

Pre-Decisional

ENVIRONMENTAL ASSESSMENT
**WILDLIFE DAMAGE MANAGEMENT (WDM) IN
THE SOUTHERN UTAH ADC DISTRICT**

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In Cooperation With:

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
MANTI-LaSAL NATIONAL FOREST
FISHLAKE NATIONAL FOREST
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UNITED STATES DEPARTMENT OF INTERIOR
BUREAU OF LAND MANAGEMENT (BLM)
RICHFIELD DISTRICT
MOAB DISTRICT
CEDAR CITY DISTRICT

UTAH DIVISION OF WILDLIFE RESOURCES (UDWR)

UTAH DEPARTMENT OF AGRICULTURE (UDA)

Pre-Decisional

1.0 CHAPTER 1: PURPOSE AND NEED FOR ACTION

INTRODUCTION

Across the United States, wildlife habitat has been substantially changed as human populations expand and land is used for human needs. These human uses and needs often compete with wildlife which increases the potential for conflicting human/wildlife interactions. In addition, segments of the public strive for protection for all wildlife; this protection can create localized conflicts between human and wildlife activities. The ADC Final Environmental Impact Statement (FEIS) 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 is generally 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 value is 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."

USDA/APHIS/Animal Damage Control (ADC) is charged by law to reduce human/wildlife conflicts (Animal Damage Control Act of 1931, as amended; Agricultural and Related Agencies Development Appropriation Act of 1988). This Environmental Assessment (EA) evaluates ways by which this mandate can be carried out within the Southern Utah ADC District (District).

ADC is a cooperatively funded (ADC Directives 3.101 and 3.110) and service oriented program. Before any wildlife damage management (WDM) is conducted, Agreements for Control or ADC Annual Work Plans must be signed by the landowner/administrator and ADC for private and public lands, respectively. As requested, ADC cooperates with land and wildlife management agencies to effectively and efficiently reduce wildlife damage according to all applicable Federal, State and local laws (ADC Directive 2.210).

ADC PROGRAM

ADC's mission is to provide leadership in WDM in the protection of America's agricultural, industrial and natural resources, and safeguard public health and safety (ADC Directive 1.201). This is accomplished through:

- close cooperation with other Federal and State agencies
- training of WDM professionals;
- development and improvement of strategies to reduce economic losses and threats to publics from wildlife;
- collection, evaluation and distribution of WDM information;
- cooperative WDM programs;
- informing and educating the public on how to reduce wildlife damage and;
- providing data and a source for limited-use management materials and equipment, including pesticides. (USDA 1989)

PURPOSE

This EA analyzes WDM related to the protection of livestock, poultry, designated wildlife species, and to protect public health and safety on private and public lands within the District. The area encompassed by the District is more than 30.8 million acres. ADC has agreements to conduct WDM on about 18.4 million acres within the District or about 60% of the area. Of that area, WDM was conducted by ADC on only 7,006,947 acres or about 23% of the District in Fiscal Year (FY) 94 (Management Information System (MIS) 1994). The District encompasses Federal lands under the administration of the Forest Service, Bureau of Land Management (BLM), National Park Service, and Tribal, Utah School Institutional Trust (State trust), county and private lands.

Within the District, cattle and sheep are permitted to graze on Federal lands throughout the year, with most livestock grazing on National Forest Systems lands in the summer, and on BLM administered lands in the winter. Many livestock ADC protects, graze on National Forest System, BLM, State trust and private lands.

Pre-Decisional

Currently, ADC conducts damage management for the protection of livestock on Federal lands under six EAs prepared by the respective land managing agencies. Requests to assist in the protection of public health and safety, or requests for assistance in protecting designated wildlife species are not addressed in the existing EA's. Within the District, ADC has also received requests to protect big game, nesting waterfowl and the threatened Utah prairie dog (*Cynomys parvidens*) from predation. Annually, ADC responds to several requests for assistance with coyotes (*Canis latrans*), cougars (*Felis concolor*) or black bears (*Ursus americanus*) thought to be a threat to public health and safety. This EA is intended to supersede the six existing EAs, and expand the scope to address similar ADC actions to protect additional resources.

1.1 NEED FOR ACTION

The need for action is based on the necessity for a program to protect livestock, wildlife, and public health and safety. In a recent District Court decision (U. S. District Court of Utah, Civil No. 92-C-0052A, Southern Utah Wilderness Alliance et al. v. Thompson, H. et al., Forest Supervisor), 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.”

1.1.1 Summary of the Proposed Action

The proposed action intends to implement a livestock, wildlife, and public health and safety protection program that would augment that presently conducted. Currently, ADC activities on Federal lands are for the protection of livestock. The ADC program intends to implement an Integrated Wildlife Damage Management (IWDM) (ADC Directive 2.105) approach that considers the needs of multiple resources, and would allow the prudent use of all legal techniques and methods, either singly or in combination, to meet program objectives. Livestock producers would be provided with information regarding the use of animal husbandry methods, and training in non-lethal and lethal techniques. WDM methods used by ADC would include calling and shooting, shooting, aerial hunting, trapping, snaring, M-44's, denning, dogs, euthanasia and the Livestock Protection Collar (LPC). WDM would be allowed in the District, when requested, on National Forest System lands, BLM administered lands, intermingled Utah School and Institutional Trust Land and other Federal lands where there are Annual Work Plans, and on State lands and private lands where signed Agreements for Control are in place. All WDM would be consistent with other uses in the area and would comply with all appropriate Federal, State and local laws. An ADC Annual Work Plan would be cooperatively developed for each BLM District, each National Forest, and any American Indian Tribe requesting assistance. These work plans will be reviewed annually. (See Chapter 3 for a more detailed description of the current program and the proposed action.)

1.1.2 Need for Wildlife Damage Management for the Protection of Livestock and Poultry

Agriculture generated \$743 million in cash receipts in 1994 (Utah Department of Agriculture (UDA) 1994). Livestock production, primarily cattle, domestic turkeys and sheep, is one of the primary agricultural industries, and accounted for 75.4% of all agricultural cash receipts (UDA 1994).

Livestock production contributes significantly to the economy of the counties and communities within the District. Approximately 42% of the cattle and 72% of the sheep in the State spend some time in the District. Because the herds are migratory and use Federal, State and private lands, the number of livestock fluctuate by county and time of year. However, estimated livestock inventories for the counties in the District are 358,000 head of stock cattle and 166,200 head of stock sheep (Table 1-1) (UDA 1994). Additionally, sheep from Colorado and northern Utah use range in winter on the District. ADC MIS (1994) data show a total of 139,345 adult sheep, 93,529 lambs, 9,105 adult cattle, and 8,458 calves were protected by ADC in the District. Additionally, domestic turkeys are produced in great numbers in Sanpete County. Estimated turkey inventories from producers show approximately 5.5 million turkeys will be produced in 1995, with a value of \$93,500,000.

Table 1-1. Livestock Inventories by County in the District¹

Cattle

Sheep

¹ Livestock grazing in the District is dynamic and many livestock graze in more than one county. These numbers represent the breeding livestock owned by ranchers in the county and not necessarily the number of livestock grazed within the county.

Pre-Decisional

County	1993	1994	1993	1994
Beaver	37,000	37,000	600	400
Carbon	9,000	10,000	7,400	6,300
Emery	25,000	26,000	7,500	6,600
Garfield	20,000	18,000	2,900	2,100
Grand	3,000	4,000	1,000	600
Iron	21,000	22,000	45,500	42,100
Kane	11,000	12,000	1,600	1,900
Millard	59,000	58,000	4,800	4,100
Piute	10,000	11,000	5,300	4,800
San Juan	19,000	26,000	2,500	3,000
Sanpete	50,000	44,000	82,600	74,600
Sevier	49,000	53,000	10,400	11,000
Washington	18,000	19,000	600	400
Wayne	20,000	18,000	9,500	8,300

Scope of Livestock Losses

Cattle and calves are most vulnerable to coyote predation at calving time and less vulnerable as they get older and larger. Because calving occurs at lower elevations in late winter and early spring, vulnerability of cattle to cougars and bears is reduced. Calves remain vulnerable to these predators throughout the spring and summer when they are moved to the higher elevations in the District. Sheep and lambs remain vulnerable to coyotes and cougars throughout the year, and to black bears when they are grazed at the higher elevations. Lambs can also be vulnerable to red fox (*Vulpes vulpes*) predation in the spring, primarily at the lower elevations.

Livestock predation causes economic loss to livestock owners; Table 1-2 shows confirmed and reported livestock losses by species within the District in 1994. Without effective WDM to protect livestock, predation would be higher (Nass 1977, 1980, Howard and Shaw 1978, Howard and Booth 1981, O'Gara et al. 1983).

Many studies have shown that coyotes inflict high predation rates on livestock and coyotes accounted for 59.7% of the livestock confirmed as killed or injured in the District in FY94 (MIS 1994). This includes 60.6% of the lambs, 97% of the calves, 69% of the adult sheep, and 36.5% of the domestic turkeys. Cougars can also inflict a high rate of predation on livestock in the District. Shaw (1989) reported that all of the cougars in his Arizona study area ate calves. In the District, cougars accounted for 24.7% of the livestock losses confirmed in FY 1994 (MIS 1994), including 31.3% of the lambs, and 21.7% of the adult sheep. Black bears accounted for 6.5% of the confirmed losses Districtwide, including 7.5% of the lamb losses and 8.7% of the adult sheep losses (MIS 1994). Red foxes are the primary turkey predator accounting for 63.5% of the confirmed turkey losses and less than 1% of the lamb losses in the District.

Table 1-2. Reported (Rpt) and Confirmed (Conf) Livestock Losses in the District

Species	Adult Sheep		Lambs		Adult Cattle		Calves		Poultry	
	Rpt	Conf	Rpt	Conf	Rpt	Conf	Rpt	Conf	Rpt	Conf
Coyote	2,259	505	3,508	1,043	24	0	199	69	0	170

Pre-Decisional

Species	Rpt	Conf	Rpt	Conf	Rpt	Conf	Rpt	Conf	Rpt	Conf
Cougar	596	250	533	538	0	0	1	1	4	2
Black Bear	257	89	376	129	0	0	0	1	0	0
Red Fox	0	0	0	2	0	0	0	0	0	216
Total	3,112	884	4,417	1,710	24	0	200	71	4	388

Connolly (1992) 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 scientific studies and recent livestock loss surveys from the National Agricultural Statistics Survey (NASS), ADC only confirms about 19% of the total adult sheep and 23% of the lambs actually killed by predators. ADC Specialists do not try to find every head of livestock reported to be killed by coyotes and red fox, but verify that a problem exists that requires management action. In the District, 34% of the sheep and lambs and 35% of the calves reported killed were confirmed by ADC Specialists (MIS 1994). Because of the State compensation program, which pays ranchers up to 50% of the value of their confirmed livestock losses from cougar and bear predation, ADC Specialists are expected to investigate and confirm a higher number of sheep suspected to be killed by these predators. However, because cattle are managed differently on summer ranges, losses of calves to predators could go unnoticed until the evidence used to confirm predation is destroyed.

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 WDM, losses of adult sheep and lambs to predators can be as high as 8.4% and 29.3% respectively (Henne 1977, Munoz 1977, O'Gara et al. 1983) as compared with areas with control at about 0.5 and 4.3, respectively (USDI 1979).

Value of Livestock and Poultry Losses

Livestock are an important component of the local economies in the District. Although the District encompasses about 58% of the land mass of the State, only 10.6% of the State's population resides in the District. Cash receipts for livestock in the 14 county District totaled \$203.9 million, or about 36.6% of the total cash receipts for livestock statewide. Livestock cash receipts were 80.2% of the total agricultural cash receipts for the District (UDA 1994).

Livestock predation reported to ADC in the District in FY93 totaled \$326,397 (MIS 1993). Livestock predation reported in the District in FY94 totaled \$661,135 (MIS 1994). Confirmed predation losses in FY93 and FY94 were valued at \$148,683 and \$210,050, respectively. These dollar values represent data collected from only those producers that had Agreements for Control with ADC to protect their livestock. NASS (1995) estimated Utah statewide predation losses of sheep and lambs at \$1,695,550. For reasons noted above, the predation confirmed by or reported to ADC represents only a fraction of the total predator loss. It must be noted that these losses occurred with a WDM program in place.

Agricultural employment in the District plus Juab County (which is outside the District boundaries) in 1994 was estimated to be 6,366 jobs, or 7.6% of the total employment in the District (Utah, State of, Economic and Demographic Projections 1994).

Predation is rarely distributed equally among livestock producers. Some livestock producers could have virtually no losses while others will suffer extreme losses, and losses may vary from year to year. Predation was the number one reason reported by sheep producers who had gone out of the sheep business (U. S. District Court of Utah, Civil No. 92-C-0052A, Southern Utah Wilderness Alliance et al. v. Thompson, H. et al. 1993).

1.1.3 Need for Wildlife Damage Management to Protect Wildlife

Research data show that WDM has the potential to benefit populations of both game and non-game wildlife. WDM undertaken to protect livestock could augment wildlife management objectives set by the Utah Division of Wildlife Resources (UDWR), and the U.S. Fish and Wildlife Service (FWS) regarding threatened and endangered (T&E) species concerns. Conversely, a lack of predator damage management could adversely affect certain species (Connolly 1978, Schmidt 1986).

Pre-Decisional

Under certain conditions, predators, primarily coyotes, have been documented as having a significant adverse impact on deer (*Odocoileus spp.*) and pronghorn antelope (*Antilocapra americana*) populations, and this predation is not necessarily limited to sick or inferior animals (Pimlott 1970, Bartush 1978, USDI 1978, Hamlin et al. 1984, Neff et al. 1985, Shaw 1989). Connolly (1978) reviewed 68 studies of predation on wild ungulate populations and concluded that in 31 cases, predation was a limiting factor. These cases show that coyote predation had a significant influence on white-tailed deer (*O. virginianus*), black-tailed deer (*O. hemionus columbianus*), pronghorn antelope and bighorn sheep (*Ovis canadensis*) populations. Mackie et al. (1976) documented high winter losses of mule deer (*O. hemionus*) to coyote predation in north-central Montana and stated that coyotes were the cause of most overwinter deer mortalities. Teer et al. (1991) documented that coyote diets contain nearly 90% deer during May and June. They concluded from work done at the Welder Wildlife Refuge, in Texas that coyotes take a large portion of the fawns each year during the first few weeks of life. 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).

Mule deer fawn survival was significantly increased and more consistent inside a predator-free enclosure in Arizona (LeCount 1977, Smith and LeCount 1976). Hamlin et al. (1984) observed that a minimum of 90% summer mortality of fawns was a result of coyote predation. Trainer et al. (1981) reported that heavy mortality of mule deer fawns during early summer and late fall and winter was limiting the ability of the population to maintain or increase itself. Their study concluded that predation, primarily by coyotes, was the major cause for low fawn crops on Steens Mountain in Oregon. Garner (1976), Garner et al. (1976) and Bartush (1978) found annual losses of deer fawns in Oklahoma to be about 88% with coyotes responsible for 88% to 97% of the mortality. Other authors observed that coyotes were responsible for most of fawn mortality during the first few weeks of life (Knowlton 1964, White 1967).

Guthery and Beasom (1977) demonstrated that after coyote control, deer fawn production was more than 70% greater after the first year, and 43% greater after the second year in their southern Texas study area. Another Texas study (Beasom 1974a) found that predators were responsible for 74% and 61% of the fawn mortality for two consecutive years. Stout (1982) increased deer production on three areas in Oklahoma by 262%, 92% and 167% the first summer following coyote damage management, an average increase of 154% for the three areas. 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.

Neff et al. (1985) concluded from radio tracking studies that most of coyotes who hunted pronghorn antelope fawns on Anderson Mesa, Arizona were residents. This means that most of the depredating coyotes were present on the fawning grounds during fawning times. Jones (1949) believed that coyote predation was the main limiting factor of pronghorn antelope in Texas. A six-year radio telemetry study of pronghorn antelope in western Utah showed that 83% of all fawn mortality was attributed to predators (Beale and Smith 1973). In Arizona, Arrington and Edwards (1951) showed that intensive coyote damage management was followed by an increase in pronghorn antelope to the point where antelope were once again huntable, whereas on areas without coyote damage management this increase was not noted. Similar observations of improved pronghorn antelope fawn survival and population increase following damage management have been reported by Riter (1941), Udy (1953) and Bodenchuk (in press). Major losses of pronghorn antelope fawns to predators have been reported from additional radio telemetry studies (Beale 1978, Barrett 1978, Bodie 1978, Von Gunten 1978, Hailey 1979, and Tucker and Garner 1980). Coyote damage management on Anderson Mesa, Arizona increased the herd from 115 animals to 350 in three years, and peaking at 481 animals in 1971. After coyote damage management was stopped, the pronghorn fawn survival dropped to only 14 and 7 fawns per 100 does in 1973 and 1979, respectively. Initiation of another coyote damage management program began with the reduction of an estimated 22% of the coyote population in 1981, 28% in 1982, and 29% in 1983. Pronghorn antelope populations on Anderson Mesa, during 1983, showed a population of 1008 antelope, exceeding 1000 animals for the first time since 1960. Fawn production increased from a low of 7 fawns per 100 does in 1979 to 69 and 67 fawns per 100 does in 1982 and 1983, respectively (Neff et al. 1985). After a five-year study, Neff and Woolsey (1979, 1980) determined that coyote predation on pronghorn antelope fawns was the primary factor causing fawn mortality and low pronghorn densities on Anderson Mesa, Arizona. Coyote reduction was necessary and cost effective in pronghorn antelope management, as shown by Smith et al. (1986).

Clearly, predator damage management can be an important tool in maintaining big game production and management objectives.

Predation has also been suspect in limiting recovery of the Utah prairie dog and desert tortoise (*Gopherus agassizi*) (McDonald, UDWR, pers. comm. 1995). In 1988, District personnel were requested to remove coyotes from the

Pre-Decisional

Beaver Dam Slopes in Washington County to protect the desert tortoise. Limited predator removals may also benefit the Utah prairie dog recovery effort by reducing predation on newly transplanted individuals, and supplying baseline data on disease prevalence by monitoring predators from the recovery area. 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; W. Haglan, FWS pers. comm. 1995), and predator removals may be useful should ferret reintroduction be planned for the Cisco Desert (B. Blackwell, UDWR pers. comm. 1995)

Revenue derived from recreation, especially recreation related to wildlife and the outdoors, is increasingly important to the economy of southern Utah. Southwick (1994) estimated the total economic impact from deer hunting in the United States in 1991 to be \$16.6 billion. In Utah, local economies benefit from these recreational activities. Deer hunting alone provided 2,000 jobs to the residents of Utah and generated more than \$127 million in Utah in 1991. As a result, the maintenance of game populations is important to the UDWR, which has the responsibility for managing wildlife for the benefit of the State of Utah and its residents. WDM may periodically be requested by the UDWR to protect, mule deer, pronghorn antelope, mountain goats (*Oreamnos americanus*), bighorn sheep (*Ovis canadensis*), ring-neck pheasants (*Phasianus colchicus*), turkeys (*Meleagris gallopavo*), nesting waterfowl or other wildlife. 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 UDWR, but a strategy used to achieve management objectives.

1.1.4 Need for Wildlife Damage Management to Protect Public Health and Safety

The UDWR is responsible for managing black bears and cougars and has the primary authority for responding to potentially dangerous bear and cougar incidents. By agreement, ADC would assist the UDWR when requested. Requests from the public regarding potentially dangerous coyotes are referred to ADC. These requests are given a higher priority and are scrutinized using the ADC Decision Model (Slate et al. 1992 and ADC directive 2.201) described in Chapter 3 of this EA and the ADC FEIS (USDA 1994). In FY93 ADC responded to two requests from UDWR for protection of public safety from cougars. In FY 94 ADC received one request for assistance regarding a black bear, which could not be responded to do to a lack of NEPA documentation and conflicting work schedules. In FY95 ADC responded to two cougar and two black bear requests. Additionally, in FY 95 ADC provided direct damage management assistance in two cases of threats to aviation safety from coyotes on airport runways. When requests for assistance occur on Federal lands, the Federal land managing agency is also involved.

1.1.5 Richfield ADC District Objectives

The need for WDM in the District helped ADC, with input from UDA, UDWR, FWS, BLM and the Forest Service define the objectives. The objectives for the District are:

- A. Livestock Protection: For cooperative agreements and Agreements for Control, ADC's objectives are to:
 - A-1. Respond to 100% of the requests for assistance with the appropriate action as determined by the ADC Specialist, applying the ADC Decision Model (Slate et al. 1992 and ADC Directive 2.201).
 - A-2. Hold lamb losses to less than 5% per year on areas with cooperative agreements.
 - A-3. Hold adult sheep losses to less than 3% per year in areas with cooperative agreements.
 - A-4. Hold calf losses to less than 1% per year in areas with cooperative agreements.
 - A-5. Provide 100% of the cooperators and cooperating Federal, State and local agencies with information on non-lethal management techniques proven to be effective for reducing predation within:
 - 1 year of the signed decision for this EA
 - 3 weeks of signing a new cooperative agreement
 - 1 year of new information becoming available
 - A-6. Maintain the lethal take of non-target animals by ADC personnel during damage management to less than 2% of the total animals taken

Pre-Decisional

- A-7. Continue to monitor the implementation of producer implemented (non-lethal) methods
- B. Protection of Wildlife as coordinated by the UDWR or FWS
 - B-1. Respond to 100% of the requests from UDWR, and when coordinated with the UDWR, the FWS for the protection of wildlife species where funding and the workforce permits.
 - B-2. Involve the UDWR in planning the livestock protection program that would be designed to consider wildlife and livestock when designing a WDM program.
- C. Protection of Public Health and Safety from Predators
 - C-1. Respond to 100% of the UDWR black bear and cougar requests for public health and safety.
 - C-2. Respond to 100% of the cooperators requests for public health and safety protection from coyotes using the ADC Decision Model (Slate et al. 1992).

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). This EA would be tiered to that EIS.

1.2.2 National Forest Land and Resource Management Plans (LRMPs). The National Forest Management Act requires that each National Forest prepare a Land and Resource Management Plan (LRMP) for guiding long range management and direction. LRMP documents and the decision made from this EA would need to be consistent.

1.2.3 National Forest EAs for Wildlife Damage Management. All three National Forests within the District currently have EAs and Decision Records addressing predator damage management. Predator damage management will continue under these documents until superseded by a new decision document.

1.2.4 BLM Resource Management Plans (RMP) and Management Framework Plans (MFPs). The BLM currently uses RMPs to guide management on lands they administer. RMPs generally replace older land use plans known as MFPs. Any decision made because of this analysis must be according to the direction in the RMPs/MFPs for the Cedar, Richfield and Moab BLM Districts.

1.2.5 BLM EAs for Wildlife Damage Management. All three BLM Districts within the District currently have EAs and Decision Records addressing predator damage management. Predator damage management will continue under those documents until superseded by a new decision document.

1.3 Decision to be Made

Based on agency relationships, MOUs and legislative mandates, ADC is the lead agency for this EA, and therefore responsible for the scope, content and decisions made. The Forest Service and BLM, UDWR and UDA had input throughout the EA preparation to ensure an interdisciplinary approach in compliance with NEPA, and agency mandates, policies or regulations.

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

- Should WDM as currently implemented be continued in the District (the no action alternative)?
- If not, how should ADC fulfill their legislative mandate and responsibilities in the District?
- Might the proposal have significant impacts requiring an EIS analysis?

1.4 Scope of this Environmental Assessment Analysis

1.4.1 Actions Analyzed. This EA evaluates WDM to protect livestock, poultry, and designated wildlife species as determined by the UDWR, and when coordinated with the UDWR, FWS requests for T&E species protection from predation caused by coyotes, red fox, cougars, and black bears within the District. This EA will also analyze WDM to protect public health and safety from coyotes, black bears and cougars. Protection of other agricultural resources

Pre-Decisional

and other program activities will be addressed in other NEPA documents.

1.4.2 Wildlife species potentially protected by ADC. UDWR may request ADC assistance to achieve management objectives for Utah prairie dogs, desert tortoise, black-footed ferrets, mule deer, pronghorn antelope, bighorn sheep, mountain goats, ring-necked pheasants, turkeys and nesting waterfowl. The FWS may also request ADC assistance for the Utah prairie dog, desert tortoise or black-footed ferret. If UDWR or FWS identifies additional species in need of protection, a determination will be made on a case-by-case basis if additional NEPA analysis is needed.

1.4.3 American Indian Lands and Tribes. Presently, no tribes have Cooperative Agreements with ADC for WDM. If a tribe enters into a Cooperative Agreement, this EA will be supplemented pursuant to NEPA.

1.4.4 Period for which this EA is Valid. This EA will remain valid until ADC and other appropriate agencies determine that new needs for action, changed conditions or new alternatives having different environmental effects must be analyzed. At that time, this analysis and document will be supplemented pursuant to NEPA. Review of the EA will be conducted each year at the time of the annual planning process by ADC and cooperating agencies to ensure that the EA is sufficient.

1.4.5 Site Specificity. This EA addresses all lands under Cooperative Agreement, Agreement for Control or ADC Annual Work Plans in the District. These lands are under the jurisdiction of the Forest Service, BLM, State, county and private administration/ownership. This EA emphasizes major 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 (Slate et al. 1992) and ADC Directive 2.201 will be the site-specific procedure for NEPA compliance for individual actions conducted by ADC in the District (see Chapter 3 for a description of the ADC Decision Model and its application).

1.4.6 Summary of Public Involvement. Issues related to the proposed action were initially developed by an interdisciplinary team process involving the Forest Service, BLM, FWS, Utah School and Institutional Trust Lands Administration, UDWR and UDA. A Multiagency Team (MAT) of ADC, Forest Service, BLM, UDWR and UDA personnel refined these issues, prepared objectives and identified preliminary alternatives. A scoping letter containing the issues, objectives, preliminary alternatives and a summary of the need for action, was sent to 1180 individuals or organizations who had identified an interest in ADC, Forest Service or BLM projects. Notice of the proposed action and availability of the scoping letter was placed in 4 newspapers with circulation throughout the District and the State. Scoping responses were documented from 73 letters or written comment. The responses represented a wide range of opinions, both supporting and opposing the proposal. All comments were analyzed to identify new issues, alternatives, or to redirect the objectives of the program. All responses are maintained in the administrative file.

1.5 AUTHORITY AND COMPLIANCE

1.5.1 Authority of Federal² and State Agencies in Wildlife Damage Management in Utah

ADC Legislative Authority

The primary, statutory authority for the ADC program is the Animal Damage Control Act of 1931, 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

² Detailed discussions of the ADC legal mandates, and key legislation pertinent to wildlife damage management are found in Chapter 1 of the ADC Feis (USDA 1994).

Pre-Decisional

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 the part of the Act discussing "bringing (damage) under control," rather than "eradication" and "suppression" of wildlife populations. In 1988, Congress strengthened the legislative mandate 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."

Utah Division of Wildlife Resources (UDWR)

The UDWR is responsible for managing all protected and classified wildlife in Utah, except Federally listed T&E species, despite the land class the animals inhabit (Utah Code Annotated (UCA) 23-13-2). UDWR is also authorized to cooperate with ADC and the UDA for controlling predatory animals (UCA, Title 4 Chapter 23). Utah State law allows a landowner or lawful occupant to take any black bear, cougar, or bobcat that is causing damage without first obtaining a permit from UDWR (Utah Wildlife board (UWB) R657-10-21). The law, however, does require the landowner to notify UDWR of the methods used, and species and number of animals taken.

In Utah, black bear and cougar management is the responsibility of the UDWR. However, the current policies of the UWB authorize ADC to independently respond to livestock damage caused by black bear and cougar. The UDWR and the land managing agency are notified in advance when practical, otherwise they are notified within 48 hours after any action is taken to resolve a problem.

Generally, either the UDWR or ADC receives requests to handle cougar or black bear damage to livestock. The UDWR may choose to ask ADC to respond to the request or may respond itself. Under existing agreements, ADC is authorized to respond independently to livestock damage caused by black bears and cougar.

Utah Department of Agriculture (UDA)

Coyotes are not protected in Utah and are classified as predatory animals under UCA Title 4 Chapter 23, administered by the UDA. The UDA is also authorized to enter into Cooperative Agreements with ADC and local entities for controlling coyote damage (UCA 4-23-5). The UDA 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 (UCA 4-23-6). The UDA currently has an MOU, Cooperative Agreement, and Annual Work Plan with ADC. These documents establish a cooperative relationship between ADC and UDA, outlines responsibilities, and sets forth annual objectives and goals of each agency for resolving WDM conflicts in Utah.

U.S. Forest Service and Bureau of Land Management (BLM)

The Forest Service and BLM have the responsibility to manage the resources of 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 reducing 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. Copies of these MOUs are available by contacting the ADC State Director's Office in Salt Lake City, Utah.

Pre-Decisional

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

National Environmental Policy Act. Environmental documents pursuant to NEPA must be completed before work plans, consistent with the NEPA supported decision, can be developed and implemented. Before 1993, each National Forest (and occasionally individual Ranger Districts) and each BLM District prepared its own NEPA document. This resulted in different requirements and procedures for different agencies, and omitted analysis of ADC WDM 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 Annual Work Plans will be analyzed in a comprehensive manner in the Richfield ADC District.

ADC also coordinates specific projects and programs with other agencies. The purpose of these contacts is to coordinate any WDM that may affect resources managed by these agencies or affect other areas of mutual concern. Federal agencies that request ADC assistance to protect resources outside the species discussed in this EA would be reviewed, and if necessary, the agency requesting the assistance would be responsible for NEPA compliance.

Endangered Species Act (ESA) It is ADC (ADC Directive 2.310) and Federal policy, under the ESA, that all Federal agencies shall seek to conserve endangered and threatened species and shall utilize their authorities in furtherance of the purposes of the Act (Sec.2(c)). ADC conducts Section 7 consultations with the FWS to utilize the expertise of the FWS 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 or threatened species. . ." (Sec.7(a)(2))

Migratory Bird Treaty Act The Migratory Bird Treaty Act provides the FWS regulatory authority to protect birds that migrate. The law prohibits any "take" of these species, except as permitted by the FWS; therefore the FWS issues a permit before ADC conducts any WDM (ADC Directive 2.301).

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 chemicals used or recommended by the ADC program in the District are registered with and regulated by the EPA and the UDA. ADC uses the chemicals according to labeling procedures and requirements as regulated by the EPA and UDA (ADC Directive 2.401).

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 resources in areas of these Federal undertakings.

1.6 A PREVIEW OF THE REMAINING CHAPTERS IN THIS EA

The remainder of this EA is composed of five (5) 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, how well each alternative meets the objectives, determines consistency with Forest Service LRMPs and BLM RMPs or MFPs, and determines the economic impacts of each alternative. Chapter 5 contains the list of preparers of this EA.

Pre-Decisional

2.0 CHAPTER 2: ISSUES AND AFFECTED ENVIRONMENT

INTRODUCTION

Chapter 2 contains a discussion of the issues, including issues that will receive detailed environmental impact analysis in Chapter 4 (Environmental Consequences); issues used to develop mitigation measures and standard operating procedures in Chapter 3; and issues that will not be considered in detail, with 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

The Multiagency Team (MAT), consisting of representatives from the lead (ADC) and cooperating agencies (BLM, Forest Service, UDWR, UDA), identified the following issues, which were also raised during public scoping:

Issue 1. Viable populations of predators, non-target animals, and T&E Species.

Issue 2. ADC methods, and selectivity, relative cost and humaneness of each method.

Issue 3. Appropriate control methods for the land classifications.

Issue 4. Public health and safety

Issue 5. Economics.

A detailed description of the issues is contained in the following discussion:

2.2 ISSUES ADDRESSED IN THE ANALYSIS OF ALTERNATIVES

2.2.1 Concerns for the Viability of Target and Non-target Wildlife within the District

One issue is the concern for ADC WDM to adversely affect wildlife populations. Maintaining viable populations of all species is a concern of the public and ADC, public land and wildlife managing agency biologists. Some commentators believe that WDM interrupts the "balance of nature" and this should be avoided. Others believe that the "balance" has shifted to favor generalist species, including predators. Many commentators were concerned that big game populations were diminished because of predation and that UDWR management objectives are not being met. To address these concerns, the effects of each Alternative on the following sub-issues will be examined:

2.2.1.1 Concern for the viability of coyote, cougar, bear and red fox populations within the District.

2.2.1.2 Concern for the viability of non-target, big game, and T&E Species within the District;

2.2.2 ADC Methods

The methods used by ADC to address wildlife damage were identified as an issue by the MAT and the public. Some respondents believe that ADC should use: 1) cost-effective methods, 2) humane methods and 3) selective methods. Other respondents want a full range of WDM tools and methods available for use. To address these concerns, the effects of each Alternative on the following sub-issues will be examined:

2.2.2.1 Concerns over the use of each WDM method.

2.2.2.2 Concerns over the selectivity, relative cost and humaneness of each WDM method.

2.2.3 Appropriate control methods for a variety of land classifications

The use of ADC methods on varying land classifications was another issue addressed by the MAT and the public. Some believe that methods should be different for public lands than for private lands. Some addressed ADC in wilderness areas (WAs) or wilderness study areas (WSAs), expressing opposing views that ADC either should or should not continue WDM in these areas. To address these concerns, the effects of each Alternative on the following sub-issues will be examined:

2.2.3.1 Concerns over the effects of ADC WDM in WAs and WSA's.

Pre-Decisional

2.2.3.2 Concerns over the effects of ADC WDM on activities on public lands.

2.2.4 Public Health and Safety

Public health and safety was an issue identified by the MAT and concurred upon by the public. Some respondents believe that increased numbers of predators endangered public safety. Others were concerned about the safety of the public regarding the use of various ADC WDM tools. To address these concerns, the effects of each Alternative on the following sub-issue will be examined:

2.2.4.1 Concerns over the effects of ADC WDM on public health and safety.

2.2.5 Economics

The issue of economics was raised by the MAT and the public. Some members of the public believe that the program should be run in a cost-effective manner and that a strict cost:benefit analysis would show the program ineffective; others believe the program is an economic necessity. To address these concerns, the effects of each alternative on the following sub-issue will be examined:

2.2.5.1 Concerns over the economic effects of ADC WDM.

2.3 Environmental Descriptions used to develop mitigation for all the Alternatives

2.3.1 Wildlife Damage Management in Special Management Areas on Federal Lands

WAs or primitive areas (PAs) are areas designated by Congress to be managed for the preservation of wilderness values. Many different types of areas exist on Federal lands that currently have a special designation and/or require special management consideration. These include WAs or PAs, WSA's, National Parks and Recreation Areas and Areas of Critical Environmental Concern (ACECs).

Within the District, there are currently four designated WAs on National Forest System Lands and two on BLM administered land. Existing WSAs could be officially designated as wilderness in the future. Appendix C lists areas currently designated within the District. The special management required for these different areas varies considerably by designation and land administrator, and are governed by different legal mandates.

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

ADC WDM is conducted (and is proposed to continue) when and where a specific need is identified, only when allowed under the provisions of the specific wilderness designation, and with the awareness 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 wilderness and wilderness study areas are listed in Chapter 3 under Mitigation.

BLM Special Management Areas

WSAs. WSAs are areas studied for their potential to qualify as wilderness areas and are currently awaiting Congressional designation. These are primarily BLM lands and are managed according to BLM's WSA Handbook H-8550-1 in a way that does not diminish their wilderness values (BLM, 1987). This interim management does allow for continuation of most prior (non-land disturbing) activities and does not preclude WDM. Currently, there are 84 existing WSAs, Instant Study Areas (ISA) or PAs, totaling 2,920,212 acres, within the District being managed under BLM Interim Management Guidelines.

ACECs. While ACECs are BLM lands for which special management is deemed necessary; it should be noted that the legal mandate for designation and management for ACECs comes from the Federal Land Management and Policy Act (FLPMA) and is considerably different from 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

Pre-Decisional

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 a variety of 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 and ACEC designation does not, by itself, preclude WDM. Rather, the individual management prescriptions developed and presented within a given ACEC management plan determine what is allowable. Historically, WDM has not been necessary within these areas.

2.3.2 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. In this discussion, humaneness applies only to those actions taken by humans to catch, handle and/or kill problem wildlife.

Animal welfare organizations are concerned that some methods used to manage wildlife damage expose animals to unnecessary pain and suffering. Research suggests that with some methods, such as restraint in leghold traps, changes in the blood chemistry of trapped animals show "stress." Blood measurements indicated similar changes in foxes chased by dogs for about 5 minutes as those restrained in traps (USDA 1994). However, such research has not yet progressed to the development of objective, quantitative measurements of pain or stress for use in evaluating humaneness.

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 being maimed or killed by predators (USDA 1994).

ADC has improved on humaneness and selectivity of WDM methods through training, research and development of devices such as: trap pan-tension devices, break-away snares, aerial hunting developments, electronic trap monitoring devices and the LPC. Research is continuing to bring new findings and products into practical use. ADC personnel in the District are experienced and professional in their use of management methods so that the tools are used in as humane and selective manner as possible. Mitigation measures and standard operating procedures used to maximize humaneness are listed in Chapter 3.

2.3.3 The public's concern about use of chemicals

Much of the public concern over the use of WDM chemicals is based on erroneous perceptions that ADC uses nonselective, outdated chemical methodologies. 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 (ADC Directives 2.210, 2.401, 2.415, 2.420, 2.425). Based on a thorough Risk Assessment, APHIS concluded that when ADC program chemicals are used according to label directions, they are selective to target individuals or populations, and that such use has negligible impacts on the environment (USDA 1994).

2.4 Affected Environment

Components of the environment to be examined in this EA are wildlife populations, livestock predation and protection, public health and safety, and social attitudes. The ADC program, due to its limited scope, has limited effects on other components of the environment. Evaluations of the program have shown there is no effect on soils, silvacultural practices, water, cultural resources, air quality, prime or unique farmlands, floodplains, wetlands or riparian zones (BLM 1994a, b and c, and Forest Service 1992a and b). Because ADC has no cooperative agreements with American Indian tribes within the District, no effect on American Indian concerns is expected.

2.4.1 Wildlife populations

Localized coyote populations could be affected, to one degree or another, by the current predator damage management program. However, the ADC program currently operates on only 23% of the District, thus the impact of coyote removals on the Districtwide coyote population would at most apply to this percentage of the land. Coyote densities, however, have probably increased because of the absence of large predators with which they evolved. Specifically, wolves are thought to have suppressed coyote densities. Schmidt (1986) reported many citations where the removal of dominant wolves in the early years of this century led to increases in coyote

Pre-Decisional

abundances. Schmidt (1986) further suggests that coyote distribution has expanded into all areas north of Panama.

Estimating the Districtwide coyote population requires extrapolation of data from many sources. Coyote population studies in Utah suggest densities between 0.2 and 1.5 coyotes per square mile (USDI 1979:70). Connolly (unpubl. rpt. 1994) estimated coyote populations for the West Desert Eco-region of the Richfield BLM District. Based upon published reports, field personnel input and past surveys, the autumn coyote population was estimated to be stable at about one coyote per square mile. This figure is probably applicable to lower elevation rangelands found on the Moab and Cedar City BLM Districts as well.

Coyote densities in the mountainous regions of the District are likely the same. Population modeling for the West Desert Eco-region of the Richfield BLM District suggested the ADC removal rate of coyotes was 0.06 coyotes per square mile (MIS 1994). For the 1994 grazing season, and the 1994-95 aerial control season on the Dixie National Forest, coyote removal occurred at 0.08 coyotes per square mile (MIS 1994). The increased rate of removal, despite a smaller workforce, would suggest population densities equal to or greater than on the desert. Gese et al. (1988) suggested a similar pattern on his study area in Colorado. For private lands, the densities are likely lower, primarily due to increased development and human activities on these lands. To estimate private land populations conservatively, a density estimate of 0.1 coyotes per square mile (one half the reported minimum in the Utah studies) will be used.

Estimating coyote populations for the District is based on coyote density multiplied by the number of square miles of each land type. Because autumn population densities are used, this in no way suggests a maximum population. Minimum populations occur immediately before coyote whelping, while maximum populations occur immediately after (post-whelping). Connolly (unpubl. rpt. 1994), noted that in stable populations, mortality must equal natality. For this exercise, we attribute one half the annual mortality, in a stable population as occurring between whelping (maximum population) and autumn, and the other half of the mortality occurring between autumn and the following whelping season. Connolly's discussion with respect to maximum and minimum populations is as follows: "Modeling studies have shown that a lightly harvested population with 97 coyotes at breeding (pre-whelping) would be expected to produce 107 pups for a total of 204 animals in the maximum (post-whelping) population (Connolly and Longhurst 1975, Table 3 10% Annual Harvest Level). In this stable or average population, annual [natality] equals mortality so that 107 coyotes die annually. If half these deaths occur before September (autumn), Connolly and Longhurst's September population would contain $204 - (107/2) = 150.5$ coyotes. Thus for every coyote present in September, the maximum (post-whelping) population contains $204/150.5 = 1.36$ coyotes. Similarly, the minimum (pre-whelping) population contains $97/150.5 = 0.64$ animals for every one present in September." Thus it follows that our maximum population numbers for the District are 1.36 times the autumn population, and the minimum population is 0.67 times the autumn population.

The estimated maximum coyote population for the District, based on 1.36 coyotes per square mile of Federal and State land, and 0.1 coyotes per square mile for private land, tribal land and National Parks is 56,887. The estimated fall population, based on 1.0 coyotes per square mile on Federal and State lands and 0.1 per square mile of private lands is 42,012. The estimated minimum coyote population using density figures of 0.64 and 0.1 respectively is 27,136.

UDWR modeling studies estimate that the cougar population, for the District, is about 1,528 individuals (B. Blackwell, B. Giunta, J. Karpowitz, K. McDonald, UDWR, pers. comm, 1995).

UDWR modeling studies estimate the black bear population in the District to be between 300 and 600 individuals (B. Blackwell, UDWR pers. comm. 1995).

Red foxes exist throughout the District. The highest concentrations are in the settled valleys in and around agricultural lands. However, red foxes may be expanding their range into other habitats, including west desert and mountainous rangelands. Voigt (1987) reported population densities ranging from a low of 0.3 foxes per square mile to a high of 78 per square mile. For purposes of analysis, we conservatively estimate red foxes densities at 1.0 per square mile on 20% of the district. Therefore, the total fox population in the District is estimated at 9,645. All indications are that this species is increasing its range and abundance in Utah (B. Blackwell, UDWR, pers. comm. 1995).

Non-target animals include species that would be unintentionally captured, or for cougars or bears, members of the target species that would not be involved in the individual depredation incident. The ADC MIS considers non-target animals "taken" when they are captured; for the purposes of Objective A-6 and the analysis of impacts to populations, only "lethal take" is considered. When possible, non-target species would be released when it is

Pre-Decisional

determined that they would survive (ADC Directive 2.450). Non-target animals taken in the District in FY93 and FY94 are shown in Table 2-1. The total non-target take for FY93 was 13 animals, of which four were released. The total non-target take for FY94 was 14, of which six were released.

Table 2-1 Non-target animals taken in the Southern Utah ADC District in FY 93 & FY 94

FY 93			
Species	Number	Method	Disposition
Gray fox	2	Leghold trap	Killed
Kit fox	1	" " "	"
Raccoon	1	Neck snare	"
Red fox	2	M-44, neck snare	"
Striped skunk	1	Neck snare	"
Black bear	1	Dogs,	1 Killed
	1	Leghold trap	1 Released
Bobcat	3	Leghold trap	All Released
Cougar	1	Foot snare	Killed
FY 94			
Species	Number	Method	Disposition
Badger	5	Leghold trap	Killed
Feral dog	1	Neck snare	Released
Porcupine	1	" "	Killed
Red fox	2	Neck snare (2)	"
	2	Leghold traps (2)	Released
Bobcat	1	Foot snare	"
Cougar	2	Dogs	"
		Neck snare	"

Federally listed T&E species that may occur in the District include the Utah prairie dog, the Mexican spotted owl (*Strix occidentalis lucida*), bald eagle (*Haliaeetus leucocephalus*), American peregrine falcon (*Falco peregrinus*), bonytail (*Gila elegans*), humpback chub (*G. cypha*), Colorado squawfish (*Ptychocheilus lucius*), razorback sucker (*Xyrauchen texanus*), black-footed ferret, whooping crane (*Grus americana*), southwestern willow flycatcher (*Empidonax traillii extimus*), Virgin River chub (*Gila seminuda*= *G. robusta seminuda*), woundfin (*Plagopterus argentissimus*), and desert tortoise. Endangered species consultations with the FWS have been undertaken on those species for which a "may affect determination" has been made as listed in the FEIS (USDA 1994). Where applicable, the Reasonable and Prudent Alternatives for these species have been implemented. Not all identified effects were because of the predator damage management portions of the program. Copies of the endangered species consultations were included in the FEIS (USDA 1994). Chapter 3, section 3.5.1 lists mitigation measures and standard operationing procedures that would be implemented to insure that no T&E species would be adversely affected by the program.

2.4.2 Land Classifications

Pre-Decisional

The District consists of mostly Federal lands. Exact acreage of all land classes is difficult to obtain, however, we estimate that there are more than 30 million acres within the District. Of this, 2.8 million are under the jurisdiction of the Utah School and Institutional Trust Lands Administration. The BLM administers 16.2 million acres and the Forest Service administers 4.6 million acres. In addition, private, municipal, county, other State agency, National Park and Recreation Area lands exist within the District. Chapter 1 discussed acreage within the District where ADC currently has Agreements for Control.

Currently, there are four designated WAs, totaling 128,000 acres on National Forests System lands in the District. Of these, ADC has been requested to conduct predator damage management in one WA, the 7,000 acre Ashdown Gorge on the Dixie National Forest. There are currently two designated WAs in the District administered by the BLM, totaling 129,600 acres. ADC has not received, nor anticipates any requests for assistance on these areas.

There are currently 84 WSA's, ISA's or Pas in the District being managed by the BLM under the Interim Management Guidelines, totaling 2,920,212 acres. Of these, ADC has received requests for predator damage management on 7 WSA's that total 371,273 acres (see Appendix C for a complete listing of WSAs, Was, ISAs, PAs). WDM has only occurred on a small portion of the WSAs, WAs, ISAs, or PAs, and has complied with the BLM's interim management policy (BLM 1987).

2.4.3 Livestock Grazing in the District

Chapter 1, section 1.1.2 includes a discussion of the grazing patterns and numbers of livestock grazed in the District.

2.4.4 Levels of Predation

Chapter 1, section 1.1.2 contains a discussion of the levels of predation in the District.

2.5 Issues Not Considered in Detail with Rationale

2.5.1 ADC's Impact on Biodiversity

No ADC WDM is conducted to eradicate a wildlife population. ADC operates according to international, Federal and State laws and regulations enacted to ensure species diversity and viability. Any reduction of a local population or group would be temporary because migration from adjacent areas and/or reproduction would soon replace the animals removed. The impacts of the current ADC program on biodiversity are not significant nationwide, statewide, or in the District (USDA 1994). The ADC take of any predator population is a very small proportion of the total population as analyzed in Chapter 4.

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

Concern was raised during public involvement that ADC should not conduct WDM until economic losses become unacceptable. Although some losses of livestock and poultry can be expected and are tolerated by livestock producers, ADC has a legal mandate to respond to requests for WDM, and it is program policy to aid each requester to reduce losses. ADC uses the Decision Model (Slate et al. 1992) discussed in Chapter 3, page 3-3 to determine an appropriate strategy.

In the Southern Utah Wilderness Alliance, et al. v. Thompson, H., Forest Supervisor 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 needs only show that damage from predators is threatened to establish a need for WDM (United States District Court of Utah, Civil No. 92-C-0052A January 20, 1993).

2.5.3 Grazing on Federal Lands

One commentor suggested ADC examine the issue of grazing on Federal lands. ADC does not administer nor does it have the authority to regulate any grazing programs on Federal lands. Grazing on Federal lands is outside the scope of this EA.

2.5.4 No "Chaining"

One commentor suggested ADC examine the issue of "chaining" of brush. ADC does not conduct any "chaining"

Pre-Decisional

programs on any lands to remove brush or shrubry, nor is ADC a land management agency or have the authority to conduct “chaining” programs. Therefore, the issue of chaining is outside the scope of this EA.

2.5.5 Fully Protect the Habitats of all Wildlife

One commentor suggested ADC examine the issue of habitat protection for all wildlife. Habitat management and protection are under the authority of Federal and State land management agencies, and private landowners. Habitat protection is therefore outside the scope of this EA.

2.5.6 Promote Wilderness Designation

One commentor suggested ADC examine the issue wilderness designation. Wilderness designation is a responsibility of the U.S. Congress through proposals from legislators. Wilderness designation is therefore outside the scope of this EA.

2.5.7 Timber Harvest Should be Examined on the Basis of Sustained Growth and No Clear Cutting.

One commentor suggested ADC examine the issue of timber harvest on a sustained growth and no clear cutting. ADC is not a land or forest management agency but rather resolves wildlife damage problems to protect American agriculture, natural resources, industry, and public health and safety. Timber harvest is therefore outside the authority and outside the scope of this EA.

Pre-Decisional

3.0 CHAPTER 3: ALTERNATIVES

3.1 INTRODUCTION

This chapter consists of four parts: 1) an introduction, 2) description of alternatives considered and analyzed in detail including the Proposed Action (Alternative 3), 3) a description of alternatives considered, but eliminated from detailed study, and 4) a discussion of mitigation measures and Standard Operating Procedures (SOP). Six alternatives were recognized, developed, and analyzed in detail by the Multiagency Team (MAT) (ADC, BLM, Forest Service, UDWR, UDA); 3 alternatives were considered but not analyzed in detail with supporting rationale. The six alternatives analyzed in detail are:

- 1) Alternative 1 - Continue the Current Southern Utah ADC District Program: (No Action). 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, Forest Service, State, county, municipal and private lands under Cooperative Agreement, Agreement for Control, and Annual Work Plans with ADC. The current program direction is primarily for the protection of livestock with minimal efforts expended to address designated wildlife protection. Protection of public health and safety from black bears or cougars is at the request of the UDWR.
- 2) Alternative 2 - No Federal ADC Program.
- 3) Alternative 3 - Integrated Wildlife Damage Management for Multiple Resources (preferred alternative). This alternative would allow for ADC WDM to be based on the needs of multiple resources (livestock, wildlife and public health and safety) and would be implemented following consultations with the UDWR.
- 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 lethal control.
- 5) Alternative 5 - Corrective Control Only. This alternative would require that livestock depredation occur before the initiation of lethal control. No preventive lethal control would be allowed.
- 6) Alternative 6 Technical Assistance Only. Under this alternative, ADC would not conduct operational WDM in the District. The entire program would consist of only technical assistance.

3.2 DESCRIPTION OF THE ALTERNATIVES

3.2.1 ALTERNATIVE 1 - Continue the Current Southern Utah ADC District 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 CEQs definition (CEQ 1981).

Overview

The No Action alternative would continue the current ADC IWDM program for the protection of livestock in the District. The current program is a collection of cooperative programs with other Federal, State and local agencies, and private individuals and associations to protect livestock, poultry, and public health and safety (described in Chapter 1). The District conducts technical assistance, and preventive (in response to historical loss) and corrective (in response to current loss or hazard) operational WDM on BLM, National Forest System, State, county and private lands under MOU, Cooperative Agreements or Agreement for Control, or Annual Work Plans. All WDM is based on interagency relationships, which require close coordination and cooperation because of overlapping authorities.

On Federal lands, ADC Annual Work Plans describe the WDM that would occur. Currently, six separate Environmental Assessments (EAs) regulate ADC WDM on Federal lands within the District. During the ADC annual planning process with the BLM and Forest Service, plans and maps are prepared which describe and delineate where WDM would be conducted and what methods would be used. 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 problem

Pre-Decisional

predator populations or groups and/or individual offending animals, depending on the circumstances.

WDM is only conducted in designated WAs or WSAs when allowed by the legislation designating the area or under regulations developed by the Forest Service or BLM. WDM in these designated areas is only a small portion, and expected to continue to be a small portion of the current program.

Under the current program, WDM for the protection of wildlife is not addressed in existing EAs. WDM for the protection of wildlife may be conducted at the request of the UDWR or FWS, but would consist of a separate project with no coordination between a livestock protection project and a wildlife protection project.

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, P. 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. IWDM is the implementation and application of safe and practical methods for the prevention and control 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 3-3.

The philosophy behind IWDM is to implement effective management techniques, in a cost-effective manner while minimizing the potentially harmful effects to humans, target and nontarget species, and the environment. IWDM draws from the largest possible array of options to create a combination of appropriate techniques 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.

IWDM Strategies that the District would use consist of:

- **Technical Assistance Recommendations** (implementation is the responsibility of the requester): District personnel provide information, demonstrations and advice on available WDM techniques. Technical assistance includes demonstrations on the proper use of management devices (propane exploders, electronic guards, cage traps, etc.) and information on animal husbandry, wildlife habits and habitat management, and animal behavior modification. Technical assistance is generally provided following an on-site visit or verbal consultation with the requester. Generally, several management strategies are described to the requester for short and long-term solutions to damage problems; these strategies are based on the level of risk, need and practical application. Technical assistance may require substantial effort by District personnel in the decision making process, but the actual management is generally the responsibility of the requester.
- **Direct Control Assistance** (management conducted or supervised by ADC personnel): Direct control assistance is implemented when the problem cannot be resolved through technical assistance 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 resolve problems effectively, especially if restricted pesticides are required, 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 requester, ADC, or other agency personnel, as appropriate. Two strategies are available:
 1. **Preventive Damage Management.** Preventive damage management is applying WDM strategies before damage occurs, based on historical damage problems. As requested and appropriate, ADC personnel provide information and conduct demonstrations, or take action 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 livestock guarding dogs, fencing or other husbandry techniques, or be requested to conduct predator

Pre-Decisional

damage management before lambing. For WDM on Federal lands, historical loss areas are delineated in Annual Work Plans, which identify areas where preventive WDM could occur. In addition, when conducting WDM, ADC must also receive a request from the livestock owner or individual experiencing the damage. Management areas and techniques are reviewed during the annual meeting between the appropriate agencies.

2. **Corrective Damage Management** Corrective damage management is applying WDM to stop or reduce current losses. As requested and appropriate, ADC personnel provide information and conduct demonstrations, or take action to prevent additional losses from recurring³. For example, in areas where verified and documented lamb depredations are occurring, ADC may provide information about livestock guarding dogs, fencing or husbandry techniques, or conduct operational damage management to stop the losses.

ADC Decision Making

The ADC FEIS 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).

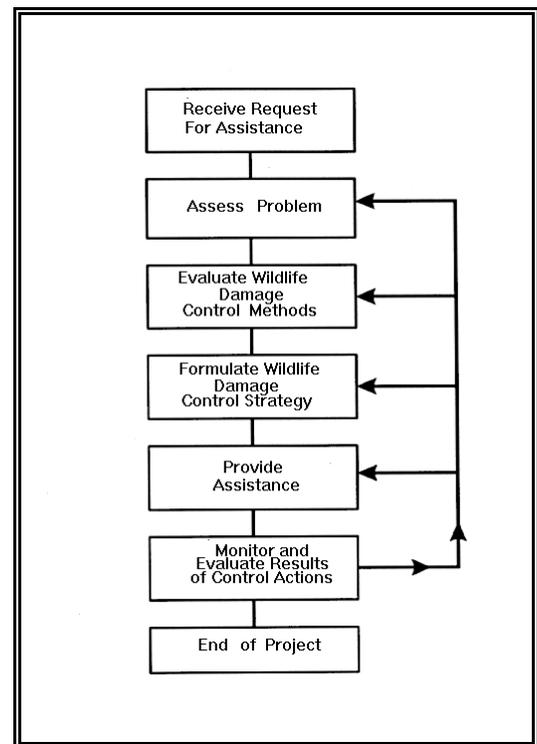
As depicted in the ADC Decision Model (Figure 1), consideration is given to the following factors before selecting or recommending control methods and techniques:

- Species responsible for the damage
- Magnitude, geographic extent, frequency, historical damage 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
- Potential legal restrictions
- Costs of damage management options⁴

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 the requester's satisfaction. 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 situations 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 FEIS provides detailed examples of how the ADC Decision Model is implemented for coyote predation to sheep on public and private lands (USDA 1994).

On most ranches, predator damage may occur whenever vulnerable livestock are present because no cost-effective method

Figure 1
APHIS ADC Decision Model



Livestock producers must enter into a *Agreement For Control On Private Property* with ADC, and rely on professional personnel to carry out the WDM deemed necessary.

⁴ The cost of damage management may sometimes be a secondary concern because of environmental and legal, public health and safety, animal welfare or other considerations.

Pre-Decisional

or combination of methods that permanently stops or prevents predation are available. When damage continues intermittently over time, the ADC Specialist and 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 control strategy reevaluated and revised periodically.

Wildlife Damage Management Methods used in the District.

Mechanical Management Methods:

1. Mechanical management methods consist primarily of livestock producer efforts at 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 (USDA 1992). ADC offers technical assistance to producers and provides sources for livestock guarding dog procurement. Livestock producer practices recommended by ADC include:
 - Animal husbandry, which generally includes modifications in the level of care or attention given to livestock which may vary depending on the age, size and class of the livestock. Animal husbandry practices include but are not limited to techniques such as livestock guarding dogs, herders, shed lambing, and carcasses 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 brush or wooded areas in or adjacent to lambing or calving pastures may be appropriate to reduce available cover for predators.
 - Animal behavior modification refers to tactics that alter the behavior of wildlife and reduce predation. Animal behavior modification may be scare tactics or fencing to deter or repel animals that cause loss or damage to livestock or property. Some but not all devices used to accomplish this are ⁵:
 - Predator-proof fences
 - Electronic guards
 - Propane exploders
 - Pyrotechnics
2. Leghold traps, and neck and foot snares are used in the District for preventive and corrective damage management only where signed *Agreements for Control on Private Property* are in place, or on Federal lands, according to ADC Annual Work Plans. For technical assistance requests, traps may be recommended or distributed to the requester for use in resolving problems caused by coyotes or fox.

When resolving black bear and cougar problems, ADC personnel typically use spring-activated foot snares or trailing hounds. These techniques allow for the capture and euthanasia of individual offending animals according to UDWR policies. Both techniques also allow for the release of non-target individuals in the rare instance of the capture of a non-offending individual.
3. Ground shooting is selective for target species and may involve the use of spotlights, decoy dogs and predator calling. Shooting with rifles or shotguns is used to manage livestock depredation problems and public health hazards when lethal methods are determined appropriate.
4. Hunting dogs are essential to the successful tracking and capture of problem black bears and cougars. 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.
5. Denning is the practice of finding coyote or red fox dens and euthanizing the animals inhabiting the den using a

⁵ 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 1982; Conover 1982).

Pre-Decisional

fumigant cartridge registered with the EPA (EPA Reg. No. 56288-21). (See the gas cartridge under chemical methods).

6. Aerial hunting, the shooting of coyotes and fox from fixed-winged aircraft or helicopters, is used on all lands where authorized and determined appropriate. Aerial hunting consists of visually sighting target animals and shooting them from the aircraft. Aerial hunting is a method used to protect livestock and wildlife because of the technique's cost effectiveness and efficacy (Smith et al. 1986).

Chemical Management Methods:

All chemicals used by ADC are registered under Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) and administered by the EPA and the UDA and under the guidance of ADC Directive 2.401. All District personnel are certified as pesticide applicators by the UDA, Pesticide Division; the UDA requires pesticide applicators to follow all certification requirements set forth in FIFRA. No chemicals are used on Federal or private lands without authorization from the land management agency or property owner/manager (see Mitigation page 3-9 for a more detailed explanation). The chemical methods used and/or available for use in the District are:

1. Sodium cyanide, the active ingredient in M-44s, 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 FY94, about 0.5 pounds of sodium cyanide were used in the District (MIS 1994). In FY93, about 1.6 pounds of sodium cyanide were used in the District (MIS 1993). 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 Klendshoj 1954). The BLM and Forest Service must authorize the use of sodium cyanide (M-44s) on Federal lands under their jurisdiction.

The M-44 cyanide ejector is a selective device used for reducing coyote, red fox, gray fox and feral dog predation (EPA Reg. No. 56228-15), and for protecting endangered species and public health (Thomas 1986, Connolly 1988). M-44s are used for preventive and corrective management on State, county and private lands, and on Federal lands, where authorized. ADC personnel comply with the EPA label and 26 use restrictions (see USDA 1994, Appendix Q). In FY94, 105 problem coyotes were killed with the M-44, accounting for about 6% of the coyote take by ADC personnel in the District. Additionally, one red fox was taken by an M-44 in FY 94, accounting for about 5% of the red fox taken in the District (MIS 1994). In FY93, 336 problem coyotes were killed with the M-44 device, accounting for 11% of the coyote take by ADC personnel within the District. Two red foxes (one target and one non-target) were also killed by the M-44 device in FY93, accounting for 10% of the ADC take of red fox in the District.

2. The gas cartridge is registered as a fumigant by the EPA (EPA Reg. No. 56228-21) and contains 35% charcoal and 65% sodium nitrate by weight. When ignited, the cartridge burns in the den of an animal and produces large amounts of carbon monoxide, a colorless, tasteless gas, which kills animals in the den. This technique would be used on State, county, private, and on BLM and National Forest System lands, where livestock killing can be attributed to food procurement for young (Till and Knowlton 1983, Till 1992). In FY94, 40 coyote dens were fumigated using 44 cartridges and three red fox dens were fumigated using nine cartridges (MIS 1994). In FY93, 4 coyote dens were fumigated, using four gas cartridges (MIS 1993).
3. Livestock Protection Collars (LPCs), containing the toxicant sodium fluoroacetate (Compound 1080), are registered with the EPA (EPA Reg. No. 56228-22) for ADC use nationwide. Before use in individual states, the registrant must receive approval from the State agency that oversees pesticide usage; ADC has applied to use the LPC through the UDA. If the LPC is approved for use, it would be incorporated into the current IWDM program. Use of the LPC would follow EPA registration and UDA requirements, and would be restricted to specially trained and certified ADC employees. The LPC would not be used on BLM and National Forest System lands in the District because of use restrictions.

Sodium fluoroacetate has been used since World War II. Sodium fluoroacetate has been the 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

Pre-Decisional

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's Cycle, which is the energy producing process for cells. Many EPA imposed restrictions apply to the use LPCs.

The LPC is constructed to fit two different size lambs. An individual collar contains 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, lambs are made susceptible to attack to prompt target predators to attack collared lambs (Blakesley and McGrew 1984, Scrivner and Wade 1986, Connolly and Burns 1990). LPCs consist of two bladders that are punctured when a collared lamb is attacked and bitten on the throat by a predator. Upon puncturing the collar, the offending animal ingests some of the solution and dies. In this usage, sodium fluoroacetate has virtually no risk of secondary poisoning (USDA 1994, Appendix P).

3.2.2 Alternative 2 - No Federal ADC Program

This alternative would eliminate all ADC WDM (operational and technical assistance) on all land classes. However, State and county agencies, and private individuals could conduct WDM. ADC would not be available to provide technical assistance or make recommendations to livestock producers. Occasionally, control methods applied by nonagency personnel could be used contrary to their intended or legal use, or more than what is recommended or necessary. The illegal use of pesticides could increase which would be extremely detrimental to wildlife (G. Young, FWS pers. comm. 1995, Schueler 1993).

Due to interest in this alternative, an analysis has been included. A "no control" alternative was evaluated in the FEIS (USDA 1994).

3.2.3 Alternative 3 - Integrated WDM for Multiple Resources (Proposed Action)

This alternative proposes to combine an ADC livestock protection program with any potential need to protect designated wildlife resources following consultation with UDWR, and as coordinated with the UDWR, FWS T&E species concerns on all land classes. Cougar and black bear damage management would be conducted consistent with Utah Wildlife Board (UWB) policy. Damage management strategies, including areas to receive control, timing of control and methods to be used would be selected based on the combined needs of livestock and wildlife resources, rather than just the needs of the livestock resources, mitigated by potential adverse impacts to wildlife. This strategy provides for an ecosystem management approach for areas where ADC conducts WDM. For any specific area of public land, the UDWR and/or FWS would attend the Annual Work Plan meeting between ADC and the BLM or the Forest Service. ADC would identify areas where requests for assistance to protect livestock have been received or are anticipated (based on historic losses). The UDWR or FWS would identify areas where protection of wildlife may be necessary to achieve their management objectives, and any mitigation necessary to protect other wildlife resources. The land management agency, consistent with existing MOUs, would identify areas where other mitigation is necessary to protect resources under their jurisdiction. A control strategy would then be developed based on the combined resources need, and the mitigation.

Mechanical and chemical management tools described in Alternative 1 would apply, where appropriate, under this alternative. WDM would be conducted in designated WAs, WSAs, PAs or ISAs when allowed by the legislation designating the area, or under regulations developed by the Forest Service or BLM. WDM in these designated areas would be expected to be only a very small portion of the program under Alternative 3.

3.2.4 Alternative 4 - Non-lethal control required prior to lethal control.

This alternative would require livestock producers to conduct non-lethal control methods before the use of lethal control 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 control 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 control strategies on the needs of designated wildlife for predator protection.

Pre-Decisional

3.2.5 Alternative 5 - Corrective Control Only.

This alternative would provide for WDM only in places where livestock depredations are occurring. Incumbent in this alternative is ADC verification of the loss and the species responsible. Producers would still implement non-lethal methods they determine to be practical and effective. Lethal control 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 control methods described in Alternative 1 would be available, once losses have occurred and are verified.

3.2.6 Alternative 6 - Technical Assistance Only.

This alternative would eliminate ADC operational WDM in the District. ADC would only provide technical assistance and make recommendations when requested. However, private landowners, contractors, or others could conduct their own WDM 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 livestock producers. Individuals experiencing wildlife damage would, independently or with ADC recommendations, carry out and fund control activities. Individual producers could implement WDM as part of the cost of doing business, or a State agency could assume a more active role in providing operational WDM.

If this alternative would be selected, ADC could not direct how a State agency or individuals would implement WDM. 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. The illegal use of pesticides could increase which would be extremely detrimental to wildlife (G. Young, FWS pers. comm., Schueler 1993).

3.3 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL WITH RATIONALE

Several alternatives were considered but not analyzed in detail. These are:

3.3.1 Compensation for Wildlife Damage Losses

The compensation alternative would direct all ADC program efforts and resources toward the verification of livestock and poultry losses from predators, and providing monetary compensation to the producers. ADC services would not include any direct control nor would technical assistance or nonlethal methods be available.

This option is not currently available to ADC because ADC is mandated to protect American agricultural and natural resources (Animal Damage Control Act of 1931, as amended; and the Rural Development, Agricultural and Related Agencies Appropriation Act 1988). Analysis of this alternative in the FEIS shows that it has many drawbacks (USDA 1994):

- It would require larger expenditures of money and workforce to investigate and validate all losses, and to determine and administer appropriate compensation.
- Compensation would most likely be below full market value. Making timely responses to all requests to assess and confirm losses would be difficult, and many losses could not be verified.
- Compensation would give little incentive to livestock 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.

Pre-Decisional

3.3.2 Eradication and Suppression

An eradication and suppression alternative would direct all ADC program efforts toward planned, total elimination of native predatory species.

Eradication of coyotes is legal in Utah but not supported by ADC, UDWR or UDA. This alternative will not be considered by ADC in detail because:

- ADC opposes eradication of any native wildlife species.
- UDWR opposes eradication of any native Utah wildlife species.
- UDA opposes eradication of any native Utah wildlife species.
- The eradication of a native species or local population would be extremely difficult if not impossible to accomplish, and cost prohibitive.
- Eradication is not acceptable to most members of the public.

Suppression would direct ADC program efforts toward managed reduction of certain problem wildlife populations or groups. Considering large-scale population suppression as the basis of the ADC program is not realistic, practical, or allowable under present ADC policy. Typically, ADC activities in the District would be conducted on a small portion of the area inhabited by problem species.

In localized areas where damage can be attributed to predation by specific groups, UDWR has the authority to lengthen hunting seasons and increase hunter tag quotas; UDA has the authority to control unprotected predators, such as coyotes. When many requests for WDM are generated from a localized area, ADC after consultation with UDWR or UDA, would consider suppression of the local population or groups of the offending species, if appropriate.

3.4 MITIGATION AND STANDARD OPERATING PROCEDURES FOR WILDLIFE DAMAGE MANAGEMENT TECHNIQUES

3.4.1 Mitigation and Standard Operating Procedures (SOPs)

Mitigation measures are any feature of an action that serves to prevent, reduce, or compensate for impacts that otherwise might result from that action. The current ADC program, nationwide and in Utah, uses many such mitigation measures and these are discussed in detail in Chapter 5 of the FEIS (USDA 1994). The following mitigating measures are incorporated into ADC's Standard Operating Procedures and Alternatives 1, 3, 4, 5:

- The ADC Decision Model is used to identify effective, and biologically and ecologically sound WDM 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 cougar and black bear because the weight of these target animals allows trap tension adjustments to exclude the capture of smaller nontarget animals.
- Leghold trap under pan-tension devices are used throughout the program to reduce capture of nontarget wildlife that weigh less than the target species.
- Captured nontarget animals are released unless it is determined by the ADC Specialists that they will not survive.
- Conspicuous, bilingual signs alerting people to the presence of traps, snares and M-44s are placed at major access points into areas where management equipment is set.
- Reasonable and prudent alternatives and SOPs are identified by the FWS and implemented to avoid impacts to T&E species. These include for the:

Utah Prairie Dog - "ADC personnel do not conduct nor recommend prairie dog control within the range of the Utah prairie dog. Pan-tension devices are used for leghold traps placed in Utah prairie dog habitat for coyote control" to exclude capture of the Utah prairie dog.

Pre-Decisional

Bald Eagle - “When bald eagles are in the immediate vicinity of a proposed control program, ADC personnel must conduct daily checks for carcasses or trapped individuals. Carcasses of target animals taken with any chemical that may pose a secondary poisoning hazard must be immediately removed and disposed of in a manner that prevents scavenging by any non-target species.”

Desert Tortoise - “Aluminum and magnesium phosphide, and sodium and potassium nitrate shall be used within the desert tortoise range only by qualified individuals. Such persons shall be limited to qualified wildlife biologists, or to agents of county agricultural commissioner offices, university extension offices, or representatives of State or Federal wildlife agencies.”

“The size of all access and right-of-way roads associated with ADC Program activities shall be minimized.”

“All vehicle traffic during control activities shall be restricted to roadways and areas that have been cleared of tortoises. The agency requesting control shall provide information to ADC personnel prior to undertaking the proposed action regarding areas where vehicular traffic is not allowed.”

- EPA-approved label directions are followed for all pesticide use.
- All District ADC Specialists who use restricted chemicals and euthanasia drugs are trained and certified by program personnel or others who are experts in the safe and effective use of these materials.
- M-44s are used following EPA label requirements (see FEIS Appendix Q for label and use restrictions).

Some additional mitigating measures specific to the District include:

- ADC Annual Work Plans are developed which delineate the areas where WDM would occur and the methods that would be used on 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 UDWR.
- M-44s would not be used on Federal lands without the approval of the BLM Area Manager or the Forest Service Forest Supervisor, as appropriate.
- At least two days before the opening of the bird hunting season, all management equipment is removed from identified bird hunting areas on Federal and private lands.
- No WDM would be conducted within public safety zones (one-quarter mile or appropriate buffer zone around any residence, community, State or Federal highway, or developed recreation site), except 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 of this document.

3.4.2.1 Wildlife Populations

- ADC personnel are directed to resolving problems by taking action against individual problem animals, or local populations or groups.
- ADC’s kill is considered with the "Total Harvest" (ADC take and sport harvest) when estimating the population of key 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 (See Chapter 4).

Pre-Decisional

- ADC personnel are highly trained and experienced to select the most appropriate method for taking problem animals and exclude nontarget animals, thereby reducing potential impacts to non-target wildlife.
- For Federal lands, sensitive species would be addressed during the Annual Work Planning process and appropriate restrictions placed on WDM would be implemented to insure species viability.

3.4.2.2 Methods

- Leghold trap under pan-tension devices are used to reduce hazards to nontarget wildlife that weigh less than the target species.
- Captured nontarget animals are released unless it is determined by the ADC Specialist that they will not survive.
- All pesticides are registered with the EPA
- EPA-approved label directions are followed by ADC employees.
- The ADC Decision Model is designed to identify effective WDM strategies and their impacts.
- ADC employees that use pesticides are trained to use each specific material and are certified for pesticide use under the EPA and UDA.
- ADC employees who use pesticides participate in continuing education programs to keep abreast of developments and to maintain their certifications.

3.4.2.3 Activities on Public Lands vs. Private Lands, especially Wilderness and Special Management Areas (BLM and National Forest System lands)

- WDM will be conducted only when and where a need exists and is requested.
- Vehicle access will be limited to existing roads.
- WDM is conducted only with the concurrence of the land management agency.
- ADC personnel follow guidelines as specified and agreed upon in the ADC Annual Work Plan.
- WDM in WSAs would conform to the BLM Interim Management Policy and Guidelines for Lands Under Wilderness Review (BLM 1987).
- Should any of BLM's existing WSAs be officially designated as WAs, WDM would be performed according to BLM Wilderness Management Policy (BLM 1981) and appropriate language contained in the wilderness legislation.

3.4.2.4 Method Selectivity and Humaneness

- Research continues to improve the selectivity and humaneness of management devices.
- Leghold trap pan-tension devices designed to exclude most nontarget animals or animals that weigh less than the target species are used.
- Euthanasia procedures that do not cause pain and approved by the American Veterinary Medical Association (AVMA) are used.

Pre-Decisional

4.0 CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

Chapter 4 provides information needed for making informed decisions on the WDM objectives outlined in Chapter 1, and the issues and affected environment discussed in Chapter 2. The chapter consists of: 1) analyses of how each alternative meets the objectives and assesses the consistency of the alternatives with existing management plans, and 2) analyses of the environmental consequences of each alternative.

4.1 OBJECTIVE ANALYSIS AND CONSISTENCY DETERMINATION

4.1.1 Objective A-1 - Respond to 100% of the requests with the appropriate action.

4.1.1.1 Alternative 1. - Continue the Current District Program (No Action):

The current District WDM program responds to requests for livestock protection on State, county, private, National Forest System and BLM lands where signed Cooperative Agreements, *Agreements for Control* or Annual Work Plans are in place. ADC cannot, however, respond to requests to protect calves from coyote predation on the Moab BLM District, or portions of the Richfield BLM District until after losses are confirmed.

Fully meeting Objective A-1 is impossible for ADC since cattle producers cannot be provided operational WDM when it is requested. Further, implementing the ADC Decision Model (Slate et al. 1992) is compromised under the current program on Federal lands. Alternative 1 only partially allows ADC to meet Objective A-1.

4.1.1.2 Alternative 2. - No Control.

Under Alternative 2 no operational or technical assistance would be provided by ADC in the District. State agencies, individuals and livestock producers or other entities would be responsible for conducting all WDM without support or advice from ADC.

Based on these restrictions, Alternative 2 does not meet Objective A-1.

4.1.1.3 Alternative 3. - Integrated Wildlife Damage Management (IWDM) for Multiple Resources (Proposed Action):

Alternative 3 would allow ADC to coordinate with other resource agencies to develop an IWDM program based on the needs of livestock, wildlife and public health and safety. In the development of a livestock protection program, other resource needs would be considered and integrated into the program based on the ADC Decision Model.

Alternative 3 would allow ADC to fully meet Objective A-1 since livestock protection would be permitted on all land classes, as mitigated by other concerns.

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

Alternative 4 would limit lethal control of predators to situations where non-lethal predator damage management had been practiced. In reality, most livestock producers practice some measure of non-lethal damage management. ADC files (1995) show that 99.5% of sheep producers in the District currently practice one non-lethal measure and 87.9 % currently use five or more nonlethal methods. Non-lethal options for cattle producers are more limited, yet many producers practice improved husbandry at calving time, in part to reduce predation.

Alternative 4 would require ADC documentation of non-lethal method use, in effect reducing the workforce available for damage management activities. Alternative 4 would restrict ADC's ability to meet Objective A-1. In addition, implementing the ADC Decision Model would be compromised under Alternative 4, thus only allowing ADC to partially meet Objective A-1.

4.1.1.5 Alternative 5 - Corrective Control Only:

Alternative 5 would limit lethal control of coyotes and red fox to situations where livestock losses from these species have been verified. Livestock damage caused by cougars and black bears is currently conducted on a corrective basis, per policies of the UDWR.

Pre-Decisional

This alternative 5 would preclude preventive damage management in areas where historical losses have occurred. Many sheep producers, and some cattle producers have predictable patterns of depredations which result in requests for damage management before damage begins. Alternative 5 would not allow ADC to fully meet Objective A-1 and the ADC Decision Model would be compromised.

4.1.1.6 Alternative 6. - Technical Assistance.

Alternative 6 would limit ADC to providing only technical assistance to livestock producers concerning the use of available and legal methods, make recommendations, and provide instructional literature on WDM. ADC would not provide any operational WDM on Federal, State, or private lands within the District. State agencies, individuals, livestock producers or other entities would be responsible for conducting all WDM.

Based on these restrictions, Alternative 6 would not allow ADC to respond with a full array of WDM strategies and methods, and Objective A-1 could not be met.

4.1.2 Objective A-2. - Hold lamb losses due to predation to less than 5%/year in areas with Cooperative Agreements⁶

4.1.2.1 Alternative 1. - Continue the Current District Program (No Action):

The District ADC program has not been able to limit the average annual lamb losses to below 5% of the total protected. The 1993 loss data (MIS 1993) showed that of the 69,913 lambs protected, 3,790 (5.4%) were reported killed by predators. The 1994 loss data (MIS 1994) showed that of the 93,529 lambs protected, 4,726 (5.0%) were reported as killed by predators. Losses to individual producers also, at times, exceed the 5% criteria established in Objective A-2. Loss of lambs in some areas may vary for several reasons including: 1) terrain, weather, and vegetative cover that restrict access and limits the array of available methods, 2) too few ADC personnel for the work load, 3) restrictions on, or effectiveness of methods on public lands.

We believe that Alternative 1 would partially meet the criteria of Objective A-2 for average District lamb losses, and would not be met for each producer in the District.

4.1.2.2 Alternative 2. - No Federal ADC Program:

Alternative 2 would eliminate the Federal ADC program and place the responsibility for WDM with the State and/or local governments, or individual producers. Without an effective WDM program, lamb losses could be 3 to 6 times higher than those currently being experienced (Gee et al.1977, O'Gara et al. 1983). Under Alternative 2, no *Agreements for Control* would be kept. These documents and their unique numbers are the mechanisms for collecting and managing most of the information gathered by ADC; without them no producer or District information could be maintained.

Alternative 2 does not allow ADC to meet the criterion for Objective A-2.

4.1.2.3 Alternative 3. - IWDM for Multiple Resources (Proposed Action):

Alternative 3, an IWDM program with considerations for multiple resources would better permit ADC to meet the Objectives of A-2. By considering all resources, ADC could vary the timing, areas and methods of control to better achieve multiple resources objective. Alternative 3 would better allow ADC to meet Objective A-2 for the average District lamb losses. However losses to individual producers may, at times, exceed the 5% criteria established in the Objective.

4.1.2.4 Alternative 4. - Non-lethal Control Prior to Lethal Control:

As stated in 4.1.1.5, most of the sheep producers in the District are already practicing non-lethal measures to reduce predator damage. Therefore, the impacts of this Alternative would be the same as Alternative 1.

District personnel would use MIS reported losses, which involves annual standardized interviews with livestock owners and operators, to determine levels of predation. Losses would be calculated as a proportion of total inventory of livestock grazed by cooperators on the District. These objective levels were selected based on statewide loss proportions, as historical data do not exist for the District itself.

Pre-Decisional

We believe that Alternative 4 would partially meet the criteria of Objective A-2 for average District lamb losses, and would not be met for each producer in the District.

4.1.2.5 Alternative 5. - Corrective Control Only:

Although the current program only permits corrective control of cougar and black bear damage, these two species only accounted for 39% of the reported lamb losses in 1993 (MIS 1993) and 20% of the reported lamb losses in 1994 (MIS 1994). Without a preventive control program for coyote and red fox damage management, losses to these species would increase, although not to the extent under Alternative 2. If lamb losses to coyote and red fox doubled, the overall lamb loss rate would increase from an average of 5.2% to an estimated 8.6%.

Alternative 5 would not allow ADC to meet Objective A-2.

4.1.2.6 Alternative 6. - Technical Assistance.

The impacts would be the same as Alternative 2. Alternative 6, a technical assistance only program, would not allow ADC to meet the criterion for Objective A-2.

4.1.3 Objective A-3. - Hold adult sheep losses due to predation to less than 3%/year in areas with cooperative agreements.

4.1.3.1 Alternative 1. - Continue the Current District Program: (No Action).

The current District ADC program held 1993 annual adult sheep predation to 1.2% of the total protected. In 1994, losses to adult sheep were 2.2% of the total protected. During 1994, protection of sheep on BLM lands in the District was restricted to "emergency control only" on a corrective basis. Losses to adult sheep may vary for several reasons including: 1) terrain, weather, and vegetative cover that restrict access and limits the array of available methods; 2) too few ADC personnel for the work load; or 3) restrictions on methods and effectiveness on public lands.

Alternative 1 meets the criterion for Objective A-3, however, the loss is not consistent between producers and the 3% goal is not being met for each producer in the District.

4.1.3.2 Alternative 2. - No Control.

Under Alternative 2, No Federal ADC program would be available to livestock producers in the District, leaving the WDM responsibility with the State and/or local government, and producers. Without an effective WDM program, existing predation losses to adult sheep could increase up to about three times the current predation losses (Gee et al. 1977, O'Gara et al. 1983). Under Alternative 3, no *Agreements for Control* would be kept. These documents and their unique numbers are the mechanisms for collecting and managing most information gathered by ADC without them no producer or District information could be maintained.

Alternative 2 does not allow ADC to meet the criterion for Objective A-3.

4.1.3.3 Alternative 3. - IWDM for Multiple Resources (Proposed Action):

Alternative 3 is similar to Alternative 1 for this objective, in that it also allows ADC to protect adult sheep on private, State, BLM and National Forest System lands. Therefore, the impacts of Objective A-3 in relation to Alternative 3 would be the same as Alternative 1.

Alternative 3 meets the criterion for Objective A-3, however, the loss is not consistent between producers and the 3% goal is not being met for each producer in the District.

4.1.3.4 Alternative 4. - Non-lethal Control Prior to Lethal Control:

As noted in 4.1.1.4, most sheep operators currently practice some type(s) of non-lethal predator damage management. Therefore, the impacts of Objective A-3 in relation to Alternative 4 would be the same as Alternative 1.

Alternative 4 meets the criterion for Objective A-3, however, the loss is not consistent between producers and the

Pre-Decisional

3% goal is not being met for each producer in the District.

4.1.3.5 Alternative 5. - Corrective Control Only:

During the winter of 1993/94 (1994 MIS Supplement Year) protection of sheep on BLM lands was on an “emergency control only” basis, following the confirmed loss of sheep to predators. For the 6-month grazing period, losses of sheep on BLM lands were essentially adult sheep. Districtwide, adult sheep losses increased for the supplement year by 1%, from 1.2% of the sheep protected in 1993 to 2.2% in 1994. We believe a significant portion of the increased loss can be attributed to the lack of preventive predator damage management on BLM lands. If a similar level of loss was extended to the private and National Forest System grazing lands during a grazing season, an additional 1% loss would be expected. This would result in about 3.2% of the adult sheep herd being killed by predators as a result of using a “corrective control only” strategy.

Alternative 5 would not allow ADC to meet Objective A-3.

4.1.3.6 Alternative 6. - Technical Assistance.

Under Alternative 6, a technical assistance only program, ADC could only provide information and training to requesters. Implementation of WDM would be the responsibility of the requester. Without an effective WDM program, existing predation losses to adult sheep could increase up to about three times the current predation losses (Gee 1977, O’Gara et al. 1983). The impacts would be the same as for Alternative 2. Under Alternative 6, no *Agreements for Control* would be kept. These documents and their unique numbers are the mechanisms for collecting and managing most information gathered by ADC; without these documents no producer or District information could be maintained.

Alternative 6 would not allow ADC to meet the criterion for Objective A-3.

4.1.4 Objective A-4. - Hold calf loss due to predation to less than 1%/year in areas with Cooperative Agreements.

4.1.4.1 Alternative 1. - Continue the Current District Program: (No Action).

Calf predation in the District in 1993 and 1994 was 1.98% and 2.36%, respectively. Calf predation occurs primarily during calving times and generally occurs at lower elevations on private, State and BLM lands. Occasional losses are reported at higher elevation rangelands, which are generally National Forest System lands. However, most of the time when cattle are moved to these rangelands, they are of sufficient size to preclude coyote predation.

Under the current program, ADC cannot provide preventive predation management on BLM lands within the Moab District or the Hanksville Eco-region of the Richfield BLM District. In the Cedar City BLM District, preventive damage management is limited to areas with recent historical losses. Coyote damage management has not been necessary for cattle on National Forest System lands. By State statute, cougar and black bear damage management is limited to corrective control only, despite land status.

We do not believe that Alternative 1 can meet the criterion for Objective A-4.

4.1.4.2 Alternative 2. - No Control.

Under Alternative 2, no Federal ADC program would be maintained in the District. WDM would be the responsibility of the State and/or local governments, and individual producers. While difficult to predict quantitatively, it would be expected that losses would remain static to increase slightly over levels of the current program.

As the current program does not meet the criteria of Objective A-4, it would be expected that Alternative 2 would not meet Objective A-4.

4.1.4.3 Alternative 3. - IWDM for Multiple Resources (Proposed Action):

Alternative 3 improves ADC’s ability to protect calves from predation and respond to requests from the UDWR and FWS to protect wildlife by providing for integrated WDM in the District. The ability of ADC to meet the

Pre-Decisional

criterion for Objective A-4 would be improved because ADC could conduct WDM on all lands with cooperative agreements or Annual Work Plans when needs arise. Even with improved access, cattle producers will likely suffer losses on calving ranges, and losses to cougar and black bear.

We believe that Alternative 3 would better allow ADC to meet the standards set in Objective A-4.

4.1.4.4 Alternative 4. - Non-lethal Control Prior to Lethal Control:

Alternative 4 would require non-lethal methods be in place before implementation of lethal control. Effective, cost-efficient, non-lethal methods cannot universally be applied to cattle production. While confined calving may reduce predation or increase the likelihood of detecting predation when it does occur, the cost of private pastures or hay is cost prohibitive for most producers. Documenting non-lethal practices would likely take a workforce away from conducting damage management. No known non-lethal methods effectively prevent cougar or black bear predation.

Because ADC would not be able to respond to cougar or black bear damage, and would be more restricted to respond to coyote damage, it is likely that calf losses would remain static to slightly increase from the current level. As the current level of predation does not meet the standards for Objective A-4, we do not believe that Alternative 4 would meet Objective A-4.

4.1.4.5 Alternative 5 - Corrective Control Only.

Under Alternative 5, ADC lethal control could only be implemented following the documentation of livestock predation. This is the current program regarding control of black bear and cougar predation, and is the current program regarding coyote predation on calves on all National Forest System lands, the Moab BLM District and portions of the Richfield and Cedar City BLM Districts. Preventive WDM for coyotes in calving areas is currently conducted on private lands.

Losses of calves from coyotes would be expected to rise above the current program level. Since calf predation under the current program exceeds the standard set in Objective A-4, Alternative 5 would not meet the criterion for Objective A-4.

4.1.4.6 Alternative 6. - Technical Assistance.

Under Alternative 6, ADC could only provide information, demonstrations, and training to requesters. Implementation of WDM would be the responsibility of the requester. Under Alternative 6, no Agreements for Control would be kept. These documents and their unique numbers are the mechanisms for collecting and managing most information gathered by ADC; without the documents, no producer or District information could be maintained. Losses could be expected to rise, but quantifying those losses is uncertain. As the current program does not meet Objective A-4, we believe Alternative 6 would not meet the standard of Objective A-4.

4.1.5 Objective A-5. - Provide 100% of cooperators and cooperating Federal, State and local agencies with information on nonlethal management techniques proven to be effective for reducing predation.

4.1.5.1 Alternative 1. - Continue the Current District Program (No Action):

ADC is providing information on nonlethal management techniques to livestock producers, and any other individuals that request such information. Currently, the program must modify the MIS before it can be used to meet Objective A-5. When all the components of the MIS are fully modified and operational, ADC would be able to determine who has been provided information on nonlethal and other producer implemented methods, until then manual compilation of the data would be conducted.

Alternative 1 would allow ADC to meet the criterion of Objective A-5.

4.1.5.2 Alternative 2. - No Control.

Alternative 2, No ADC Program, would not allow ADC to meet the criterion for Objective A-5 as no personnel would be available to provide or track the distribution of equipment or information.

Pre-Decisional

4.1.5.3 Alternative 3. - IWDM for Multiple Resources (Proposed Action):

The analysis is the same as in Alternative 1. Alternative 3 would allow ADC to meet the criterion of Objective A-5.

4.1.5.4 Alternative 4. - Non-lethal Control Prior to Lethal Control:

Nothing in Alternative 4 precludes the distribution of information regarding non-lethal methods. The analysis is the same as Alternative 1, therefore Alternative 4 would allow ADC to meet the criterion for Objective A-5.

4.1.5.4 Alternative 5. - Corrective Control Only:

Nothing in this Alternative would preclude the distribution of information regarding the use of non-lethal methods. The analysis is the same as Alternative 1 and therefore, Alternative 5 would allow ADC to meet the criterion for Objective A-5.

4.1.5.6 Alternative 6. - Technical Assistance:

Under Alternative 6, Technical Assistance only, ADC would still provide information, demonstrations and training on lethal and non-lethal methods for resolving wildlife damage problems. However, under a technical assistance program, the tracking of what sort of information was distributed would be limited to the number of demonstrations and training sessions, etc., provided within a county.

Alternative 6 would only allow ADC to partially meet the criterion of Objective A-5.

4.1.6 Objective A-6. - Maintain the lethal take of nontarget animals by ADC personnel during damage management to less than 2% of the total animals taken.

4.1.6.1 Alternative 1. - Continue the Current District Program (No Action):

The ADC program in the District captured 13 nontarget animals and killed eight in 1993, representing 0.3% of the total animals killed in the District by ADC. ADC captured 12 nontarget animals and killed eight in 1994, representing 0.4% of the total animals killed in the District by ADC.

Alternative 1, the Current Program, is currently meeting the criterion for Objective A-6.

4.1.6.2 Alternative 2. - No Control:

Under Alternative 2, no ADC program would be maintained and therefore no target or nontarget animal would be killed by ADC.

Alternative 2 would allow ADC to meet the criterion for Objective A-6.

4.1.6.3 Alternative 3. - IWDM for Multiple Resources (Proposed Action):

Alternative 3 may increase WDM in the District by allowing for ADC to protect livestock and designated wildlife species. The increased activities could increase the take of nontarget animals, however, we do not believe that the increase would be different from the current ratio of nontarget to target animals.

Alternative 3, would meet the criterion for Objective A-6.

4.1.6.4 Alternative 4. - Non-lethal Control Prior to Lethal Control:

As noted in 4.1.1.4, most livestock producers currently use some kind of non-lethal WDM and the current level and kind of WDM would not change substantially. Therefore, the analysis is the same as Alternative 1.

Alternative 4 allows ADC to meet the criterion for Objective A-6.

4.1.6.5 Alternative 5. - Corrective Control Only:

Pre-Decisional

Under Alternative 5, ADC lethal control could only be implemented following documented losses of livestock to coyote or red fox predation. Currently, State Statute prescribes that black bear and cougar damage management is on a corrective control only basis. Following documented losses, ADC could employ the same methods currently available. We believe that the ratio of non-target to target captures would remain about the same as the current program and the analysis is the same as Alternative 1.

Alternative 5 would allow ADC to meet the criterion for Objective A-6.

4.1.6.6 Alternative 6. - Technical Assistance:

Under Alternative 6, no operational WDM would be maintained and therefore no target or nontarget animals would be killed by ADC.

Alternative 6 would allow ADC to meet the criterion for Objective A-6.

4.1.7 Objective A-7. - Continue to monitor the application of producer implemented (nonlethal) techniques.

4.1.7.1 Alternative 1. - Continue the Current District Program (No Action):

The ADC program collects data on nonlethal and producer implemented methods recommended by ADC personnel, and those used by producers. The ADC MIS can store the data needed to satisfy this objective, however, the output report programming has not been completed. This is an ADC priority that will be met in the future. Information for the analysis in this EA was collected and tabulated manually and would continue until the MIS could satisfy the Objective.

Alternative 1 will allow ADC to meet the criterion for Objective A-7.

4.1.7.2 Alternative 2. - No Control:

Alternative 2 would not allow ADC to meet the criterion for Objective A-7 as no program or personnel would be available to distribute information, or accumulate and evaluate data.

4.1.7.3 Alternative 3. - IWDM for Multiple Resources (Proposed Action):

The analysis for Alternative 3 is the same as Alternative 1. Alternative 3 will allow ADC to meet the criterion for Objective A-7.

4.1.7.4 Alternative 4. - Non-lethal Control Prior to Lethal Control:

Alternative 4 would require the monitoring and documented use of non-lethal methods before the implementation of lethal control. Modification to the MIS would be necessary before this system could generate a non-lethal use report. Until that is accomplished summarization of the information would be accomplished manually.

Alternative 4, by using either manual compilation or MIS reporting, would allow ADC to meet the criterion for Objective A-7.

4.1.7.5 Alternative 5. - Corrective Control Only:

Nothing in Alternative 5 precludes the monitoring of producer implemented non-lethal methods, and the analysis is the same as Alternative 1.

Alternative 5 would allow ADC to meet the criterion for Objective A-7.

4.1.7.6 Alternative 6. - Technical Assistance:

ADC would continue to provide information, demonstrations and training to livestock producers on lethal and nonlethal methods for resolving wildlife damage. However, under a Technical Assistance program, monitoring would be limited to the number of demonstrations and training sessions, etc., conducted within a county and not the methods implemented by producers.

Pre-Decisional

Alternative 6 would only partially allow ADC to meet the criterion of Objective A-7.

4.1.8 Objective B-1. - Respond to 100% of requests from UDWR or FWS for protection of wildlife species where the funding and workforce permit.

4.1.8.1 Alternative 1. - Continue the current District program: (No Action).

The ADC program in the District responded to all requests from the UDWR or the FWS to protect specific wildlife species. NEPA documentation has been limited to that provided in BLM EAs. To date, none of the UDWR or FWS requests have required that ADC operate on National Forest System lands. The NEPA compliance responsibility has been transferred from the Forest Service and BLM to ADC. If future requests involve either of these Federal land classes, ADC would not be able to respond to these requests until NEPA documentation and decisions are in place.

Therefore, Alternative 1 would only allow ADC to partially meet the criterion of Objective B-1.

4.1.8.2 Alternative 2. - No Control:

Under Alternative 2, no ADC program would be available, therefore Alternative 2 would not allow ADC to meet the criterion for Objective B-1.

4.1.8.3 Alternative 3. - IWDM for Multiple Resources (Proposed Action):

Alternative 3 would allow for WDM on all land classes to protect designated wildlife species, upon receiving UDWR or FWS requests.

Alternative 3 would allow ADC to fully meet the criterion for Objective B-1.

4.1.8.4 Alternative 4. - Non-lethal Control Prior to Lethal Control:

Alternative 4 directs WDM to protect only livestock, and would not permit the protection of wildlife species. Non-lethal protection of wildlife species from predation is very limited.

Alternative 4 would not allow ADC to meet the criterion for Objective B-1.

4.1.8.5 Alternative 5. - Corrective Control Only:

As with Alternative 4, Alternative 5 directs WDM at the protection of only livestock and would not permit ADC to meet the criterion for Objective B-2.

4.1.8.6 Alternative 6. - Technical Assistance:

Under Alternative 6, no operational ADC program would be available, therefore Alternative 6 would not allow ADC to meet the criterion for Objective B-1.

4.1.9 Objective B-2 Involve UDWR in the design of the livestock protection programs.

4.1.9.1 Alternative 1. - Continue the Current District Program (No Action):

The current program involves the UDWR in the design of the livestock protection program and the implementation of mitigation to preclude adverse impacts to target and nontarget wildlife. It does not, however, allow for the consideration of wildlife resources to be protected in conjunction with livestock protection on the same ranges.

Alternative 1 would partially allow ADC to meet the criterion for Objective B-2.

4.1.9.2 Alternative 2. - No Control:

Under Alternative 2, no Federal livestock protection program would be available, therefore no opportunity to coordinate with UDWR on other resources to be protected. Producer implemented control programs would likely give little consideration to wildlife resources and would likely be less target specific.

Pre-Decisional

Alternative 2 would not allow ADC to meet the criterion for Objective B-2.

4.1.9.3 Alternative 3. - IWDM for Multiple Resources:

Alternative 3 provides for the UDWR involvement in both the design of a livestock protection program and an ADC WDM program to protect multiple resources.

Alternative 3 would fully allow ADC to meet the criterion for Objective B-2.

4.1.9.4 Alternative 4. - Non-lethal Control Prior to Lethal Control:

Alternative 4 directs ADC actions at livestock programs where non-lethal methods have already been implemented. As noted in 4.1.1.4, most livestock producers already practice some method of non-lethal WDM. Therefore, the analysis is the same as Alternative 1.

Alternative 4 would partially allow ADC to meet the criterion for Objective B-2.

4.1.9.5 Alternative 5. - Corrective Control Only:

As with Alternative 4, Alternative 5 directs ADC action only for the protection of livestock; in this case only after documented losses to predators have occurred. The analysis is the same as Alternative 1.

Alternative 5 would partially allow ADC to meet the criterion for Objective B-2.

4.1.9.6 Alternative 6. - Technical Assistance Only:

Under Alternative 6, no operational ADC program would be available, therefore no opportunity to coordinate with UDWR regarding the protection of wildlife resources. The analysis is the same as Alternative 2.

Alternative 6 would not allow ADC to meet the criterion for Objective B-2.

4.1.10 Objective C-1. - Respond to 100% of UDWR black bear and cougar requests for human health and safety. (See Chapter 1 section 1.1.4 for the criteria used to handle problem black bears and cougars)

4.1.10.1 Alternative 1. - Continue the current District program (No Action):

The ADC program in the District responded to: two problem cougar requests from the UDWR for protection of public safety in 1993. In 1994, ADC received one request for assistance from UDWR regarding a black bear in which ADC was not able to respond due to work schedules and a lack of NEPA documentation. In 1995, 2 cougar requests and 2 black bear requests were received, all four were responded to by ADC.

Alternative 1, the Current ADC Program only partially meets the criterion for Objective C-1.

4.1.10.2 Alternative 2. - No Control:

Under Alternative 2, no ADC program would be available to respond to UDWR requests. Alternative 2 would not allow ADC to meet the criterion for Objective C-1.

4.1.10.3 Alternative 3. - IWDM for Multiple Resources (Proposed Action):

Alternative 3 would allow for ADC to protect public health and safety regardless of land classification. As protected species, requests for the protection of public health and safety from cougars or black bears must originate with the UDWR. ADC would respond to requests from the public, but only after they were referred to the UDWR.

Alternative 3 would allow ADC to meet the criterion for Objective C-1.

4.1.10.4 Alternative 4. - Non-lethal Control Prior to Lethal Control:

Alternative 4 directs ADC actions to the protection of livestock and would not allow ADC to meet the criteria for

Pre-Decisional

Objective C-1.

4.1.10.5 Alternative 5. - Corrective Control Only:

In its strictest interpretation, Alternative 5 would allow ADC to assist UDWR after public health and safety had been jeopardized, and would not permit any preventive measures to protect public health and safety. In a more conventional interpretation, Alternative 5 directs WDM at livestock protection only.

Under either case, Alternative 5 would not permit ADC to meet the criterion of Objective C-1.

4.1.10.6 Alternative 6. - Technical Assistance only:

Under Alternative 6, no operational ADC program would be available to respond to UDWR requests. Alternative 6 would not allow ADC to meet the criterion for Objective C-1.

4.1.11 Objective C-2 -Respond to 100% of cooperator requests for public health and safety protection from coyotes using the ADC Decision Model (Slate et al. 1992)

4.1.11.1 Alternative 1. - Continue the Current District Program (No Action):

Coyote, as unprotected species, requests for public health and safety may be received from individuals, associations, municipal or county governments, or State or Federal agencies. To date, ADC has responded to all such requests. In 1994, one request was received regarding coyotes in a municipal area. In 1995, two requests were received regarding coyotes on airports, compromising aviation safety.

Alternative 1 would permit ADC to meet the criterion of Objective C-2.

4.1.11.2 Alternative 2. - No Control:

Under Alternative 2, no Federal ADC program would be available. Alternative 2 would not permit ADC to meet the criterion for Objective C-2.

4.1.11.3 Alternative 3. - IWDM for Multiple Resources (Proposed Action):

Under Alternative 3, ADC would respond to such requests, using the ADC Decision Model to determine the appropriate course of action. Alternative 3 would permit ADC to meet the criterion for Objective C-2.

4.1.11.4 Alternative 4. - Non-lethal Control Prior to Lethal Control:

Alternative 4 directs WDM to primarily protect livestock and would not permit ADC to meet the criterion for Objective C-2.

4.1.11.5 Alternative 5. - Corrective Control Only:

As with 4.1.10.5, under the strictest interpretation, Alternative 5 would only allow ADC to respond to public health and safety complaints after public health or safety has been jeopardized. Under a more conventional interpretation, Alternative 5 directs WDM to protect livestock. In either case, Alternative 5 would not permit ADC to meet the criterion for Objective C-2.

4.1.11.6 Alternative 6. - Technical Assistance Only:

Under Alternative 6, no operational ADC program would be available. Alternative 6 would not allow ADC to meet the criterion for Objective C-2.

4.1.12 Summary

Table 4-1 summarizes how each alternative would: meet each objective; partially meet the objective; does not meet the objective; or does not affect the objective.

Pre-Decisional

Table 4-1 - Objectives/Alternatives Comparison

Program Objectives	Alternative 1 <i>No Action</i>	Alternative 2 <i>No Program</i>	Alternative 3 <i>Proposed</i>	Alternative 4 <i>Nonlethal</i>	Alternative 5 <i>Corrective</i>	Alternative 6 <i>Technical</i>
A-1 <i>Requests</i>	Partially Meets	Does not Meet	Meets	Partially Meets	Partially Meets	Does not Meet
A-2 <i>Lambs</i>	Partially Meets	Does not Meet	Meets	Partially Meets	Does not Meet	Does not Meet
A-3 <i>Sheep</i>	Meets	Does not Meet	Meets	Meets	Does not Meet	Does not Meet
A-4 <i>Calves</i>	Does not Meet	Does not Meet	Partially Meets	Does not Meet	Does not Meet	Does not Meet
A-5 <i>Information</i>	Meets	Does not Meet	Meets	Meets	Meets	Partially Meets
A-6 <i>Nontarget</i>	Meets	Meets	Meets	Meets	Meets	Meets
A-7 <i>Monitor</i>	Meets	Does not Meet	Meets	Meets	Meets	Partially Meets
B-1 <i>Wildlife</i>	Partially Meets	Does not Meet	Meets	Does not Meet	Does not Meet	Does not Meet
B-2 <i>Design</i>	Partially Meets	Does not Meet	Meets	Partially Meets	Partially Meets	Does not Meet
C-1 <i>Safety</i>	Partially Meets	Does not Meet	Meets	Does not Meet	Does not Meet	Does not Meet
C-2 <i>Safety</i>	Meets	Does not Meet	Meets	Partially Meets	Does not Meet	Does not Meet

4.1.13 Alternative Consistency with Forest Service Land and Resource Management Plans (LRMP) and BLM Resource Management Plans (RMP)

Before an Alternative can be considered for implementation on National Forest System or BLM lands, it must be consistent with land management and/or resource management plans. In the Forest Service, 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 older cases, Management Framework Plans (MFPs). If the selected Alternative is consistent with LRMPs, RMPs, or MFPs no further action will be necessary by the Forest Service or BLM.

If an alternative that is inconsistent with LRMPs, RMPs or MFPs is selected in the decision process, the Forest Service or BLM could amend their plans 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 plans or modification of the selected alternative(s).

The following is a review of the consistency of each LRMP, RMP or MFP in the District:

4.1.13.1 Manti-LaSal National Forest LRMP

The Manti-LaSal NF LRMP does not cover WDM. The fact that the LRMP does not address WDM, does not necessarily indicate inconsistency. The Manti-LaSal NF has been asked to make a consistency determination based on this EA and follow appropriate NEPA procedures in making amendments that may be needed. Any

Pre-Decisional

inconsistencies not resolved in LRMPs would be identified in the annual work plan.

4.1.13.2 Dixie National Forest LRMP

The Dixie NF LRMP was amended to address WDM following the Dixie ADC EA. Consistency with this EA would not apply regarding WDM for wildlife protection. The Dixie NF has been asked to make a consistency determination based on this EA and follow appropriate NEPA procedures in making any amendments that would be needed.

4.1.13.3 Fishlake National Forest LRMP

Forest direction (General Direction for Wildlife and Fish Cooperation with Other Agencies (C12)) in the Fishlake NF LRMP states: "Manage animal damage in cooperation with the Division of Wildlife Resources, The Fish and Wildlife Service* and other appropriate agencies and cooperators." Under this direction, Alternatives 1, 3, 4, 5, and 6 would be consistent. Forest consistency under Alternative 2 would be determined by the Forest when individuals or other agencies assume WDM responsibilities. The Fishlake NF has been asked to make a consistency determination based on this EA and follow appropriate NEPA procedures in making amendments that may be needed.

4.1.13.4 Richfield BLM District RMPs/MFPs

The Richfield BLM District authorized WDM at the request of permittees and has an ADC Annual Work Plan. There are two RMPs and two older MFPs currently in the Richfield BLM District: the House Range RMP, the Warm Springs RMP, the Mountain Valley MFP and the Henry Mountain MFP. The Mountain Valley and Henry Mountain MFPs do not discuss WDM. Alternative 4 in this EA is identical to the Proposed Action in the Richfield BLM Animal Damage Control Plan/EA (#J-050-094-024) (BLM 1994c). Alternative 5 of this EA is identical to Alternative 2 in the BLM ADC Plan/EA, and Alternative 2 is identical to Alternative 3 in the BLM ADC Plan/EA. These three alternatives were found to "... conform to the Resource Management Plans for the Warm Springs and House Range Resource Areas and to the intent of the Sevier and Henry Mountains Management Framework Plan." (Plan Conformance/NEPA Compliance Record, Richfield BLM Animal Damage Control Plan/EA December 1993). Alternatives 1, 3, and 6 of this EA have not yet been analyzed by the BLM, and a consistency determination must be made. The Richfield BLM District has been asked to make a consistency determination based on this EA and follow appropriate NEPA procedures in making amendments that may be needed.

4.1.13.5 Moab BLM District RMPs/MFPs

The Moab BLM District has authorized WDM at the request of permittees and has an ADC Annual Work Plan. There are four RMPs/MFPs currently in the Moab BLM District: Price River Resource Area MFP, San Rafael RMP, Grand Resource Area RMP and San Juan RMP. Currently WDM is conducted according to the Moab District Animal Damage Control EA (#UT060-93-001) (BLM 1994b) and Decision Record/Finding of No Significant Impact (FONSI) dated May 17, 1994. Alternatives 1, 2 and 5 of this EA are identical to Alternatives 1, 2 and 3, respectively, of the BLM EA. Consistency determinations, however, were not presented in the EA for those Alternatives. The Moab BLM District has been asked to make a consistency determination based on this EA and follow appropriate NEPA procedures in making amendments that may be needed.

4.1.13.6 Cedar City BLM District

The Cedar City BLM District authorized WDM at the request of permittees and the UDWR and has an Annual Work Plan. There is one RMP (Cedar-Beaver-Garfield-Antimony RMP) and 6 MFPs (Escalante, Paria, Vermillion, Zion, Pinyon, and Virgin River) in the Cedar City BLM District. The Cedar City District ADC EA (#UT-040-93-003) (BLM 1994a) states, "None of these plans directly address animal damage control activities. However, ADC activities do not conflict and are in conformance with these land use plans." The Cedar City BLM District has been asked to make a consistency determination based on this EA and follow appropriate NEPA procedures in making amendments that may be needed.

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.

Pre-Decisional

Table 4-8 (page 4-35) summarizes a comparison of the issues and impacts to each Alternative, both positively and negatively.

The following resource values within the District would not be significantly impacted by any of the alternatives analyzed: soils, geology, minerals, water quality/quantity, flood plains, wetlands, visual resources, air quality, prime and unique farmlands, aquatic resources, timber and range. 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 in the FEIS (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. Analysis of the District "takes" during FY93 and FY94, in combination with other mortality, indicates that cumulative impacts are not significant. It is not anticipated that the District program will result in any adverse cumulative impacts to T&E species, on WSAs or WAs, and WDM does not jeopardize public health and safety.

Irreversible and Irrecoverable Commitments of Resources: Other than minor uses of fuels for motor vehicles, electrical energy for office maintenance, there are no irreversible or irretrievable commitments of resources. Based on these estimates, the District program produces very negligible impacts on the supply of fossil fuels and electrical energy.

Issues Analyzed in Detail

4.2.1 Concerns for the viability of coyote, cougar, black bear and red fox populations within the District.

The species evaluated in this chapter were selected for analysis because they are taken by ADC in response to livestock and poultry predation, and public health and safety threats. The "Magnitude" analysis for this EA follows the process described in the ADC FEIS (USDA 1994, Table 4-2). Magnitude is defined in the FEIS as "... a measure of the number of animals killed in relation to their abundance." Magnitude may be determined either quantitatively or qualitatively. Quantitative analysis is used whenever possible as it is more rigorous and is based on allowable harvest levels, population estimates and harvest data. Qualitative analysis is based on population trends and harvest data or trends and modeling. Allowable harvest levels were determined from research studies cited in the FEIS (USDA 1994, Table 4-2) and from the UDWR data. "Other Harvest" includes the known fur harvest, sport harvest, and other information obtained from the UDWR. "Total Harvest" is the sum of the ADC kill and the "Other Harvest."

Estimating wildlife densities is not precise and often dynamic, and professional judgement is required to account for unknowns and variables, such as the ability of habitats to support populations and recruitment. Therefore, assessments are based on conservative population estimates rather than higher population estimates to better insure that no adverse wildlife population impacts occur.

4.2.1.1 Alternative 1. - Continue the current District Program: (No Action).

In 1993, coyotes were responsible for about 56% of the verified and 56% of the reported Districtwide dollar losses. In 1994, coyotes were responsible for about 57% of the verified and about 76% of the reported Districtwide dollar losses. ADC Summary Reports (MIS 1994) indicate that the coyote is reported to be the primary predator on sheep (72%), lambs (74%), cattle (100%), and calves (99%). The total reported loss to coyotes in the District was valued at \$499,372 (MIS 1994).

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 species' unique resilience, its ability to adapt, and its perseverance under adverse conditions is commonly recognized among biologists and rangeland managers.

Determinations of absolute densities for coyote populations are frequently limited to educated guesses (Knowlton 1972). Coyotes are highly mobile animals with home ranges (territory) that vary by sex and age of the animal and

Pre-Decisional

season of the year (Pyrah 1984, Althoff 1978, Todd and Keith 1976). The literature on coyote spatial organization is confusing (Windberg and Knowlton 1988, Messier and Barrette 1982). Coyote population densities will vary depending on the time of year, food abundance, and habitat. Coyote densities have ranged from a low of 0.2/mi² when populations are low (prewhelping) to a high of 3.55/mi² when populations are high (postwhelping) (USDI 1979, Knowlton 1972). Coyote home ranges may vary from 2.0 mi² to 21.3 mi² (Andelt and Gipson 1979, Gese et al. 1988⁷). Ozoga and Harger (1966), Edwards (1975), and Danner (1976) however, observed a wide overlap between coyote home range and did not consider coyotes territorial. In addition, 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 nonbreeding 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.

Many authors have estimated coyote populations throughout the west and elsewhere (Pyrah 1984, Camenzind 1978, Knowlton 1972, Clark 1972, USDI 1979). The total coyote population in Utah and in the District can be estimated by using scientific modeling, such as presented in Section 2.4.1. We estimate the maximum District coyote population at 56,887 and the minimum District coyote population at 27,136. These estimates are based on reported and estimated densities in public and private rangelands and are based on stable populations.

Coyote Population Impact Analysis

Data on the ADC coyote kill is available for 1993 and 1994, however, comparative sport harvest and other take data in Utah can only be estimated, as explained earlier. For these reasons, UDWR 1993-94 data will be used to examine Districtwide potential impacts on coyote populations. The coyote population estimate, made in this document (2.4.1), will be used as a baseline as it is the best data available. It should also be noted that the level of "Other Take" reported to UDWR may be low because the reporting of coyotes killed is not required. Table 4-2 displays the known information about coyote abundance and harvest in 1993 and 1994.

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 state 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 rapid occupancy of vacant territories (Windberg and Knowlton 1988). While removing animals from small areas at the appropriate time can protect vulnerable livestock, immigration of coyotes from the surrounding area could quickly replace the animals removed (Stoddart 1984). Connolly (1978) noted, the coyote has 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 reporting, will not affect the coyote population in the District because the "Total Take" of coyotes in the District is less than 10%. Evaluating the data using standards established in USDA (1994) to determine the magnitude to which total harvest impacts the species, less than 70% of the population of coyotes, results in a determination of "low magnitude."

Table 4-2. Coyote Harvest Data for the District

Coyote Population Statistics	1993	1994
Estimated Coyote Population	56,887	56,887
ADC Kill	2,913	1,848
Estimated Other Take	3,000	3,000

All literature citations reported in km² have been converted to mi² for reader convenience and to maintain consistency.

Pre-Decisional

Coyote Population Statistics	1993	1994
ADC Kill (% of population)	5.1	3.2
Other Take (% of population)	5.3	5.3
Total Take (% of population)	10.4	8.5

Black Bear Population Information

Black bears occur throughout much of Utah except in the highly developed Wasatch front portion of the state. Bears present problems concerning livestock predation, property damage, and threats to public safety and nuisance situations in the District.

The 1993 reported black bear predation in the District included 89 sheep and 175 lambs valued at \$10,690; 1993 verified black bear predation was 66 sheep, 91 lambs and 2 calves valued at \$12,790 (MIS 1993). The 1994 reported black bear predation in the District included 257 sheep and 376 lambs, valued at \$56,643. The 1994 verified black bear predation in the District included 89 sheep, 125 lambs and 1 calf valued at \$16,225 (MIS 1994).

Female black bears generally reach reproductive maturity at about 3.5 years of age. Following a 7-8 month gestation period (about 220 days), they produce from one to four cubs in Utah, with 2 young per litter being most common. Annual mortality is greatest in the juvenile age classes, with orphaned cubs having the highest mortality; mortality in adult black bears is 10% to 20%.

Black bear densities are generally low in the entire District, but are considered highest in the Book Cliffs, LaSal Mountains, Boulder Mountain and the Blue Mountains. The current Districtwide population is estimated to be 300-600 animals (B. Blackwell, UDWR, pers. comm. 1995).

Black Bear Population Impact Analysis

Data on ADC and non-ADC black bear kills are available for 1994. Statewide, the estimated black bear population has remained stable to increasing (B. Blackwell, UDWR, pers. comm. 1995).

The allowable harvest (kill) level for black bear described by the UDWR is about 10% of the population. The allowable harvest described by USDA (1994) is 20%. Age structure and sex ratios of the kill, however, may affect the recommended bear harvest.

In 1994, the ADC District kill was 5 bear or about 0.8-1.6% of the estimated population. This level of ADC's take is well below the allowable harvest level of 10-20% (USDA 1994, B. Blackwell, UDWR, pers. comm. 1995) and is judged that this is a "low magnitude" of harvest. The ADC kill of black bear represented 11.4% of the known mortality. It should be noted that although ADC took a very small proportion of the black bear in relationship to the total population, the effort is considered quite important by ADC and UDWR in resolving black bear damage and protecting public health and safety, and to meet black bear damage management goals. In 1995, District ADC Specialists killed 13 black bear and released two others. Three nontarget bears were captured in 1995, and two were released. The stable population trend appears unchanged and the 1993 and 1994 ADC kill and "Other Take" would be a low/moderate magnitude of impact.

UDWR has analyzed black bear populations and concluded that the current harvest, whether by hunting, ADC, or unknown, is not causing a decline in the overall District bear population. The data suggest that, Districtwide, the total known kill is about 7-11% of the estimated population. This level is at or below the parameters of "low/moderate magnitude" of impact established in the USDA (1994) and the UDWR.

Cougar Population Information

In 1993, the total reported cougar predation in the District was valued at \$50,185 (MIS 1993). In 1994, the total reported cougar predation in the District was valued at \$36,990 (MIS 1994). The 1993 confirmed loss was 120 sheep, 594 lambs, five calves, 47 domestic turkeys and one goat valued at \$48,195. The 1994 confirmed loss was 250 sheep, 538 lambs, one calf and two chickens valued at \$60,900.

Pre-Decisional

Cougars have an extensive distribution across North America including Utah. It is the largest member of the cat family in Utah, and is known by several names, including panther, puma, catamount, and most commonly, mountain lion. Cougars inhabit many habitat types from desert to alpine environments, indicating a wide range of adaptability. They are very closely associated with deer and elk because of their dependence upon these species for food.

Female cougars 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). Cougars breed and give birth year-round, but most births occur during late spring and summer following about a 90-day gestation period (Ashman et al. 1983, Seidensticker 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.

Cougar density primarily results from prey availability and the social tolerance for other cougars. Prey availability is directly related to prey habitat quality which directly influences cougar nutritional health, and reproductive and mortality rates. Studies suggest that as available prey increases, so do cougar populations, and since cougars are territorial animals, the rate of population increase tends to decrease as cougar density increases. As cougar population density increases, mortality rates from intraspecific fighting and cannibalism also increase, and/or cougars disperse into unoccupied or less densely occupied habitat.

Cougar densities in other states, based on a variety of population estimating techniques, range from a low of about 1/100mi² to a high of 24/100mi² (Johnson and Strickland 1992). An average density estimate for the western states was 7.5/100mi² (Johnson and Strickland 1992). UDWR modeled cougar populations in Utah and based on that model, cougar populations are stable with a current Districtwide population of 1,528 cougars (B. Blackwell et al. UDWR, pers. comm. 1995). Temporary decreases in cougar populations are linked to increased sport hunting permits, directed by the UWB to strike a balance between perceived high cougar densities, perceived low deer densities, and threats to public safety.

Cougar populations can sustain 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% removal)," cougar populations on their study area had the recruitment (reproduction and immigration) capability to replace annual losses rapidly.

Cougar Population Impact Analysis

The allowable annual harvest level for cougar, projected by the USDA (1994, Table 4-2) is 30% of the population, however, the UDWR cougar population model indicates that cougar populations will remain stable with human caused mortality at 25% of the harvestable population that includes males, females without kittens and transients (B. Blackwell, UDWR per. comm. 1995). Comparable data for Utah are not yet available for 1995. Therefore, 1994 data will be used to determine potential Districtwide impacts on cougar populations.

The available data suggest that the total harvest Districtwide for 1994 was 329 animals, about 21.5% of the total estimated population. ADC killed 49 problem cougars Districtwide or about 3% of the population during 1994. No nontarget cougars were killed and two nontarget cougars were captured and released. These figures are well within the parameters for a determination of "low magnitude" of impact (USDA 1994) and serve to achieve the management goals of the UDWR and UWB. This impact analysis suggests that the WDM program conducted District wide is not having an adverse impact on cougar populations.

Red Fox Population Information

Red fox predation in the District is confined to poultry and lambs. Verified and reported damage amounted to about \$3,430 in 1993 (MIS 1993). Verified and reported losses amounted to \$4,340 in 1994 (MIS 1994). Additionally, red fox predation on nesting waterfowl and nesting and winter concentrations of ring-neck pheasants are of concern to the UDWR.

Red foxes are the most common and well-known species in the genus *Vulpes* and are the most widely distributed nonspecific predators 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, 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

Pre-Decisional

during the last 20 years. Investigations have revealed that red fox are extremely adaptive with much diversity in their behavior and habitats. Voigt and Earle (1983) showed that red fox avoided coyotes but coexisted in the same area and habitats.

The density of red fox populations is difficult to determine because of the species secretive and elusive nature. However, the red fox has a high reproductive rate and 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 more than 50/mi² (Harris 1977, MacDonald and Newdick 1982, Harris and Rayner 1986) where food was abundant; Ontario population densities are estimated at 2.6 animals/mi² (Voigt 1987), and Sargeant (1972) reported 1 fox den/3 mi².

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 will 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 will affect fox populations to a greater extent than a short-term over harvest.

For purposes of analysis, we estimated red fox density at 1.0 per square mile on 20% of the district. Therefore, the total fox population in the District is estimated at 9,645. The UDWR reported about 2200 red foxes harvested by fur trappers in 1993/94. ADC removed 20 red foxes in the District in FY93, two of which were nontarget. In FY94, ADC removed 17 red foxes, again including two as nontarget species and released another two nontarget red foxes.

Red Fox Population Impact Analysis

Using the 1993/94 estimated "Takes" by fur trappers as the basis of non-ADC Take, the "Total Take" of red fox in 1993 was 2220 animals in the District. The ADC kill of red fox was 20 animals in the District, or less than 1% of the total take.

USDA (1994) determined the allowable harvest level for red fox to be 70% of the total population. The ADC data for 1993 and 1994 suggest that ADC kill to be 0.2% of the total estimated population during both years.

"Total Take" was about 23% of the estimated Districtwide population. As these harvest levels are less than 70% of the total population, the magnitude of impact is determined to be low.

4.2.1.2 Alternative 2 - No Control and Alternative 6 - Technical Assistance:

Both Alternative 2 and Alternative 6 would result in no ADC operational programs and the potential effects would be similar, therefore they will be analyzed together. Some type of WDM would most likely be conducted by livestock and poultry producers, by various State or local governmental agencies, or other combinations. The impacts on wildlife populations may vary considerably from those described in Alternative 1, because of the potential for improper or inappropriate selection and use of control methods, emphasis on lethal methods, duplication of effort and possible misuse of pesticides.

A thorough review of the potential impacts of these two alternatives can be found in USDA (1994). The USDA (1994) summarized the biological impacts of the no ADC 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

Pre-Decisional

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, many people could be using chemical methods. Misuse of chemicals could increase and thereby adversely affect certain wildlife populations and public health and safety."

How WDM 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 placed on 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 UDWR or UDA 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 WDM would probably dilute resources needed for other wildlife management and State functions.

Alternative 2 and 6 would likely have greater adverse impact on wildlife populations than the current program although professional wildlife biologists do not believe that the harvest for some predatory species would be above allowable harvest level.

4.2.1.3 Alternative 3: IWDM for Multiple Resources (Proposed Action):

Alternative 3 would authorize ADC WDM on BLM, National Forest System, State and private lands, as requested to protect livestock, wildlife and public health and safety. The actual area where ADC services would be requested is unknown and could vary from year to year, based on needs of requesters and levels of predation. However, the actual area that would be worked in any one year would be similar to the area worked under Alternative 1. Changes from Alternative 1 would be in the timing of control and the species considered as targets, based on the combined needs of wildlife and livestock resources.

ADC estimates that WDM conducted under this alternative could increase the kill of coyotes, but probably would not exceed 5% of the current program. A 5% increase, based on 1993 data (to use the higher of the two most recent years' data), would mean the kill of an additional 146 coyotes. At a 5% increase in ADC kill, the "Total Take" of coyotes in the District would be 10.6% of estimated population and remains below the 70% harvest level for a determination of "low magnitude" of impact. Red fox takes are expected to rise by 150%, with all of the increase being attributed to the protection of wildlife. A 150% increase would result in a total ADC kill of 50 red fox District wide. At the 150% increase ADC kill level, the "Total Take" of red fox in the District would be 23.3% of estimated population and remain below the 70% harvest level for a determination of "low magnitude" of harvest.

Even if the ADC kill of coyotes, increased 10% to 20%, and the ADC kill of red fox increased 500% the impact to the respective populations would remain at a low magnitude. The ADC kill of these species is small in comparison to the total population size and therefore increases in the ADC kill would generally not result in an adverse impact to populations.

Black bear and cougars killed in the District would not increase above the level established under Alternative 1. No change in the magnitude of impact to the populations is expected.

Therefore, Alternative 3 will have a low magnitude of impact on targeted wildlife populations.

4.2.1.4 Alternative 4. - Non-lethal Control Prior to Lethal Control:

As noted throughout this document, most of the sheep producers and many cattle producers already practice some form of non-lethal WDM. ADC WDM under Alternative 4 would be similar to those practiced under the current program. The impacts to target populations of coyotes, red fox, cougars and black bears would then be identical to those described in 4.2.1.1 for Alternative 1.

4.2.1.5 Alternative 5. - Corrective Control Only:

Under Alternative 5, lethal control of predators by ADC would only be initiated following confirmed loss of livestock due to predation. The current program calls for only corrective control of cougars and black bears, so the impacts of this alternative on cougar and black bear populations is similar to those described for Alternative 1. Red fox currently are controlled on a corrective only basis, mainly due to their relative minor role as a livestock predator. Impacts to red fox populations would also be similar to those described under Alternative 1.

Pre-Decisional

ADC's coyote kill would likely be reduced under Alternative 5. In FY94, coyote damage management was placed on a corrective only basis for BLM lands in the District due to a lack of BLM NEPA documentation for the program. The Districtwide coyote kill rate for FY94 was 63% of the ADC coyote kill for FY93. Most of this can be attributed to the "emergency" control on BLM lands. Current efforts on the National Forest System lands in the District involve only essentially corrective control. Ground-based control efforts are restricted to only the grazing season, and winter aerial hunting is limited to areas where losses occurred and were not resolved during the grazing season. Therefore, we can expect ADC coyote kills, under Alternative 5, to almost mirror the efforts under the program for FY94.

4.2.2 Concern for the Viability of Nontarget Wildlife, Big Game, and T&E Species within the District.

4.2.2.1 Alternative 1. - Continue the Current District Program (No Action):

Nontarget animals taken by the ADC program in FY93 and FY94 are identified in Table 2-1 (page 2-6). Nontarget animals are individuals killed that were not involved in the depredation situation being resolved, or target species inadvertently killed while attempting to take other target species or individuals. Nontarget animals could include black bears, cougars, red fox, bobcats (*Lynx rufus*), raccoons (*Procyon lotor*), badgers (*Taxidea taxus*), grey fox (*Urocyon cinereoargenteus*), kit fox (*Vulpes macrotis*), striped skunks (*Mephitis mephitis*), and dogs. ADC Policy (ADC Directive 2.450) states "Nontarget animals captured would be released if it is determined that they are physically able to survive." In FY93, ADC killed two grey fox, one kit fox, one raccoon, two nontarget red fox, one striped skunk, one nontarget black bear, and one nontarget cougar. Of these, three were caught in leghold traps, three in neck snares, one caught by dogs on the ground, one killed by an M-44, and one caught in a foot snare. In FY94, ADC killed five badgers, one porcupine (*Erethizon dorsatum*), and two nontarget red fox. Of these, five were killed in leghold traps, and three in neck snares.

Impacts to red fox, cougar and black bear populations were examined under 4.2.1. Nontarget catches of these species were included in the analyses of impacts to these populations. Impacts for this analysis include the potential of the ADC program to affect grey fox, porcupine, kit fox, raccoon, and striped skunk populations. Additionally, the potential exists for the ADC program to kill nontarget bobcats.

Of the above animals listed as nontarget species, the grey fox, kit fox, bobcat and striped skunk are considered as furbearers under Utah statutes. Striped skunks are, however, considered unprotected furbearers, with no restrictions on take. Porcupines are considered as protected wildlife under UDWR regulation. UDWR regulates the take of these species, and ADC Take is permitted under a Certificate of Registration. Raccoons are considered as a "depredating animal" under State Statute (UCA 4-23), and are regulated by the UDA. No permit is required to kill a raccoon.

The combined two year take of nontarget species not considered in 4.2.1 is two grey fox, one kit fox, five badgers, one raccoon, one striped skunk, and one porcupine. The ADC take of these species represents far less than 1% of the total take of that species for the same time period.

While Districtwide population estimates are not generally available for these species, the magnitude of this level of take is small and insignificant to these common species. ADC policy will remain to minimize nontarget catches. Under Alternative 1, nontarget catch and kill rates are expected to remain at the same level.

In FY92, a bald eagle was inadvertently captured, and later euthanized. This incident led to a change in ADC Directive 2.450 which has further defined the distance a trap may be placed to an exposed animal carcass. While unfortunate, the death of this eagle is not expected to cause jeopardy to the species, which has been down listed from endangered to threatened, and the change in ADC policy has effectively prevented any further occurrences. Under Alternative 1, no capture of threatened or endangered species is anticipated.

Under Alternative 1, no protection from predation will be offered to other wildlife species, other than an incidental benefit from the control of predators to protect livestock. This could result in localized reductions of big game numbers, especially mule deer and pronghorn antelope that are subject to coyote predation. Other species, such as the threatened Utah prairie dog and the endangered desert tortoise, would not receive protection. This would severely hamper the reintroduction efforts of Utah prairie dogs aimed at recovering the species, and would limit ADC's ability to contribute to desert tortoise protection, as directed by the Endangered Species Act (Section 7 (a)(1)). In all cases, the management objectives of the wildlife managing agencies for these species would not be met under Alternative 1.

Pre-Decisional

4.2.2.2 Alternative 2. -No Control and Alternative 6. - Technical Assistance Only:

Alternative 2 and Alternative 6 would result in no ADC operational program taking place. Thus, their impacts will be the same. No nontarget animals would be captured by ADC. However, it must be considered that overall nontarget captures could increase as untrained individuals would attempt to conduct control. For the more common species, the magnitude will likely be similar to the current program. However, some endangered species may become inadvertently killed by these efforts, especially if the efforts include the illegal use of pesticides. While ADC would still be available to advise producers under Alternative 6, compliance with ADC advice would be voluntary.

Alternative 2 would result in a nontarget take greater than those under Alternative 1, which may further endanger some species. Alternative 6 would result in a greater nontarget take than those described in Alternative 1, although probably not as many as under Alternative 2. ADC would still place special emphasis on protecting endangered species.

Under both alternatives, no protection would be offered to other wildlife species. The effects would be similar to those described under Alternative 1.

4.2.2.3 Alternative 3. - IWDM for Multiple Resources:

Alternative 3 would allow for the protection of other wildlife species in the implementation of the ADC program and present a program that provides for coordinated efforts to protect livestock, wildlife, and public health and safety. Coordination would occur between land and wildlife managing agencies. Local populations of some big game populations, waterfowl and ringed-neck pheasant populations could benefit from WDM under specific conditions. ADC can also assist in the protection of T&E species at the request of the UDWR or FWS. Wildlife managing agencies would better be able to meet their objectives for management of these species where predation is considered the main threat to species recovery.

Through coordinated efforts, some species will be considered as targets in areas where they currently serve as nontargets. This will especially be true for red fox in waterfowl protection plans, and badgers in areas of Utah prairie dog transplants. Changes in timing of control will also allow ADC Specialists to use more selective control equipment, especially on National Forest System lands. Overall, however, the nontarget capture and kill rate will remain essentially unchanged. Impacts to nontarget populations will be similar to those described under Alternative 1.

4.2.2.4 Alternative 4. - Non-lethal Control Prior to Lethal Control:

As noted throughout this document, Alternative 4 is nearly identical to the current program, as most producers currently employ non-lethal methods. The impacts to nontarget wildlife, including T&E species and big game, would be identical to that described under Alternative 1.

4.2.2.5 Alternative 5. - Corrective Control Only:

Under Alternative 5, control would be limited to those instances where confirmed predator damage has been documented. Likely, ADC would respond with increased use of aerial hunting, and call and shoot techniques, both of which are highly selective for the offending animals. However, nontarget wildlife may be taken in producer initiatives without ADC preventive control. Overall, impacts to nontarget wildlife populations, T&E and big game species would be similar to Alternative 1.

4.2.3 Concerns over the use of each WDM method.

4.2.3.1 Alternative 1. - Continue the Current District Program (No Action)⁸:

The use of the LPC, once approved, would be very limited due to its label restrictions. Under Alternative 1, we anticipate its use in less than 10 instances per year, resulting in the death of up to 12 coyotes. Similar use patterns would exist under Alternatives 3, 4, and 5.

Pre-Decisional

The WDM methods available for use in the current program are described in 3.2.1, and will not be repeated here. Under the current program, all methods are used as selectively and humanely as possible, in conformance with the ADC Decision Model (Slate et al. 1992) and ADC Program Directives. Actual deployment of each method is currently, stored in the MIS system, however an output report summarizing the number of "device nights" is not available. As an index of use, the number of target animals taken, by method, is presented in Table 4-3.

Table 4-3. Target Animal Take by Method During FY 93 & 94 Combined:

Species	Trap	Neck Snare	Aerial Hunt	Foot Snare	Call/ Shoot	Shoot	Dogs	M-44	Den
Coyote	236	181	2594	----	513	101	44	441	726
Red Fox	1	----	7	----	1	4	----	2	18
Bear	----	3	----	4	----	----	1	----	----
Cougar	----	3	----	30	----	----	50*	----	----

* includes two cougars captured and moved.

Under Alternative 1, method use would remain the same, with heavy reliance on selective methods such as aerial hunting, call and shoot, and M-44s. Leghold traps would remain important tools on the summer range (including National Forest System lands) due to a lack of authorization for control outside of the grazing season. Control methods for cougar and bear will not change. Producer implemented non-lethal methods would not change.

4.2.3.2 Alternative 2. - No Federal ADC Program and Alternative 6. - Technical Assistance Only:

Under both Alternative 2 and Alternative 6, no Federal operational WDM would exist, therefore no methods would be employed by ADC personnel. Livestock producers or State and local agencies would likely conduct a WDM, and possibly the use of methods under these programs would be less regulated. 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. Further, livestock producers or their employees may take a cougar or bear, which has threatened or killed livestock within 72 hours of the event. This provision would allow for the killing of a bear or cougar 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.

4.2.3.3 Alternative 3. - IWDM for Multiple Resources:

Alternative 3 would provide for an IWDM strategy, based on the need to protect multiple resources. The major change in this management strategy would be in the timing of control, with method use being essentially the same as under Alternative 1. Denning, currently authorized on the National Forest System lands but not used, call and shoot, and aerial hunting could all increase slightly. Leghold trap use on National Forest System lands would decrease as problem sites could be addressed before the arrival of livestock. M-44 devices could not be used for the protection of wildlife, other than T&E species, so substantial increases in M-44 device use would not occur. Methods for the control of black bear and cougar damage would not change. Producer implemented non-lethal control methods would remain the same.

4.2.3.4 Alternative 4. - Non-lethal control Prior to Lethal Control:

As noted throughout the document, Alternative 4 does not substantially differ from the existing program. The impacts of Alternative 4 would be the same as the impacts of Alternative 1.

4.2.3.5 Alternative 5. - Corrective Control Only:

Under Alternative 5, no lethal preventive control would be allowed. Methods used to resolve wildlife damage

Pre-Decisional

under this Alternative would be selected based on timeliness and site specificity. No consideration of other resources requested for protection would be allowed. Increased use of aerial hunting, and call and shoot methods would occur, with decreased use of M-44s. Leghold trap and neck snare use would remain unchanged. Producer implemented non-lethal methods would remain unchanged.

4.2.4 Concerns over the Selectivity, Relative Cost and Humaneness of each WDM Method.

The selectivity of each method described in Chapter 2 is based, in part, on the application of the method and the skill of the ADC Specialist, 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, section 2.3.2. The selectivity, relative cost and humaneness of each Alternative are based on the methods employed under that alternative.

Schmidt and Brunson (1995) surveyed the public on the humaneness of WDM methods where respondents were asked to rate a variety of WDM methods on humaneness (1=not humane, 5= humane). Methods were ranked based on the perception of the individual, with no instructions given how to base their score (Table 4-4).

Table 4-4. Public Attitudes Toward Humaneness of WDM Methods.

Method	Ranking
Adjusting planting/grazing schedules	4.4
Human guards/livestock herders	4.2
Fencing out wildlife	4.0
Scare devices	4.0
Fertility control	4.0
Guard dogs/animals	3.7
Chemical repellents	3.7
Live traps	3.7
Calling and shooting	2.7
Poisons for predators	2.3
Fumigation or gassing dens	2.1
Foot snares	1.9
Shooting animals from aircraft	1.9
Neck snares	1.7
Leghold traps	1.7

4.2.4.1 Alternative 1. - Continue the Current Program:

Leghold traps are perceived as less humane than other methods, in some measure due to public perceptions of the traps. ADC currently employs traps with offset jaws to reduce injury. Traps are checked every 48 hours and animals captured are euthanized, or in case of a non-target capture released if capable of surviving. By policy, ADC traps are equipped with pan-tension devices to impede non-target captures unless the use of the device excludes the capture of a target animal. Target to non-target capture rates for less skilled trappers, or trappers that

Pre-Decisional

do not use under pan-tension devices contribute to the perception that leghold traps are not selective. However, traps are selective as employed by ADC Specialists because of the mitigation measures and ADC policy restrictions. In FY93 and FY94 combined, 237 target animals were captured with only 14 non-target animals captured. Six of the 14 non-target captured animals were released, while eight were euthanized. Foot snares are employed like traps for cougar and bear damage management, although they are generally checked daily. The recent use of remote transmitters to signal when a foot snare has been disturbed has allowed for easier monitoring of the snares, further increasing humaneness. As employed by ADC Specialists, foot snares are highly selective. In FY93 and FY94 combined, ADC Specialists in the District captured 34 target animals with two non-target captures. One non-target animal was released. The other was euthanized. Traps are considered moderately expensive due to the UDWR trap check regulation and policies, increased travel time and larger workforce required to effectively use them.

Neck snares are not generally perceived as humane. A successful capture of an animal around the neck generally results in death, however, this death is not considered a type of euthanasia by the American Veterinary Medical Association (AVMA). Occasionally, a snared animal may be captured around the chest or abdomen. Snares, by law, are checked every 96 hours. Neck snares, as employed in the ADC program, are selective for target animals, although less so than leghold traps. In FY93 and FY94 combined, 187 target and eight non-target animals were captured. Two of the nontarget animals were released. Neck snares are less expensive than leghold due to a longer UDWR check requirement.

Aerial hunting is perceived as inhumane by the public in Schmidt and Brunson's (1995) study, but they believed the perception is based on "fairness" rather than actual pain or suffering. In actuality, aerial hunting results in less anxiety and a rapid death from one or more gunshots. The use of a "ground crew" provides for a quick follow-up should a wounded animal escape in thick cover. Aerial hunting is very selective, not only allowing for identification of the target, but its use in a specific geographic area allows for control of specific individuals or populations responsible for damage. No non-target animals were taken in the District in FY93 and FY94 while 2601 target animals were taken by this method. Aerial hunting is an expensive method but, when used, it is considered effective enough to offset the costs.

Calling and shooting, and shooting are regarded as more humane than equipment placed for the capture of predators. Both methods are highly selective, as positive identification of the predator would be made before shooting. Combined, 619 target animals were removed by these two methods in FY93 and FY94 with no non-target animals removed. Both methods are moderately expensive due to high workforce costs and diminishing results over time.

Dogs are used during coyote hunting to attract predators to a caller who may then shoot the animal. The use is similar in humaneness and selectivity to call and shoot methods. In the hunting of cougars and bears, trailing hounds are used to follow the offending animal from the site of the depredation and hold the animal at bay, usually in a tree. The use of hounds may not be perceived as humane, presumably because of the anxiety of the predator. Dogs can be highly selective, not only for the offending species but for offending individuals. Usually, if a non-target bear or cougar is encountered, it is "treed" and can be released. In FY93 and FY94, 95 target predators were removed with the use of hounds with a single non-target bear killed by this method. Dogs are moderately expensive to use for WDM due to increased travel expenses, high workforce requirements and expenses necessary in maintaining the dogs

The M-44 device is perceived by ADC Specialists as humane, owing to the rapid death following the pull of the device. It was not included in Schmidt and Brunson's (1995) evaluation, since they believed the public would not know how the device functions. Rather, they asked the public if "poisons for predators" were humane, and the general response was that they were not. M-44 devices are highly specific to members of the Canidae family, and as employed in the ADC program, are highly specific to coyotes (Connolly 1988). In FY93 and FY94, 443 target predators were killed by the device while one red fox was the only non-target taken. M-44 devices are less expensive than traps or snares due to a weekly check requirement by the EPA.

Denning is the practice of finding the den of the offending species and asphyxiating the offspring with a gas cartridge. While not generally perceived as humane, the use of carbon monoxide is considered a form of euthanasia by the AVMA. Again, the issue of "fairness" may enter into the humaneness issue. Denning is very selective as positive identification of the species is possible. In FY93 and FY94, 744 target predators were killed by denning, with no non-target animals being taken. Denning, and the act of finding the den is time consuming and therefore, could be more expensive than other methods.

Pre-Decisional

The toxicant in the Livestock Protection Collar (LPC) causes death after the target predator punctures the collar. However, since death is based on the amount of toxicant ingested, along with other factors and is not instantaneous, it would not be perceived as humane. The LPC is, however, very selective, requiring an attack on the throat of a collared sheep. The LPC is more expensive than traps because of increased monitoring of the target flock, the initial costs of the LPCs, and sacrifice of additional livestock attacked and killed while wearing an LPC.

Non-lethal methods are generally perceived as humane, although familiarity with the impacts of the methods may change this perception. Guard dogs, while not killing coyotes, will chase and occasionally kill rabbits, deer, antelope or elk fawns that are using the range at the same time. Fencing of livestock pastures may inhibit big game movement, resulting in restricted migration and possibly death through starvation (V. W. Howard, Jr., NM State University, pers. comm. 1994). Increased husbandry practices may temporarily decrease livestock depredations, but could increase anxiety in the livestock, resulting in lower birth rates and increased abandonment of young, which then starve. Nonlethal methods are moderately expensive (guard animals and herders) to very expensive (fencing and habitat modification). Costs of many nonlethal methods are borne by livestock producers.

The current program uses the above methods for the resolution of wildlife damage in the District. Non-capture methods (aerial hunting, call and shoot, shooting, denning, M-44s and dogs for coyotes) accounted for 4,451 target animals taken in the District, or 90% of the target animals taken in FY93 and FY94. Dogs for cougar and bear accounted for 51 target animal captures (two of which were moved), or 1% of the target animals captured in the same period. Capture methods (leghold traps, foot snares and neck snares), which would involve potential capture injury and anxiety, accounted for 458 target animal captures, or 9% of the target animal captures.

The current program is highly selective, with 27 non-target captures and 17 non-target kills in two fiscal years. Selectivity depends on training, experience and the manner in which the methods are used and the program is implemented.

Aerial hunting, call and shooting, shooting and denning by skilled ADC Specialists are extremely selective methods: no non-targets were taken by these methods in FY93 and 94 while 80% of the target animals were taken by these methods combined.

4.2.4.2 Alternative 2. - No Federal ADC Program, and Alternative 6. - Technical Assistance Only:

These two Alternatives, which would provide no Federal operational ADC program, could arguably be determined the most humane, as no wildlife would be killed by the Federal government. However, the effect, specifically increased producer efforts and the resultant increases in lethal methods, nonspecific trapping and possibly illegal use of toxicants, would negate any increases in humane treatment of wildlife under these Alternatives. As no Federal program would be in place, selectivity and cost of methods used by ADC would not be an issue. Producer implemented lethal methods may not be as selective.

4.2.4.3 Alternative 3. - IWDM for Multiple Resources:

Alternative 3 would be considered slightly more humane than Alternative 1, owing to increases in denning, aerial hunting, and calling and shooting, and a decrease in the reliance on trapping. The cost of implementing Alternative 3 could be slightly more expensive than Alternative 1, but the methods used would be considered effective enough to offset any additional cost. The slight shift in methods would result in a slight increase in selectivity over Alternative 1.

4.2.4.4 Alternative 4. - Non-lethal Control Prior to Lethal Control:

The humaneness, selectivity and cost of Alternative 4 would not be substantially different from Alternative 1.

4.2.4.5 Alternative 5. - Corrective Control Only:

Alternative 5 would be considered slightly more humane and selective than Alternative 1, due to increased use of aerial hunting and calling and shooting; the cost of WDM would increase under Alternative 5.

4.2.5 Concerns over the effects of ADC WDM in Wilderness and WSAs.

WDM in designated WAs or WSAs is permitted under regulations developed by the Forest Service and the BLM.

Pre-Decisional

However, some members of the public object to such activities, believing they interfere with the predator/prey balance of the area, and interfere with the wilderness experience of the visitor.

4.2.5.1 Alternative 1. - Continue the Current Program (No Action):

The current program involves a complicated set of rules governing WDM in WAs or WSAs. WDM has occurred in the Ashdown Gorge WA on the Dixie National Forest on a corrective control only basis. Similarly, activities in WSAs in the Richfield BLM District are on a case-by-case basis, following the documented loss of livestock to predators. In the Moab BLM District, WDM in WSAs is permitted for cougar or bear predation, as these activities are directed by the policies of the UDWR. However, no lethal control of coyotes may be conducted in WSAs until 2% of the sheep grazing in the area have been confirmed as killed by coyotes. No requests for WDM in WAs or WSAs have been received from livestock operators in the Cedar City BLM District, the Manti-LaSal National Forest or the Fishlake National Forest.

Negative impacts to wilderness values may include decreased visitor enjoyment or solitude if they observe the WDM in progress, or evidence of the activities, such as signs posted at the entrance to the areas. Some members of the public believe the integrity of the wilderness itself is compromised by management activities of any kind, including wildlife management. There is also a short term effect in possibly reduced opportunity to see or hear predators, particularly coyotes, in WAs or WSAs resulting from WDM.

Positive aspects to wilderness values include increased opportunity to observe other wildlife that benefit from WDM, such as deer, pronghorn and rabbits. WDM may also assist the land managing agency reach multiple use goals for these areas, by providing a safer environment for people and livestock to graze. WDM is not currently carried out specifically for the benefit of wildlife.

Currently, no restrictions on WDM methods in WAs or WSAs by anyone other than ADC are in place. Producers, private trappers and sport hunters are allowed free access to WAs and WSAs, and remove wildlife under provisions established by the UDWR. The effects of these efforts have historically been low and are expected to continue in this manner.

4.2.5.2 Alternative 2. - No Federal ADC Program, and Alternative 6. - Technical Assistance Only:

Under these two Alternatives, no Federal operational WDM would occur in the District, including WAs and WSAs. Negative impacts to wilderness values could include increased producer efforts that would be less selective, decreased wildlife viewing opportunities for prey species currently benefitted by current method use, and decreased opportunity for safe livestock grazing. Positive impacts to wilderness values could be a more enjoyable visit by wilderness visitors, due to the lack of control equipment or its evidence. Increased opportunity to view or hear predators may be offset by decreased opportunity to view other wildlife negatively affected by a lack of control. Land managing and wildlife managing agency objectives may not be reached.

4.2.5.3 Alternative 3.- IDWM for Multiple Resources (Proposed Action):

Under the proposed action, WDM may be conducted in WAs or WSAs as appropriate, if consistent with BLM and Forest Service direction. WDM would be the least amount necessary to protect the desired resource, whether wildlife or livestock, or public health and safety. Where possible, resource protection would be included in annual work plans. Where a history of livestock loss is not available to demonstrate the need, and wildlife resource protection is not an objective of the UDWR or FWS, WDM activities would be on a case-by-case basis, with review of the action by the land managing agency to assure the proposal complies with agency policies or objectives.

Negative impacts to wilderness values may include decreased solitude to the visitor in the WA or WSA at the time of the WDM, and a decreased opportunity to see or hear some predators. Also, some members of the public will believe that the integrity of the WA would be compromised by any management activity including WDM. Positive impacts to wilderness values include increased opportunity to view other wildlife, especially in areas where WDM has been requested to assist wildlife populations. Alternative 3 will also allow ADC to assist land managing agencies reach multiple use goals for WAs and WSAs, by fostering a safer environment for people, livestock and to assist wildlife managing agencies achieve management objectives for wildlife in these areas.

4.2.5.4 Alternative 4. - Non-lethal Control Prior to Lethal Control:

Pre-Decisional

Alternative 4 would allow lethal control of predators in areas where non-lethal control had not been sufficient to protect the livestock. As such, Alternative 4 is the same as the current program for the Richfield BLM District, and the Dixie National Forest and for areas where control has not been requested. However, this Alternative would allow control in WSAs in the Moab BLM District upon documentation of non-lethal efforts and the verification of livestock losses in the WSAs. It would replace the 2% loss criteria currently in place.

Impacts to wilderness values under Alternative 4 would be the same as for Alternative 1, except there would likely be increased WDM in the Book Cliffs area, where sheep graze in WSAs. Visitors to those areas would be subject to the same negative and positive impacts as visitors in the other BLM Districts.

4.2.5.5 Alternative 5. - Corrective Control Only:

As described in 4.2.5.1, all control in WAs and WSAs is currently on a corrective basis, following the documented loss of livestock to predators, with the exception of the 2% threshold established in the Moab BLM District. As such, the impacts to wilderness values under Alternative 5 would be the same as under Alternative 1, except the Moab BLM District WSAs in the Book Cliffs. There, impacts to wilderness values would be the same as in the other BLM Districts.

4.2.6 Concerns over the effects of ADC WDM on other activities on Public Lands.

4.2.6.1 Alternative 1. - Continue the Current Program (No Action):

Under Alternative 1, WDM is integrated into other activities on public lands at annual work plan meetings held between ADC and the BLM and Forest Service. At each meeting, the needs for WDM are discussed, including past loss and control data, changes in the grazing season and other activities, such as planned events or logging operations on the lands identified for WDM activities. Each of the current EAs contain provisions for the establishment of public safety zones around areas of known use, and ADC policies provide for restrictions in control methods based on other uses of an area. The Reasonable and Prudent Alternatives provided by the FWS in the Endangered Species Act (ESA) Section 7 consultation are placed into effect based on known or suspected T&E species in the areas. Other measures are in place to preclude negative impacts on other wildlife, such as restrictions on aerial hunting in areas of raptor nesting or bighorn lambing grounds. These are factored into the ADC Decision Model and strategies for WDM are developed based on the combined needs in the area.

Over the past two years, no significant conflicts with other uses have been identified in the annual work plan process. The mitigation described above has, in effect, been sufficient to preclude conflicts. In that time, several questions have been raised at the District level, regarding the compatibility of WDM activities and recreational use. Most of these were in response to recreationists observing warning signs posted according to ADC policy. Others were requests for information on control methodologies from areas where ADC did not conduct WDM.

Livestock grazing is another use of the public lands, and its permitted use is one way land managers meet their multiple use objectives for these areas. WDM assists public land grazers by protecting sheep, and where permitted, cattle while on public lands. WDM for cattle protection is currently restricted to corrective control only on the Moab BLM District and part of the Richfield BLM District. Restrictions on the season of control prevent WDM on summer sheep range on National Forest System lands.

Wildlife management objectives set by the UDWR or the FWS for public lands may not be achievable under the current program. Where protection of a wildlife resource is determined to be necessary, the current program requires WDM be based on only the livestock grazing programs.

WDM as currently mitigated, adversely affects livestock grazing and wildlife management activities. Other uses on the public lands, are not adversely affected.

4.2.6.2 Alternative 2. - No Federal ADC Program, and Alternative 6. - Technical Assistance Only:

Under these two alternatives, no opportunity for the Federal ADC program to conflict with recreational uses of public lands would be available. Similarly, no opportunity to assist land or wildlife managers in meeting their objectives for these lands would be available. Livestock or wildlife objectives for public lands may not be achieved under these two alternatives.

4.2.6.3 Alternative 3- IDWM for Multiple Resources (Proposed Action):

Pre-Decisional

Under Alternative 3, the annual work plan process will continue, with the addition of the wildlife managing agencies. Mitigation developed for the protection of public health and safety, T&E species, other sensitive wildlife, and other needs will continue to be incorporated into the annual work plan. ADC program policies regarding mitigation of possible adverse impacts to public health and safety will continue in force. The inclusion of wildlife resources in need of protection would assist the wildlife management agencies achieve their objectives for these lands. Public land cattle producers in all BLM Districts will receive WDM as needed to achieve their objectives. The season of control restrictions on National Forest System lands could be altered to allow for incorporation of wildlife objectives. If so, WDM for the protection of sheep on the National Forest System lands could be enhanced. The possibility still exists however, that predator losses will continue to be unacceptably high for individual sheep and cattle producers.

WDM under Alternative 3 would be compatible with all uses of the public lands but may be marginal in relation to meeting the objectives of the EA for some producers.

4.2.6.4 Alternative 4. - Non-lethal Control Prior to Lethal Control:

As noted elsewhere, Alternative 4 is not significantly different from the current program. The impacts of Alternative 4 on other uses of the public lands would be the same as the impact of Alternative 1.

4.2.6.5 Alternative 5. - Corrective Control Only:

Under Alternative 5, WDM would only take place after the confirmed loss of livestock to predators. There would be no need for the development of an annual work plan, therefore mitigation designed to protect other wildlife, public health and safety or other uses of the public land would be provided to ADC on a case-by-case basis. For most uses of the public land, the impacts would be the same as under Alternative 1. For sheep producers, meeting the objectives for livestock protection would not be achieved. Some of these producers would go out of business, or change class of livestock, making it difficult or impossible to meet the range management objectives of the BLM or Forest Service. Wildlife management objectives set by UDWR or the FWS for public lands may not be achieved under Alternative 5. Where protection of a wildlife resource is determined to be necessary, Alternative 5 requires WDM be based on confirmed livestock losses only.

WDM under Alternative 5 would adversely affect livestock grazing and wildlife management activities. Other uses on the public lands, would not be adversely affected.

4.2.7 Concerns over the effects of ADC WDM on Public Health and Safety.

4.2.7.1 Alternative 1- Continue the Current Program (No Action):

Effects on public health and safety include potential benefits caused by ADC fostering a safer environment and potential negative effects that might result from the exposure of the public to WDM methods. The current program uses integrated methodologies to protect livestock, primarily sheep on public and private lands. The ADC FEIS (USDA 1994) identified risks to the public from ADC chemical and nonchemical methods and concluded low public health risks were associated with use of all nonchemical methods. The three chemical methods used in predator damage management (sodium cyanide in the M-44, sodium nitrate in the gas cartridge, and sodium fluoroacetate in the LPC) posed probable risks, but 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 three chemicals were primarily environmental risks addressed by the EPA rather than safety or health risks to the public. The risks to health or safety are generally limited to the ADC Specialists associated with implementing the methods. During FY93 and FY94, no instances of compromised public health and safety in the District were reported to ADC.

4.2.7.2 Alternative 2. - No Federal ADC Program, and Alternative 6. - Technical Assistance Only:

Alternative 2 and Alternative 6 would result in no Federal operational WDM program in the District. The low risks associated with Federal use of WDM methods would be nonexistent under these two alternatives. However, increased use of the same methods by less skilled trappers or livestock producers, and without policy restrictions on how WDM is conducted may result in an increased risk to the public. No program would be available for the protection of aviation safety, and UDWR would not have access to ADC Specialists in the event of black bear or cougar attacks on humans. Both Alternatives would result in increased risks to public health or safety over those identified in Alternative 1.

Pre-Decisional

4.2.7.3 Alternative 3. - IWDM for Multiple Resources:

The methods available for use under Alternative 3 would be the same as those identified in Alternative 1. The impacts to public health and safety would be the same as under Alternative 1.

4.2.7.4 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 are the same as those identified for Alternative 1.

4.2.7.5 Alternative 5. - Corrective Control Only:

Although the use of WDM methods under Alternative 5 may differ from the current program, the shift would not change the low risk factors associated with any of the methods. The impacts of Alternative 5 on public health and safety are similar to those identified for Alternative 1.

4.2.8 Concerns over the Economic Effects of WDM.

The economic impacts of the alternatives are discussed in relation to resolving wildlife damage problems by the District ADC program. Economic impacts are monetary benefits or liabilities that the alternatives would have on livestock, poultry and wildlife losses, and on dangerous human encounters. Economic impacts of the Alternatives are compared against Alternative 1. Costs and benefits associated with implementing IWDM would be considered but may be a secondary concern of overriding legal and environmental considerations. A complete review of the ADC Program's Economic Impact Assessment may be found in the USDA (1994, Chapter 4).

4.2.8.1 Alternative 1. - Continue the Current District Program (No Action):

Costs of the current program in the District for 1994 included salary and benefits for field, supervisory and administrative staff, supplies, equipment, vehicles and transportation, aerial hunting, and all other related program expenditures. During FY1994, about \$752,301 was expended for total District operations. Of this total, \$738,052 was for livestock, livestock feed and poultry protection (98%), \$5,202 was expended for wildlife protection, and about \$9,047 for responding to requests for property protection, urban and crop related programs that will be analyzed in other NEPA documents.

Benefits to sheep and cattle producers from ADC can be measured by comparing the number of livestock protected, the number of livestock killed by predators, and livestock projected to have been saved, to the amount of funds expended for this protection (MIS 1994). The District protected 250,462 head livestock/poultry during 1994. During that same time, livestock and poultry producers reported that 7,757 head were killed by predators (3.2% of the total protected) valued at \$610,135 (Table 1-2). These losses occurred despite current WDM efforts.

Examples of benefits of the current program can be shown by examining predation rates to lambs, sheep, and calves. Table 1-2 of this Chapter shows reported predator losses for lambs, sheep and calves. Reported lamb, sheep, and calf losses from predators in the District in 1994 averaged 4.7%, 2.2%, and 2.4%, respectively. The predation rates for lambs and sheep coincide with the predation rates of between 4% and 8% for lambs and 1% and 2.5% for adult sheep as reported in the literature (USDI, 1978). However, Table 1-2 shows that the reported predation losses of calves are below the Utah level of 3.6% as determined by NASS (1992).

No data exist for the District that shows the predation to livestock or wildlife without WDM. However, hypothetical losses to sheep and lambs can be estimated by comparing the current predation rate from studies of sheep in areas without predator control. Table 4-5 summarizes sheep loss from studies in areas without WDM.

Pre-Decisional

Using the average rate of loss to predators from these studies, a hypothetical loss without WDM can be estimated when

Table 4-6
SUMMARY OF FIELD STUDIES OF SHEEP LOSSES WITHOUT COYOTE CONTROL
Annual Losses (%)

Source	Location	Year	Sheep	Lambs
Henne (1977)	Montana	1974	7.5%	28.8%
Munoz (1977)	Montana	1975	8.1%	24.2%
McAdoo and Klebenow (1978)	California	1976	1.4%	6.2%
Delorenzo and Howard (1976)	New Mexico	1974	Were 0% lost or not reported	12.1%
Delorenzo and Howard (1976)	New Mexico	1975	Were 0% lost or not reported	12.1%

applied to the total number of sheep and lambs protected. These estimates serve as a basis for determining benefits from the current program.

Because no published data exist to show predator losses to calves in areas without WDM, estimating the number of calves that would be lost to predation is impossible. The NASS (1992) survey reported Utah calf loss at of 3.6%; that will be used as a possible calf loss rate for the District. Table 4-6 summarizes sheep and lamb predation with and without control. The difference between the predation rate with WDM and the predation rate without WDM results in projected livestock saved by the District ADC program.

The resultant hypothetical livestock saved amounts to 4690 sheep, 10,893 lambs and 104 calves. When comparing the value of losses without WDM to that reported for areas with WDM, the estimated annual savings could be \$436,873 for sheep, \$615,019 for lambs, and \$42,666 for calves totaling \$1,094,558.

Table 4-6. Actual and Hypothetical Livestock Losses to Predators in the Southern Utah ADC District

Livestock Class	With ADC (% predation)	Without ADC (% predation)	Difference	1994 \$Value	Total Saved
Adult Sheep	3113 (2.2)	7,803 (5.6)	4,690	\$93.15	\$436,873
Lambs	4726 (5.0)	15,619 (16.7)	10,893	\$56.46	\$615,019
Calves	200 (2.4)	304 (3.6)	104	\$410.25	\$42,666
Total					\$1,094,558

Pre-Decisional

Using current program cost data and the hypothetical loss estimate of \$1,094,558, a cost:benefit ratio of 1:1.48 is obtained. It is judged that the District program provides benefits to livestock producers.

The current program provides little direct protection for wildlife and there is no way to determine the cost:benefit of public health and safety. Incidental benefits may occur to wildlife living in areas where livestock protection is afforded. However, seasons of control and areas of control restrictions on Federal lands preclude effective control of predators to benefit wildlife. No direct economic benefit to wildlife can be attributed to the current program.

4.2.8.2 Alternative 2. - No Federal ADC Program:

Based on the above discussion, monies spent to maintain the current program would be saved, but direct and indirect costs to the producer would increase. Compared to current program economic benefits, the No Control alternative offers requesters the least amount of protection. It is believed that livestock and poultry losses would, at a minimum, double or increase to maximum levels found in the studies where no control was conducted unless a non-Federal WDM program was initiated.

Even with a non-Federal program, losses would be expected to increase. The loss rates presented in Table 4-5 are the average losses from research and are below the maximum level experienced. In *SUWA v. Thompson et al.* (US District Court, District of Utah, Civil No. 92-C-0052A), the court found that there were increased predation losses in the absence of the Federal ADC program, even though private programs would have been an option. They also found that increased predation loss, “. . . the predominant reason why ranchers leave the sheep business, threatens the economic viability of the permittees.” Determining total losses under Alternative 2 is difficult, as some sheep producers would go out of the sheep business, thereby decreasing the number of livestock exposed to predation risk. However, the loss amount shown in Table 4-6 represents a conservative estimate of the losses expected for Alternative 2.

4.2.8.3 Alternative 3. - IWDM for Multiple Resources (Proposed Action):

Expenditures for the protection of livestock under Alternative 3 are expected to remain the same. Any changes realized under this alternative are expected to come from increased efficiency through coordinated efforts.

Livestock losses will continue to occur under the proposed action, but are estimated to meet the objectives set forth in 1.1.5. Losses of sheep and lambs are expected to remain constant to decrease slightly, while losses to calves will decrease approximately 57%, resulting in an estimated 115 additional head valued at \$47,178 being saved over Alternative 1. If sheep and lamb losses remain the same, and calf losses decrease to 1%, the effective cost benefit ratio would be 1:1.55.

Neff et al. (1985) and Smith et al. (1986) conducted a cost:benefit analysis and concluded, that the favorable cost:benefit ratios at the end of the 10-year cycle appears to reflect the fact that as the pronghorn antelope population increases, because of coyote damage management, the total number of antelope fawns produced increases resulting in increased payoff for the fixed annual cost of the control operation. In conclusion, they said that coyote population control was a practical and economically sound management tool for certain wildlife management objectives.

A hypothetical cost:benefit analysis by Beasom (1974b) showed that coyote predation management would be economically feasible to bolster deer populations if the animals were harvested by hunters. He further said that each year that management occurred, cost would decline as equipment expenses would be spread out over many years and personnel would become more experienced with the area. His analysis was based on the additional recruitment (reproduction and immigration) of deer with an estimated value of \$150/male deer and \$50/female deer. Costs to hunters during his study were 100% more than what was calculated for his analysis.

Guthery and Beasom's (1977) data suggest that increased herd size because of WDM results in little or no adverse impact on range forage. They cautioned however, that the increased productivity and populations of deer should be managed accordingly to avoid the overuse of range forage. Neff et al. (1985) state that the decrease in coyote population on Anderson Mesa did not exhibit an increase in the rodent or rabbit population.

Based on the research of coyote predation on deer and antelope, providing economic benefit to rural locales by managing coyote predation to increase wildlife populations to huntable levels seems feasible (Smith et al. 1986). By increasing the populations of wildlife, more opportunities exist for recreationists that want a "wildlife experience." This increased level of recreational activity would generate additional sources of income to rural economies. Recreationists purchase food, fuels, lodging, and other items and services in pursuit of their diversions.

Pre-Decisional

In the long term, predator management would not affect coyote populations because of immigration from adjacent areas and increased survival of coyote pups (Windberg and Knowlton 1988, Stoddart 1984). If UDWR objectives are to be maintained, research indicates that monitoring and periodic WDM could be needed to achieve objectives. Alternative 3 would generate a favorable cost:benefits.

4.2.8.4 Alternative 4. - Non-lethal Control Prior to Lethal Control:

As noted earlier, this alternative does not substantially differ from the current program. The economic impacts associated with Alternative 4 are the same as those associated with Alternative 1.

4.2.8.5 Alternative 5. - Corrective Control Only:

The economic impacts of this alternative include increased losses of adult sheep and lambs to coyotes. Losses of all livestock to cougar and bear, and most of the losses of calves to coyotes 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 4-5, as often lamb losses go undetected until they are large enough that carcasses remains may be readily found. Adult sheep losses would increase, although not to the extent indicated in Table 4-5. While speculative, adult sheep losses would be between 3-5% and lamb losses would be between 12-15%. Calf losses would be expected to remain between 2-3%. Using the lower and upper loss percentages and 1994 livestock numbers and values, losses of this magnitude would result in \$1,092,377 to \$1,544,978 in livestock losses in the District annually, or an increased economic loss of \$482,242 to \$934,833.

As with the current program, Alternative 5 would provide little direct protection for wildlife. Incidental benefits could occur to wildlife living in areas where livestock protection is afforded, but these would be less than in Alternative 1. No direct economic benefit to wildlife would be attributed to Alternative 5.

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 WDM techniques. Even if costs remain the same, a negative cost:benefit ratio exists, given the loss rates estimated above.

4.2.8.6 Alternative 6. - Technical Assistance:

Program costs to implement this alternative would be less than Alternatives 1 and 3. Technical Assistance activities would reduce costs associated with ADC personnel and IWDM. ADC Specialists positions in the District would be decreased to only those needed to provide technical assistance and make recommendations to landowners or permittees wishing to conduct their own control programs. Livestock producers would absorb the cost of hiring private control agents or doing the work themselves. No ADC assistance would be provided to the UDWR for the protection of wildlife or public health and safety. The UDWR would have to contract control activities to private individuals or conduct control activities itself. It is believed that livestock and poultry predation could, at a minimum, double or increase to levels found in the studies where no control was conducted unless a non-Federal WDM program was initiated. We project that program costs would decrease by two-thirds.

Table 4-7. Economic Benefits of WDM

	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
Livestock/Poultry	Favorable	Unfavorable	Favorable	Favorable	Unfavorable	Unfavorable
Wildlife	Unfavorable	Unfavorable	Favorable	Unfavorable	Unfavorable	Unfavorable

Program costs to implement this alternative would be less than Alternatives 1 and 3. Technical Assistance activities would reduce costs associated with ADC personnel and IWDM. ADC Specialists positions in the District would be decreased to only those needed to provide technical assistance and make recommendations to landowners or permittees wishing to conduct their own control programs. Livestock producers would absorb the cost of hiring private control agents or doing the work themselves. No ADC assistance would be provided to the UDWR for the protection of wildlife or public health and safety. The UDWR would have to contract control activities to private individuals or conduct control activities itself. It is believed that livestock and poultry

Pre-Decisional

predation could, at a minimum, double or increase to levels found in the studies where no control was conducted unless a non-Federal WDM program was initiated. We project that program costs would decrease by two-thirds.

4.2.9 Summary of ADC’s Impacts

Table 4-8 is a comparison of the alternatives and environmental consequences (impacts). The level of impacts is based on the above analysis and rated as: Neutral, Neu/Low, Low, Low/Moderate, Moderate, Moderate/High, and High. The impacts are also rated in a positive(+) or negative (-) manner, in that, the impacts are based on individual or society’s perception of how the impact could affect the environment.

Table 4-8. Issues/Impacts/Alternatives/Comparison

Issues/Impacts	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
Coyote	Low (-)					
Black Bears	Low/Mod (-)	Neu/Low (-)	Low/Mod (-)	Low/Mod (-)	Low (-)	Neu/Low (-)
Cougar	Low (-)	Neu/Low (-)	Low (-)	Low (-)	Low (-)	Neu/Low (-)
Red Fox	Low (-)					
Nontarget	Low (-)					
Big Game	Low (-)	Moderate (-)	Mod/High (+)	Low (-)	Low (-)	Moderate (-)
T&E Species	Low (-)	Mod/High (-)	Mod/High (+)	Low (-)	Low (-)	Mod/High (-)
Methods*	Moderate	Low	Moderate	Moderate	Low	Low
Selectivity	Low (+)	Neu/Low(-)	Low (+)	Low (+)	Low (+)	Neu/Low (-)
Cost:Benefit	Moderate (+)	Neu/Low (-)	Moderate (+)	Moderate (+)	Moderate (-)	Moderate (-)
Humaneness*	Low	Low	Low	Low	Low	Low
WSAs/WAs*	Low	Low	Low	Low	Low	Low
Public Lands*	Low	Low	Low	Low	Low	Low
Public Health Safety	Low (+)	Low	Low (+)	Low (+)	Low (-)	Low (-)
Economics	Low (+)	Low (-)	Low (+)	Low (+)	Low (-)	Low (-)

* Evaluated strictly on the use of WDM methods and not on perceptions because of a wide range of human perceptions on the issue.

Based on the diversity and distribution of the affected environment, the above analysis failed to identify any cumulative impacts nor are any impacts expected because of WDM conducted by the District program. Any localized reduction of predator populations would soon be replaced and habitats reoccupied as ADC personnel could only conduct WDM on areas with Agreements for Control, Cooperative Agreements or annual work plans. Currently this is only 23% of the area. In addition, cougar and black bear are regulated by the UDWR, and ADC responds to predation caused by these species, with close cooperation with UDWR. The effects (“Other take + ADC take”) to predator populations that ADC targets during WDM are low to low/moderate and is not having long-term adverse impact on any species.

Pre-Decisional

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Pre-Decisional

APPENDIX A

LITERATURE CITED

- ADC Directive 1.201 ADC Mission and Program Philosophy
- ADC Directive 2.105 The ADC Integrated Wildlife Damage Management Program
- ADC Directive 2.201 ADC Decision Model
- ADC Directive 2.210 Compliance with Federal, State, and Local Laws and Regulations
- ADC Directive 2.301 Migratory Bird Damage Control and Depredation Permits
- ADC Directive 2.310 Threatened and Endangered Species
- ADC Directive 2.401 Pesticide Use
- ADC Directive 2.415 M-44 Use and Restrictions
- ADC Directive 2.420 Livestock Protection Collars
- ADC Directive 2.425 Denning
- ADC Directive 2.450 Traps and Trapping Devices
- ADC Directive 3.101 Cooperative Programs
- ADC Directive 3.110 Funding Arrangements
- ADC 1995. Nonlethal Methods Summary, Southern Utah ADC District, ADC District Office, Richfield, UT
- Ables, E. D. 1969. Activity studies of red foxes in southern Wisconsin. *J. Wildl. Manage.* 33:145-153.
- Allen, S. H., J. O. Hastings, and S. C. Kohn. 1987. Composition and stability of coyote families and territories in North Dakota. *Prairie Nat.* 19:107-114.
- _____, and A. B. Sargeant. 1993. Dispersal patterns of red foxes relative to population density. *J. Wildl. Manage* 57:526-533.
- Althoff, D. P. 1978. Social and spatial relationships of coyote families and neighboring coyotes. M.S. Thesis, Univ. Nebraska, Lincoln. 80pp.
- Andelt, W. F. and P. S. Gipson. 1979. Home range, activity, and daily movements of coyotes. *J. Wildl. Manage.* 43:944-951.
- Andrews, R. D., G. L. Storm, R. L. Phillips, and R. A. Bishop. 1973. Survival and movement of transplanted and adopted red fox pups. *J. Wildl. Manage.* 37:69-72.
- Animal Damage Control Act of March 2, 1931. (46 Stat. 1468: 7 USC 426-426c) as amended
- Arrington, O. N., and A. E. Edwards. 1951. Predator control as a factor in antelope management. *Trans. N. Am. Wildl. Conf.* 16:179-193.
- Ashman, D., G.C. Christensen, M.L. Hess, G.K. Tsukamoto and M.S. Wickersham. 1983. The mountain lion in Nevada. Nevada Dept. of Wildlife, Reno. 75pp.
- Atzert, S. P. 1971. A review of sodium monofluoroacetate (Compound 1080) its properties, toxicology, and use in predator and rodent control. USDI, FWS, Spec. Sci. Rpt.--Wildl. No. 146. 34pp.
- Barrett, M. W. 1978. Pronghorn fawn mortality in Alberta. *Proc. Pronghorn Antelope Workshop* 8:429-444.
- Bartush, W. S. 1978. Mortality of white-tailed deer fawns in the Wichita Mountains, Comanche County, Oklahoma, Part II. M.S. Thesis. Oklahoma State Univ., Stillwater, OK. 161pp.
- Beale, D.M., and A.D. Smith. 1973. Mortality of pronghorn antelope fawns in western Utah. *J. Wildl. Manage.* 37:343-352.

Pre-Decisional

- _____. 1978. Birth rate and fawn mortality among pronghorn antelope in western Utah. Proc. Pronghorn Antelope Workshop 8:445-448.
- Beasom, S. L. 1974a. Relationships between predator removal and white-tailed deer net productivity. J. Wildl. Manage. 38:854-859.
- _____. 1974b. Intensive short-term predator removal as a game management tool. Trans. N. Am. Wildl. Conf. 39:230-240.
- Bekoff, M., and M. C. Wells. 1982. Behavioral ecology of coyotes: social organization, rearing patterns, space use, and resource defense. Z. Tierpsychol. 60:281-305.
- Blackwell, B. 1995. UDWR. pers. comm.
- Blakesley, C. S., and J. C. McGrew. 1984. Differential vulnerability of lambs to coyote predation. Appl. Animal Behav. Sci. 12:349-361.
- BLM (Bureau of Land Management). 1981. Wilderness Management Policy. USDI, BLM. 36 pp.
- _____. 1987. Interim Management Policy and Guidelines for Lands Under Wilderness Review. Update Document H-8550-1. USDI, BLM. 56 pp.
- _____. 1991 Utah Statewide Wilderness Study Report, USDI, BLM. 1120 pp.
- _____. 1994a. Cedar City BLM District Animal Damage Control Environmental Assessment (NO. UT-040V-93-003), USDI, BLM. Cedar City, UT.
- _____. 1994b. Moab District Animal Damage Control Environmental Assessment (No. UT060-93-001), USDI, BLM. Moab, UT.
- _____. 1994c. Richfield BLM District Animal Damage Control Plan Environmental Assessment (No. J-050-094-024), USDI, BLM. Richfield, UT.
- Bodenchuk, M. J. (in press). Environmental Assessment of Wildlife Damage Control for Wildlife Protection, 12th Great Plains Wildlife Damage Control Workshop Proceedings
- Bodie, W. L. 1978. Pronghorn fawn mortality in the upper Pahsimeroi River drainage of central Idaho. Proc. Pronghorn Antelope Workshop 8:417-428.
- Burns, R. J., G.E. Connolly and P. J. Savarie. 1988. Large livestock protection collars effective against coyotes. Proc. Vertebr. Pest Conf. 13:215-219.
- Camenzind, F. J. 1978. Behavioral ecology of coyotes on the National Elk Refuge, Jackson, Wyoming. Pp 267-294 in M. Bekoff, ed. Coyotes: Biology, behavior and management. Academic Press, New York.
- CEQ, 1981. Forty most asked questions concerning CEQ's National Environmental Policy Act regulations. (40 CFR 1500-1508) Fed. Reg. 46(55): 18026-18038.
- CFR (Code of Federal Regulations), 40CFR 1502.14(d). US Govt. Printing Office, Wash. D.C.
- Clark, F. W. 1972. Influence of jackrabbit density on coyote population change. J. Wildl. Manage. 36:343-356.
- Connolly, G. E., and W. M. Longhurst. 1975. The effects of control on coyote populations. Div. of Agric. Sci., Univ. of California Davis. Bull. 1872. 37pp.
- _____. 1978. Predators and Predator Control pp 369-394 in Schmidt J.L. and D.L. Gilbert, eds. Big Game of North America: Ecology and Management. Wildlife Management Institute.
- _____, R. E. Griffiths, Jr., and P. J. Savarie. 1978. Toxic collar for control of sheep-killing coyotes: A progress report. Proc. Vertebr. Pest Conf. 8:197-205.
- _____. 1988. M-44 sodium cyanide ejectors in the Animal Damage Control Program, 1976-1986. Proc. Vertebr. Pest Conf. 13:220-225.
- _____, and R. J. Burns. 1990. Efficacy of Compound 1080 livestock protection collars for killing coyotes that attack sheep. Proc. Vertebr. Pest Conf. 14:269-276.
- _____. 1992. Coyote damage to livestock and other resources. pp. 161-169 in: A.H. Boer, ed. Ecology and Management of

Pre-Decisional

- the Eastern Coyote. Univ. of New Brunswick, Fredericton, N.B., Canada.
- _____. 1994. Analysis of ADC program impacts on coyote populations on the Richfield BLM District. unpub. rpt. ADC District Office Files, Richfields, UT.
- Conover, M. R., 1982. Evaluation of behavioral techniques to reduce wildlife damage. Proc. Wildl.-Livestock Relation Sym. 10: 332-344.
- Cook, R. S., M. White, D. O. Trainer, and W. C. Glazener. 1971. Mortality of young white-tailed deer fawns in south Texas. J. Wildl. Manage. 35:47-56.
- Coolahan, C. 1990. The use of dogs and calls to take coyotes around dens and resting areas. Proc. Vertebr. Pest Conf. 14:260-262.
- Creed, R. F. S. 1960. Gonad changes in the wild red fox (*Vulpes vulpes crucigera*). J. Physiol. (London) 151:19-20.
- Danner, D. A. 1976. Coyote home range, social organization, and scent post visitation. M.S. Thesis, University of Arizona, Tucson. 86 pp.
- _____, and N. S. Smith. 1980. Coyote home range, movements, and relative abundance near cattle feedyard. J. Wildl. Manage. 44:484-487.
- DeLorenzo, D. G. and V.W. Howard, Jr. 1976. Evaluation of Sheep Losses on a Range Lambing Operation Without Predator Control in Southeastern New Mexico. Final Report to the US Fish and Wildlife Service, Denver Wildlife Research Center, NM State Univ. Las Cruces, NM
- Edwards, L. L. 1975. Home range of coyotes in southern Idaho. M.S. Thesis, Idaho State Univ., Moscow. 36 pp.
- EPA Label - Gas Cartridge (EPA. Reg. No. 56228-21)
- EPA Label - M-44 (EPA. Reg. No. 56228-15)
- EPA Label - Livestock Protection Collar (EPA. Reg. No. 56228-22)
- Feldstein, M. and N. C. Klendshoj. 1954. The determination of cyanide in biological fluids by microdiffusion analysis. J. Lab. Clin. Med. 44:166-170.
- Forest Service. 1991. Environmental Assessment for Animal Damage Management on the Dixie National Forest. USDA, Forest Service, Cedar City, UT.
- _____. 1992a. Environmental Assessment for Animal Damage Control Program Fishlake National Forest. Richfield, UT.
- _____. 1992b. Environmental Assessment for Predator Management- Manti/LaSal National Forest. Price, UT
- Garner, G. W. 1976. Mortality of white-tailed deer fawns in the Wichita Mountains, Comanche County, Oklahoma. PhD. Thesis. Oklahoma State Univ., Stillwater. 113 pp.
- _____, J. A. Morrison, and J. C. Lewis. 1976. Mortality of white-tailed deer fawns in the Wichita Mountains, Oklahoma. Proc. Annu. Conf. Southeast. Assoc. Fish and Wildl. Agen. 13:493-506.
- Gee, C.K., R.S. Magleby, W. R. Bailey, R.L. Gum, and L.M. Arthur. 1977. Sheep and lamb losses top predators and other causes in the western United States. USDA, Economic Res. Serv. Agricultural Economic Report No. 369. 41pp.
- Gese, E. M., O. J. Rongstad, and W. R. Mytton. 1988. Home range and habitat use of coyotes in southeastern Colorado. J. Wildl. Manage. 52:640-646.
- Guinta, B. 1995. UDWR pers. comm.
- Guthery, F. S., and S. L. Beasom. 1977. Responses of game and nongame wildlife to predator control in south Texas. J. Range Manage. 30:404-409.
- Haglan, B. 1995. US Fish and Wildlife Service. pers. comm.
- Hailey, T. L. 1979. A handbook for pronghorn management in Texas. Fed. Aid. in Wildl. Resto. Rept. Ser. No. 20. Texas Parks and Wildl. Dep., Austin, TX. 59pp.

Pre-Decisional

- Hamlin, K. L., S. J. Riley, D. Pyrah, A. R. Dood, and R. J. Mackie. 1984. Relationships among mule deer fawn mortality, coyotes, and alternate prey species during summer. *J. Wildl Manage.* 48:489-499.
- Harris, S. 1977. Distribution, habitat utilization and age structure of a suburban fox (*Vulpes vulpes*) population. *Mammal Rev.* 7:25-39.
- _____. 1979. Age-related fertility and productivity in red fox, *Vulpes vulpes*, in suburban London. *J. Zool.* 187:195-199.
- _____. and J. M. V. Rayner. 1986. Urban fox (*Vulpes vulpes*) population estimates and habitat requirements in several British cities. *J. Anim. Ecol.* 55:575-591.
- Henne, D. R. 1977. Domestic sheep mortality on a western Montana ranch. pp. 133-149 in R. L. Phillips and C. Jonkel eds. *Proc. 1975 Predator Sym. Montana For. Conserv. Exp. Stn., School For., Univ. Mont. Missoula.*
- Holle, D. G. 1977. Diet and general availability of prey of the coyote (*Canis latrans*) at the Wichita Mountains National Wildlife Refuge, Oklahoma. M.S. Thesis. Oklahoma State Univ., Stillwater. 59pp.
- Hornocker, M.G. 1970. An analysis of mountain lion predation upon mule deer and elk in the Idaho primitive area. *Wildl. Monogr.* 21. 39pp.
- Howard, V. W. Jr., and R. E. Shaw. 1978. Preliminary assessment of predator damage to the sheep industry in southeastern New Mexico. *Agric. Exp. Stn., New Mexico State Univ., Las Cruces, Res. Rpt.* 356.
- _____, and T. W. Booth. 1981. Domestic sheep mortality in southeastern New Mexico. *Agric. Exp. Stn., New Mexico State Univ., Las Cruces. Bull* 683.
- NM State University. pers. comm.
- Johnson, E. L. 1984. Applications to use sodium fluoroacetate (Compound 1080) to control predators; final decision. *Fed. Reg.* 49(27):4830-4836.
- Johnson, G.D. and M.D. Strickland. 1992. Mountain lion compendium and an evaluation of mountain lion management in Wyoming. Western EcoSystems Technology, Inc. 1406 S. Greeley Hwy., Cheyenne, WY 82007. 41pp.
- Jones, P. V. Jr., 1949. Antelope management. Coyote predation on antelope fawns: main factor in limiting increase of pronghorns in the upper and lower plains areas in Texas. *Texas Game and Fish.* 7:4-5, 18-20.
- Karpowitz, J. 1995. UDWR. pers. comm.
- Knowlton, F. F. 1964. Aspects of coyote predation in south Texas with special reference to white-tailed deer. PhD. Thesis, Purdue Univ. Lafayette. 147pp.
- _____. 1972. Preliminary interpretation of coyote population mechanics with some management implications. *J. Wildl. Manage.* 36:369-382.
- _____, and L.C. Stoddart. 1992. Some observations from two coyote-prey studies. pp 101-121 in A.H. Boer, ed., Ecology and Management of the Eastern Coyote. Univer. of New Brunswick, Fredericton, New Brunswick, Canada.
- Knudson, T. 1990. Birds fall prey to a King Midas technology. *High Country News.* June 4, pp. 7.
- LeCount, A. 1977. Causes of fawn mortality. Final Rept., Fed. Aid. for Wildl. Restor. Proj. W-78-R, WP-2, J-11. Arizona Game and Fish Dept. Phoenix, AZ. 19pp.
- Litvaitis, J. A. 1978. Movements and habitat use of coyotes on the Wichita Mountains National Wildlife Refuge. M.S. Thesis. Oklahoma State Univ., Stillwater. 70pp.
- _____, and J. H. Shaw. 1980. Coyote movements, habitat use, and food habits in southwestern Oklahoma. *J. Wildl. Manage.* 44:62-68.
- MacDonald, D. W., and M. T. Newdick. 1982. The distribution and ecology of foxes. *Vulpes vulpes* (L.) in urban areas. in R. Bornkamm, J. A. Lee, and M. R. D. Seaward eds. *Urban Ecology.* Blackwell Sci. Publ., Oxford, UK. pp.123-135.
- Mackie, C.J., K.L. Hamlin, C.J. Knowles, and J.G. Munding. 1976. Observations of Coyote Predation on Mule and White-tailed deer in the Missouri River Breaks. 1975-76. *Montana Deer Studies*, Montana Dept. of Fish and Game, Federal Aid Project 120-R-7. pp 117-138.
- McAdoo, J.K. and D.A. Klebenow, 1978. Predation on Range Sheep with No Predator Control. *J. Range Management* 31(2):111-114

Pre-Decisional

- McDonald, K. 1995. UDWR. pers. comm.
- Messier, F. and C. Barrette. 1982. The social system of the coyote (*Canis latrans*) in a forested habitat. *Can. J. Zool.* 60:1743-1753.
- MIS (Management Information System). 1993. District Summary Reports for the Southern Utah ADC District. ADC State Office, P.O. Box 26976, Salt Lake City, UT 84126
- MIS. 1994. District Summary Reports for the Southern Utah ADC District. ADC State Office, P.O. Box 26976, Salt Lake City, UT 84126
- Munoz, J.R. 1977. Cause of Sheep Mortality at the Cook Ranch, Florence, Montana. 1975-1976. M.S. Thesis. University of Montana, Missoula. 55pp.
- Nass, R.D. 1977. Mortality associated with range sheep operations in Idaho. *J. Range Manage.* 30: 253-258
- _____. 1980. Efficacy of predator damage control programs. *Proc. Vertebrate Pest Conf.* 9:205-208.
- NASS (National Agricultural Statistics Service). 1992. Cattle and calf death loss. USDA, NASS, Washington, DC. 23pp.
- _____. 1995. Sheep and goat predator loss. USDA, NASS, Washington, DC. 16pp.
- Neff, D. J., and N. G. Woolsey. 1979. Effect of predation by coyotes on antelope fawn survival on Anderson Mesa. Arizona Game and Fish Dept. Spec. Rept. No. 8. Phoenix. 36pp.
- _____, and _____. 1980. Coyote predation on neonatal fawns on Anderson Mesa, Arizona. *Proc. Biennial Pronghorn Antelope Workshop.* 9:80-97.
- _____, R.H. Smith, and N.G. Woolsey. 1985. Pronghorn antelope mortality study. Arizona Game and Fish Department, Res. Branch Final Rpt. Fed. Aid Wildl. Restor. Proj. W-78-R. 22pp.
- O'Gara, B. W., K. C. Brawley, J. R. Munoz, and D. R. Henne. 1983. Predation on domestic sheep on a western Montana ranch. *Wildl. Soc. Bull.* 11:253-264.
- Ozaga, J. J., and E. M. Harger. 1966. Winter activities and feeding habits of northern Michigan coyotes. *J. Wildl. Manage.* 30:809-818.
- Pfeifer, W. K., and M. W. Goos. 1982. Guard dogs and gas exploders as coyote depredation control tools in North Dakota. *Proc. Vertebr. Pest Conf.* 10:55-61.
- Phillips, R. L. 1970. Age ratio of Iowa foxes. *J. Wildl. Manage.* 34:52-56.
- _____, and L. D. Mech. 1970. Homing behavior of a red fox. *J. Mammal.* 51:621.
- Pils, C. M. and M. A. Martin. 1978. Population dynamics, predator-prey relationships and management of the red fox in Wisconsin. *Wis. Dep. Nat. Resour., Tech. Bull.* 105. 56 pp.
- Pimlott, D. H. 1970. Predation and productivity of game populations in North America. *Trans. Int. Congr. Game Biol.* 9:63-73
- Pyrah, D. 1984. Social distribution and population estimates of coyotes in north-central Montana. *J. Wildl. Manage.* 48:679-690.
- Riter, W. E. 1941. Predator control and wildlife management. *Trans. N. Am. Wildl. Conf.* 6:294-299.
- Robinette, W.L., J.S. Gashwiler, and O.W. Morris. 1961. Notes on cougar productivity and life history. *J. Mammal.* 42:204-217.
- Rowlands, I. W., and A. S. Parkes. 1935. The reproductive processes of certain mammals VIII. Reproduction in foxes (*Vulpes spp.*). *Proc. Zool. Soc. London:*823-841.
- Rowley, G. J. and D. Rowley. 1987. Decoying coyotes with dogs. *Proc. Great Plains Wildl. Damage Cont. Work.* 8:179-181.
- Roy, L. D., and M. J. Dorrance. 1985. Coyote movements, habitat use, and vulnerability in central Alberta. *J. Wildl. Manage.* 49:307-313.
- Rural Development, Agriculture, and Related Agencies appropriations Act of 1988 (Public Law 100-202, Dec.22, 1987. Stat. 1329-1331 (7 U.S.C. 426c)).
- Sargeant, A. B. 1972. Red fox spatial characteristics in relation to waterfowl predation. *J. Wildl. Manage.* 36:225-236.

Pre-Decisional

- _____. 1978. Red fox prey demands and implications to prairie duck production. *J. Wildl. Manage.* 42:520-527.
- Schmidt, R.H. 1986. Community-Level Effects of Coyote Population Reduction. Special Technical Publication 920, American Society for Testing and Materials. Philadelphia, PA.
- _____ and M.W. Brunson. 1995. Assessing Public Attitudes toward Animal Damage Control Management Policies: Initial Findings. Utah State University. Logan, UT
- Schueler, D.G. 1993. Contract Killers. *Sierra Magazine*. November/December, 1993.
- Scrivner, J. H., and D. A. Wade. 1986. The 1080 livestock protection collar for predator control. *Rangelands* 8:103-106.
- Seidernsticker, J.C., IV, M.G. Hornocker, W.V. Wiles, and J.P. Messick, 1973. Mountain lion social organization in the Idaho Primitive Area. *Wildlife Monograph*, Vol. 35. pp60.
- Shaw, H. 1989. *Soul Among Lions - The Cougar as Peaceful Adversary*. Johnson Books, Boulder, CO. 140pp.
- Sheldon, W. G. 1950. Denning habits and home range of red foxes in New York state. *J. Wildl. Manage.* 14:33-42.
- Slate, D.A., R. Owens, G. Connolly, and G. Simmons. 1992. Decision making for wildlife damage management. *Trans. N. A. Wildl. Nat. Res. Conf* 57:51-62.
- Smith, R. H., and A. LeCount. 1976. Factors affecting survival of mule deer fawns. Final Rept., Fed. Aid Proj. in Wildlife Restro. W-78-R, WP-2. J-4. Arizona Game and Fish Dept. Phoenix, AZ.
- _____, D. J. Neff, and N. G. Woolsey. 1986. Pronghorn response to coyote control - A benefit:cost analysis. *Wildl. Soc. Bull.* 14:226-231.
- Southwick, R. 1994. The 1991 Economic Benefits of Hunting in the United States. *Inter. Assoc. of Fish Wildl. Agen., Fur Res. Comm., Southwick and Associates, Arlington, VA.* 20 pp.
- Steele, J. L. Jr., 1969. An investigation of the Comanche County deer herd. *Okla. Dept. Wildl. Conserv. Fed. Aid in Fish and Wildl. Restoration Proj. W-87-R.* 20pp.
- Stoddart, L.C. 1984. Relationships between prey base fluctuations and coyote depredation on sheep on the Idaho National Engineering Laboratroy (INEL), 1979-1982. Unpublished Research Work Unit Report. Denver Wildl. Res. Cent. 16pp.
- Storm, G. L., R. D. Andrews, R. L. Phillips, R. A. Bishop, D. B. Siniff, and J. R. Tester. 1976. Morphology, reproduction, dispersal, and mortality of midwestern red fox populations. *Wildl. Monogr.* 49. 82pp.
- Stout, G. G. 1982. Effects of coyote reduction on white-tailed deer productivity on Fort Sill, Oklahoma. *Wildl. Soc. Bull.* 10:329-332.
- Stukel, E. 1995. SD Game Fish and Parks. pers. comm.
- Tabel, H., A. H. Corner, W. A. Webster, and C. A. Casey. 1974. History and epizootology of rabies in Canada. *Can. Vet. J.* 15:271-281.
- Teer, J.G., D. L. Drawe, T. L. Blankenship, W. F. Andelt, R. S. Cook, J. Kie, F. F. Knowlton, and M. White. 1991. Deer and coyotes: The Welder Experiments. *Trans. N.A. Wildl. Nat. Res. Conf.* 56:550-560.
- Thomas, L. 1986. Statement of fact and proposed findings and conclusions on behalf of the United States Fish and Wildlife Service before the USEPA Administrator. FIFRA Docket No. 559. pp4-5.
- Till, J. A., and F. F. Knowlton. 1983. Efficacy of denning in alleviating coyote depredations upon domestic sheep. *J. Wildl. Manage.* 47:1018-1025.
- _____. 1992. Behavioral effects of removal of coyote pups from dens. *Proc. Vertebr. Pest Conf.* 15:396-399.
- Todd, A. W., and L. B. Keith. 1976. Responses of coyotes to winter reductions in agricultural carrion. *Alberta Recreation, Parks Wildl., Wildl. Tech. Bull.* 5. 32 pp.
- Trainer, C. E., J. C. Lemos, T. P. Kister, W. C. Lightfoot, and D. E. Toweill. 1981. Mortality of mule deer fawns in southeastern Oregon. 1968-1979. Oregon Dept. Fish Wildl. Res. Dev. Sect. Wildl. Res. Rpt. 10: 113 pp.
- _____, M.J. Willis, G. P. Keister, Jr., and D.P. Sheehy. 1983. Fawn mortality and habitat use among pronghorn during spring and summer in southeastern Oregon, 1981-82. Oregon Dept. of Fish and Wildl. Wildl. Res. Rpt. No. 12. 117pp.

Pre-Decisional

- Tucker, R. D., and G. W. Garner. 1980. Mortality of pronghorn antelope fawns in Brewster County, Texas. Proc. West. Conf. Game and Fish Comm. 60:620-631.
- Tullar, B. F. Jr., L. T. Berchielli, Jr., and E. P. Saggese. 1976. Some implications of communal denning and pup adoption among red foxes in New York. N.Y. Fish and Game J. 23:93-95.
- Udy, J. R. 1953. Effects of predator control on antelope populations. Utah Dept. Fish and Game. Salt Lake City, UT. Publ. No. 5, 48pp.
- United States District Court of Utah. 1993. Civil No. 92-C-0052A, January 1993.
- USDA (U.S. Department of Agriculture). Animal and Plant Health Inspection Service (APHIS), Animal Damage Control (ADC) Strategic Plan. 1989. USDA, APHIS, ADC Operational Support Staff, 4700 River Road, Unit 87, Riverdale, MD 20737.
- _____. 1992. A producers guide to preventing predation to livestock. USDA/APHIS/ADC, Washington, D.C. Agr. Inform. Bull. No. 650. 14pp.
- _____. 1994. Final Environmental Impact Statement. USDA, APHIS, ADC Operational Support Staff, 4700 River Road, Unit 87, Riverdale, MD 20737.
- USDI (U.S. Department of the Interior). 1978. Predator damage in the West: a study of coyote management alternatives. U.S. Fish and Wildlife Serv. (FWS), Washington, D.C. 168pp.
- _____. Fish and Wildlife Service. 1979. Mammalian predator damage management for livestock protection in the Western United States. Final Environmental Impact Statement. Washington, D.C. 789 pp.
- UDA (Utah Department of Agriculture) 1994. Agricultural Statistics. Salt Lake City, UT.
- Utah, State of, Economic and Demographic Projections, 1994. Governor's Office of Planning and Budget. Salt Lake City, UT.
- UCA (Utah Code Annotated). Title 4 Chapter 23
- _____. 4-23-5.
- _____. 4-23-6.
- _____. 23-13-2.
- UWB (Utah Wildlife Board) Rule. R657-10-21
- Voigt, D. R. and B. D. Earle. 1983. Avoidance of coyotes by red fox families. J. Wildl. Manage. 47:852-857.
- _____, and D. W. Mac Donald. 1984. Variation in the spatial and social behavior of the red fox, *Vulpes vulpes*. Acta. Zool. Fenn. 171:261-265.
- _____. 1987. "Red Fox". pp. 378-392 in: Novak, M.; Baker, J. A.; Obbard, M. E. and Mallock, B. (Eds.) Wild Furbearer Management and Conservation in North America. Ontario Ministry of Natural Resources, Toronto, Ontario, Canada. 1150 p.
- Von Gunten, B. L. 1978. Pronghorn fawns mortality on the National Bison Range. Proc. Pronghorn Antelope Workshop. 8:394-416.
- White, M. 1967. Population ecology of some white-tailed deer in south Texas. PhD. Thesis. Purdue University, Lafayette. pp72-86. 215 pp.
- Windberg, L. A. and F. F. Knowlton. 1988. Management implications of coyote spacing patterns in southern Texas. J. Wildl. Manage. 52:632-640.
- Young, G. 1995. US Fish and Wildlife Service. pers. comm.

Pre-Decisional

**APPENDIX B.
ACRONYMS AND GLOSSARY**

ACRONYMS

ACEC	Area of Critical Environmental Concern
ADC	Animal Damage Control
APHIS	Animal and Plant Health Inspection Service
AWP	Annual Work Plan
BLM	Bureau of Land Management
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
Conf.	Confirmed
EA	Environmental Analysis
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FEIS	Final Environmental Impact Statement on the national ADC program
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FLPMA	Federal Land Management and Policy Act
FWS	U.S. Fish and Wildlife Service
ISA	Instant Study Area
IPM	Integrated Pest Management
IRC	Internal Revenue Code
IWDM	Integrated Wildlife Damage Management
LPC	Livestock Protection Collar
LRMP	Land and Resource Management Plans
MAT	Multiagency Team
MIS	Management Information System
MFP	Management Framework Plan
MOU	Memorandum of Understanding
NASS	National Agricultural Statistical Service
NEPA	National Environmental Policy Act
NHPA	National Historical Preservation Act
PA	Primitive Study Area
ROD	Record of Decision
Rpt.	Reported
RMP	Resource Management Plan
T&E	Threatened and Endangered Species
UAS	Utah Agricultural Statistics Service
UCA	Utah Code Annotated
UDA	Utah Department of Agriculture
UDWR	Utah Division of Wildlife Resources
USDA	U.S. Department of Agriculture
USDI	U.S. Department of Interior
UWB	Utah Wildlife Board
WA	Wilderness Area
WDM	Wildlife Damage Management
WSA	Wilderness Study Area

Pre-Decisional

GLOSSARY

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

Annual Work Plan: A management plan developed jointly by the BLM, Forest Service, ADC, UDWR, and UDA specifying when, where, how, and under what constraints wildlife damage management would be conducted during the next 12 months. The plan would include a map showing planned control, restricted control, no control, and special protection areas.

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 and guarding dogs, 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"

Candidate Species: Any species being considered by the Secretary of the Interior for listing as an endangered or threatened species but is undergoing a status review or is proposed for listing.

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

Carnivore: A species that lives primarily meat (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 euthanising the pups. The adult predators may also be euthanised.

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

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

Direct Control: Administration or supervision of wildlife damage management by ADC, often involving direct capture or intervention with 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.

Pre-Decisional

Environmental Assessment (EA): An analysis of the impact of a planned action to the 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 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, the harvest or harvest level represents a ceiling population 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 a species to maintain its population through reproduction or immigration 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 control situation.

Offending Animal: 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.

Pre-Decisional

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.

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

Predator: An animal that kills and 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 other municipal jurisdiction).

Pyrotechnics: Fireworks or projectiles used to frighten wildlife.

Range Allotment: An area, usually on public land, allocated for the use of a prescribed number of grazing animals under a management plan.

Range Condition: The relative status of rangeland in terms of available forage.

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 UDA, 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.

Requestor: An individual or agency(ies) that requests wildlife damage management assistance from ADC.

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

Sensitive Species: Those species designated, usually in cooperation with the State agency responsible for managing the species, as sensitive. They are those species that are: 1) under status review by the FWS/NMFS; or 2) whose numbers are declining so rapidly that Federal listing may become necessary; or 3) with typically small and widely dispersed populations; or 4) those inhabiting ecological refuge or other specialized or unique habitats. Sensitive species are managed under the same criteria as threatened and endangered 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 last long enough to affect 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.

Pre-Decisional

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 for others to use in managing wildlife damage problems.

Threatened Species: Federal designation for any 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 predation and human safety threats in a coordinated, managed program.

Work Plan: see "ADC Annual Work Plan"

Pre-Decisional

**Appendix C
WA's, WSA, ISA's in the Southern Utah ADC District**

Wilderness Areas

National Forest Designated Wilderness

Dixie National Forest	
Ashdown George Wilderness Area*	7,000 acres
Pine Valley Mountain Wilderness Area	50,000 acres
Box-Death Hollow Wilderness Area	26,000 acres
Fishlake National Forest (none)	
Manti-LaSal National Forest	
Dark Canyon Wilderness Area	45,000 acres
Forest Service Total	128,000 acres

BLM Designated Wilderness

Paria Canyon	
Vermillion Cliff's Wilderness Area	110,000 acres
Beaver Dam Mountains	19,600 acres
Designated Wilderness Total	129,600 acres

Wilderness Study Areas/Instant Study Area/Primitive Areas

Swazy Mountain WSA*	52,578	Death Ridge WSA	67,508
Conger Mountain WSA*	21,680	Burning Hills WSA	62,390
Howell Peak WSA*	27,359	Fifty Mile Mountain WSA	161,143
King Top WSA*	91,431	The Scorpion WSA	37,164
Notch Peak WSA*	55,609	Cougar Canyon	15,968
Wah Wah Mountain WSA*	45,342	Rd Canyon WSA	19,035
Little Rockies WSA	38,700	Canaan Mountain WSA	51,059
Mt. Ellen/Blue Hill WSA	50,843	Orderville Canyon WSA	1,750
Bull Mountain WSA	6,735	Deep Creek WSA	3,320
Dirty Devil WSA	46,630	Red Butte WSA	804
Fiddler Butte WSA	920	Spring Canyon WSA	4,433
Mt. Hillers WSA	5,940	The Watchman WSA	600
Mt. Pennell WSA	29,540	N. Fork Virgin River WSA	1,040
Fremont Gorge	2,540	LaVerkin Creek Canyon WSA	567
Horseshoe Canyon WSA	35,790	Taylor Creek Canyon WSA	35
French Spring/Happy Canyon WSA	15,220	Goose Creek Canyon WSA	89
Flume Canyon WSA	54,612	Beartrap Canyon WSA	40
Spruce Canyon WSA	20,990	White Rock Range WSA	2,600
Floy Canyon WSA*	77,274	Moquith Mountain WSA	15,510
Coal Canyon WSA	64,546	Parunuweep Canyon WSA	32,053
Westwater Canyon WSA	32,280	Paria - Hackberry WSA	145,281
Los Spring WSA	3,880	Wahweep WSA	144,761
Desolation Canyon WSA	313,643	The Blues WSA	19,030
Mexican Mountain WSA	62,208	The Cockscomb WSA	10,827
Sids Mountain WSA	80,084		
San Rafael Reef WSA	59,569	Joshua Tree ISA	1,040
Crack Canyon WSA	25,955	Devils Garden ISA	640
Muddy Creek WSA	32,040	Escalante Canyons (1) ISA	360
Devils Canyon WSA	9,610	Escalante Canyons (5) ISA	760
Indian Creek WSA	6,870	N. Escalante Canyon/ Gulch ISA	127,827
Cottonwood Canyon WSA	11,330	Phipps Death Hollow ISA	45,290
Steep Creek WSA	23,803	Butler Wash WSA	23,950
Carcass Canyon WSA	48,631	Mancos Mesa WSA	51,440
Mud Springs WSA	40,477	Grand Gulch Primitive Area	37,580

Pre-Decisional

Pine Canyon WSA	10,890
Bullet Canyon WSA	8,280
Sheiks Flat WSA	3,140
Slickhorn Canyon WSA	43,390
Road Canyon WSA	54,820
Fish Creek Canyon WSA	49,650
Mule Canyon WSA	5,990
Cheesebox Canyon WSA	15,410
Dark Canyon Primitive Area/ACEC	62,040
Middle Point WSA	5,990
Bridger Jack Mesa WSA	5,290
Behind the Rocks WSA	13,410
Mill Creek WSA	9,780
Negro Bill Canyon WSA	7,620
South Needles WSA	160
Jack Canyon WSA	8,180
Turtle Canyon WSA	35,619

Total **2,920,212 acres**