a species.

Significant Impact: An impact that will cause important positive or negative consequences to man and his environment.

Take: The capture or killing of an animal.

Target Species/Animal/Population: An animal or population at which wildlife damage management is directed to alleviate damage to agriculture and non-agriculture resources. The same species may be either a target or non-target, depending on the situation.

Technical Assistance: Advice, recommendations, information, demonstrations, and materials provided to others for managing wildlife damage problems.

Threatened Species: Federal designation for species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Total Harvest: The total number of individuals intentionally taken by humans from a population. Harvest does not include natural or accidental mortality.

Toxicant: A poison or poisonous substance.

Unconfirmed Losses: Losses or damage reported by resource owners or managers, but not verified by

ADC.

Wilderness Study Area (WSA): Undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, and managed to preserve its natural conditions.

Wildlife: Any wild mammal, bird. reptile amphibian.

Wildlife Damage Management: Actions directed toward resolving livestock or wildlife predation, protecting property or safeguarding public health and safety in a coordinated, managed program.

Work Plan: A management plan developed jointly by ADC and/or the BLM, Forest Service, MFWP, and MDA specifying when, where, how, and under what constraints wildlife damage management would be conducted. The plan would include a map showing planned control, restricted control, no control, and special protection areas.

Appendix C

Montana Fish, Wildlife and Parks(MFWP 1996a)

Trapping and Fur Harvest Report 1995