Final

ENVIRONMENTAL ASSESSMENT (EA)

PREDATOR DAMAGE MANAGEMENT IN THE LAS CRUCES ADC DISTRICT IN SOUTHWESTERN NEW MEXICO

including the counties of [redacted]

Prepared by:

UNITED STATES DEPARTMENT OF AGRICULTURE (USDA)
ANIMAL AND PLANT HEALTH INSPECTION SERVICE (APHIS)
ANIMAL DAMAGE CONTROL (ADC)

In Cooperation With:

[redacted]

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1.0 CHAPTER 1: PURPOSE OF AND NEED FOR ACTION

INTRODUCTION

Across the United States, wildlife habitat has been substantially changed as human populations expand and land is used for human needs. These human uses and needs often compete with wildlife which increases the potential for conflicting human-wildlife interactions. In addition, certain segments of the public strive for protection for all wildlife. Such 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 generally is regarded as providing economic, recreational and aesthetic benefits . . . , and the mere knowledge that wildlife exists is a positive benefit to many people. However, . . . the activities of some wildlife may result in economic losses to agriculture and damage to property . . . Sensitivity to varying perspectives and values 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."*

Normally, according to the APHIS procedures implementing the National Environmental Policy Act (NEPA), individual wildlife damage management actions are categorically excluded (7CFR 372.5(c), 60 Fed Reg. 6,000-6,003, 1995). To evaluate and determine if there may be any potentially significant impacts to the human environment from the proposed program, we have decided to prepare this environmental assessment (EA).

ADC is a cooperatively funded and service oriented program. Before any wildlife damage management is conducted, *Agreements for Control* must be signed by ADC and the land owner/administrator. For [redacted] and [redacted] lands, *ADC Work Plans* must be prepared by ADC in cooperation with the land managing agency. ADC cooperates with land and wildlife management agencies, as requested, to effectively and efficiently resolve wildlife damage problems in compliance with all applicable federal, state and local laws.

ADC Program

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

A) training of wildlife damage management professionals;
B) development and improvement of strategies to reduce economic losses and threats to humans from wildlife;
C) collection, evaluation, and dissemination of management information;
D) cooperative wildlife damage management programs;
E) informing and educating the public on how to reduce wildlife damage, and;
F) providing data and a source for limited-use management materials and equipment, including pesticides (USDA 1989).

Purpose

This EA analyzes predator damage management related to the protection of livestock and other resources such as wildlife, agricultural crops, property and to protect human health and safety in the District. The area encompassed

by the District is nearly 24.7 million acres (data from New Mexico Stockman 1994) and covers [redacted] (Figure 1-1).

ADC has active agreements to conduct predator damage management on about 8.2 million acres within the District, or 33% of the area (MIS 1995). The percentage of the total land area of the District under each type of land ownership is as follows: [redacted] -- 26%; [redacted] -- 19%; private land -- 22%; State Trust Land -- 14%; Indian Tribal land -- 2%; Other federal (U.S. Fish and Wildlife Service (USFWS) and military reservation) and county, municipal land -- 17%.

Within the District, cattle and/or sheep, depending on the area, are permitted to graze on federal lands under the jurisdiction of the [redacted] and [redacted]. In addition, 439 livestock operators on private lands in all eight counties of the District currently participate in the cooperative ADC program. This represents about 43% of the farms and ranches in the District that produced livestock on public and private lands during 1995 (calculated from information obtained from County Assessor's Offices, pers. comm. and from Thal et.al. 1992). In 1995 ADC had PDM agreements for private, [redacted], and [redacted] land totaling 3.3 million, 613,500, and 4.3 million acres, respectively. ADC does not conduct operational PDM on all properties under agreement in every year. In 1995, PDM activities were conducted on about 36% of the private, 39% of the [redacted], and 41% of the [redacted] land area under agreement, or 13% of the land area of the District. However, these numbers do not accurately reflect the actual amount of area in which lethal PDM methods were used. A special nonroutine compilation of pasture areas on which PDM lethal methods were expected to be used in FY 1996 -- pasture areas *within* cooperating ranches and public land allotments in the Albuquerque ADC District -- indicated the actual area impacted was less than 1/5 of the total area under agreement. Although a similar compilation is not available for the Las Cruces District, this indicates that less than 7% of the land area of the District actually had some level of ADC PDM activity during a year's time. Additionally, the majority of ADC PDM activities are not year-round on most of this 7% of the land area, but generally occur for periods ranging from a few days (in the case of aerial hunting) to about 1 - 6 months.

Figure 1-1. Districts of the USDA, APHIS, Animal Damage Control Program in New Mexico.

Currently, ADC conducts limited predator damage management on the [redacted]. National Environmental Policy Act (NEPA) compliance for those actions was met through the preparation of an environmental assessment for a four-allotment area on the [redacted] and adoption by ADC of an EA prepared previously by the [redacted]. Limited PDM activities associated with bear predation on livestock or human safety situations on the [redacted] have been categorically excluded from further NEPA analysis. An EA is also in place that covers PDM on the [redacted], although the District PDM program has not operated on the Coronado for several years. This EA constitutes the required NEPA document for ADC PDM on [redacted] in the District and will supersede the existing EAs.

ADC currently conducts predator damage management on [redacted] within the [redacted]. In FY 1995, operational PDM actions were conducted on [redacted] totaling 1,762,551 acres or [redacted] in the District. As stated above, in most instances, entire allotments are not worked, but only areas or pastures

within such allotments where cattle are concentrated during calving or where losses have occurred previously. These types of actions are approved in accordance with [redacted] policy and were evaluated in an EA prepared by the [redacted]. This EA will replace the existing [redacted] and constitute required NEPA documentation for predator damage management on all [redacted] lands in the District.

No predator damage management has been requested from ADC on National Park Service (NPS) or USFWS administered lands within the District to protect livestock, poultry or wildlife, or for human safety. Should any need arise in the future for ADC service on those lands, those federal agencies will be responsible for required NEPA documentation.

Both [redacted] Counties have conducted limited bounty type systems to encourage coyote hunting in their respective counties. [redacted] County utilized a reward system for ear tagged coyotes for approximately five years and only one tagged coyote was turned in. This program was discontinued in 1994. Sierra County pays a bounty of $10 per coyote to 50 hunters on an approved list. For FY 94 through FY 96, the numbers of coyotes taken were 391, 650, and 348 respectively. [redacted].

ADC has not conducted predator damage management on [redacted] since November 16, 1992. This EA will constitute the required NEPA documentation for any future PDM actions that are authorized on [redacted] in the District.

1.1 NEED FOR ACTION

1.1.1 Summary of Proposed Action

The proposed action is to continue the current program of predator damage management for the protection of livestock, crops, property, human health and safety, and other wildlife resources in the District. ADC proposes to conduct activities, as requested, on private and public lands in the District. An Integrated Wildlife Damage Management (IWDM) approach would be implemented which would allow use of all legal techniques and methods, both lethal and nonlethal, used singly or in combination, to minimize predation and to resolve other conflicts with predators. Livestock producers would be provided with information regarding the use of effective animal husbandry methods, and other nonlethal and lethal techniques. Nonlethal and lethal methods used by ADC would include pyrotechnics, electronic scaring devices, propane exploders, cage or culvert traps, immobilizing agents, calling and shooting, aerial hunting, trapping and snaring, M-44s, denning, dogs, DRC-1339, euthanasia, and the Livestock Protection Collar (LPC). Predator damage management would be allowed in the District, when requested and approved, on [redacted] lands, [redacted], and other federal lands where there are Work Plans, on [redacted] if a wildlife damage management plan is approved, and on Tribal lands, private lands, and county or municipal lands where there are signed *Agreements for Control*. No predator damage management would be conducted in areas of heavy human use such as campgrounds or other high use recreation areas on public lands, or on lands with legal or policy restrictions against such activities. All management would comply with appropriate federal, state and local laws. An ADC Work Plan would be developed cooperatively with [redacted], and with each National Forest and [redacted] district within the District as appropriate. If requested and allowed by funding and manpower restrictions, ADC could enter into agreements for PDM with American Indian Tribes as well. These work plans would be reviewed annually. See Chapter 3 for a more detailed description of the current program.

1.1.2 Need for Predator Damage Management for Protection of Livestock

Contribution of Livestock to the Economy

Agriculture generates more than $1.5 billion in annual sales of farm and ranch commodities in New Mexico. Livestock production, primarily cattle, sheep and poultry, is one of the primary agricultural industry sectors in the State and accounts for more than 70% of total farm commodity cash receipts (NMDA/NMASS 1994).

Livestock production in the Las Cruces District contributes significantly to local economies. About 4% of all sheep and lambs and 25% of all beef cattle and calves on hand January 1, 1995 in New Mexico were in the eight cooperating counties in the District (NMDA/NMASS 1994). Beef cattle and sheep inventories from the eight counties were estimated at 142,000 head of beef cattle and calves and 11,800 sheep and lambs, valued at more than $71 million (NMDA/NMASS 1994). Total cash receipts from sales of all livestock products except milk were more than $236 million. Table 1-1 displays livestock[1] and gross farm sales for each cooperating county.

Scope of Livestock Losses

Cattle and calves are most vulnerable to predation (killing, harassment, or injury resulting in monetary losses to the owner) at calving and less vulnerable at other times of the year. However, sheep and especially lambs, can sustain high predation rates throughout the year (Henne 1977, Nass 1977, 1980, Tigner and Larson 1977, O'Gara et al. 1983). This killing of livestock causes economic hardships to livestock owners. Without effective predator damage management to protect livestock, predation would be higher (Nass 1977, 1980, Howard and Shaw 1978, Howard and Booth 1981, O'Gara et al. 1983).

Table 1-1
Livestock Product Sales
(excluding dairy production) and
Total Farm Product Sales
Las Cruces ADC District
(Source: New Mexico Agricultural Statistics 1994)

County	Livestock Products ($)	Total Gross Farm Sales ($)	% Of Total Sales
[redacted]	17,381,000	18,782,000	92.5%
[redacted]	99,447,000	201,022,000	49.5%
[redacted]	20,964,000	25,962,000	80.7%
[redacted]	14,931,000	22,667,000	65.9%
[redacted]	19,329,000	60,634,000	31.9%
[redacted]	10,399,000	14,941,000	69.6%
[redacted]	16,345,000	24,661,000	66.3%
[redacted]	26,846,000	32,537,000	82.5%
TOTAL	225,372,000	401,206,000	56.2%

Many studies have shown that coyotes (*Canis latrans*) can inflict high predation rates on livestock. Coyotes accounted for 93% of all predator-killed lambs and ewes on nine sheep bands in shed lambing operations in southern Idaho and did not feed on 25% of the kills (Nass 1977). Coyotes were also the predominant predator on sheep throughout a New Mexico study; more than 43% of lambs killed by coyotes were not fed upon (DeLorenzo and Howard 1977). Other predators that cause predation on cattle, calves, sheep and lambs in the District are black bear (*Euarctos*[2] *americanus*), mountain lion (*Felis concolor*), and feral or free-roaming dogs (*Canis familiaris*). Feral and/or free ranging dogs are responsible for considerable predation on livestock and wildlife. Both bald eagles

[1]Livestock products include cattle, calves, sheep, lambs, poultry, and dairy products.

[2]Species also known as *Ursus*.

(*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*) prey on young lambs and kid goats and occasionally attack young calves (Phillips et al. 1996). Ravens (*Corvus corax* and *C. cryptoleucus*) sometimes attack newborn lambs, kid goats, and calves, and adult cows and ewes that are temporarily incapacitated during the birth process (Wade and Bowns 1982). They peck the eyes and soft tissues causing injuries that either result in death or result in the animal having to be destroyed. Other small carnivores such as badgers (*Taxidea taxus*), gray fox (*Urocyon cinereoargenteus*), red fox (*Vulpes fulva*), raccoons (*Procyon lotor*), and striped skunks (*Mephitis mephitis*) sometimes prey on young lambs, kid goats, and domestic fowl.

Research studies have shown that, in the absence of PDM, 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) whereas in studies with PDM, losses were about 0.5 and 4.3%, respectively (USDI 1979). In a study in New Mexico in which predator control was partially withheld (i.e., PDM was intensively conducted on adjacent ranches), predation losses of lambs were 15.6% one year and 12.1% the next with coyotes being responsible for 77% and 100% of the predation losses in the two years, respectively (DeLorenzo and Howard 1977). The ADC FEIS reviewed these studies, including the New Mexico study, and calculated an unweighted average predation loss rate of 4.5% for ewes and 17% for lambs in the absence of PDM. Conversely, other studies indicate that sheep and lamb losses are much lower where predator damage management is applied (Nass 1977, Tigner and Larson 1977, Howard and Shaw 1978; Howard and Booth 1981).

Loss of Livestock

NASS (1995a) reported that predators killed 6,975 adult sheep valued at $453,375 and 18,400 lambs valued at $699,200 in the State during 1994. Cattle and calf predation losses in the State totaled 2,800 head valued at $1.3 million in 1991 (NASS 1992) and 2,600 head valued at $965,000 in 1995 (NASS 1995b). In 1995, livestock producers who are cooperators with ADC reported that predators killed 44 adult sheep, 655 lambs, 1,626 calves, 83 adult cattle, and 63 head of poultry in the District valued at more than $631,000 (Table 1-2). These losses occur in spite of current control efforts by producers, who often entail substantial indirect costs (Jahnke et al. 1987), and by ADC program personnel.

Table 1-2
Number of Reported Livestock Killed by Predators
Las Cruces ADC District
1995

County	Lambs	Sheep	Cattle	Calves	Other Livestock	Total Value ($)
[redacted]	0	0	0	347	0	178,900
[redacted]	9	20	3	60	15	25,880
[redacted]	0	0	5	134	0	45,750
[redacted]	0	0	11	210	0	61,445
[redacted]	0	0	35	221	6	64,438
[redacted]	627	21	7	156	0	62,210
[redacted]	2	0	4	88	35	46,475
[redacted]	17	2	18	411	12	146,186
TOTAL	655	44	83	1,626	68	$631,284

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 NASS, ADC only confirms about 19% of the total adult sheep and 23% of the lambs actually killed by predators. In the District, 55% of the adult sheep, 8.5% of the lambs, and 3.3% of the calves reported killed were confirmed by ADC Specialists (MIS 1994 and 1995). ADC Specialists do not attempt to locate every head of livestock reported by ranchers to be killed by predators, but rather to verify sufficient losses to determine that a problem exists that requires management action. Table 1-3 shows the predation losses verified by ADC personnel in the District during 1995. ADC personnel verified that predators killed 12 adult cattle, 54 calves, 24 adult sheep, 56 lambs, and 6 other livestock and poultry in the eight cooperating counties in the District in 1995 (MIS 1995). The reported value of these losses was $33,905. In the District, verified losses to all classes of livestock from coyote predation are higher than the losses caused by mountain lion and black bear and other predators combined. Coyote predation accounted for about 56% of the verified total value of all livestock lost to predators in the District in 1995, with [redacted] sustaining the highest economic livestock loss, followed by [redacted]. Coyotes were responsible for about 63% of all livestock and poultry verified by ADC personnel as being killed or injured by predators, followed by mountain lion 14%, dogs 10%, bobcat 6%, black bear 4%, kit fox 2% (MIS 1995).

Table 1-3
Number of Verified Livestock Losses to Predation
Las Cruces ADC District
1995

County	Lambs	Sheep	Cattle	Calves	Other Livestock	Total Value ($)
[redacted]	1	0	1	5	2	2,695
[redacted]	0	2	2	8	2	6,770
[redacted]	0	0	0	8	0	3,900
[redacted]	0	0	0	0	0	0
[redacted]	1	0	9	0	1	5,200
[redacted]	50	22	0	0	0	3,785
[redacted]	0	0	0	8	1	2,000
[redacted]	5	0	0	25	0	9,555
Total	56	24	12	54	6	33,905

Presently, 40 cattle grazing allotments are permitted on the [redacted] in the [redacted]; 8 cattle allotments are permitted on the New Mexico portion of the [redacted]; 139 cattle allotments are permitted on the [redacted]; and 49 cattle and 1 sheep allotment are permitted on the [redacted] within the Las Cruces ADC District. Current predator damage management efforts on these allotments consist of the permittee implementing any practical nonlethal methods such as guard dogs, harassment, predator-resistant net wire fencing (allowed where customarily used for livestock management), and shifting livestock to other pastures to avoid high risk areas when practical. Also, they sometimes utilize private houndsmen or trappers when available. No current livestock loss data are available for these NF allotments.

Because of the mobility and large home range of coyotes, it is often necessary to conduct predator damage management on both private and adjacent public lands to provide adequate livestock protection.

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Table 1-4
Number of Livestock Protected
Las Cruces ADC District
1995

County	Lambs	Sheep	Cattle	Calves	Other Livestock	TOTAL
[redacted]	100	320	10,518	8,614	0	19,552
[redacted]	638	475	5,271	3,605	359	10,348
[redacted]	0	0	8,405	6,767	0	15,172
[redacted]	0	0	7,822	5,906	0	13,728
[redacted]	0	0	9,121	11,630	420	21,171
[redacted]	7,891	9,333	4,071	3,420	0	24,715
[redacted]	18	14	5,883	5,404	264	11,583
[redacted]	120	220	19,181	15,683	150	35,354
TOTAL	8,767	10,362	70,272	61,029	1,193	151,623

Table 1-4 shows the types and numbers of livestock protected by ADC in the District during 1995 (MIS 1995). Reported cattle, calf, sheep and lamb losses were 7.5%, 0.4%, 0.1%, and 2.7% of the number protected, respectively, in 1995. A major factor in lamb losses in the District as reported to ADC is the extent of loss attributed to eagle depredation, primarily by golden eagles. They were responsible for 54% of reported predation losses in 1994 and for 70% of such losses in 1995. Because of current legal protections for eagles and the lack of effective strategies that would be practical for ADC to employ in providing assistance, ADC is not able to effectively assist in resolving eagle depredation problems.

Livestock Losses on Public Lands

Comments received during public involvement indicated a greater interest in whether there is need for PDM on public lands managed by the [redacted] and [redacted]. Livestock losses reported to have occurred during 1994 and 1995 by cooperating[redacted] and [redacted] grazing permittees in the District are shown in Table 1-5. The percentages of all of the reported losses in the District that occurred on[redacted] and [redacted] lands in 1995 were as follows: adult sheep -- 25%; lambs -- 81%; adult cattle -- 55%; and calves -- 26%. As previously noted, it must be emphasized that these losses do not represent the entire picture when evaluating need for PDM on public land areas because they do not provide a measure of the number and value of losses that would occur *without* PDM (see section 4.2.7 for an estimate of avoided losses for the District as a whole).

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Table 1-5.

Reported livestock losses to predators on cooperating [redacted] [redacted] and [redacted] grazing allotments in the Las Cruces ADC District, 1994 and 1995. These were losses that occurred with the ADC program in place and do not indicate losses avoided by PDM. (see Section 4.2.7 of the EA for estimates of avoided losses).

Type of Public Land	Predator Species	Number Lost by Livestock Class -- 1994						Total $ Value
		Sheep	Lambs	Goats	Kid Goats	Cattle	Calves	
[redacted]	Coyote					3	36	$17,900
	Bobcat							
	Mt. Lion						21	$10,500
	TOTAL	0	0	0	0	3	57	$28,400
[redacted]	Coyote	8	463	1		29	351	$216,420
	Bobcat		115					$5,350
	Bl. Bear	18					4	$1,275
	Mt. Lion	26				2	9	$7,100
	F/FR Dog					6	9	$10,600
	Eagle		706		50		1	$43,750
	TOTAL	52	1,284	1	50	37	374	$284,495

Type of Public Land	Predator Species	Number Lost by Livestock Class -- 1995						Total $ Value
		Sheep	Lambs	Goats	Kid Goats	Cattle	Calves	
[redacted]	Coyote						165	$73,675
	Mt. Lion					4	15	$8,550
	Bl. Bear					2	34	$16,450
	TOTAL	0	0	0	0	6	214	$98,675
[redacted]	Coyote		116			34	383	$149,628
	Bobcat		15					$1,050
	Bl. Bear							
	Mt. Lion	11	10			10	21	$14,605
	F/FR Dog					2	13	$4,500
	Eagle		387					$21,270
	TOTAL	11	528	0	0	46	417	$191,053

1.1.3 Need for Predator Damage Management to Protect Other Wildlife

Revenue derived from recreation, especially recreation related to wildlife and the outdoors, is increasingly important to the economy of New Mexico. Southwick (1993) estimated the total economic impact from deer hunting in the United States in 1991 to be $16.6 billion. Recreation associated with the [redacted], including hunting and fishing, generates $12 million annually for the economy of [redacted] Counties, and $20 million annually statewide (Thal et al. 1991). In New Mexico, local economies also benefit from these recreational activities. As a result, the maintenance of big game populations is important to the NMGF which has the responsibility for managing wildlife for the benefit of the State of New Mexico. Although PDM for big game protection has not been conducted under the current program in recent years, it may be requested by the NMGF to reduce predation on mule deer (*Odocoileus hemionus*) and pronghorn antelope (*Antilocapra americana*) or to enhance populations of other identified species.

Under certain conditions, predators, primarily coyotes, have been documented as having a significant adverse impact on deer and pronghorn antelope 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). Connolly (1978) reviewed 68 studies of predation on wild ungulate populations and concluded that, in 31 cases, predation was a limiting factor. These cases showed that coyote predation had a significant influence on some populations of white-tailed deer (*Odocoileus virginianus*), black-tailed deer (*Odocoileus hemionus columbianus*), pronghorn antelope and bighorn sheep (*Ovis canadensis*). Mackie et al. (1976) documented high winter losses of mule deer due 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 conducted at the [redacted], Texas that coyotes take a large portion of the fawns each year during the first few weeks of life. Fawn remains were also common in coyote scats (feces) during the first 4 to 8 weeks of life 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 (recruitment). Their study concluded that predation, primarily by coyotes, was the major cause for low fawn crops on [redacted] in Oregon. Other authors observed that coyotes were responsible for the majority 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 70% greater after the first year, and 43% greater after the second year on 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. 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 about 88% to 97% of the mortality. Knowlton and Stoddart (1992) reviewed deer productivity data from the [redacted] following coyote reduction. Deer densities tripled compared to 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 the majority of coyotes who hunted pronghorn antelope fawns on [redacted], 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) and Udy (1953). Major losses of pronghorn antelope fawns to predators have been reported from more recent radiotelemetry studies (Beale 1978, Beale and Smith 1973, Barrett 1978, Bodie 1978, Von Gunten 1978, Hailey 1979, and Tucker and Garner 1980). Coyote damage management on [redacted], Arizona increased the herd from 115 animals to 350 in three years, and peaking at 481 animals in 1971. After coyote damage management was discontinued, 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 estimate 22% of the coyote population in 1981, 28% in 1982, and 29% in 1983. Pronghorn antelope populations on [redacted] during 1983, indicated a population of 1,008 antelope, exceeding 1,000 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 5-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 [redacted], Arizona. Coyote reduction was found to be necessary and cost effective in pronghorn antelope management, as shown by Smith et al. (1986).

Predation was the leading cause of pronghorn antelope fawn loss, accounting for 91% of the mortalities that occurred during a 1981-82 study in southeastern Oregon (Trainer et al. 1983). Trainer et al. (1983) also noted that most pronghorn antelope fawns were killed by coyotes and that known probable coyote kills comprised 60% of fawn mortality. In addition, a coyote reduction study in southeastern Oregon documented that in 1985, 1986 and 1987 an estimated reduction of 24%, 48%, and 58% of the spring coyote population in the study area resulted in an increase in antelope fawns from 4 fawns/100 does in 1984 to 34, 71, and 84 fawns/100 does in 1985, 1986, and 1987, respectively (Willis et al. 1993).

Clearly, predator damage management can be an important tool in maintaining big game production and management objectives. Factors such as predator densities, alternate prey densities, weather conditions, deer and antelope population densities and vulnerability can influence survival and recruitment of young into a population. A number of studies (some of which are identified above) have demonstrated that coyote damage management can increase deer and pronghorn antelope fawn survival where predation is a limiting factor affecting the ability of these populations to maintain or increase their densities. If [redacted] management objectives for these species are to be met, monitoring and periodic coyote damage management may be needed. Under an existing agreement with ADC, [redacted] could request predator damage management to assist in reaching management objectives for specific deer and pronghorn antelope populations in the State. An American Indian Tribe could also request similar PDM assistance from ADC and enter into a management agreement. Only after [redacted] or a Tribe has determined that predation is a limiting factor in meeting such objectives would ADC respond with operational PDM.

1.1.4 Need for Predator Damage Management for the Protection of Human Health and Safety

[redacted] is responsible for responding to complaints concerning black bear and mountain lion depredations on livestock and threats to human safety and property. [redacted] has entered into a Joint Powers Agreement with ADC to assist them with problems associated with these species as well as problems caused by other state-managed species. Within the District, human interactions with bears and mountain lions could occur wherever habitat or food sources overlap with human activities. The [redacted] estimates that bear and mountain lion populations in the State are stable ([redacted], pers. comm. to A. Lara, State Director, ADC, NM, 1995). Black bear damage complaints, primarily regarding damage to livestock, occur to some degree in the District each year, and generally become more severe during drought periods when natural vegetative food sources become more scarce. Human encroachment into black bear habitat can also increase the possibility of human-bear interactions.

When bears or mountain lions damage property or threaten human health and safety, immediate action is generally taken. Normally, [redacted] responds to nuisance bear and mountain lion complaints by providing technical assistance and advice to individuals or property owners. When technical assistance does not resolve the problem, [redacted] may attempt to live-

trap and kill or relocate the offending animal [redacted] Other [redacted] management alternatives may also be implemented, such as the lengthening of the hunting season and increasing the number of hunting permits in areas experiencing problems.

The [redacted] does not support the relocation of bears or mountain lions that have killed livestock, but allows relocation of nuisance bears or mountain lions on a case-by-case basis. Success of relocation is often dependent on the age and sex of the offending animal. Relocated bears may return to their original location (Rogers 1986) or create similar problems in their new location. [redacted] policies addressing the relocation of black bear and mountain lion state:

> If a bear or mountain lion is a confirmed livestock killer it is not to be relocated. If the animal is determined to be a threat to human safety it is not to be relocated. Any nuisance bear or mountain lion that is to be relocated is to be ear tagged. It is recommended that the animal be radio collared and monitored regularly to determine the fate of the relocation attempt. If a marked animal causes damage a second time, it is to be destroyed ([redacted], pers. comm. to [redacted], 1996).

Bears may become dangerous when they habituate to urban or residential locations, recreation areas such as campgrounds and picnic areas, or garbage dumps or refuse sites where food is easily obtained. These bears may become an attraction for local residents and tourists, posing potential threats to human safety. Drought conditions that have resulted in mast crop (acorns) failures and shortages of other plant type food sources for bears have been blamed for increased bear/human encounters in the last three years**.** [redacted].

Although rare, mountain lion attacks on humans in the western United States and Canada have increased markedly in the last two decades, primarily due to increased mountain lion populations and human use of mountain lion habitats (Beier 1992). Incidents of this nature in New Mexico have been rare. In the early 1970's, a young boy was killed by a mountain lion in northern New Mexico. Fatal attacks in California and Colorado in the past several years emphasize the need for awareness and the capability to respond to this type of damage situation. [redacted].

Although such occurrences are rare, coyotes occasionally threaten the safety of young children and even adults in areas where subdivisions have encroached into wildlife habitat areas. A 3-year-old girl was killed by a coyote in [redacted], California in 1981 and officials documented attacks on four other children aged 13 months to 5 years old, and on three adults in the same county over the period 1975 - 1981 (Howell 1982). In [redacted], NM, three children were attacked by one or more coyotes that were coming into a residential area on a frequent basis in 1995 ([redacted], ADC, pers. comm.). This is generally only a problem when the coyotes lose their fear of humans and learn that they can find food in urban settings. The primary recommendation in these situations is for residents to fence their yards or properties to exclude coyotes, to avoid feeding coyotes, to eliminate readily available food and water sources, and to harass ones that are seen coming around houses or into neighborhoods. Sometimes, however, coyotes maintain their boldness and must be removed to reduce the safety threat to a satisfactory level. After the [redacted], CA child's death, city and county officials trapped 55 coyotes in an 80-day period from within one-half mile of the home where the child was killed, an unusually high number for such a small area (Howell 1982). This is not expected to be a major problem in the District but could result in requests for assistance under the current program.

Other problems caused by predators that relate to human health and safety are nuisance problems such as noises, odors, and structural damage to personal possessions that can occur when animals take up residence under or in, or frequent areas in close proximity to, human dwellings. Typical species that cause this type of problem are skunks (*Mephitis sp*; *Spilogale putorius*; *Conepatus leuconotus*) and raccoons, but any species can become a nuisance under certain circumstances.

1.1.5 Need for Predator Damage Management for the Protection of Crops and Property

Certain types of crops are occasionally damaged by predator species. Coyotes sometimes are attracted to watermelon fields and not only destroy melons that they consume but sometimes render melons unmarketable by biting into them to test for ripeness. Bears sometimes cause damage to corn, vegetables, and fruit crops. These types of problems have not been a major source of damage reported to ADC in New Mexico but could be a requested PDM activity under the current program.

Occasionally, property items are damaged by certain predator species. Coyotes sometimes dig up and chew into buried plastic water lines. Bears sometimes damage water control mechanisms at livestock watering sites on ranches. They can damage bee hives when attracted to honey, or can damage human dwellings when looking for food. Pets, including dogs and cats, are sometimes killed and eaten by coyotes, mountain lions, and bobcats. Birds of prey such as great horned owls sometimes kill young domestic kittens and puppies. A total of 22 companion and/or hobby animal pets were reported killed by predators to ADC in NM in FY 1995. These are just some of the property types that could be damaged resulting in requests for assistance to ADC.

1.1.6 ADC OBJECTIVES

Due to the requests for predator damage management in the District, ADC developed a set of objectives in order to define the PDM program in the District. These were developed with input from [redacted].

A. Respond, through technical assistance (advice) or, when warranted, direct control assistance, with the appropriate action to 100% of the requests from the public, American Indian Tribes, and from state, federal, or local agencies and organizations, for assistance in resolving problems caused by predator impacts on livestock, crops, property, wildlife, and human health and safety.

B. Provide 100% of cooperators (and cooperating Federal, State and local agencies that administer land where livestock are grazed) with information on nonlethal management techniques that have been proven to reduce or prevent predator damage. All existing cooperators will be provided this information within one year of the signed decision. All new cooperators will be provided this information within three weeks of signing an Agreement for Control.

C. Maintain lamb depredation losses at less than 5%(objective C-1), adult sheep depredation losses at less than 2%(objective C-2), and calf depredation losses at less than 1% (objective C-3) of the number of each that are annually protected, respectively. Depredation losses will be based on reported losses from cooperating livestock producers. Objectives for depredation loss rates for other classes of livestock will be established as necessary.

D. Maintain lethal take of nontarget animals to less than 5% of the total take of target and nontarget animals.

The purpose of these objectives is to provide benchmarks for measuring success of the program and do not necessarily dictate that PDM activities would be reduced or curtailed once the objectives are met. For example, if livestock loss objectives are met and it is determined that improvements in service could reduce losses even further, then ADC could continue to strive to achieve even lower loss rates, provided that adverse environmental impacts would not become significant. On the other hand, if circumstances such as changes in law, regulation, policy, or other factors affecting success reduce the effectiveness of the program, objectives could be changed to reflect the new conditions under which the program must operate.

1.2 RELATIONSHIP OF THIS ENVIRONMENTAL ASSESSMENT TO OTHER ENVIRONMENTAL DOCUMENTS

1.2.1 ADC Programmatic EIS. ADC has issued a Final EIS (FEIS) and a Record of Decision (ROD) on the national APHIS/ADC program (USDA 1994a). This EA is tiered to the programmatic EIS, and pertinent information available in the FEIS has been incorporated by reference into this EA.

1.2.2 [redacted]. The [redacted] requires that each [redacted] prepare a [redacted] for guiding long-range management and direction. The [redacted] provide for ADC PDM. The [redacted] does not specifically address PDM. However, this silence does not necessarily denote inconsistency with the [redacted]. In previous EAs for PDM on all [redacted] in the District, ADC PDM actions as conducted under the current program were determined by the [redacted] to be consistent. (See Chapter 4, section 4.1.5 for more information)

1.2.3 **EAs for Wildlife Damage Management on** [redacted]. ADC PDM actions on the [redacted] have been covered by previous EAs ([redacted]). The EAs for the [redacted] were prepared by the [redacted] and their decisions were signed in 1985 and 1990, respectively ([redacted]). ADC prepared an EA for a [redacted] area within the [redacted] for which a decision was signed in early 1996 (USDA 1996). ADC adopted an EA prepared by the [redacted] for PDM on the [redacted] and its decision was signed in July of 1995 (USDA 1995a). This EA addresses agency responsibilities, guidance and restrictions for various management objectives and land classes. ADC PDM will continue on the Las Cruces District in accordance with the aforementioned EAs until officially superseded by the final decision from this EA.

1.2.4 [redacted]

1.2.5 [redacted]

1.2.6 **The FEIS for Amendment of** [redacted] **in the Southwestern Region.** In December 1995 the [redacted]). The Record of Decision of that FEIS, signed in June of 1996, provides the standards and guidelines for [redacted] management direction. Those standards and guidelines apply unless standards and guidelines in individual [redacted] provide more restrictive direction. The [redacted] is responsible for identifying inconsistencies of ADC activities with these standards and guidelines during the review and/or development of ADC Work Plans.

1.3 DECISION TO BE MADE

Based on agency relationships and legislative responsibilities, ADC is the lead agency for this EA, and therefore responsible for the scope, content and decisions made. As cooperating agencies the [redacted] and [redacted] will provide input and recommendations to ADC on when and where wildlife damage management will be conducted on [redacted] and [redacted] lands and ensure proposed activities are consistent with [redacted], [redacted] and [redacted] policies. Work plans will be reviewed by the appropriate [redacted] or [redacted] to ensure activities are in compliance with [redacted] and [redacted] and terms of the MOUs. [redacted] and [redacted] will provide input and cooperation with ADC in conducting wildlife damage management activities. If a management agreement is reached with the [redacted], PDM actions on [redacted] may also be conducted in accordance with such agreement.

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

- Should predator damage management as currently implemented be continued in the District (the "no action" alternative)?
- If not, how should ADC fulfill its legislative authority and responsibilities in the District?
- Might the proposal have significant impacts needing an EIS?

1.4 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT ANALYSIS

1.4.1 Actions Analyzed. This EA evaluates wildlife damage management to protect livestock, crops, property, wildlife, and human health and safety from damage caused by coyotes, black bears, mountain lions, bobcat, gray fox, red fox, kit fox, raccoon, striped skunk, and common ravens, and other predator species within the District.

1.4.2 Wildlife Species Potentially Protected by ADC. [redacted] has indicated it may, at some point in the future, request ADC assistance to achieve management objectives for mule deer and pronghorn antelope. If [redacted] identifies additional species are in need of protection, a determination will be made on a case-by-case basis if additional NEPA analysis is needed. NEPA analysis of any predator damage management for species under the jurisdiction of another federal agency (for example migratory birds, and endangered or threatened species) will be conducted by the authorized federal agency.

1.4.3 American Indian Lands and Tribes. Cooperative PDM programs with Indian Tribes could be established under the current program and the analysis contained in this EA will apply to such programs.

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 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 by ADC and each cooperating agency to ensure that the EA and the analyses contained herein are still appropriate.

1.4.5 Site Specificity. This EA analyzes potential impacts of PDM and addresses ADC 's PDM activities on all lands under Cooperative Agreement, Agreement For Control or ADC Work Plans in the District. It also addresses the impacts of PDM on areas where additional agreements with ADC may be written in the reasonably foreseeable future. Because the proposed action is to continue the current program, and because the current program's goal in meeting its mission is to provide service when requested within the constraints of available funding and manpower, it is conceivable that additional PDM efforts could occur. Thus, this EA anticipates this potential expansion and analyzes the impacts of such expanded efforts as part of the current program. The EA emphasizes significant issues as they relate to specific areas whenever possible; however, the issues that pertain to predator damage and resulting management are the same, for the most part, wherever they occur, and are treated as such. The standard ADC Decision Model (Slate et al. 1992) and ADC Directive 2.105 describe the routine thought process that is the site-specific procedure for determining methods and strategies to use or recommend for individual actions conducted by ADC in the State (See USDA 1994, Chapter 2 and Appendix N for a more complete description of the ADC Decision Model and examples of its application). Decisions made using the model will be in accordance with any mitigations and standard operating procedures described herein and adopted or established as part of the decision.

1.4.6 Summary of Public Involvement Efforts

Issues related to the proposed action were identified during a public involvement process conducted with members of the livestock industry, environmental and animal welfare interest groups, the general public, American Indian Tribes, [redacted] and [redacted] resource specialists, and state and county agencies, and other federal agencies. The public was notified about the proposed action through published notices and a public involvement letter and were invited to comment on plans for the future conduct of the District program. This letter was mailed on April 2, 1996 to 1,887 individuals, organizations and agencies, and legal notices were published in 7 daily newspapers, two of which have statewide distribution.

A total of 65 responses to the initial public involvement effort were received. The responses represented a wide range of opinions, both supporting and opposing the proposed action or alternatives. The responses and a preliminary evaluation of the issues and alternatives identified from the responses were provided to members of the interagency group for input. Issues determined to be substantive and relevant to the analysis are discussed in Chapter 2 and evaluated in Chapter 4. Concerns that were not deemed to be substantive or relevent were not analyzed in detail. Copies of the Pre-Decision EA were mailed to organizations and individuals as well as public agencies and local American Indian Tribes for review and comments. In addition, a news release was issued to statewide and local media and formal public notice was published in area newspapers announcing the availability of the Pre-Decision EA.

Other Agency Involvement

To assure that the concerns of other federal and state agencies have been addressed, the [redacted], [redacted] were asked to participate in the interagency group and are cooperating agencies in the development of the EA. A preliminary draft EA was circulated to each [redacted] in the District, the [redacted] Regional Office, [redacted], and the U.S. Fish and Wildlife Service Ecological Services office. American Indian Tribes were provided a copy of the Pre-Decision EA and asked to review and comment.

1.5 AUTHORITY AND COMPLIANCE

1.5.1 Authority of Federal and State Agencies in Wildlife Damage Management in New Mexico

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 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 authority 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."*

[redacted]

The [redacted] is responsible under Chapter 17, NMSA for managing most wildlife species in the State under the direction of the [redacted]. In New Mexico, black bear and mountain lion management is the responsibility of the [redacted]. [redacted] manages black bear and mountain lion damage to livestock and, at times, human safety by funding ADC activities to remove problem members of those species. [redacted] to respond to livestock damage caused by black bears and mountain lions after obtaining a permit from [redacted]. [redacted]. District personnel have not taken any lions for preventive purposes in that unit but could under the current program. Generally, either the [redacted] or ADC receives requests to handle wildlife damage to livestock. [redacted]

[redacted]

The [redacted]) has responsibility under Chapter 77, Article 15, Sections 1-5, New Mexico Statutes Annotated (NMSA) for the control of predators and rodents that may damage agricultural or rangeland resources in the State and has authority under those statutes to cooperate with the federal government in order to meet that responsibility. As part of its state-managed predator and rodent control program, [redacted]. Coyotes are not protected in New Mexico and may be taken by any legal means at any time of the year. [redacted].

New Mexico Statutes - Animal Control Laws

Under New Mexico state law (NMSA 77-1-2), the owner or keeper of a dog that kills or injures livestock is liable for all damages. It is also the right of the owner of the injured or killed livestock to kill the dog while it is upon property controlled by the owner of the livestock. In New Mexico, dog control is generally the responsibility of local governmental agencies. Local animal control officials or county sheriffs are responsible for dealing with dogs that threaten, damage, or kill livestock. ADC policy allows ADC to assist in resolving feral/free-ranging dog damage problems at the request of local authorities upon approval of the ADC State Director.

[redacted] **and** [redacted]

The [redacted] and [redacted] have the responsibility to manage federal lands for multiple uses including livestock grazing, timber production, recreation and wildlife habitat, while recognizing the state's authority to manage wildlife populations. Both the [redacted] and [redacted] recognize the importance of managing wildlife damage

on lands and resources under their jurisdiction, as integrated with their multiple use responsibilities. [redacted]

[redacted]

The [redacted] is responsible for optimizing economic returns from [redacted] in New Mexico for the benefit of Trust beneficiaries while also maintaining the renewable and sustainable natural resources of the trust for the future. At the present time no agreement exists between the [redacted] and the Las Cruces ADC District. [redacted]

1.5.2 [redacted] County Environmental Protection Ordinances.

The counties of [redacted] have passed ordinances requiring county involvement in analyses of federal actions that could affect environmental quality in the counties. These counties were invited to participate in the development of issues and alternatives, were sent public involvement letters, and were sent copies of the preliminary draft and Pre-Decision EA for review and comment.

1.5.3 Compliance With Federal Laws.

Several federal laws regulate ADC wildlife damage management. ADC complies with these laws, and consults and cooperates with other agencies as appropriate.

National Environmental Policy Act. NEPA requires analysis of environmental impacts before ADC work plans can be implemented. Before 1993, each National Forest (and occasionally individual Ranger Districts) and each [redacted] would prepare all NEPA documents for ADC activities on federal lands under their jurisdiction. This resulted in differing requirements and procedures among the different land management agencies, and did not analyze impacts of ADC activities on other types of land ownership. This EA, with ADC as the lead agency, is the first time that ADC PDM actions and potential actions on all land classes will be analyzed in a comprehensive manner.

ADC also coordinates specific projects and programs with other agencies. The purpose of these contacts is to coordinate any wildlife damage management that may affect resources managed by these agencies or affect other areas of mutual concern. Federal agencies that request ADC assistance to protect resources are responsible for NEPA compliance. For example, the USFWS would be responsible for NEPA compliance regarding actions requested for the protection of endangered species.

Endangered Species Act (ESA) It is 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)). As authorized by the ESA, ADC has determined that proposed action would have no effect on the majority of listed species. For those species that might be affected, ADC conducts Section 7 consultations with the U.S. Fish & Wildlife Service (USFWS) to ensure that "any action authorized, funded or carried out by such an agency . . . is not likely to jeopardize the continued existence of any endangered or threatened species . . . Each agency shall use the best scientific and commercial data available" (Sec.7(a)(2)). ADC obtained a Biological Opinion (BO) from USFWS in 1992 describing potential effects on T & E species and prescribing reasonable and prudent measures for avoiding jeopardy (USDA 1994, Appendix F). ADC has also initiated formal consultation on several species not covered by the 1992 BO and will abide by any reasonable and prudent measures or alternatives that are established as a result of that consultation.

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

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

National Historical Preservation Act (NHPA) of 1966 as amended The NHPA and its Implementing regulations (36 CFR 800) require federal agencies to: 1) determine whether activities they propose constitute "undertakings" that can result in changes in the character or use of historic properties and, 2) if so, to evaluate the effects of such undertakings on such historic resources and consult with the State Historic Preservation Office regarding the value and management of specific cultural, archaeological and historic resources, and 3) consult with appropriate American Indian tribes to determine whether they have concerns for traditional cultural properties in areas of these federal undertakings. Activities described under the proposed action do not cause major ground disturbance and are not undertakings as defined by the NHPA. The NM Historic Preservation Office has indicated no concerns with ADC PDM actions in the State.

Final

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

Representatives from the lead (ADC) and cooperating agencies ([redacted], [redacted], [redacted]) identified a number of issues for analysis. These same issues as well as several others were also raised during the public involvement process. The following issues were deemed substantive to this EA and were analyzed in detail:

- Impact of the ADC predator damage management program on target species populations (i.e., coyote, mountain lion, black bear, etc.).
- Impact of ADC predator damage management on nontarget species populations, including Threatened, Endangered and sensitive species.
- The potential for ADC's coyote take to cause increases in rodent, rabbit, and other prey species populations to the point that detrimental effects on vegetation resources occur.
- Impact of ADC predator damage management activities on public use of public lands.
- Impact of ADC predator damage management on private recreational and commercial fur harvest.
- Social and economic impacts of ADC predator damage management on the agricultural community and on other agencies.
- Cost of providing PDM services for livestock protection compared to the value of livestock losses avoided.
- Humaneness and selectivity of ADC predator damage management methods.

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

2.2 ISSUES ADDRESSED IN THE ANALYSIS OF ALTERNATIVES

2.2.1 Impact of the ADC predator damage management program on target species populations (i.e., coyote, mountain lion, black bear, fox, etc.).

One issue is the concern that ADC PDM might adversely affect populations of target species, which, for purposes of this EA are primarily coyotes, bobcats, mountain lions, and black bears. Maintaining viable populations of all species is a concern of the public and of ADC, public land, and wildlife management agency biologists. Some commentors believe that PDM interrupts the "balance of nature" and this should be avoided. Others believe that the "balance" has shifted to favor generalist species, including predators. Many commentors were concerned that big game populations have

decreased or have been kept at lower than desired levels because of predation. To address these concerns, the effects of each Alternative on populations of each target species are examined.

2.2.2 Impact of ADC predator damage management on nontarget species populations, including Threatened, Endangered and Sensitive Species.

Another major issue of concern is whether ADC PDM activities adversely affect populations of nontarget species and, particularly, whether those activities jeopardize the continued existence of Threatened and Endangered (T&E), and [redacted] or [redacted] designated "Sensitive" species. In accordance with the Endangered Species Act, an evaluation is made to determine if ADC actions might adversely affect any listed T&E Species or species officially proposed for listing. Although not required by law to do so, ADC has also evaluated potential impacts on [redacted] and [redacted] designated "Sensitive" species, and on USFWS designated candidate species (i.e., species for which information exists to support proposals for listing, but which have not yet been formally proposed) and "Species of Concern." Information on these special status species is presented later in Chapter 2 and the evaluation of impacts is summarized in Chapter 4. Impacts on other nontarget species that do not fall within any of the above "special status" categories and that has been taken by ADC in the District are also evaluated. "Take" of nontargets includes captures in which the animal is released unharmed (e.g., from traps or snares) and those that are killed by ADC methods. For purposes of analyzing potential adverse impacts on populations, only those nontargets killed are assumed to be pertinent. To address this concern, past and a potential lethal take of the most affected nontarget species is examined in relation to estimated populations.

2.2.3 The potential for ADC's coyote take to cause increases in rodent, rabbit, and other prey species populations.

Several commentors expressed concern that ADC's killing of coyotes might result in increased populations of rodents, rabbits, or other prey species populations that could lead to adverse effects on agricultural crops and rangeland vegetation resources. This issue is closely related to the first issue stated above and is analyzed in detail for each alternative.

2.2.4 Impact of ADC predator damage management activities on public use of public lands.

Some concerns were voiced that ADC PDM activities might detrimentally affect the ability of the public to safely use public lands for recreation and other purposes such as fuel wood cutting. Some individuals believe their recreational experiences on public lands are impaired by knowing that any lethal PDM actions are occurring on such lands. Worries were expressed that members of the public or their pets might be harmed by leghold traps or M-44 devices or that they or their pets might be inadvertently shot during aerial hunting operations.

2.2.5 Impact of ADC predator damage management on private recreational and commercial fur harvest.

A concern was raised that ADC PDM activities might adversely impact the interests of private fur harvesters by reducing populations of furbearers across the district. The first two issues described above (impacts on target and nontarget species populations) relate closely to this issue and the analyses of impacts for those issues will be used to assist in evaluating the potential for adverse impacts on private fur harvest.

2.2.6 Social and Economic Impacts of ADC predator damage management on the agricultural community and on other agencies.

Concerns were raised that without adequate PDM, there would be adverse impacts on the agricultural sector of the economy and that those impacts might lead to adverse social impacts in communities that rely heavily on agriculture as an economic base. In addition, there was concern expressed that a lack of effective ADC PDM service would increase costs incurred by state agencies for addressing and resolving predator problems.

2.2.7 Cost of providing PDM services for livestock protection compared to the value of livestock losses avoided.

A number of commentors expressed the concern that the value of livestock losses reported to, or verified by, ADC is often less than the cost of providing PDM services for the protection of livestock. However, this concern, stated in that way, indicates a misconception of the purpose of PDM for livestock protection, which is not to wait until the value of losses is high, but to *prevent* or *stop* losses in order to minimize them. PDM would reach its maximum potential success if it prevented *all* losses, which would mean the value of losses would be zero. However, in the real world, it is not reasonable to expect zero loss, and so ADC documents the losses that occur as best as possible. It is assumed that by stating the above concern, commentors are actually concerned as to whether the cost of providing PDM services is equal or greater than the value of livestock losses *avoided* (thus, the issue has been restated as above).

It is not possible to accurately determine the number of livestock saved from predators by ADC since that number represents losses or events that never occurred. However, reasonable estimates can be made. Using the best information available, the ADC programmatic EIS concluded that benefits, in terms of avoided sheep and lamb losses plus price benefits to consumers, are 2.4 times the cost of providing ADC PDM services for sheep protection in the 16 western states (USDA 1994, p. 4-109). That analysis did not address the value of calf protection which is a substantial component of ADC PDM services in the Las Cruces District program.

Connolly (1981) examined the issue of cost effectiveness of federal predator control programs and concluded that public policy decisions have been made to steer the program away from being as cost effective as possible. This is because of the elimination of relatively inexpensive control methods believed to be effective but less environmentally preferable such as toxic baits. Thus, the increased costs of implementing the remaining available methods were to achieve other public benefits besides livestock protection and could be viewed as mitigation for the loss of effectiveness in reducing damage. The ADC EIS, Appendix L, p. 32 stated:

> Cost effectiveness is not, nor should it be, the primary goal of the APHIS ADC program. Additional constraints, such as environmental protection, land management goals, and others, are considered whenever a request for assistance is received. These constraints increase the cost of the program while not necessarily increasing its effectiveness, yet they are a vital part of the APHIS ADC program.

CEQ regulations (40 CFR 1502.23) do not require a formal, monetized cost-benefit analysis to comply with NEPA. Despite this fact and the general idea that government PDM is not necessarily intended to be cost effective, the question of costs vs. value of avoided livestock losses for the current PDM program is addressed in Chapter 4.

2.2.8 Selectivity and humaneness of ADC predator damage management methods.

A number of commentors were concerned that ADC's lethal PDM methods are inhumane. Humaneness, as it relates to the killing or capturing of wildlife is an important but very complex concept that can be interpreted in a variety of ways. Humaneness is a person's perception of harm or pain inflicted on an animal, and people may perceive the humaneness of an action differently. The issue of humaneness has two aspects in relation to the need for PDM:

1. Animal welfare organizations are concerned that some methods used to manage wildlife damage and wildlife populations in general 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 indicate "stress." Blood measurements indicated similar changes in foxes that had been chased by dogs for about five 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.

2. Humaneness, as perceived by the livestock industry and pet owners, requires that domestic animals be protected from predators because humans have bred the natural defense capabilities out of domestic animals. It has been argued that man has a moral obligation to protect these animals from predators (USDA 1994). Predators frequently do not kill larger prey animals quickly, and will often begin feeding

on them while they are still alive and conscious (Wade and Bowns 1982). The suffering apparently endured by livestock damaged in this way is unacceptable to many livestock producers.

Thus, the decision-making process involves tradeoffs between the above two aspects of humaneness. An objective analysis of this issue must consider not only the welfare of a wild animal caught in a leghold trap or snare, but also the welfare of the domestic animals that may be maimed and or killed if the leghold trap were not being used. The challenge in coping with this issue is how to achieve the least amount of animal suffering with the constraints imposed by current technology. Additionally, to insure the most professional handling of these issues and concerns, ADC has numerous policies established giving direction toward the achievement of the most humane PDM program possible.

ADC has improved the selectivity of management devices through research and development of pan tension devices and other device modifications such as breakaway snares. Research is continuing with the goal of bringing new findings and products into practical use. Until such time as new findings and products are found to be practical, it is assumed that some animal suffering will occur if PDM objectives are to be met in those situations where nonlethal control methods that have no adverse impacts on other wildlife are not practical. Furthermore, although it is currently not possible to quantify suffering, it is possible that the actual net amount of animal suffering would be less under the proposed action (or any other alternative involving the use of lethal methods) than under no PDM since the perceived suffering of livestock preyed upon by predators would be reduced if the action is successful.

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

2.3 Affected Environment

Components of the environment examined in this EA are wildlife populations, livestock production and protection, social and economic factors as they relate to the agricultural industry, and public lands. The ADC program, due to its limited scope, has limited effects on other components of the environment, and the following resource values within the District are not expected to be significantly impacted by any of the alternatives analyzed: soils, geology, minerals, water quality/quantity, floodplains, wetlands, visual resources, air quality, prime and unique farmlands, aquatic resources, timber and range. These resources will not be analyzed further.

American Indian tribal lands in the District total [redacted] acres and are governed by five different Tribes. The [redacted] tribe has the majority [redacted]) of the tribal lands in the District. ADC only conducts WDM on American Indian tribal lands at the request of the tribe having jurisdiction over such lands and under cooperative agreements with terms and conditions that are dictated by tribal officials. The Las Cruces District currently has no agreements with tribes for PDM. Also, known tribes in the District were sent letters of invitation to be involved in the public involvement process and were sent the Pre-Decision EA for review and comment. This should assure no adverse impacts on American Indian interests in the District.

The District is 38,559 square miles or more than 24.6 million acres in size with a diverse mix of habitat types for wildlife. Twelve of sixteen "ecozones" described by Dick-Peddie (1993) as occurring in New Mexico are found in the District. Predominant ecozones are Desert Grassland and Chihuahuan Desert Scrub in lower elevation areas ranging up to juniper savanna, coniferous and mixed woodland, and subalpine and montane coniferous forest in higher elevation areas. Most of the District is rural in nature and consists of rangeland areas where the primary land use is rangeland livestock production.

[redacted] and [redacted] lands are designated for multiple use which, in addition to livestock grazing, includes recreation (e.g., hiking, camping, hunting, fishing and wildlife viewing), timber, fuel wood cutting, and mineral/oil and gas extraction. State Trust lands are not open to the public for multiple use.

Trust lands are leased for a wide variety of purposes to generate revenues for the beneficiaries of the Trust and to conserve sustainable natural resources for the future. One of these uses on State land is rangeland livestock production and another is hunting and fishing. The State Game Commission purchases the right for licensed hunters, trappers, and fisherman to hunt, trap, or fish for game animals, protected furbearers and fish on State Trust lands during open seasons, and to access such lands for several days prior to each season, as set by the New Mexico State Game Commission.

2.3.1 Wildlife populations

Coyote Population Information

Localized coyote populations could be affected, to one degree or another, by the current predator damage management program. However, the ADC program currently has agreements to conduct PDM activities on only 21.5% of the land area of the District and, during any one year, actually conducts such activities on properties that total less than 17% of the land area of the District. During any one year, ADC actually conducts operational activities on only a portion of these ranches, and only on selected portions (areas where the depredations actually occur or are expected such as calving pastures) of ranches. Thus the impact of coyote removals on the District-wide coyote population would at most apply to a small percentage of the land area of the District.

Average coyote densities are probably higher than historical levels because of the absence of competing or conflicting 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 abundance. Schmidt (1986) further suggests that coyote distribution has expanded into all areas north of Panama. However, introduced gray wolves in the Northern Rocky Mountains do not appear to be limiting coyote numbers in areas of occupied wolf range (C. Niemeyer, ADC Wolf Specialist, pers. comm. 1996).

Another factor affecting seasonal coyote abundance in the State is the level of private harvest. Coyotes are not protected in New Mexico with the exception of limited restrictions on take by nonresident hunters and trappers. Under current state law, they may be killed year-round with no restriction on numbers taken. Historically, private harvest of coyotes is much higher when fur prices are high. In 1982, coyote pelt prices in the U.S. averaged $34.92 per pelt and 421,000 coyotes were harvested by private trappers and hunters. By 1992, however, pelt prices fell to $13.53 and only 158,000 coyotes were harvested which was a 63% decrease. A statistical analysis of harvest and fur price data showed that more than 80% of the variation in numbers of coyote furs harvested annually can be explained by the prices which trappers receive for their furs (McDonnell 1996). In New Mexico, private harvest of coyotes when fur prices were high was between 18,000 and 25,000 annually (early 1980s) but, in recent years, has been down in the range of 9,000 to 10,000. Thus, the *status quo* for coyote populations in New Mexico in the absence of federal ADC PDM actions is an annual harvest pressure of between 9,000 and 25,000. Harvest data specific to the Las Cruces District from the [redacted] 1994-95 Furbearer Harvest Survey showed that 2,412 coyotes, or 26% of the total statewide harvest, were taken by private trappers and hunters in the District during that season ([redacted] 1995). Data for the 1993-94 season showed 4,497 coyotes taken or 47% of the statewide total ([redacted] 1994). Assuming the proportional take in relation to statewide take in the District averages about 37% (the average of 26% and 47%) among high fur price and low fur price years, the private harvest in the District during high fur price years was probably about 9,200. In addition to this harvest, the coyote kill under [redacted] County's bounty program ranged from about 350 to 650 per year. This means the range of private harvest is 2,800 -- 9,900 per year, which is the baseline from which impacts of ADC PDM take will be analyzed for the District.

To discuss the impacts of various environmental constraints and external factors on coyote populations and density, it is essential to understand the basic mechanisms that play a role in the coyote's response to constraints and actions. The species' unique resilience, its ability to adapt, and its perseverance under adverse conditions is commonly recognized among biologists and rangeland managers.

Coyotes are highly mobile animals with home ranges (territory) that vary by sex and age of the animal and 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 home ranges may vary from 2.0 mi^2 to 21.3 mi^2 (Andelt and Gipson 1979, Gese et al.1988). Ozoga and Harger (1966), Edwards (1975), and Danner (1976) however, observed a wide overlap between coyote home range and did not consider coyotes territorial. 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.

Many authors have estimated coyote populations throughout the west and elsewhere (Pyrah 1984, Camenzind 1978, Knowlton 1972, Clark 1972, USDI 1979). Coyote population estimates for New Mexico are not available from state agencies. However, an estimate suitable for purposes of analysis can be made using information on coyote biology and population dynamics and tempering the "reasonableness" of the estimate by employing field observations of ADC personnel. These types of estimates of carnivore populations based on a knowledge of the species, experience, and intuition may be as accurate as those based on more scientific methods (Fritzell 1987).

Determinations of absolute densities for coyote populations are frequently limited to educated guesses (Knowlton 1972). A compilation of density estimates from population studies showed that coyote density can range from 0.1 to 14.3/$mi.^2$ (USDI 1978). Knowlton (1972) estimated coyote densities west wide to be an average of 0.5 to 1.0 per square mile over a large portion of the coyote's range. Coyote populations generally fluctuate annually with minimum populations occurring immediately before the birth of pups in the spring (whelping), while maximum populations occur immediately after (post-whelping). Although coyote densities vary across the District, general field observations by ADC personnel suggest coyote populations to be relatively high, and that the upper end of Knowlton's range is reasonable and, in many areas in most years, very conservative. Thus Knowlton's "average" of 1.0 per square mile is assumed to be conservative for the Las Cruces District and is used herein for analysis.

An evaluation of potentially suitable habitat for furbearing species in New Mexico showed that virtually the entire state is suitable coyote habitat (Thompson et al. 1992). A reasonable and conservative estimate of the proportion of land area in the District that is suitable coyote habitat is 95% with the remainder in urban areas, small towns and villages, rural homesites, roads, lakes, and streams. Therefore, a conservative estimate of the coyote population for the District, based on what we believe to be a conservative assumption of 1.0 per square mile, is (in rounded figures) 37,000.

Mountain lion Population Information

The mountain lion has an extensive distribution across North America including New Mexico. It is the largest member of the cat family in New Mexico, and is known by several other names, including cougar, panther, puma, and catamount. Mountain lions 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 mountain lions typically breed for the first time between 22 and 29 months of age (Ashman et al. 1983) but initial breeding may be delayed until a territory has been established (Hornocker 1970). Mountain lions breed and give birth year-round but most births occur during late spring and 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.

Mountain lion density is primarily dependent on prey availability and the social tolerance for other mountain lions. Prey availability is directly related to prey habitat quality that directly influences mountain lion nutritional health, and reproductive and mortality rates. Studies indicate that as available prey increases, so do mountain lion populations, and since mountain lions are territorial animals, the rate of population increase tends to decrease as mountain lion density increases. As mountain lion population density increases, mortality rates from intraspecific (i.e., between or among

members of the same species) fighting and cannibalism also increase, and/or mountain lions disperse into unoccupied or less densely occupied habitat.

Mountain lion densities in other states, based on a variety of population estimating techniques, range from a low of about 1/100mi^2 to a high of 24/100mi^2 ,and average densities for the western states have been estimated at 7.5/100mi^2 (Johnson and Strickland 1992). Although the [redacted] does not have estimates of mountain lion populations, they believe mountain lion populations are stable in the state ([redacted], pers. comm. to A. Lara, State Director, ADC, NM, 1995). Mountain lions can be found in a wide variety of ecozones from desert scrub to subalpine coniferous forest. Of the 38,600 mi.^{2} of land area in the District, 36,000 mi.^{2} (more than 90%) is considered to be suitable mountain lion habitat but 30-40% of the suitable habitat is marginal and of very low density ([redacted], pers. comm. 1996). In the interest of being conservative, average densities in the District are assumed to be only 3 per 100 mi.^{2} (about 40% of the average for the west cited above), which means the estimated population for the District is about 1,080.

Black Bear Population Information

Black bears can be found throughout the Rocky Mountains and west coast mountain ranges. Female black bears reach reproductive maturity at approximately 3.5 years (Kohn 1982; Graber 1981). Following a 7-8 month gestation period, they may have one to five cubs (Rogers 1976, Alt 1981, Kolenosky and Strathearn 1987). Juvenile black bear annual mortality ranges between 20 and 70 percent, with orphaned cubs having the highest mortality (Kolenosky and Strathearn 1987). Natural mortality in adult black bears is approximately 10-20 percent per year (Fraser et al. 1982). Their density will vary between 0.3 and 3.4 mi.^{2}, depending on habitat, and black bears can live up to 25 years (Rogers 1976). In the southwestern U.S., black bear population densities have been documented at 1/mi.^{2} (LeCount 1982) and generally range from 1 per mi.^{2} in good habitat to 1 per 2-5 mi.^{2} in intermediate habitat to 1 per 10 mi.^{2} in poorer suitable habitat (J. Phelps, Arizona Game and Fish Department, pers. comm. 1996).

The [redacted] estimates there is about 17,600 mi.^{2} of suitable black bear habitat in the District and that 30-40% of the suitable habitat is marginal and of very low density ([redacted], pers. comm. 1996). Therefore, in the interest of being conservative, the lowest average density of 1/10 mi.^{2} in poorer suitable habitat will be assumed for analysis purposes. This indicates a black bear population of at least 1,760 in the District.

Raven Population Information

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

Raven predation on livestock has not been a widespread problem in the District. No losses to ravens were reported to or confirmed by ADC in 1994 or 1995. If losses occurred, however, ADC would be able to respond under the current program.

Ravens are seen year-round by ADC personnel across the District, suggesting they are very common. Knight and Call (1981) summarized a number of studies on common raven territories and home ranges in the west. Nesting territories ranged in size from 3.62 mi^2 to 15.7 mi^2 in Wyoming and Oregon and home ranges varied from 2.53 mi^2 to 3 - 6 mi^2 in Utah and Oregon. Linz et al. (1990) found nest densities of one/1.7 mi^2 in their [redacted], California study.

Data from the Breeding Bird Survey show a steady increase in breeding numbers of ravens nationwide between 1966 and 1994. The annual index approximately doubled in that time period. The index for New Mexico showed a 4.1% per year average increase over that time period, a 9.8%/year increase from 1966-79, and a 2.9%/year increase from 1980-1994 (Hines et al. 1996). These data clearly indicate that human caused mortality has not resulted in any declines in raven numbers in either the short or long term in the nation or in the State.

Other Species Taken as Nontargets

Nontarget animals include species that are unintentionally captured, or for mountain lions or bears, members of the target species that were not involved in a depredation incident. The ADC MIS considers nontarget animals "taken" when they are captured; for the purposes of analysis of impacts to populations, only “lethal take” is considered. When possible, nontarget species are released when it is determined that they are likely to survive (ADC Directive 2.450). Nontarget animals taken in the District in 1994 and 1995 are shown in Table 2-1[3]. The total nontarget take for 1994 was 135 animals, of which 46 were released. The total nontarget take for 1995 was 74, of which 12 were released. The gray fox (*Urocyon cinereoargenteus*) was the most predominant native species taken as nontarget in District PDM program over the last two years -- 29 were killed in 1994 and 14 were killed in 1995. All other species taken as shown in Table 2-1 are either nonnative (e.g., feral/free-ranging dogs and cats), or are common and not classified as threatened or endangered under either state or federal law and are taken in low enough numbers (< 15 per year) that population impacts analysis is unnecessary. Although take of gray fox and also kit fox (*Vulpes macrotis*) is also low (<30 per year of either species), population status is estimated for purposes of impact analysis.

Table 2-1 Nontarget animals taken by ADC predator damage management activities in the Las Cruces ADC District in 1994 and 1995

1994					
Species	**Number**	**Method**	**Disposition**	**Total Number Killed**	**Total Number Released**
Badger	2 12	Leghold trap Leghold trap	Killed Released	2	12
Bobcat	4 7	Leghold trap Leghold trap	Killed Released	4	7
Gray fox	19 1 9 3	M-44 Neck snare Leghold trap Leghold trap	Killed " " Released	29	3
Red fox	1	Leghold trap	Released	0	1
Kit fox	6 3 1	M-44 Leghold trap Leghold trap	Killed " Released	9	1
Mule deer	1	Neck snare	Killed	1	0
Black bear	1	M-44	Killed	1	0

[3]The ADC MIS records unintentionally taken animals as “Nontarget” and as “Target - Unintentional”. This latter designation refers to animals that were listed as potential target species on an Agreement for Control, but were not being targeted at the time they were inadvertently taken. For purposes of discussions in this EA, the term “Nontarget” refers to both categories.

1994					
Javelina	1	Leghold trap	Released	0	1
Jackrabbit	2 1	Neck snare Leghold trap	Killed Killed	3	0
Cottontail rabbit	1 1	Neck snare Leghold trap	Released Released	0	2
Striped skunk	1 3 2 1	M-44 Leghold trap Cage trap Cage trap	Killed Killed Killed Released	6	1
Porcupine	4 1 4 1	Neck snare Neck snare Leghold trap Leghold trap	Killed Released Killed Released	8	2
Feral/free-ranging dog	11 2 15 1	Leghold trap Leghold trap M-44 Neck snare	Killed Released Killed Released	26	3
Feral/free-ranging cat	13	Cage trap	Released	0	13
TOTAL	135			89	46

1995					
Species	**Number**	**Method**	**Disposition**	**Total Number Killed**	**Total Number Released**
Badger	3	Leghold trap	Released	0	3
Bobcat	1 1	Neck snare Leghold trap	Killed Killed	2	0
Gray fox	12 1 1 2	M-44 Neck snare Leghold trap Leghold trap	Killed Killed Killed Released	14	2
Kit fox	7	M-44	Killed	7	0
Javelina	1	Leghold trap	Released	0	1
Mountain lion	1	Leghold trap	Released	0	1
Striped skunk	3	Leghold trap	Killed	3	0
Porcupine	5 1 1	Neck snare Leghold trap Leghold trap	Killed Killed Released	6	1
Raccoon	2	Leghold trap	Killed	2	0
Ringtail	1	Leghold trap	Released	0	1

1995					
Feral/free-ranging dog	20 5 2 1	M-44 Leghold trap Leghold trap Neck snare	Killed Killed Released Killed	26	2
Feral/free-ranging cat	2 1	Leghold trap Cage trap	Killed Released	2	1
TOTAL	74			63	12

Gray Fox Population Information

Gray fox inhabit brushy and wooded areas, and have omnivorous feeding habits, eating birds, rabbits, eggs, insects, carrion, fleshy fruits, and grains. Gray fox reach reproductive maturity at about 1 year of age and litters average four pups after a 2-month gestation period (Nowak and Paradiso 1983). Published estimates of density vary from 3.1 and 5.4/mi^2 (Fritzell 1987). Gray foxes have been reported to live up to 15 years, but annual mortality may be as high as 60% (Seton 1929, Lord 1961).

Gray fox are found throughout the state and their primary habitat is rocky and brushy areas of lower to mid-elevation areas. No estimates of gray fox populations for New Mexico are available. However, [redacted] considers the population trend to be stable [redacted], pers. comm. to Alex Lara, ADC, 1995). Approximately 80% of the District is suitable gray fox habitat (based on visually estimating the primary and secondary habitat as shown on the map in Thompson et al. (1992)). Using the low end of the density estimates shown above, the gray fox population for the District would be nearly 96,000. However, in the interest of being conservative for purposes of impacts analysis, it is assumed herein that gray fox density in the District is only one fifth of the lowest published density of 3.1 per square mile cited above. Thus, a highly conservative minimum estimate of the gray fox population in the District would be about 19,000.

Kit Fox Population Information

Kit fox inhabit areas of lower to mid-elevations in arid and semiarid desert grasslands, desert scrub and juniper savanna habitats. Kit fox have been documented in literature, museum specimens, resource agency reports and by observation surveys in every county of the District (Thompson et al. 1992). Kit fox are carnivorous and feed primarily on nocturnal prey such as cottontail rabbits, kangaroo rats, deer mice, birds, insects and occasionally plant material (O'Farrell 1987). Kit fox reach reproductive maturity between 10 and 22 months of age and litters average 3-5 pups after a 49-55 day gestation period. They use underground dens throughout the year, so prefer areas with loose-textured soils. Published estimates of density vary from 1/43 ha(106 acres) in California to 1/1,036 ha (2,560 acres) in Utah (O'Farrell 1987). No estimates of kit fox populations for New Mexico are available.

Approximately 75% of the District is occupied kit fox habitat (based on visually estimating the primary and secondary habitat as shown on the map of occupied habitat in Thompson et al. (1992)). Assuming that kit fox population densities in the District fall between those recorded in the literature, then a population density estimate on the low end would be about 7,200 and an estimate on the high end would be about 173,000 kit fox.

Threatened or Endangered and Sensitive Species

T&E species that are federally listed as occurring or that could occur in the District are:

Mammals:

- Black-footed ferret (*Mustela nigripes*)
- Mexican long-nosed bat (*Leptonycteris nivalis*)
- Lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*)
- Mexican gray wolf (*Canis lupus baileyi*)
- Jaguar (*Panthera onca*) (Proposed for listing)

Birds:

- Bald eagle (*Haliaeetus leucocephalus*)
- American peregrine falcon (*Falco peregrinus*)
- Northern aplomado falcon (*Falco femoralis septentrionalis*)
- Mexican spotted owl (*Strix occidentalis lucida*)
- Whooping crane (*Grus americana*)
- Southwestern willow flycatcher (*Empidonax traillii extimus*)
- Interior least tern (*Sterna antillarum*)
- Arctic peregrine falcon (*Falco peregrinus tundrius*)
- Piping plover (*Charadrius melodius*)
- Brown pelican (*Pelecanus occidentalis*)

Reptiles:

- Ridge-nosed rattlesnake (*Crotalus willardi obscurus*)

Fish:

- Gila topminnow (*Poeciliopsis occidentalis*)
- Gila trout (*Oncorhynchus gilae*)
- Beautiful shiner (*Cyprinella formosa*)
- Chihuahua chub (*Gila nigrescens*)
- Loach minnow (*Tiaroga cobitis*)
- Spikedace (*Meda fulgida*)

Invertebrates:

- Alamosa springsnail (*Tryonia alamosae*)
- Socorro springsnail (*Pyrgulopsis neomexicana*)

Plants:

- Kuenzler hedgehog cactus (*Echinocereus fendleri*)
- Sacramento prickly poppy (*Agremone pleiacantha spp. pinnatisecta*)
- Sneed pincushion cactus (*Coryphantha sneedii var. sneedii*)
- Todsen's pennyroyal (*Hedeo matodsenii*)

ADC has consulted with the USFWS regarding potential impacts of all current methods on T&E species, and abides by reasonable and prudent alternatives (RPA's) and measures (RPM's) established in the 1992 Biological Opinion (B.O.) that resulted from that consultation. For the full context of the B.O. see the ADC FEIS, Appendix F (USDA 1994). ADC

has initiated or reinitiated formal section 7 consultation on several species listed as occurring or potentially occurring in the District that were not covered by the 1992 B.O. (Mexican spotted owl, southwestern willow flycatcher, Mexican gray wolf), and has requested a conference on the jaguar (*Panthera onca*) which is proposed for listing. Two species not currently listed in New Mexico, but that may occur in the future in the southwestern corner of the District are the ocelot (*Felis pardalis*) and the jaguarundi (*Felis yagouaroundi cacomitili*), and ADC has initiated formal section 7 consultation regarding these species. ADC will abide by any RPA's or RPM's that are established as a result of those consultations.

In the 1992 B.O. the Service found no adverse impacts on fish, invertebrate, or plant species were likely from any ADC activity which includes PDM actions in the Las Cruces District. We find no reason to believe our PDM activities would have any potential to impact those types of species listed above. Therefore, ADC PDM will have no effect on any listed fish, invertebrate, or plant species.

Listed species not covered by the 1992 B.O. or the pending formal Section 7 consultation mentioned above (excluding fish, invertebrates, or plants) that are on the above list are the Mexican long-nosed bat, Lesser long-nosed bat and ridge-nosed rattlesnake. The Service determined no aspect of the ADC program was likely to adversely affect any listed bat species in the 1992 B.O. ADC has not taken any bats during PDM activities nor is such take likely. Therefore, ADC will have no effect on listed bat species. The only PDM method that could potentially affect the ridge-nosed rattlesnake is the gas cartridge used for fumigating coyote dens. However, this method is rarely used in the Las Cruces District -- for example, no dens were taken and no den fumigants were used in 1995, and only 4 coyotes were taken by denning with no fumigants being used in 1994. In addition, ADC personnel are instructed to treat only active coyote dens (i.e., that show fresh tracks and signs of use). Coyotes are generally not tolerant of other den inhabitants such as snakes while they are actively using a den for pup-rearing. Treating only active coyote dens should preclude impacting rattlesnakes with denning gas cartridges. Also, as shown in the [redacted] point locality herpetological data, the ridge-nosed rattlesnake is found in a very limited portion of one county (Hidalgo) in montane habitat. ADC anticipates little or no opportunity to use gas cartridges in such habitat in that part of the District. Therefore, ADC PDM should have no adverse effects on the ridge-nosed rattlesnake. Further section 7 consultation on this species has been initiated and ADC will abide by any RPAs or RPMs that are established to avoid jeopardy.

Use of DRC-1339 on egg and meat baits for control of ravens, crows and magpies was not covered in the 1992 B.O. Because of potential concerns regarding possible effects on bald eagles, further section 7 consultation has been initiated for this method, and ADC will abide by any RPAs or RPMs that are established to avoid jeopardy. However, potential impacts on eagles from this method are low (USDA 1994a, Appendix P; see Chapter 3, section 3.3.2.2 for more discussion).

"Sensitive" species are also known as "Special Status" species and are designated as such by federal land managing agencies for purposes of providing special habitat management considerations. In general, they include T&E species, species that are candidates for T&E listing, and species classified as endangered under State law (the New Mexico Wildlife Conservation Act). Special status species that have been designated in the Las Cruces District include the above-mentioned T&E species plus candidate species that include one frog, an invertebrate, and two plants. Also, the [redacted] black-tailed prairie dog (an unofficially recognized subspecies of *Cynomys ludovicianus*) has been designated as special status by the [redacted]. ADC PDM actions would not impact these species with the potential exception of the [redacted] black-tailed prairie dog, which could potentially benefit from local coyote population reduction should such an action be conducted within the species' range. This is unlikely to be a significant beneficial impact.

The USFWS has identified as occurring or potentially occurring in the District 27 mammal species (14 bat species, 10 rodent, 1 hare, 1 shrew, 1 otter) 9 bird species (including 1 owl and 3 hawks), 5 reptile species, 3 amphibian species, 10 fish species, 8-10 invertebrate species, and 32 species of plants as "Species of Concern." ADC has not taken any of these species in PDM operations in the District. Coyotes are opportunistic predators and could prey upon any of the animal species if the opportunity arises. Local reduction in coyote numbers by ADC PDM activities has the potential

to benefit these species but such benefits are unlikely to be significant. Four species of raptors (birds of prey) within this group could conceivably be impacted by ADC PDM actions. Although ADC is not required to take special measures to reduce potential impacts on species within this group, mitigation measures already in place to avoid adverse impacts are described in Chapter 3.

Chapter 3, section 3.4.2.2, lists mitigation measures and standard operating procedures that would be implemented to avoid jeopardizing any T&E, special status, or sensitive species.

2.3.2 Land Classifications

A majority of the District is in nonprivate ownership (78%). The [redacted] administers 4.6 million acres. In addition, private, State Trust, municipal, county, Tribal, and other federal (Bureau of Reclamation, USFWS, military) lands exist within the District. Chapter 1 discussed acreage within the District where ADC currently has Agreements for Control.

A number of commentors expressed opposition to ADC PDM actions on lands open to the public, specifically [redacted] and [redacted] lands. The amount of each type of land ownership, the area currently under PDM agreement, and the area upon which PDM activities were actually conducted in 1995, as well as species take by land ownership type, are shown in Table 2-2. ADC PDM activity on [redacted] land has been a minor part of the current program. Actions on [redacted] have been more common.

Table 2-2. Acreage of Areas Worked by ADC Predator Damage Management (PDM) and Species Take (#killed) by Land Status in Las Cruces ADC District during 1995. No PDM was conducted by ADC on State Trust lands.

		[redacted]	[redacted]	Private
Acres in District (total land area = 24.7 million acres)		6,420,144	4,729,080	5,384,763
Acres under PDM Agreement (active agreements only)		4,304,723	613,509	3,244,110
Acres of Agreements worked - 1995[1]		1,762,551	249,077	1,638,966
% of Area Worked		27.5%	5.3%	30.4%
# Killed/Species in 1995:				
	Coyote	757	11	1,428
	Bobcat	4	0	2
	Mountain lion	0	1	1
	Bear	0	1	1
	Gray fox	11	0	3
	Kit fox	6	0	2
	Badger	0	0	1
	Fer./FR dog	15	0	11
	Raccoon	0	0	2
	Porcupine	1	0	5
	Striped skunk	2	0	20

[1] This represents the total acreage of properties under Agreements for Control upon which ADC conducted *any* amount of PDM activity. In actuality, ADC generally only works on portions of a given property in any one year. Thus, the actual acreage impacted by PDM actions is less than the amount shown.

It is expected that the current program would not operate on more than 20% of the [redacted] land or more than 40% of the [redacted] under the current program. The amount of [redacted] intermingled with other land ownerships on cooperating ranches that received ADC PDM service in 1995 was about 496,000 acres [redacted] under the current program. If and when allowed to resume PDM on [redacted], it is expected that ADC PDM activities would not occur on more than 25% of the [redacted] in the District in any one year under the current program.

Currently, there are four designated [redacted], totaling 863,000 acres on [redacted] lands in the District -- [redacted] There are currently no designated [redacted] in the District administered by the [redacted]. ADC has not been requested to conduct predator damage management in any of the [redacted], but could be requested to do so since many livestock grazing allotments encompass portions of the [redacted]. PDM could be allowed on [redacted] on a case-by-case basis if approved by the [redacted] and/or as required by current [redacted] policy. The need for and restrictions on such actions on [redacted] would be addressed in the ADC Work Plan prepared by ADC in cooperation with each individual [redacted]. No M-44 use is allowed in designated wilderness areas.

There are currently [redacted] in the District being managed by the [redacted], totaling 730,810 acres. [redacted] has determined that 380,971 acres of these areas are suitable for [redacted]. ADC has received few requests for predator damage management on any of these [redacted]. PDM could be allowed on any of these areas if such actions are addressed in the ADC Work Plan prepared by ADC in cooperation with [redacted]. Such actions would be conducted in compliance with [redacted].

Other types of public land areas of special concern include "[redacted] and [redacted]. In the District there are [redacted]. [redacted] are areas managed for the protection of certain qualities or values such as biological, riparian, cultural, historic, scenic, geological, paleontological, recreation, rangeland, or sensitive plant species. [redacted] is responsible for identifying any conflicts that PDM might have with the management of any of these areas during the ADC Work Plan process. In general, PDM has not been needed in such areas. When the need arises, restrictions on WDM methods in these areas may be established if appropriate.

2.3.3 Livestock Grazing in the District

Chapter 1, section 1.1.2 includes a discussion of the livestock industry in the District. Most rural land areas within the District are used for rangeland livestock production. The most prominent class of livestock grazed across the District is beef cattle with cow-calf operations being the primary type affected by predation. One county, [redacted], has a majority of the rangeland sheep production that occurs in the District and has 92% of the stock sheep protected by the District PDM program.

2.4 Issues Not Considered in Detail with Rationale

2.4.1 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 generally can be expected to replace the animals removed within the same year. 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 species is a very small proportion of the total estimated population as shown by the analysis in Chapter 4.

2.4.2 Livestock Losses Should Be an Accepted Cost of Doing Business -- A Threshold of Loss Should be Reached Before Providing PDM service.

Some commenters felt that livestock producers should expect some level of loss as a cost of doing business, and that ADC should not initiate any control actions until economic losses reach some predetermined "threshold" level. Although some losses of livestock and poultry can be expected and tolerated by livestock producers, ADC has a legal responsibility to respond to requests for wildlife damage management, and it is program policy to aid each requester to minimize losses.

If damage management efforts are not initiated soon after a damage problem is detected, damages may sometimes escalate to excessive levels before the problem is solved. ADC uses the Decision Model (Slate et al. 1992) discussed in Chapter 3, page 3-1 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). Thus, there is judicial precedence indicating that it is not necessary to establish a criterion, such as percentage of loss of a herd to justify the need for ADC action.

2.4.3 Grazing on Federal Lands

Several commentors suggested ADC analyze impacts of livestock grazing on Federal lands. ADC does not administer, nor does it have the authority to regulate, any grazing programs on Federal lands. The issue of whether grazing should be allowed on Federal lands is outside the scope of this EA.

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

During public involvement, some commentors felt that wildlife damage management should not be provided at the expense of taxpayers or that it should be fee based. ADC was established by Congress as the agency responsible for providing wildlife damage management to the people of the United States. Funding for ADC comes from a variety of sources in addition to federal appropriations. Such nonfederal sources include State general appropriations, local government funds (county or city), livestock associations, Indian tribes, and private funds which are all applied toward program operations. Federal, state, and local officials have decided that ADC should be conducted by appropriating funds. Although not required by law, the NM ADC program currently requires cooperative local government or private funding of about 50% of the cost of providing the services of an ADC Specialist. Thus, WDM services are, in essence, "fee based" to a relatively high degree for a federal program. Additionally, wildlife damage management is an appropriate sphere of activity for government programs, since wildlife management is a government responsibility. A common argument for publicly funded wildlife damage management is that the public should bear responsibility for damage to private property caused by public wildlife.

2.4.5 The indiscriminate killing of coyotes often disturbs stable coyote populations, thus encouraging opportunist animals far more likely to kill livestock.

Annual mortality in coyote populations is known to range from 19-100% with 40-60% mortality most common. USDI (1979) analyzed studies of coyote survival rates and found:

> Typical annual survival rates are only 45% to 65% for adult coyotes. High mortality rates have also been shown in four telemetry studies involving 437 coyotes that were older than 5 months of age; 47% of the marked animals are known to have died. Mortality rates even among "unexploited" coyote populations were reported to be between 38-56%. Thus, most coyote populations, even those that are not subjected to control activities, are not stable. In studies where reported coyote mortality was investigated, only 14 of 326 recorded mortalities were due to ADC activities.

Dispersal of "surplus" young coyotes is the main factor that keeps coyote populations distributed throughout their habitat. Such dispersal of subdominant animals removes surplus animals from higher density areas and repopulates areas where artificial reductions have occurred. Two studies (Connolly et al. 1976, Gese and Grothe 1995) investigated the predatory behavior and social hierarchy of coyotes, and determined that the more dominant (alpha) animals were the ones that initiated and killed most of the prey items. Connolly et al. (1976) concluded that the proclivity of individuals to attack seemed related to their age and relationship with conspecifics. The coyotes that attacked sheep most frequently were 2-year-old males and females paired with these males. Gese and Grothe (1995) concluded from observing wild coyotes that the dominant pair was involved in the vast

majority of predation attempts. The alpha male was the main aggressor in all successful kills, even when other pack members were present. Thus it appears removal of local established territorial coyotes actually removes the individuals that are most likely to kill livestock and generally results in the immigration of young coyotes that are less likely to kill livestock.

2.4.6 ADC exacerbates coyote damage problems by killing off rodents and rabbits so they do not have adequate supplies of natural prey.

Some commentors that expressed this concern also expressed a mutually exclusive concern that ADC kills off coyote populations which results in the irruption of rodent and rabbit populations to the point of causing damage to agricultural crops and vegetation resources. The latter issue is analyzed in detail in Chapter 4. In actuality, ADC conducts very little rodent and rabbit population reduction in the District. In 1994, ADC treated or supervised the treatment of only [redacted] of pocket gopher problems and [redacted] of kangaroo rat areas for cropland or rangeland protection purposes. In 1995, acres treated were [redacted] (pocket gopher) and [redacted] (kangaroo rat). These treated areas were less than .006% of the land area of the District. In other words, 99.995% of the potential rodent and rabbit populations of the District were unaffected by ADC activities. Thus, the above concern is unfounded.

2.4.7 Impacts on other wildlife species populations caused by low-level flights during aerial hunting.

Several commentors expressed concern that aerial hunting disturbs other wildlife species populations to the point that their survival and reproduction might be adversely affected. State game agencies use low-level fixed-wing airplane and helicopter flights routinely to census big game populations. Aerial hunting by ADC is primarily limited to open areas of relatively flat to rolling terrain in open grassland or low shrub/sagebrush areas or, at most, scattered pinyon-juniper savanna areas. This is because target predators are not readily visible in more densely vegetated areas and because it is unsafe to attempt aerial hunting flights in rugged terrain. Thus, aerial hunting is not generally conducted in primary habitat areas of deer and elk. This does not mean deer, elk, and pronghorn antelope are never seen or occasionally flushed during aerial hunting operations. However, they are not pursued and generally are observed to run short distances before stopping in the absence of active pursuit. Most aerial hunting occurs prior to big game fawning periods. No aerial hunting occurs in bighorn sheep habitat.

Aerial hunting has not been extensively used in the District -- only 50.1 hours of helicopter and 30.9 hours of fixed-wing hunting were expended in 1995. None of these hours were on [redacted] land and only 10.9 hours were on [redacted] land. As shown in section 1.0, ADC conducted PDM activities on areas under agreement that totaled only about 13% of the land area of the District in 1995. More than 85% of the land area of the District was therefore not subjected to any aerial hunting by ADC. Put in perspective, the amount of aerial hunting by ADC that occurred in the District was the equivalent of only 9.7 minutes of low-level flight per 10 mi.^{2} during all of 1995 on the 13% of the District that comprised areas under agreements worked for PDM.

Concerns regarding impacts on wildlife from low-level flight by military aircraft have been voiced, but no quantitative data exist to evaluate whether such activity has significant impacts on populations ([redacted], pers. comm. 1996). ADC aerial hunting operations are conducted at low speeds (35 - 60 mph) and at much lower ambient noise levels compared to military aircraft. The startling effects on wildlife would therefore be much less than those caused by military fighter jets. Since the 1950s the [redacted] has flown more than 500 fixed-wing and 250-350 helicopter hours per year to survey deer, elk, antelope, waterfowl, and eagles and to perform capture and transplant of antelope. No significant adverse impacts have been noted from these operations ([redacted], pers. comm. 1996). ADC aerial hunting personnel frequently observe deer and antelope standing apparently undisturbed beneath or just off to one side of aircraft. In areas exposed to frequent low-level aircraft activity, animals seem to acclimate to ADC aircraft to the point that disturbance is unapparent (L. Vetterman, Regional Aircraft Manager, ADC, pers. comm. 1996). For all these reasons, ADC does not believe that aerial hunting flights cause significant adverse impacts to nontarget wildlife populations. To the extent that localized coyote removal reduces predation on deer and antelope fawns and other wildlife species, benefits to such species could outweigh potential

adverse impacts. Aerial hunting hours and the amount of area flown in the District could increase several-fold and potential impacts would still be minor.

2.4.8 Objectives are not reasonable.

During public involvement, several commentors questioned the reasonableness of the objectives established for the District PDM program. ADC has the authority and responsibility to set program objectives for meeting its mission and to monitor the effectiveness in achieving those objectives. Setting objectives is part of a good planning process and sets goals for the organization. ADC believes that the objectives established are reasonable and pertinent to its authority and responsibility. However, ADC also recognizes that objectives may need to be modified at some point in the future depending on changes in laws, regulations, policy or other factors that can affect program effectiveness.

2.4.9 Appropriateness of manipulating wildlife for the benefit of hunters or recreation.

Some individuals felt it was not appropriate to manipulate one wildlife species for the benefit of another wildlife species, or for the benefit of hunters or recreation. This is a matter of individual perception and perspective. The jurisdiction for managing most resident wildlife in the State rests with the [redacted] which, under state law, can request ADC's assistance in achieving its management objectives. American Indian Tribes have jurisdiction for management of resident wildlife species on tribal lands and could also request such assistance. ADC would not conduct PDM specifically for wildlife protection unless requested by an agency or tribe with such management authority.

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

Some individuals felt that ranchers often intentionally overestimate the extent of their livestock losses in order to justify more control work. Pearson (1986), however, reported on several studies that indicated little or no bias occurred in ranchers reporting loss, and Shelton and Klindt (1974) found that some ranchers underestimated their losses due to some husbandry practices. Schaefer et al. (1981) investigated sheep predation and determined that : 1) producers correctly assessed the cause of livestock death more than 94% of the time, and 2) the results of two types of loss surveys yielded similar results. Although loss reporting for any given individual ranch could be erroneous, these studies suggest that livestock producers as a group tend to either underestimate predation losses or report such losses with reasonable accuracy.

2.4.11 Relocation (rather than killing) of problem wildlife.

Several commentors suggested that problem predators should be live-captured and relocated instead of killed. Relocation may be appropriate in some situations (i.e., if the problem species' population is at very low levels, there is a suitable relocation site, and the additional travel and personnel costs of relocation can be met.) However, those species that often cause damage problems (i.e., coyotes, black bears, mountain lions) are relatively abundant in much of the suitable habitat in the District area, and translocation is not necessary for the maintenance of viable populations. Furthermore, so few bears and mountain lions would be taken by ADC PDM actions in the District in any one year (10 or less of either species) that relocation would not contribute significantly to enhancing local populations. Relocation of predators implicated in livestock depredation may result in future depredations if the predator encounters livestock again, and [redacted] does not allow relocation of such animals. [redacted] may decide, on a case-by-case basis to relocate nuisance bears and lions.

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

2.4.12 Appropriateness of preparing an EA (instead of an EIS) for such a large area.

Some individuals questioned whether preparing an EA for an area as large as 25 million acres would meet the NEPA requirements for site specificity. If in fact a determination is made through this EA that the proposed action would have a significant environmental impact, then an EIS would be prepared. In terms of considering cumulative impacts, one EA covering the entire District area may provide a better analysis than multiple EAs covering smaller zones within the analysis area.

2.4.13 ADC's removal of coyotes exacerbates the livestock depredation problem because coyote population reduction results in greater reproduction.

This same argument was raised in Southern Utah Wilderness Alliance v. Thompson (U.S. District Court of Utah 1993) and addressed by Connolly (1992) during that court case. What happens in an unexploited coyote population bears little relevance to the situation in the District or in most other areas of the western U.S. Coyote populations in the District are subject to mortality not only from ADC, but also from private trappers and hunters. In the absence of a Federal ADC program, private fur harvest would still occur and coyote damage control efforts would still likely be carried out by some other entity. As discussed in section 2.3.1, the *status quo* for coyote populations in New Mexico is human-caused mortality in the range of 9,000 to 25,000 coyotes killed per year (statewide) even without a federal ADC program. Although it is well supported that coyote reproduction increases as population size decreases (Connolly and Longhurst 1975), ADC is unaware of any data that would substantiate speculation about unexploited coyote populations posing less risk to livestock than exploited populations. On the contrary, research on lamb and sheep losses with restricted or no PDM indicate that coyote control is effective in reducing losses (see section 1.1.2 and 4.2.7.1). This was supported by a review of the General Accounting Office which concluded that "according to available research, localized lethal controls have served their purpose in reducing predator damage" (GAO 1990).

2.4.14 Predator Damage Management in [redacted].

Some commentors felt that PDM should not be allowed or should be heavily restricted in federally designated [redacted]. This issue is related to the issue of impacts on public use of public lands which is addressed in detail in Chapter 4. Circumstances could warrant ADC PDM service in a [redacted] in the future for either livestock or human safety protection. However, as discussed in section 2.3.2, the need for ADC PDM activities in [redacted] in the District has been very limited and is expected to remain a minor part of the District program. If PDM in [redacted] becomes necessary, it is expected that it would be limited to isolated requests by the [redacted] for service involving individual depredating black bears or mountain lions, or infrequent situations involving a confirmed coyote depredation. Bears and lions are under [redacted] management authority, and the [redacted] and [redacted] both recognize and accept state jurisdiction over the management of resident wildlife on federal public lands. Individual depredating bears or mountain lions would be taken only under permit from [redacted] and only following confirmed livestock predation (unless provisions are established for preventive control by [redacted] which are not expected to apply to any [redacted]), or identified threats to human safety. In any event, ADC PDM will only occur in wilderness when allowed under the provisions of the specific wilderness designation and with the concurrence of the land managing agency. The need for and restrictions on such actions on [redacted] would be addressed in ADC Work Plans prepared by ADC in cooperation with each individual [redacted] or [redacted] to assure that impacts on wilderness values are kept to a minimum.

Final

3.0 CHAPTER 3: ALTERNATIVES INCLUDING THE PROPOSED ACTION

Alternatives analyzed in detail are:

1) Alternative 1 - Continue the Current Federal PDM Program. This is the Proposed Action as described in Chapter 1 and is the "No Action" alternative as defined by the Council on Environmental Quality for analysis of ongoing programs or activities.

2) Alternative 2 - No Federal ADC PDM. This alternative consists of no federal PDM.

3) Alternative 3 - Technical Assistance Only. Under this alternative, ADC would not conduct any direct operational PDM activities in the Las Cruces District. If requested, affected producers would be provided with technical assistance (i.e., self-help) information only.

4) Alternative 4 - Nonlethal Required Before Lethal Control. This alternative would not allow any lethal PDM by ADC until nonlethal methods have been tried and found to be inadequate in each depredation situation.

5) Alternative 5 - Corrective Control Only When Lethal PDM Methods are Used. This alternative would require that livestock depredation or other resource damage by predators must be occurring before the initiation of lethal control. No preventive lethal control would be allowed.

6) Alternative 6 - Expanded Federal Predator Damage Management. This alternative would require additional expenditures for more field personnel, equipment, and aerial hunting in the District.

3.1 DESCRIPTION OF THE ALTERNATIVES

3.1.1 ALTERNATIVE 1 - Continue the Current Program (the Proposed Action and the "No Action Alternative)

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

A succinct description of the proposed action was presented in Chapter 1. The discussion that follows contains further information intended to foster understanding of the proposed action.

Overview

The No Action alternative would continue the current ADC Integrated Wildlife Damage Management (IWDM) program for the protection of livestock, property, crops, wildlife and human health and safety from damage caused by predators in the District. The current predator damage management (PDM) program is a collection of cooperative programs with other Federal, State and local agencies, and private individuals and associations (described in Chapter 1). The District conducts technical assistance and preventive (in response to anticipated or historical loss) and corrective (in response to current loss or hazard) operational PDM on private, [redacted], and [redacted] lands under MOU, Cooperative Agreements or Agreements for Control, or Annual Work Plans. ADC PDM could also extend to State Trust land areas if a management plan is approved. All ADC PDM is based on interagency relationships, which require close coordination and cooperation because of overlapping authorities.

On Federal lands, ADC Work Plans describe the WDM that would occur. Currently, four separate Environmental Assessments meet NEPA compliance for ADC WDM on Federal lands within the District. During the ADC annual

planning process with the [redacted], plans and maps are prepared which describe and delineate where WDM would be conducted and what methods would be used. Before WDM is conducted by ADC 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 predator populations or groups and/or individual offending animals, depending on the circumstances.

WDM is only conducted in designated [redacted] when allowed by the legislation designating the area or under regulations developed by the Forest Service or [redacted]. WDM in these designated areas is only, and is expected to continue to be, a very minor part 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 [redacted], an American Indian Tribe, or, for example, in the case of T&E species protection, the USFWS. The agency with management authority would then be responsible for determining the need for such actions and ADC could assist them contingent upon available funding and personnel. These types of projects have not been requested in recent years but could be conducted under the current program. The decisions on methods to be used and the timing of their application would be made in coordination with the wildlife management and land management agencies.

Integrated Wildlife Damage Management

During more than 70 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 evaluation of local problems 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) described in the FEIS. The model represents the thought process used by ADC personnel in deciding courses of action for specific wildlife damage problems. A complete discussion of the ADC decision model is presented in (USDA 1994).

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

- Species responsible
- Magnitude of the damage
- Geographic extent of damage
- Duration and frequency of the damage
- Prevention of future damage (lethal and nonlethal techniques)

The cost of management may sometimes be secondary because of overriding environmental, legal, human health and safety, animal welfare, or other concerns.

The IWDM strategies that ADC employs consist of:

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

- Direct Control Assistance (activities conducted or supervised by ADC personnel): Direct control assistance is implemented when the problem cannot effectively 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 effectively resolve problems, especially if restricted pesticides are proposed, or the problem is complex requiring the direct supervision of a wildlife professional. ADC considers the biology and behavior of the damaging species and other factors using the ADC decision model (Slate et al. 1992). The recommended strategy(ies) may include any combination of preventive and corrective actions that could be implemented by the requestor, ADC, or other agency, as appropriate. Two strategies are available:

    1. **Preventive Damage Management.** Preventive damage management is applying wildlife damage management 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 depredation has occurred on lambing grounds, ADC may provide information about guarding dogs, fencing or other husbandry techniques, or be requested to conduct PDM.

    2. **Corrective Damage Management**. Corrective damage management is applying wildlife damage management to stop or reduce current losses. As requested and appropriate, ADC personnel provide information and conduct demonstrations or, with the appropriate signed agreement, take action to prevent additional losses from recurring. For example, in areas where lamb depredation is occurring, ADC may provide information about guarding dogs, fencing or husbandry techniques, or conduct operational damage management to stop the losses.

Predator Damage Management Methods Available for Use

A number of methods are available for consideration in predator damage situations.

Nonlethal Methods

Livestock producer practices consist primarily of nonlethal preventive methods such as animal husbandry, habitat modification, and animal behavior modification. Livestock husbandry and other management techniques are implemented by the livestock producer. Producers are encouraged to use these methods, based on the level of risk, need, and professional judgement on their effectiveness and practicality (USDA 1992). Livestock producer practices recommended by ADC or already in use by many producers include:

- Animal husbandry methods. These generally involve modifications to the level of care or attention given to livestock which may vary depending on the age and size of the livestock. Animal husbandry practices

include but are not limited to techniques such as guarding animals (guard dogs, llamas, donkeys), herders, shed lambing, confinement calving, and carcass removal. Guard dogs can be effective in reducing predation on sheep or goats in some situations (Coppinger et al. 1988; Green et al. 1984) and ADC has an information bulletin available to producers who are interested in this method (Green and Woodruff 1990). They require a considerable degree of commitment and effort on the part of producers to be effective and, apparently, have not been used to a great degree by New Mexico Sheep producers -- only 8.5% of cooperating producers indicated using guard dogs, and only 28% of those that tried them reported satisfactory results (NMADC 1995). Guarding animals have not been proven to be effective for cattle and calf protection. In addition, some guard dogs chase other wildlife besides predators, some apparently learn to regularly kill deer fawns, and may influence wild turkey distribution (Timm and Schmidt 1989). Llamas have also been advocated as effective livestock guarding animals (Franklin and Powell 1994), but some degree of nontarget hazard may likewise exist from the use of llamas for this purpose. Llamas are sometimes carriers of paratuberculosis (Johne's disease) which may be transmissible to native ungulates or domestic livestock (Wildlife Management Institute 1995). This disease involves a chronic wasting of the intestinal tract and associated lymphoid tissues, and there is no known cure. Thus, although considered a nonlethal control measure, guarding animals can sometimes have lethal or otherwise detrimental impacts on nontarget wildlife and these impacts could easily occur unnoticed by livestock operators or federal land managers. Guard dogs have also been known to conflict with recreational users on public lands by showing aggressive behavior toward or attacking humans which poses liability concerns for livestock producers and federal land management agencies to the point that guard dogs may not be allowed on public land areas (D. Roth, USFS, pers. comm.). Close confinement of cattle during calving is sometimes practical for small operations but, as a rule, not practical on large rangeland operations which are the primary mode of calf production for which ADC receives requests for PDM. Carcass removal usually is not feasible on extensive pasture and range operations (Wade 1982).

- Habitat modification. This practice alters habitat to attract or repel certain wildlife species away from damage sites, or to separate livestock from predators. Habitat modification practices could be encouraged when practical, based on the type and extent of the livestock operation. For example, clearing brushy or wooded areas in or adjacent to lambing or calving pastures may be appropriate to reduce available cover for predators. Habitat alteration may not be recommended if it has substantial negative impacts on other species of wildlife. This option is generally not available for public land areas.

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

  - Predator-proof fences
  - Electronic guards
  - Propane exploders
  - Pyrotechnics

  These techniques can be effective in certain circumstances, but are generally only practical on small pasture situations, or, as in the case of the electronic guard, in situations where livestock are closely herded as is most often the case in many [redacted] sheep grazing allotments. Scaring devices, when effective, are usually so for only a short period of time before predators become accustomed and learn to ignore them. Propane exploders, another scaring device, are not practical under large rangeland pasture situations because of the large expanses of land involved, and they can also be disturbing to other wildlife besides target predators and to recreational users on public land areas when they happen to be nearby. Predator proof fencing is effective but generally cost-prohibitive in most situations. Most sheep and goat producers, however, already employ *predator-resistant* net wire fencing (NMADC 1995). It serves to not only contain sheep but helps to discourage predator ingress into production areas. Coyotes or other predators that make

it through, over, or under such fences often leave evidence at their points of entrance that helps to facilitate their capture and/or removal with lethal means. Fencing adequate to stop predator movements can also restrict movements of game animals and other wildlife (Wade 1982). In large rangeland pasture situations predators would likely be enclosed with livestock by construction of predator proof fencing. This means depredations would likely occur anyway requiring the implementation of predator removal methods to resolve depredation problems. Also, coyotes have been known to pass through, over, or under even very aggressive fence designs, including high-tensile wire electric fencing. Also, coyotes have been known to pass through, over, or under even very aggressive fence designs including high-tensile wire electric fencing. Once inside such fenced areas, coyotes do not generally leave and can cause depredations (Dr. V.W. Howard, NMSU, pers. comm. 1996). Scaring devices such as propane exploders are not practical under large rangeland pasture situations. They can also be disturbing to other wildlife besides target predators and to recreational users on public land areas when they happen to be nearby.

Extent of Nonlethal Method Use for PDM in New Mexico

A survey to determine private costs of predator control in New Mexico in 1983 indicated 67% of sheep producers in the State used one or more nonlethal methods of predator control. These methods included guard dogs, herders, and "other nonlethal" (included predator-resistant fencing, night penning, and shed lambing) which were used by 29%, 22% and 52%, respectively, of the nonlethal method users (Littauer et al. 1986). The NM ADC program surveyed more than 1,100 livestock producers in the state who were cooperators in the ADC program in 1994 to determine the extent and kinds of nonlethal methods tried or being used. The survey indicated that 98% of cooperating sheep producers and 79% of cattle producers, or 83% of cooperating producers overall were using or had tried one or more nonlethal methods. Ninety-five percent of the cooperating producers said they used an integrated approach in which nonlethal methods are used in conjunction with lethal methods (NMADC 1995). These two surveys suggest that either the proportion of sheep producers using nonlethal methods has increased in the state over the last 10 years, or that sheep producers who are cooperators with ADC tend to use nonlethal methods to a greater degree than sheep producers in the state overall.

It is apparent that, despite the limitations described above, nonlethal methods are an important part of overall PDM for livestock protection in the State and in the District.

Lethal Methods

Most nonlethal methods are only practical for use by livestock producers, and are not practical for use by ADC personnel under the current program. This is because they require continuous, year-round or at least seasonal commitments and attention to make them effective in those situations where they are practical. ADC field personnel are too few in number (30-35 statewide) to implement and maintain the nonlethal methods described above on the more than 1,300 cooperating ranches and farms in the State. Therefore, most operational activities of ADC involve conducting lethal PDM where nonlethal strategies are not practical or have not been effective.

1. Leghold and cage traps, and neck and foot snares are used by ADC for preventive and corrective damage management only where signed *Agreements For Control On Private Property* or *Agreements For Control On Nonprivate Property* are in place. Leghold traps are set in limited numbers in selected locations where tracks and other signs indicate coyotes or, in more limited circumstances, other target carnivores such as bobcats and red or gray fox, have been and will return. Scent lures are used to attract target species to the sets. When the target animal visits the set to investigate the scent, it generally steps on the trap pan which triggers the trap springs to close the jaws of the trap on the animals leg. Traps are secured either by a chain and stake driven into the ground or by a chain and "drag" which hangs up in brush soon after the captured animal leaves the trap site. The target animal is held until the ADC specialist returns to check the trap. In most cases, the target animal is euthanized by shooting. Leghold traps can also be used in "blind set"

locations where target animals are predicted to travel. Scent attractants are generally not used in these situations.

Neck snares are primarily set in spots where coyotes or other target animals are expected to pass under net wire fences or on trails through narrow pathways through brush or in arroyos and narrow draws. The target animal is generally caught by the neck and strangles relatively quickly. Foot snares are set for target lions and bears and use tension devices so that lighter weight nontarget animals cannot generally trip them and be caught. Cage traps are not practical for coyote capture because coyotes are generally too wary to enter them. Cage traps are sometimes practical for lion capture when foot snares are not available and a kind of cage trap called a culvert trap is sometimes used for capturing black bears.

Since coyotes are numerous throughout the District, they are rarely if ever relocated and released because habitats in other areas are generally already occupied by resident coyotes. Translocation of wild mammals is discouraged by ADC policy (ADC Directive 2.501) because of stress to the relocated animal and poor survival rates due to intraspecific strife with established resident animals of the same species, and because of difficulties in adapting to new locations or habitats. Relocation of captured problem mammals is also opposed by the American Veterinary Medical Association, the National Association of State Public Health Veterinarians, and the Council of State and Territorial Epidemiologists because of the risk of disease transmission among wild mammals.

2. Ground shooting is selective for target species and may be used in conjunction with the use of spotlights, decoy dogs, and predator calling. Shooting with rifles or shotguns is used to manage predator damage problems when lethal methods are determined to be appropriate. The animals are killed as quickly and humanely as possible.

3. Hunting dogs are used to trail and capture certain problem predators such as mountain lions, black bears, and bobcats. 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 locate coyotes and dens, to pursue coyotes to assist aerial hunting, or to decoy problem coyotes into shooting range.

4. Denning is the practice of locating coyote dens and destroying the pups by fumigation of the den with the gas cartridge or by excavation of the den and euthanasia of the pups (see the gas cartridge under chemical methods). Denning is only useful during the spring and early summer for a few months following the birth of pups. Effective den hunting generally requires good tracking conditions and is not a major method of take in the District. For example, in 1994 less than 0.2% of coyotes killed (4 out of a total of 2,397) were taken by this method. In 1995, no coyotes were taken by denning.

5. Aerial hunting, the shooting of coyotes from fixed-winged aircraft or helicopters, is used on all lands where authorized and determined to be appropriate. Aerial hunting consists of visually sighting target animals and shooting them from the aircraft.

Chemical Management Methods:

All chemical pesticides used by ADC are registered under FIFRA and administered by the EPA and NMDA. ADC personnel that use pesticides are certified as pesticide applicators by NMDA, or, when allowed by the pesticide labeling, are under the direct supervision of a certified pesticide applicator, and are required to adhere to all certification requirements set forth in FIFRA and New Mexico state pesticide control laws and regulations.

The chemical methods that would be used for PDM in the proposed action are:

1. Sodium cyanide in the M-44 device. The M-44 cyanide ejector is a selective device for use in reducing wild canid (coyote, red fox, gray fox and feral dog) predation on livestock (EPA Reg. No. 56228-15), and also for protecting endangered species and for certain public health uses (Thomas 1986, Connolly 1988). The M-44 operating mechanism is a spring-loaded plunger. When a target canid pulls up on the device, the plunger is released and bursts or "pops" through a plastic capsule containing one gram of powdered sodium cyanide, propelling the powder into the animal's mouth. No explosive components are involved which is a common misconception among some persons unfamiliar with the device. M-44s are used for certain types of preventive and corrective PDM involving wild canid predators. ADC personnel comply with the EPA label and 26 use restrictions (see USDA 1994, Appendix Q).

   Sodium cyanide is used for many purposes in the United States, including agricultural, pharmaceutical, mining applications, and for industrial dyes. Sodium cyanide is odorless when completely dry, but 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). Sodium cyanide is freely soluble in water and is a fast acting nonspecific toxicant that inhibits cellular respiration. Low concentrations of cyanide have been detected and are frequently found in normal human blood (Feldstein and Klendshof 1954).

2. The gas cartridge is registered as a fumigant by the EPA (EPA Reg. No. 56228-2) and is comprised of 35% charcoal and 65% sodium nitrate. When ignited, the cartridge burns in the den of an animal and produces large amounts of carbon monoxide, a colorless, tasteless gas, which kills animals in the den. This technique is used where livestock killing can be attributed to food procurement for young (Till and Knowlton 1983, Till 1992), or to euthanize pups that are discovered in dens when adult parent coyotes have been removed in direct control operations.

3. The Livestock Protection Collar (LPC) is a method that takes advantage of the coyote's normal habitat of attacking at the neck of sheep and goats. It consists of two rubber pouches or reservoirs attached to Velcro or elastic straps. The reservoirs are filled with a toxicant solution of sodium fluoroacetate (Compound 1080). When a coyote attacks a collared sheep or goat, it generally punctures one or both of the reservoirs and ingests a lethal oral dose of the toxicant. It is the most selective method ever devised for removing offending individual coyotes. 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 are registered with the EPA for ADC use nationwide and with the New Mexico Department of Agriculture for use in New Mexico. LPCs are used by trained ADC employees in accordance with the EPA registration and use restrictions. LPCs are almost exclusively used in corrective control situations in which a current, ongoing, and predictable pattern of predation is occurring --e.g., one kill per night or several kills per week in the same pasture. The flock of sheep or goats is gathered, and a target flock of collared lambs and their uncollared ewes (or kids and nannies in the case of goats) is placed back into the pasture while the rest are penned or pastured elsewhere. When successful, the coyote or coyotes attack a collared animal and receive the lethal dose. Although the lamb or kid goat is sacrificed, further losses are then prevented.

   LPCs are registered with the EPA (EPA Reg. No. 56228-22) for ADC use nationwide and with NMDA for use in New Mexico. LPC use follows EPA labeling and use restrictions, and is restricted to specially trained and certified ADC employees or employees under the supervision of a certified applicator. The LPC would not be used on [redacted] lands in the District because of use restrictions.

Sodium fluoroacetate has been used since World War II. It 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). This latter characteristic makes Compound 1080 much safer to handle and use than other commonly used insecticides. Sodium fluoroacetate is discriminatingly toxic to predators, being many times more lethal to them than to most nontarget species (Atzert 1971, Connolly and Burns 1990). Sodium fluoroacetate is a white powder soluble in water and is very stable in solution; it is currently only legal for use in the LPC. Sodium fluoroacetate kills by disrupting the Kreb's Cycle, which is the energy producing process for cells. Extensive research on nontarget and secondary hazards from use of this chemical in the LPC, as well as experience in field use, have shown almost no nontarget hazards from this method. Previous claims of significant risk of secondary poisoning of nontarget scavengers that feed on coyotes killed by 1080 poisoning were found to be invalid -- even a massive overdose of 1080 (>160 times the LD_{50}) in an experimental coyote followed by controlled feeding of the tissues to magpies (one of the most sensitive bird species to 1080) produced no secondary poisoning or toxic effects (Connolly 1980).

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

   DRC-1339 is registered with the EPA (EPA Reg. No. 56228-29) to control crows, ravens and magpies that prey on newborn livestock or on the eggs or young of wildlife species needing special protection. The DRC-1339 is incorporated into either whole egg or small meat baits (Larsen and Dietrich 1970). The feeding habits of the birds are observed before placing any treated baits in an area to reduce the risks to nontarget animals. Corvids (ravens, crows, magpies) are opportunistic feeders and by determining when and where the birds are feeding, the baits can be found more quickly and easily, thereby reducing the risks to nontarget animals. Selective damage management can be applied because corvids learn to exploit a readily available food source and they will continue to focus on that source until the availability declines. DRC-1339 was not used in the District for raven control during 1994 or 1995 but could be should the need arise.

A quantitative risk assessment approach to evaluating potential impacts of ADC's use of chemical methods concluded that no adverse effects are expected from use of any of the above chemicals (USDA 1994, Appendix P).

3.1.2 ALTERNATIVE 2 - No Federal ADC Predator Damage Management

This alternative would consist of no federal involvement in PDM in the District -- neither direct operational management assistance nor technical assistance to provide information on nonlethal and/or lethal management techniques would be available from ADC. Information on future developments in nonlethal and lethal management techniques that culminate from research efforts by ADC's research branch would not be available to producers. They would be left with the option to conduct their own predator damage control efforts. Producers, state agency personnel, or others could conduct PDM activities including the use of traps and snares, shooting, and any nonlethal methods they deem effective. Private persons and state agency personnel could use M-44 devices under NMDA certification programs, but may not be allowed to use them on [redacted] or [redacted]

[redacted]. Private persons would not (and state agency personnel might not) be bound to follow mitigation measures that ADC personnel currently follow to avoid adverse impacts to T&E and sensitive species.

3.1.3 ALTERNATIVE 3 - Technical Assistance Only

This alternative would not allow ADC operational PDM in the District. ADC would only provide technical assistance and make recommendations when requested. However, producers, state agency personnel, or others could conduct PDM activities including the use of traps and snares, shooting, and any nonlethal methods they deem effective. Private persons could use M-44 devices under the NMDA private applicator program, but may not be able to use them on [redacted] or [redacted]. Methods and control devices could be applied by persons with little or no training and experience. This in turn could require more effort and cost to achieve the same level of problem resolution, and could cause greater impacts on nontarget species. Private persons would not be bound to follow mitigation measures that ADC personnel must follow to avoid adverse impacts to T&E and sensitive species.

3.1.4 ALTERNATIVE 4 - Nonlethal Control Required Before Lethal

This alternative would allow no use of lethal methods by ADC as described under the proposed action until nonlethal methods have been employed in a given damage situation and found to be ineffective or inadequate. No preventive lethal control would be allowed. Producers and state agencies would still have the option of implementing their own lethal control measures without a requirement that nonlethal methods be conducted first.

A survey of cooperating livestock producers in the New Mexico ADC program conducted in 1994 showed that 83% of them had tried or were using one or more nonlethal methods of controlling predation. Thus, this alternative is not far removed from the current program other than that use of nonlethal methods by producers has not been fully documented or required by ADC on a routine basis.

3.1.5 ALTERNATIVE 5 - Corrective Control Only When Lethal PDM Methods are Used

This alternative would require that livestock losses or other resource damage by predators must be presently occurring, or must have occurred recently enough to predict that the loss or damage will continue to occur in the near future, before any lethal PDM methods could be used by ADC. This alternative would not allow preventive lethal control actions (i.e., lethal control actions taken in anticipation of losses or damage but in situations where losses have not occurred yet during the current production season or at the current location where the damage is expected). The difference between this alternative and Alternative 4 is that nonlethal methods would not necessarily be required to have been implemented in specific damage situations before implementing corrective lethal control. Producers and state agencies would still have the option of implementing their own lethal control measures. This alternative is already part of the current program with regard to black bear and mountain lion depredation problems in that a livestock kill must have occurred before [redacted] will request and authorize the take of a target bear or lion by ADC.

3.1.6 ALTERNATIVE 6 - Expanded IWDM for Predator Damage Management.

This alternative would require additional funding to increase the number of field personnel, equipment, and aerial hunting in the District for the purpose of reducing predation losses of livestock losses below the rates occurring under the current program. The methods and strategies would be the same as the current program, including the distribution of nonlethal PDM information to cooperating producers. This alternative would likely result in increased levels of preventive lethal control of coyotes on, and in areas adjacent to, cooperating ranch properties that have been experiencing the most severe predation problems.

3.2 Alternatives Considered But Not Analyzed in Detail With Rationale

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

3.2.1 Compensation for Predator Damage Losses

The Compensation alternative would require the establishment of a system to reimburse persons impacted by predator damage. This alternative was eliminated from further analysis because no federal or state laws currently exist to authorize such action. Under such an alternative, ADC would not provide any direct control or technical assistance. Aside from lack of legal authority, analysis of this alternative in the FEIS indicates that the concept has many drawbacks (USDA 1994):

- It would require larger expenditures of money and manpower to investigate and validate all losses, and determine and administer appropriate compensation.
- Compensation would most likely be below full market value. It is difficult to make timely responses to all requests to assess and confirm losses, and many losses could not be verified.
- Compensation would probably reduce incentive to livestock owners to limit predation through improved animal husbandry practices and other management strategies.
- Not all producers would rely completely on a compensation program and lethal control of predators would most likely continue as permitted by state law.
- Compensation would not be practical for reducing threats to human health and safety for situations in which that is the primary need for PDM.
- Compensation programs cannot address problems where predation is a limiting factor on other desirable wildlife species that management agencies or tribes wish to increase.

3.2.2 Bounties

Payment of funds for killing predators (bounties) suspected of causing economic losses is not supported by New Mexico State agencies such as [redacted]. ADC also does not support this concept because:

- ADC does not have the authority to establish a bounty program.
- Bounties are generally not as effective in controlling damage.
- Circumstances surrounding take of animals are completely unregulated.
- No process exists to prohibit taking of animals from outside the damage management area for compensation purposes.

3.2.3 Eradication and Long Term Population Suppression

An eradication alternative would direct all ADC program efforts toward total long term elimination of coyotes and perhaps other predator species within large defined areas or across the entire District.

In New Mexico, eradication of predator species is not a desired population management goal of state agencies, although, under current state law, coyotes may be taken year round with no restriction on the numbers that can be taken. Eradication as a general strategy for managing predator damage will not be considered in detail because:

- ADC opposes eradication of any native wildlife species.
- [redacted] oppose eradication of any native New Mexico wildlife species.
- Eradication is not acceptable to most members of the public.
- The eradication of a native species or local population would be extremely difficult if not impossible to accomplish. In general, any local population reduction that is achieved through PDM actions is short term and immigration from surrounding areas generally causes repopulation of the area to some extent within several months (this does not mean that the PDM action was not successful in reducing or preventing losses, however).

Suppression would direct ADC program efforts toward managed reduction of certain problem populations or groups. In areas where damage can be attributed to predation by localized populations of predators, ADC can decide to implement local population suppression as a result of using the ADC Decision Model.

It is not realistic or practical to consider large-scale population suppression as the basis of the ADC program. Typically, ADC activities in the District would be conducted on a very small portion of the area inhabited by problem species (as discussed in section 1.0).

3.2.4 The Humane Society of the United States (HSUS) Alternative

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

The major components of this proposed alternative by the HSUS have been analyzed in detail in the alternatives contained in this EA and through court rulings. The HSUS alternative would not allow for a full range of IWDM techniques to resolve wildlife damage management problems. In addition, ADC is charged by law to protect American agriculture and other resources. In Southern Utah Wilderness Society, The Wilderness Society et al. v. Hugh Thompson et al. U.S. Forest Service (Civil No. 92-C-0052A 1993), the court clearly states that, "The agency need not show that a certain level of damage is occurring before it implements an ADC program. . . .Hence, to establish need for an ADC, the forest supervisors need only show that damage from predators is threatened." Thus, there is judicial precedence indicating that it is not necessary to establish a criterion, such as percentage of loss of a herd to justify the need for ADC action. Preventive and corrective control actions are therefore justified by a reasonable determination that damage by predators is threatened. The alternatives selected for detailed analysis in this EA encompass a reasonable range as required by NEPA and include some of the suggestions in the HSUS proposal. Thus, it is believed that inclusion of this alternative would not contribute new information or options for consideration and analysis that are not already being considered in this EA or that are available through IWDM as used by ADC.

3.2.5 Lithium Chloride as an Aversive Agent

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

3.2.6 Rely on Private Fur Harvesters to Reduce Coyote Depredation on Livestock

It is sometimes postulated that private fur harvesters could meet PDM needs by removing coyotes that are killing or would kill domestic livestock. There is some truth to this in that livestock producers have indicated to ADC that predation losses in many areas were less of a problem when fur prices were higher and there was greater private coyote harvest. However, private fur takers tend to operate where furbearer populations are high. When the only monetary benefit is fur value, they cannot make a profit by pursuing individual depredating coyotes in local areas where numbers are low. Also, furs are only prime in the winter months and are worthless at the time of year when depredation control is most often needed. Although some private trappers and hunters are highly skilled and use good equipment, many are less skilled and use less adequate equipment (e.g., traps that are too small to adequately hold coyotes), and can sometimes hamper professional PDM efforts by educating coyotes to control methods. They are not required to use modifications such as pan tension devices to reduce nontarget take and are therefore less selective in taking target animals than ADC specialists. The typical strategy of private fur takers is to harvest the more easily captured animals in a population and to move on to other areas. Thus, offending animals or older and wiser coyotes that are more apt to be livestock depredators (see section 2.4.5) are more likely to be left in areas worked by private fur takers, which means depredation losses would often be about as severe as they would without private fur harvest. For all these reasons, private fur harvest is not a reasonable alternative to professional PDM programs.

3.2.7 No Wildlife Damage Management Within any [redacted]

Under the current program alternative (Alternative 1) or the Corrective Control Only Alternative (Alternative 5), the amount of predator damage control that would occur in wilderness areas is so minor that the effects of either of those alternatives would not likely be significantly different from the effects of a "[redacted]" alternative. The minor amount of predator damage control work that is conducted by ADC in [redacted] areas conforms to legislative and policy guidelines as administered by the responsible land management agency. ADC and the land management agency meet annually to review work plans that delineate what, when, why and where wildlife damage management would be conducted.

3.2.8 Antifertility Agents for Coyote Population Control

Antifertility agents to inhibit reproduction have been investigated in the past for coyote population control but were not found to be successful enough to recommend for operational use (Balser 1964; Linhart et al. 1968). Field research on the efficacy of denning (removal of coyote pups from dens) in reducing sheep predation led to the hypothesis that the territorial defense behaviors of sterilized mated coyote pairs could be used to keep other sheep-killing coyotes away from lambing grounds (Till 1992; Till and Knowlton 1983). However, more recent work by Shivik et al. (1996), suggests that territoriality can break down in areas of high food resources, e.g., a lambing ground, and that the benefits of leaving territorial non-sheep-killing coyotes in such areas may be negligible because they may tolerate other depredating coyotes in their territories. Nevertheless, ADC's National Wildlife Research Center is investigating field applications of this strategy to determine if it can be useful. Immunocontraception, i.e., the use of vaccines that inhibit reproduction, is a potentially useful concept for coyote population suppression but is in the early stages of research and development (Miller 1986; L. A. Miller, National Wildlife Research Center, pers. comm. 1996). Environmental concerns with this strategy that still need to be addressed include safety of genetically engineered vaccines to humans and other wildlife. At this time, the

methodology is controversial among wildlife biologists. In any event, no contraceptive agents are currently registered for use on coyotes and are thus not legal for use. Should any become registered in the future, ADC could consider them among the methods to be used in the current program. Additional NEPA analyses deemed necessary at that time would be conducted.

3.3 MITIGATION AND STANDARD OPERATING PROCEDURES FOR WILDLIFE DAMAGE MANAGEMENT TECHNIQUES

3.3.1 Mitigation in Standard Operating Procedures (SOPs)

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

- The ADC Decision Model which is designed to identify effective wildlife damage management strategies and their impacts.
- Traps and snares are not set within 30 feet of exposed carcasses to prevent the capture of scavenging birds. The exception to this is for the capture of mountain lion and black bear because the weight of these target animals allows foot snare tension adjustments to exclude the capture of smaller nontarget animals such as scavenging birds.
- Leghold trap underpan tension devices and foot snare trigger tension devices are used throughout the program to reduce capture of nontarget wildlife that weigh less than the target species.
- Nontarget animals captured in leghold traps or foot snares are released unless it is determined by the ADC Specialist that they will not survive. Release of large nontarget animals, such as mountain lions and black bears, may be preceded by sedation using chemical immobilizing agents administered by trained and certified ADC personnel.
- Conspicuous, bilingual warning signs alerting people to the presence of traps, snares, and M-44s are placed at major access points when they are set in the field.
- Reasonable and prudent measures or alternatives are identified through consultation with the USFWS and are implemented to avoid adverse impacts to T&E species.
- EPA-approved label directions are followed for all pesticide use.
- All State ADC Specialists who use restricted chemicals are trained by program personnel or others who are experts in the safe and effective use of these materials.
- The M-44 sodium cyanide devices are used following EPA label requirements (see FEIS Appendix Q for label and use restrictions).

Some additional mitigating factors specific to the current program include:

- Management actions would be directed toward localized populations or groups of target predator species and/or individual offending members of those species. Generalized population suppression across the District, or even across major portions of the District, would not be conducted.
- ADC uses PDM devices and conducts activities for which the risk of hazards to public safety and hazard to the environment have been determined to be low according to a formal risk assessment (USDA 1994, Appendix P).

3.3.2 Additional Mitigation specific to the issues

The following is a summary of additional mitigation measures that are specific to the issues listed in Chapter 2 of this document.

3.3.2.1 Effects on Target Predator Species Populations

- PDM activities are directed to resolving coyote and other predator damage problems by taking action against individual problem animals, or local populations or groups, not by attempting to eradicate populations in the entire area or region.
- ADC kill is monitored by considering total known harvest/kill and estimated population numbers of key species. These data are used to assess cumulative effects so as to maintain the magnitude of harvest below the level that would impact the viability of populations of native species (See Chapter 4).

3.3.2.2 Effects on Nontarget Species Populations Including Threatened and Endangered Species and Sensitive Species

- ADC personnel are highly trained and experienced to select the most appropriate method for taking problem animals and excluding nontarget animals.
- Leghold trap and foot snare underpan tension devices are used to reduce hazards to nontarget wildlife that weigh less than the target species.
- Nontarget animals captured in leghold traps or foot snares are released unless it is determined by the ADC Specialist that they will not survive.
- Release of large nontarget animals, such as mountain lions and black bears, may be preceded by sedation using chemical immobilizing agents administered by trained and certified ADC personnel.
- ADC has consulted with the USFWS regarding potential impacts of current methods on T&E species, and abides by reasonable and prudent measures established as a result of that consultation. For the full context of the Biological Opinion see the ADC FEIS, Appendix F (USDA 1994). ADC has initiated or reinitiated formal section 7 consultation on several species not covered by the 1992 B.O. (Mexican spotted owl, southwestern willow flycatcher, Mexican gray wolf, jaguar, desert tortoise, and California condor). Of these, the Mexican spotted owl, southwestern willow flycatcher, and Mexican gray wolf are listed species in New Mexico. The jaguar is proposed for listing. Listed species or "Species of Special Concern" as identified by the USFWS that are not covered by the above referenced section 7 consultations and that could conceivably be impacted by ADC PDM actions are listed as follows with specific mitigation measures and standard operating procedures designed to avoid adverse impacts:

    o New Mexican ridge-nosed rattlesnake (Listed as Threatened). As stated in Chapter 2, this species could conceivably be affected by ADC use of gas cartridges in coyote dens. Denning is rarely used in the Las Cruces District -- for example, no dens were taken and no den fumigants were used in 1995, and only 4 coyotes were taken by denning with no fumigants being used in 1994. In addition, ADC personnel are instructed to treat only active coyote dens (i.e., that show fresh tracks and signs of use) and to avoid treating burrows that show evidence of nontarget use. Coyotes do not tolerate other den inhabitants in active dens. The ridge-nosed rattlesnake only occurs in a small portion of one mountain range in [redacted] County and

ADC would likely not use gas cartridges in such habitat or in that area. All these factors combine to present virtually no risk to the ridge-nosed rattlesnake.

- o Western burrowing owl (*Athene cunicularia hypugea*) (a Species of Special Concern). This species could potentially be taken by the use of den fumigants used to kill coyote pups in dens. As stated previously, denning gas cartridges are rarely used in the Las Cruces District (no use in 1994 or 1995). In addition, ADC personnel are instructed to treat only active coyote dens (i.e., that show fresh tracks and signs of use) and to avoid treating burrows that show evidence of owl or other nontarget use. Coyotes do not tolerate other den inhabitants such as owls. Burrowing owls leave noticeable signs of their presence in the form of white droppings at burrow openings they are using. Thus, it is easy to avoid treating an owl burrow.

- o Several raptor species -- Bald eagle (federally threatened species), golden eagle, and several Species of Special Concern: Ferruginous hawk (*Buteo regalis*), northern goshawk (*Accipiter gentilis*), northern gray hawk (*Buteo nitidus maximus*). These species, as well as other raptor species, could potentially be taken by steel traps or could pick up DRC-1339 treated egg or meat baits placed for raven or crow depredation management. However, pan tension devices that exclude nontarget animals that weigh less than target coyotes are required to be used on leghold traps. In addition, ADC policy requires that leghold traps be set no closer than 30 feet to an animal carcass to reduce the chance of capturing nontarget scavenging birds. A similar restriction is in place with use of M-44 devices to reduce risk to scavenging birds. Raptors are relatively insensitive to DRC-1339 -- -- based on feeding experiments with captive golden eagles, Larsen and Dietrich (1970) reported that an 8 ½ pound eagle would have to consume more than 100 treated meat baits used in raven control to obtain a lethal dose, and current label restrictions prohibit placing more than 75 such baits at a baiting site. Up to 100 mg doses were force fed to captive golden eagles with no mortality or adverse effects noted other than regurgitation and head-shaking (Larsen and Dietrich 1970). Other raptors are from 5 to more than 500 times more resistant to DRC-1339 than crows, magpies, and ravens (DeCino et al. 1966). In addition, label restrictions require continuous observation and daily removal of DRC-1339 meat baits and observations of egg bait sites to determine if nontargets are approaching egg baits. Based on all these factors, the ADC FEIS Risk Assessment found no probable risk to raptors or other nontargets from this use of DRC-1339 (USDA 1994a, Appendix P). No raptors were taken as nontargets in the District in 1994 or 1995. Thus, risks of nontarget raptor take are low.

3.3.2.3 Impact of Coyote Removal on Prey Populations

- ADC PDM activities are directed to resolving problems by taking action against individual problem animals, or local populations or groups. ADC has agreements for PDM on about 33% of the land area of the District and generally conducts PDM activities on less than 15% of the land area in any one year. It is anticipated that, under the current program, PDM actions would not be conducted on more than 20% of the land area of the District in any one year in the reasonably foreseeable future. Thus, 80% of the land area of the District, and the associated prey populations, would not be impacted by ADC's PDM activities.

3.3.2.4 Selectivity and humaneness of ADC predator damage management methods.

- Research continues with the goal of improving the selectivity and humaneness of management devices.

- Leghold traps used in the program are required to have rounded, offset jaws to reduce leg injuries on trapped animals.
- Underpan tension devices are used on leghold traps and foot snares to exclude most nontarget animals that weigh less than the target species.
- ADC personnel attempt to kill captured target animals that are slated for lethal removal as quickly and as humanely as possible. In most field situations, a shot to the brain with a small caliber firearm is performed which causes rapid unconsciousness followed by cessation of heart function and breathing. This is in concert with the American Veterinary Medical Association's definition of euthanasia. In some situations, chemical immobilization and euthanasia methods are used.

3.3.2.5 Impact of ADC predator damage management activities on public use of public lands.

- PDM will be conducted only when and where a need exists and is requested. ADC PDM actions under the current program are limited in extent -- ADC conducts PDM on less than 30% of [redacted] land and 20% of [redacted] lands.
- Main entrance points into areas where traps, snares and M-44s are in use by ADC are posted to alert the public that such devices are in the area and to keep pets restrained. In addition, small but visible warning signs are posted within 25 feet of each M-44 to warn persons to avoid tampering with the devices.
- Vehicle access will be limited to existing roads unless offroad travel is specifically allowed by the land managing agency.
- ADC personnel follow guidelines as specified and agreed upon in ADC Work Plans. These plans include delineation of areas where certain methods may not be used during certain time periods -- for example, where M-44's may not be used during bird hunting seasons due to the increased risk to bird hunting dogs.
- [redacted].
- Should any of [redacted] existing [redacted] be officially designated as [redacted], PDM would be performed according to [redacted] and appropriate language contained in the [redacted] legislation.

Final

4.0 CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

Chapter 4 provides information needed for making informed decisions on the 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 2) analyses of the environmental consequences of each alternative.

4.1 OBJECTIVES ANALYSIS AND CONSISTENCY DETERMINATION

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

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

The current District PDM program can potentially respond to all requests for PDM assistance on private, [redacted] and [redacted] where signed Cooperative Agreements, *Agreements for Control* or Work Plans are in place. The program could also respond to requests for assistance on [redacted], Tribal lands and other federal, state and municipal lands if agreements and/or work plans have been negotiated. ADC has the option under the current program to respond to PDM requests by using an IWDM approach by providing technical assistance or direct operational actions.

Alternative 1 would allow ADC to meet Objective A.

4.1.1.2 Alternative 2. - No Federal PDM

Under Alternative 2 no operational or technical assistance PDM would be provided by ADC in the District. State agencies, individuals and livestock producers or other entities would be responsible for conducting all PDM without support or advice from ADC. Alternative 2 would not allow ADC to meet Objective A.

4.1.1.3 Alternative 3. - Technical Assistance Only

Alternative 3 would limit ADC to providing only technical assistance recommendations and instructional literature to livestock producers concerning the use of available and legal PDM methods. ADC would not provide any operational PDM within the District. State agencies, individuals, livestock producers or other entities would be responsible for conducting all direct operational PDM.

Although ADC could respond to all requests under Alternative 3, it would not be able to respond with a full array of PDM strategies and methods. Thus, ADC would not be able to respond with the most effective or appropriate methods and strategies. Alternative 3 would not allow ADC to meet Objective A.

4.1.1.4 Alternative 4 - Nonlethal Required Before Lethal Control:

Alternative 4 would limit lethal control of predators to situations where nonlethal PDM had been practiced previously. In reality, most livestock producers practice some measure of nonlethal damage management -- NMADC (1995) indicated that 83% of livestock producers that had agreements for PDM with ADC in the State were using or had tried at least one nonlethal method. Ninety-eight percent of the sheep and goat producers utilized one or more nonlethal methods. Nonlethal options for cattle producers are more limited, yet 79% of 904 producers reported implementing one or more husbandry practices at calving time to reduce predation.

Alternative 4 would require ADC to verify and document nonlethal method use which would reduce the workforce available for conducting PDM activities where they are needed. Use of the ADC Decision Model would be compromised under Alternative 4 because results of the process would not be followed or recommended in situations where nonlethal

methods were judged to be ineffective or impractical prior to their implementation. Alternative 4 would allow ADC to partially meet Objective A.

4.1.1.5 Alternative 5 - Corrective Control Only When Lethal PDM Methods are Used:

Alternative 5 would limit lethal PDM actions for all depredating species to situations where ongoing depredation problems are occurring. This is currently the situation for mountain lion (except for limited preventive control in GMU 30) and black bear depredation problems, per policies of the [redacted].

This alternative would preclude lethal preventive damage management in areas where historical losses have occurred. Many sheep producers and some cattle producers have reasonably predictable depredation problems, and, therefore, request PDM before damage begins. The ADC Decision Model would be compromised in situations where the process determines that lethal preventive actions are the best strategy for resolving depredation problems. Alternative 5 would allow ADC to partially meet Objective A.

4.1.1.6 Alternative 6 - Expanded IWDM for Predator Damage Management.

With increased personnel, equipment, and aerial hunting capabilities, this alternative would allow ADC to increase operational PDM actions for livestock protection. This would allow more timely response in corrective control situations and increased preventive control in areas where losses are more severe. If requests for wildlife or other resource protection were received, ADC would have greater capacity to respond to such requests and to provide direct operational assistance if decided to be the best course of action by use of the ADC Decision Model. Alternative 6 would allow ADC to meet Objective A.

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

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

ADC would provide information on nonlethal PDM techniques to cooperating livestock producers and any other individuals that request PDM assistance. Alternative 1 would allow ADC to meet the criterion of Objective B.

4.1.2.2 Alternative 2. - No Federal PDM

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

4.1.2.3 Alternative 3. -Technical Assistance Only

Under Alternative 3 ADC would still provide information, demonstrations and training on lethal and nonlethal methods for resolving wildlife damage problems. However, under current limitations of the ADC MIS system, documentation of information distributed would be limited to the number of demonstrations and training sessions, etc., provided within a county. Although there would be no cooperators under *Agreements for Control*, producers would still be provided the information if they requested assistance.

Alternative 3 would allow ADC to meet the criterion of Objective B.

4.1.2.4 Alternative 4. - Nonlethal Required Before Lethal Control:

Since Alternative 4 would dictate that ADC require the use of nonlethal PDM methods, providing information on such methods would be a normal course of action. Alternative 4 would allow ADC to meet the criterion for Objective B.

4.1.2.5 Alternative 5. - Corrective Control Only When Lethal PDM Methods are Used:

Nothing in this Alternative would preclude the distribution of information regarding the use of nonlethal methods. Alternative 5 would allow ADC to meet the criterion for Objective B.

4.1.2.6 Alternative 6 - Expanded IWDM for Predator Damage Management.

Nothing in this Alternative would preclude the distribution of information regarding the use of nonlethal methods. Alternative 6 would allow ADC to meet the criterion for Objective B.

4.1.3 Objective C. - Maintain lamb depredation losses at less than 5%(objective C-1), adult sheep depredation losses at less than 2%(objective C-2), and calf depredation losses at less than 1% (objective C-3) of the number of each that are annually protected, respectively[4]

Table 4-1 shows livestock loss data pertinent to the analysis of this objective for 1994 and 1995.

Table 4-1. Predation Loss Rates of Sheep, Lambs, and Calves on Cooperating Ranches and Farms -- Las Cruces ADC District 1994 and 1995.

1994									
County	**# Lambs Protected**	**# and % Lambs Lost**		**# Sheep Protected**	**# and % Sheep lost**		**# Calves Protected**	**# and % Calves Lost**	
[redacted]	109	2	1.8%	89	3	3.4%	8,307	251	3.0%
[redacted]	501	17	3.4%	663	8	1.2%	5,403	68	1.3%
[redacted]	0	0	0.0%	0	0	0.0%	6,351	150	2.4%
[redacted]	0	0	0.0%	0	0	0.0%	6,072	179	2.9%
[redacted]	0	0	0.0%	0	0	0.0%	5,031	156	3.1%
[redacted]	9,644	1,397	14.5%	13,605	64	0.5%	3,171	85	2.7%
[redacted]	16	3	18.8%	12	1	8.3%	5,104	191	3.7%
[redacted]	80	3	3.8%	60	0	0.0%	14,770	274	1.9%
TOTAL	10,350	1,422	13.7%	14,429	76	0.5%	54,209	1,354	2.5%
TOTAL (Excluding Eagle Depredation)	10,350	652	6.3%	14,429	76	0.5%	54,209	1,354	2.5%

1995

[4]District personnel would use MIS reported losses, which involves annual standardized interviews with cooperating livestock owners and operators, to determine levels of predation. Losses would be calculated as a proportion of total inventory of livestock grazed by cooperators in the District.

County	# Lambs Protected	# and % Lambs Lost		# Sheep Protected	# and % Sheep lost		# Calves Protected	# and % Calves Lost	
[redacted]	100	0	0.0%	320	0	0.0%	8,614	347	4.0%
[redacted]	638	9	1.4%	475	20	4.2%	3,605	60	1.7%
[redacted]	0	0	0.0%	0	0	0.0%	6,767	134	2.0%
[redacted]	0	0	0.0%	0	0	0.0%	5,906	210	3.6%
[redacted]	0	0	0.0%	0	0	0.0%	11,630	221	1.9%
[redacted]	7,891	627	7.9%	9,333	21	0.2%	3,420	156	4.6%
[redacted]	18	2	11.1%	14	0	0.0%	5,404	88	1.6%
[redacted]	120	17	14.2%	220	2	0.9%	15,683	411	2.6%
TOTAL	8,767	655	7.5%	10,362	43	0.4%	61,029	1,627	2.7%
TOTAL (Excluding Eagle Depredation)	8,767	198	2.3%	10,362	43	0.4%	61,029	1,627	2.7%

As noted in Chapter 1, a major factor in lamb losses in the District as reported to ADC is the extent of loss attributed to eagle depredation, primarily by golden eagles, and ADC is not able to effectively assist in resolving eagle depredation problems. Therefore, eagle losses are treated similar to other types of loss that are not related to predation in that they are not included in the analysis of each alternative's ability to meet the objectives.

4.1.3.1 Objective C-1. - Hold lamb losses due to predation to less than 5% of the number protected per year in areas with Cooperative Agreements.

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

Predation losses of lambs, excluding eagle losses, averaged 6.3% and 2.3% of the total protected by ADC in the District during 1994 and 1995. Thus, the objective was met in 1995 but not in 1994. To determine the longer-term trend, loss rates in 1992 and 1993 were examined. Lamb losses to predators other than eagles were 5.9% and 3.5% in those years when eagle losses were excluded. Therefore, the objective was met by the current program in two of the preceding four years. The four-year average lamb loss to predators excluding eagles was 4.4%. This means the objective was met *on the average* for the period 1992-95. Losses in certain counties exceeded the 5% objective to a greater degree than did the overall loss rate for the District. Losses in certain localities and in different seasons may vary for a number of reasons including: terrain, weather, vegetative cover that restrict access and limit the array of PDM methods and variation in susceptibility to control methods among individual predators (e.g., some coyotes are more difficult to capture than others).

Alternative 1 would probably meet the criterion of Objective C-1 for average District lamb losses but would not meet it in every year. It would not meet the criterion in each county in every year. If an agreement is established to allow ADC PDM to operate on [redacted], the chances of meeting the objective would be greater.

4.1.3.1.2 Alternative 2. - No Federal ADC PDM Program:

Alternative 2 would eliminate the Federal ADC program and place the responsibility for PDM with the State and/or local governments, or individual producers. Without an effective PDM program, lamb losses could be 2 to 3 times higher than those currently being experienced based on the average of loss rates in studies without PDM (USDA 1994). 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 would not allow ADC to meet the criterion for Objective C-1.

4.1.3.1.3 Alternative 3. -Technical Assistance Only.

The impacts would be similar to those under Alternative 2. Although, producers might be more effective in conducting PDM under a technical assistance only program than under no program at all, overall effectiveness would probably be less than under Alternative 1 and data on losses would not be readily available to measure the success in meeting the objective. Alternative 3 would not allow ADC to meet the criterion for Objective C-1.

4.1.3.1.4 Alternative 4. - Nonlethal Required Before Lethal Control:

As stated previously, most (98%) cooperating sheep producers in the District have tried or are already practicing one or more nonlethal measures to reduce predator damage. Lamb losses would probably increase due to restrictions on ADC lethal control. Therefore, such losses under Alternative 4 would most likely be greater than under Alternative 1.

Alternative 4 would probably not meet the criteria of Objective C-1.

4.1.3.1.5 Alternative 5. - Corrective Control Only When Lethal PDM Methods are Used:

Although the current program only permits corrective damage management of mountain lion (except for limited preventive control in GMU 30) and black bear damage, these two species accounted for none of the reported lamb losses in 1994 (MIS 1994) and only 1.8% of the reported lamb losses in 1995 (MIS 1995). However, without any preventive damage management program for coyote and, in more limited situations, bobcat, depredation, losses to these species would most likely increase, although not to the extent that they would under Alternatives 2 and 3.

Alternative 5 would probably not allow ADC to meet Objective C-1.

4.1.2.6 Alternative 6 - Expanded IWDM for Predator Damage Management.

This alternative would allow more timely response to depredation situations and increased preventive control in areas of more severe depredation problems which should result in lower loss rates of lambs. Alternative 6 would meet the criterion of Objective C-1 for District wide lamb losses.

4.1.3.2 Objective C-2. - Hold adult sheep losses due to predation to less than 2%/year in areas with cooperative agreements.

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

The current District ADC program held annual adult sheep predation losses to 0.5% of the total protected in 1994 and to 0.4% in 1995. The rate of loss in 1992 and 1993 was also low -- 0.8% and 0.4%, respectively.

Alternative 1 would meet the criterion for Objective C-2 for district wide average sheep losses.

4.1.3.2.2 Alternative 2. - No Federal ADC PDM.

Under Alternative 2, No Federal PDM program would be available to livestock producers in the District, leaving the responsibility with the State and/or local government, and producers. Without an effective PDM program, existing predation losses to adult sheep could increase 8-9 times the current level of predation loss based on average adult sheep loss rates that occur in the absence of PDM (USDA 1994). 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 and without them no producer or District information would be readily available.

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

4.1.3.2.3 Alternative 3. -Technical Assistance Only.

Under Alternative 3, ADC could only provide information and training to requesters. Implementation of PDM would be the responsibility of the requester. The impacts on adult sheep losses would be similar to those under Alternative 2. 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 these documents no producer or District information could be maintained.

Alternative 3 would not allow ADC to meet the criterion for Objective C-2.

4.1.3.2.4 Alternative 4. -Nonlethal Required Before Lethal Control.

As noted previously, most cooperating sheep producers currently practice some type(s) of nonlethal predator damage management. However, losses of adult sheep would probably increase above the level that would occur under Alternative 1 because of delays in implementing lethal PDM methods when they are judged to be the most effective strategy. Also, no lethal PDM could be conducted until losses have been confirmed. Objective C-2 would have less chance of being met under Alternative 4 than under Alternative 1. Because adult sheep loss rates are currently very low, it is possible this objective could be met by Alternative 4, but losses would be greater than under Alternative 1.

4.1.3.2.5 Alternative 5. - Corrective Control Only When Lethal PDM Methods are Used.

Predation losses of adult sheep are not as severe as are such losses of lambs and are currently well below the criterion set for objective C-2. However, losses would probably be greater than under Alternative 1 since no preventive lethal PDM actions could be taken.

Alternative 5 would probably not allow ADC to meet objective C-2.

4.1.3.2.6 Alternative 6 - Expanded IWDM for Predator Damage Management.

Since predation losses of adult sheep under the current program are currently well below the criterion set for objective C-2, Alternative 6 would meet the objective as well.

4.1.3.3 Objective C-3. - Hold calf loss due to predation to less than 1%/year in areas with Cooperative Agreements.

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

Calf predation on cooperating ranches in the District in 1994 and 1995 was 2.5% and 2.7%, respectively (Table 4-1). These rates clearly exceed the stated objective of 1%. Loss rates in 1992 and 1993 were lower -- 1.7 and 1.5%, respectively, which still exceeded the objective. The four-year average loss rate for calves was 1.9%. Therefore, the current program has not met the criterion for objective C-3 and is not likely to without increased PDM efforts. If an

agreement is established to allow ADC PDM to operate on State Trust lands, the chances of meeting the objective would be greater.

Alternative 1 will probably not meet the criterion for Objective C-3.

4.1.3.3.2 Alternative 2. - No Federal ADC PDM.

Under Alternative 2, PDM would be the responsibility of the State and/or local governments, and individual producers. It is expected that calf predation losses would be greater under this alternative than under the current program.

Losses to predators under Alternative 2 would not meet Objective C-3.

4.1.3.3.3 Alternative 3. - Technical Assistance Only.

Under Alternative 3, ADC could only provide information, demonstrations, and training to requesters. Implementation of PDM would be the responsibility of the requester. 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 the documents, no producer or District information on losses would be maintained. Losses could be expected to increase above current levels. Alternative 3 would probably not meet the standard of Objective C-3.

4.1.3.3.4 Alternative 4. - Nonlethal Required Before Lethal Control.

Alternative 4 would require nonlethal methods be in place before implementation of lethal control. Effective yet economically practical nonlethal methods are not generally available to prevent predation on calves in rangeland production situations. However, as stated previously, 79% of 904 cooperating cattle producers have implemented one or more nonlethal methods. 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 nonlethal practices would divert work efforts away from conducting operational damage management necessary.

It is likely that calf losses would increase under this alternative. Alternative 4 would probably not meet Objective C-3.

4.1.3.3.5 Alternative 5 - Corrective Control Only When Lethal PDM Methods are Used.

Under Alternative 5, ADC lethal PDM could only be implemented following the documentation of ongoing livestock predation. This is the current program regarding control of mountain lion (except for limited preventive control in GMU 30) and black bear damage.

Losses of calves from coyotes would be expected to increase above those under the current program because of the inability to respond until after calf losses begin. Alternative 5 would not allow ADC to meet the criterion for Objective C-3.

4.1.3.3.6 Alternative 6 - Expanded IWDM for Predator Damage Management.

The increased capabilities for corrective and preventive control under this alternative would result in a greater chance of meeting the objective than the current program or any other alternative.

It is predicted that the criterion for objective C-3 would be met by Alternative 6.

4.1.4 Objective D. - Maintain the lethal take of nontarget animals by ADC personnel during damage management to less than 5% of the total animals taken.

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

The ADC program in the District captured 135 nontarget animals and killed 88 of them during PDM activities in 1994. The lethal nontarget take was 3.4% of the total take in the District by ADC in 1994. ADC captured 73 nontarget animals and killed 61 during PDM actions in 1995. Lethal nontarget take was 2.6% of total take in the District by ADC in 1995.

Alternative 1, the Current Program, is currently meeting the criterion for Objective D.

4.1.4.2 Alternative 2. - No Federal ADC PDM.

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

Alternative 2 would allow ADC to meet the criterion for Objective D.

4.1.4.3 Alternative 3. - Technical Assistance Only.

Under Alternative 3, no target or nontarget animals would be killed by ADC. Alternative 3 would allow ADC to meet the criterion for Objective D.

4.1.4.4 Alternative 4. - Nonlethal Required Before Lethal Control.

As noted previously, most livestock producers currently use some kind of nonlethal PDM. Lethal PDM by ADC would likely be reduced because personnel time would be diverted to confirming use of nonlethal methods. Total take of target and nontarget animals would likely be reduced, but lethal take of nontargets as a percentage of total take would likely not change from that of the current program.

Alternative 4 would allow ADC to meet the criterion for Objective D.

4.1.4.5 Alternative 5. - Corrective Control Only When Lethal PDM Methods are Used.

Under Alternative 5, ADC lethal PDM could only be implemented following confirmation of an ongoing depredation problem. This is currently required for mountain lion (except for limited preventive control in [redacted]) and black bear damage management. Following documented losses, ADC could employ the same methods currently available. The ratio of nontargets killed to total take 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 D.

4.1.4.6 Alternative 6 - Expanded IWDM for Predator Damage Management.

Both target and nontarget take by ADC would increase under this alternative, but the proportion of total animals killed comprised of nontargets would probably remain the same. If aerial hunting was the primary method that increased in use, this percentage would decrease because aerial hunting is virtually 100% selective for the target species.

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

Table 4-2 - Objectives/Alternatives Comparison

Program Objectives	Alternative 1 *No Action*	Alternative 2 *No Program*	Alternative 3 *Technical Assistance*	Alternative 4 *Nonlethal before Lethal*	Alternative 5 *Corrective Lethal Only*	Alternative 6 *Expanded ADC PDM*
A *Respond to Requests*	Meets	Does not Meet	Does not Meet	Partially Meets	Partially Meets	Meets
B *Nonlethal Information*	Meets	Does not Meet	Partially Meets	Meets	Meets	Meets
C-1 *Lamb Losses*	Partially Meets	Does not Meet	Does not Meet	Does not Meets	Does not Meet	Meets
C-2 *Sheep Losses*	Meets	Does not Meet	Does not Meet	Partially Meets	Partially Meets	Meets
C-3 *Calf Losses*	Does not Meet	Does not Meet	Does not Meet	Does not Meet	Does not Meet	Meets
D *Nontarget take*	Meets	Meets	Meets	Meets	Meets	Meets

4.1.5 Alternative Consistency with [redacted] and [redacted]

Before an Alternative can be implemented on [redacted] or [redacted] lands, it must be consistent with land management and/or resource management plans. In the [redacted], these are termed [redacted] or more commonly "[redacted]." On [redacted] lands in the Las Cruces District, the equivalent documents are called [redacted]. If the selected Alternative is consistent with [redacted] or [redacted] no further action will be necessary by the [redacted] or [redacted] other than to participate in the coordinated development of ADC work plans.

The [redacted] and [redacted] are responsible for assuring specific actions taken in implementing the decision for this EA are consistent with the pertinent [redacted] or [redacted]. They meet this responsibility by reviewing ADC work plans that have been prepared by ADC.

The following is a review of the consistency of the alternatives with each [redacted] and [redacted]:

4.1.5.1 [redacted]

The [redacted] is in the [redacted] portion of the District and occurs in [redacted]. The [redacted] which was published in 1985, established a "standard and guideline" stating that animal damage control will be coordinated with the USFWS where needed (the federal ADC program was transferred from the USFWS to USDA, APHIS in 1986). The [redacted] is responsible for determining consistency of specific ADC PDM activities

during the coordinated preparation and/or review of ADC Work Plans. The [redacted] has found such activities to be consistent in a previous EA for animal damage management (USDA, [redacted] 1990).

[redacted] direction provides for coordination of predator damage management. Under this direction, Alternatives 1, 4, 5, and 6 may be consistent. [redacted] consistency under Alternatives 2 and 3 would be determined by the [redacted] when individuals or other agencies assume WDM responsibilities.

4.1.5.2 [redacted]

The [redacted] does not address WDM activities. However, this silence does not necessarily denote inconsistency with the [redacted]. In a previous EA, the [redacted] determined that PDM was consistent (USDA, [redacted] 1985). The [redacted] is responsible for determining consistency of specific ADC PDM activities during the coordinated development and/or review of ADC Work Plans.

Under this direction, Alternatives 1, 4, 5, and 6 may be consistent. [redacted] consistency under Alternatives 2 and 3 would be determined by the [redacted] when individuals or other agencies assume WDM responsibilities.

4.1.5.3 [redacted]

The [redacted] Plan states that ADC activities will be accomplished in accordance with interagency ADC guidelines. Such guidance is contained in the national level MOU between APHIS-ADC and the [redacted]. The [redacted] determined that ADC PDM actions are consistent with the [redacted] during preparation of an EA covering PDM on [redacted] allotments (USDA 1996). The current program and alternatives as proposed herein would not differ substantially from the proposed action in that EA and thus should similarly be consistent. The [redacted] is responsible for determining consistency of specific ADC PDM activities during the coordinated development and/or review of ADC Work Plans.

Under this direction, Alternatives 1, 4, 5, and 6 may be consistent. Forest Plan consistency under Alternatives 2 and 3 would be determined by the [redacted] when individuals or other agencies assume WDM responsibilities.

4.1.5.4 [redacted]

The [redacted] [redacted] states that corrective and preventive ADC PDM will be allowed where predator-caused livestock losses have been previously confirmed by APHIS-ADC. The current program and alternatives as proposed herein would not differ substantially from the current program on the [redacted] which is conducted under an EA and decision issued by APHIS-ADC (USDA 1995a) and determined to be consistent with the [redacted] by the [redacted] The [redacted] is responsible for determining consistency of specific ADC PDM activities during the coordinated development and/or review of ADC Work Plans.

Under this direction, Alternatives 1, 4, 5, and 6 may be consistent. Forest Plan consistency under Alternative 2 and 3 would be determined by the Forest when individuals or other agencies assume WDM responsibilities.

4.1.5.5 [redacted]

The [redacted] has authorized PDM at the request of permittees and has an ADC Work Plan. Four [redacted], the [redacted], are currently in place covering the entire [redacted]. All provide for animal damage control activities.

Language in all four of the [redacted] is inconsistent with the most recent Memorandum of Understanding between APHIS-ADC and [redacted], in that they refer to "annual" work plans, and/or state that [redacted] has approval authority for specific PDM actions on [redacted] land. The [redacted] indicates that ADC is conducted by the USFWS which has not been the

case since the program was transferred to USDA in 1985. Under the new MOU (1) ADC Work Plans are no longer required to be prepared annually but are reviewed annually and revised if necessary; (2) [redacted] no longer has complete approval authority for specific control actions but has the responsibility for assuring consistency with land use plans and for concurring with the effects of control actions as analyzed by ADC in NEPA analyses. Currently, PDM is conducted according to the [redacted]. The [redacted] has been requested to revise their [redacted] or otherwise take measures to correct any inconsistencies with the new MOU.

4.2 ENVIRONMENTAL CONSEQUENCES

This section analyzes the environmental consequences using Alternative 1 (the current program) as the baseline for comparison with the other alternatives to determine if the real or potential impacts are greater, lesser or the same. Table 4-5 (page 4 -39) 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, and timber. These resources will not be analyzed further. Potential impacts to range resources are addressed in the section on prey population impacts.

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 ADC's "take" or kill of target and nontarget species during FY 94 and FY 95, 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 or "sensitive" species, and PDM does not jeopardize public health and safety as shown by the formal risk assessment in the programmatic ADC FEIS (USDA 1994, Appendix P).

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

Issues Analyzed in Detail

4.2.1 Impact of the ADC predator damage management program on target species populations (coyote, mountain lion, black bear).

The species evaluated in this chapter were selected for analysis because they are taken by ADC in response to livestock predation and public health and safety threats, and may be taken in the future for certain types of wildlife protection or enhancement. The "Magnitude" analysis for this EA follows a process similar to that 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 sustainable harvest levels, population estimates and harvest data. Qualitative analysis is based on population trends and harvest data or trends and modeling. Sustainable harvest levels were determined from research studies cited in the FEIS (USDA 1994, Table 4-2). "Other Take" includes the known fur harvest and sport harvest as determined by the [redacted]. "Total Take" is the sum of the ADC kill and the "Other Take."

Estimating wildlife population 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 the extent of recruitment and immigration from surrounding populations. Therefore, assessments are based on conservative rather than liberal population estimates to better ensure that no adverse wildlife population impacts occur.

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

Coyotes are the primary species responsible for damage in the District and are therefore the major target species of the PDM program.

Coyote Population Impact Analysis

Data on the ADC coyote kill for 1994 and 1995 were used for this analysis. The coyote population estimate described in this document (2.4.1), and historic harvest data will be used as a baseline as it is the best data available. Table 4-3 displays the known information about coyote abundance and harvest in 1994 and 1995, as well as projected maximum harvest/take levels that might be expected in any one year in the future.

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 can replace the animals removed (Stoddart 1984).

Table 4-3. 1994, 1995 and Greatest Expected Annual Coyote Harvest Data for the Las Cruces ADC District. Sustainable Harvest = 70%

	1994	1995	With Greatest Expected Future Take/Harvest
Estimated Population	37,000	37,000	37,000
ADC Kill	2,397	2,196	4,000
Other Take[1]	5,147	2,760	10,000
Total Take	7,544	4,956	14,000
ADC Kill - % of Population	6.5%	5.9%	10.8%
Other Take - % of Population	13.9%	7.5%	27.0%
Total Take - % of Population	20.4%	13.4%	37.8%

[1]Includes private fur harvest and Sierra County's bounty take.

Using standards established in USDA (1994) to determine the magnitude of total harvest impacts to the population, less than 70% annual removal of the coyote population results in a determination of "low magnitude." The data in Table 4-3 indicate that even under the most conservative of assumptions, current cumulative annual harvest of coyotes in the District is conservatively about 20% or less of the population and

potential cumulative harvest would be less than 40%. Even if private coyote harvest more than doubled, which is conceivable considering the level of harvest in the State in the late 1970's and early 1980's, and ADC take also doubled, the cumulative impact would be less than 50% of the population killed each year and would still result in a low magnitude impact rating.

Black Bear Population Impact Analysis

Black bear harvest by hunters in New Mexico was estimated to be 595 in the 1994-95 season as reported by [redacted]. ADC's take was only 8 bears statewide in FY 1995 which is only 1.3% of the total take in the state. Private harvest in the Las Cruces District was 141 bears in 1993-94 and 281 bears in 1994-95 (from [redacted] fall bear harvest survey reports). [redacted] considers the population in the state to be stable ([redacted], pers. comm. to A. Lara, State Director, ADC, NM, 1995). ADC killed only one black bear in FY 1994 (as a nontarget on an M-44 device) and two black bears (as target animals) in the District in FY 1995. ADC take thus represented less than 1% of the total kill in the District. It is expected that lethal take of black bears by ADC would not exceed 25 in the District in any one year under the current program.

Using the conservative population estimate of 1,760 black bears in the District as shown in Chapter 2, ADC's anticipated maximum take under the current program would be only 1.4% of that number, and cumulative harvest from all sources would be about 17% percent. The sustainable harvest (kill) level for black bear described in USDA (1994, Table 4-2) is 20% of the population. Thus, cumulative take from all sources would be less than the sustainable harvest level under the above assumptions which means no significant adverse effect on the bear population would occur under the current program. A current study of the black bear population in the [redacted] sponsored by [redacted] has generated recent concern that bear mortality may be higher than expected in the area because age ratios have been found to indicate a higher than normal proportion of younger aged bears ([redacted], pers. comm. 1996). Therefore, as the agency with management responsibility, [redacted] could impose restrictions on bear take and sport harvest as needed to assure continued viability of the population. ADC would be bound to such restrictions.

Mountain lion Population Impact Analysis

Mountain lion populations can sustain relatively moderate to heavy losses of adults and still maintain viable populations. Robinette et al. (1977) reported an annual mortality of 32% in Utah, while Ashman et al. (1983) noted a sustained annual mortality of at least 30% in Nevada. Ashman et al. (1983) believed that under "Moderate to heavy exploitation (30%-50% removal)," mountain lion populations on their study area had the recruitment (reproduction and immigration) capability to rapidly replace annual losses. The sustainable annual harvest level for mountain lion populations, projected by the USDA (1994, Table 4-2) is 30% of the population.

Relatively few mountain lions are killed by ADC in the District under the current program. Two were killed as target animals in 1994 and two more were killed in 1995. It is expected that no more than 10 would be killed by the District program in any one year. Private harvest in the District was 50 in 1993-94 and 105 in 1994-95 (from [redacted] mountain lion harvest survey reports). ADC take is currently only 2-4%, at most, of total take. Assuming a similar harvest level in any future year, cumulative take from all sources should not exceed 120 mountain lions in any one year in the District. As indicated in Chapter 2, the [redacted] believes that mountain lion populations are stable in the state under current harvest levels.

Using the conservative population estimate of 1,080 mountain lions in the District as shown in Chapter 2, ADC's anticipated maximum take under the current program would be only 0.9% of that number, and cumulative harvest from all sources would be about 11%. This level of harvest/take would be only about 1/3 of the sustainable harvest level. Thus, no significant cumulative adverse effect on the mountain lion population is expected to occur under the current program. Should the situation change, [redacted] could impose harvest and take restrictions to assure a continued viable population of mountain lions in the area.

Raven Population Impact Analysis

ADC take of ravens for PDM has not occurred in the District and has not occurred every year in the statewide PDM program. It is expected that the level of take would not exceed 50 ravens in the District in any one year should the need for raven PDM arise. As shown in Chapter 2, the breeding population of ravens in the State has been increasing steadily since 1966. Thus, past levels of take in the State have not caused any declines in raven populations in the State and adverse impacts from PDM are therefore determined to be low.

4.2.1.2 Alternative 2. - No Federal ADC PDM and Alternative 3 - Technical Assistance Only.

Both Alternative 2 and Alternative 3 would result in no ADC operational programs and the potential effects would be similar, therefore they will be analyzed together. Some type of PDM would most likely be conducted by livestock producers or by various State or local governmental agencies. 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 the ADC FEIS (USDA 1994) in which the biological impacts of the "No ADC" alternative were summarized as follows:

> "Taking of target species would be more variable (i.e., lower for some species in some areas and higher in other areas). However, taking of nontarget species probably would be higher, and for some small populations, could become biologically significant. This would be especially important if the species was threatened or endangered. Species diversity could be significantly affected. The indirect impacts on nontarget species affected through the food chain or by uncontrolled releases of toxicants into the environment also could increase. In some areas, 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 PDM would be handled without ADC can only be speculated, but several probable effects can be identified. State agencies and private individuals would not be subject to the same restrictions and procedures with which ADC must comply, such as the requirement to comply with NEPA, certain provisions of the Endangered Species Act, and to coordinate and plan in cooperation with the [redacted] and [redacted]. It is assumed that a State agency such as [redacted] or [redacted] 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 their own PDM by whatever means available to them. Any State assumption of PDM could divert resources from other wildlife management activities and State functions. It is probable that private M-44 use would not be allowed on [redacted] and [redacted] lands, which could reduce the number of coyotes killed by currently legal means. However, as indicated by USDA (1994), frustration of some livestock producers could lead to illegal pesticide use with unknown adverse impacts on target species populations.

Alternatives 2 and 3 could have greater adverse impact on target species populations than the current program although, in general, the total kill of most predator species would probably not exceed sustainable harvest levels.

4.2.1.3 Alternative 4: Nonlethal Required Before Lethal Control.

As noted throughout this document, most of the sheep producers and many cattle producers already practice some form of nonlethal PDM. ADC PDM under Alternative 4 would be restricted in its use of lethal control methods and would likely have to divert resources away from conducting operational PDM toward verifying and documenting use of nonlethal methods. As a result, ADC's impacts to target and nontarget species populations would probably be less than those that would occur under the current program.

It is anticipated that some cooperating livestock producers would drop out of the current program because of reduced effectiveness. Private kill of target and nontarget species would probably increase. It is possible that frustration by some of these individuals would lead to illegal pesticide uses with unknown adverse impacts on target species populations. Impacts on target species could be greater, less than, or approximately the same as the current program depending on the level and manner of private PDM.

4.2.1.5 Alternative 5. - Corrective Control Only When Lethal PDM Methods are Used.

Under Alternative 5, lethal control of predators by ADC would only be initiated following confirmed ongoing predation of livestock or other resources. This is presently the case for black bear and mountain lion (except for limited preventive control in [redacted]) depredation under the current program (Alternative 1).

ADC's coyote kill under Alternative 5 would be less than under Alternative 1, while mountain lion and black bear take would be about the same as Alternative 1. It is anticipated that some cooperating livestock producers would drop out of the current program because of reduced effectiveness. Private kill of target and nontarget species would probably increase. It is possible that frustration by some of these individuals would lead to illegal pesticide uses with unknown adverse impacts on target species populations. Impacts on target species could be greater, less than, or approximately the same as the current program depending on the level and manner of private PDM.

4.2.1.6 Alternative 6 - Expanded IWDM for Predator Damage Management.

Impacts of ADC PDM on coyote populations would be greater under this alternative. However, it is not expected that ADC take of coyotes would be more than twice that of the current program. As shown in the analysis of cumulative impacts in section 4.2.1.1, such an increased level of take, even if combined with a doubling of private harvest, would still result in a low magnitude of impact rating. Therefore, a low impact rating would also occur with this alternative. Mountain lion and black bear take would likely remain about the same as under the current program, since they are primarily taken by ADC in the District in situations where depredations are confirmed and when requested and authorized by [redacted].

4.2.2 Impact of ADC predator damage management on nontarget species populations, including Threatened, Endangered and sensitive species.

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

Nontarget animals taken by the ADC program in 1994 and 1995 are identified in Table 2-1 (page 2-6). Nontarget take was low for most species (<10) in either of those years and is not expected to increase appreciatively. No T&E species or Sensitive species have been taken by ADC. The major nontarget species selected for analysis is the gray fox because of its potential to be captured by coyote control devices.

Gray Fox Population Impact Analysis

ADC killed 29 gray fox in 1994 and 14 in 1995. Private harvest was 1,383 gray fox in 1993-94 and 1,683 gray fox in 1994-95. ADC take is therefore only 1-2% of cumulative take. It is expected that no more than 100 gray fox would be killed by ADC in any one year under the current program.

Using the conservative population estimate of 20,000 gray fox in the District as shown in Chapter 2, ADC's anticipated maximum take under the current program would be less than 1% of that number, and cumulative harvest from all sources would be about 9%. The sustainable harvest level for gray fox determined in USDA (1994) is 25% of the total population. Even under the most conservative of assumptions contained in this analysis, cumulative take in the District

would be less than one half of the 25% sustainable harvest level. Thus, the magnitude of impact for the current program is determined to be low.

Other Nontarget Species

As stated in Chapter 2, all other nontarget species taken (as shown in Table 2-1) are either nonnative (e.g., feral/free-ranging dogs and cats), or are common and not classified as threatened or endangered under either state or federal law and are taken in low enough numbers (< 15 per year of each species) that population impacts analysis is unnecessary. Removal of feral and/or free-ranging dogs and cats is considered to be environmentally beneficial because these species are not part of the mix of native wildlife in the District and can themselves have adverse impacts on native wildlife. ADC take of these species is minor compared to the numbers euthanized by humane organizations and animal control agencies. ADC has not taken any T&E or sensitive species in the District under the current program, and it is expected such take would continue to be avoided under the current program.

4.2.2.2 Alternative 2. -No Federal ADC PDM and Alternative 3. - Technical Assistance Only:

Alternative 2 and Alternative 3 would result in no ADC operational PDM program. Thus, their impacts on this issue would be similar to each other. No nontarget animals would be captured by ADC under these two Alternatives. However, it must be considered that overall nontarget captures could increase as untrained and less experienced individuals would attempt to conduct control and the impacts would likely be similar to those described in section 4.2.1.2. As indicated by USDA (1994), frustration of some livestock producers could lead to illegal pesticide use with unknown adverse impacts on nontarget species populations. Private individuals would not be bound to standard operating procedures and mitigating measures such as pan tension devices on traps and could therefore be expected to take more nontargets than would ADC personnel. Some T&E or sensitive 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 3, compliance with ADC advice would be voluntary.

Alternative 2 would probably result in a nontarget take greater than that of Alternative 1, which may further endanger some species. Alternative 3 would probably result in greater nontarget take than Alternative 1 but less than Alternative 2.

4.2.2.3 Alternative 4 - Nonlethal Required Before Lethal Control.

As has been noted in Chapter 3, Alternative 4 is not substantially different from the current program in that 83% of cooperating livestock producers use or have tried one or more nonlethal methods. With that in mind, ADC take of nontarget animals would probably not change much from that which occurs under the current program -- i.e., it would continue to be low. ADC nontarget take would likely be slightly less than that of the current program because no preventive lethal control actions would be taken by ADC. Reasonable and Prudent Measures and Alternatives and terms and conditions established through Section 7 consultation for the protection of T&E species would be followed by ADC to avoid adverse impacts or jeopardy to T&E species. However, if producers became frustrated by reduced effectiveness of ADC, private efforts to reduce or prevent depredations could increase. This could result in less experienced persons implementing control methods which could lead to greater take of nontarget wildlife than the current program. It is hypothetically possible that, similar to Alternative 2 and 3, frustration caused by the inability to reduce losses could lead to illegal use of chemical toxicants which could lead to unknown impacts on local nontarget species populations, including T&E species. However, impacts on nontargets would probably be less under Alternative 4 than under Alternatives 2 and 3.

4.2.2.4 Alternative 5. - Corrective Control Only When Lethal PDM Methods are Used.

Under Alternative 5, ADC PDM activities would be limited to those instances where ongoing predator damage has been documented. Similar to Alternative 4, nontarget species impacts would probably be less than under Alternative 1 because ADC would not conduct preventive PDM. Reasonable and Prudent Measures and Alternatives and terms and conditions established through Section 7 consultation for the protection of T&E species would be followed. As such, these Alternatives would mean ADC would have no adverse impacts on or cause jeopardy to T&E species. However, if producers became frustrated by reduced effectiveness of ADC, private efforts to reduce or prevent depredations could increase, resulting in less experienced persons implementing control methods which could lead to greater take of nontarget wildlife than the current program. It is hypothetically possible that, similar to Alternative 2 and 3, frustration caused by the inability to reduce losses could lead to illegal use of chemical toxicants which could lead to unknown impacts on local nontarget species populations, including T&E species. Impacts on nontarget species populations would probably occur to a lesser degree than under Alternatives 2 and 3 and probably to about the same degree as Alternative 4.

4.2.2.5 Alternative 6 - Expanded IWDM for Predator Damage Management.

Under this alternative, ADC corrective and preventive lethal PDM activities would increase and nontarget take would also increase. However, as shown by the analysis in section 4.2.2.1, even a substantial increase in nontarget take would not adversely affect populations of nontarget species. ADC selectivity in use of control methods and the standard operating procedures that are intended to minimize take of T&E and sensitive species would also keep such take to a minimum under an expanded program. Therefore, impacts on nontargets, including T&E and sensitive species would be of low magnitude.

4.2.3 The potential for ADC's coyote take to cause increases in rodent, rabbit, and other prey species populations to the point that detrimental effects on vegetation resources occur.

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

The relationship between predators and rodent and rabbit populations has been summarized in USDI (1979).

> Rabbit and rodent populations normally fluctuate substantially in several-year cycles. Two hypotheses attempt to explain these cyclic fluctuations: 1) rodent and rabbit populations are self-regulated through behavior, changes in reproductive capacity due to stress, or genetic changes (Chitty 1967, Myers and Krebs 1983), 2) populations are regulated by environmental factors such as food and predation (Pitelka 1957, Fuller 1969).
>
> Keith (1974) concluded that: 1) during cyclic declines in prey populations, predation has a depressive effect and as a result, the prey populations may decline further and be held for some time at relatively low densities, 2) prey populations may escape this low point when predator populations decrease in response to low prey populations, and 3) since rabbit and rodent populations increase at a faster rate than predator populations, factors other than predation must initiate the decline in populations.
>
> Wagner and Stoddart (1972) and Clark (1972) independently studied the relationship between coyote and black-tailed jackrabbit (*Lepus californicus*) populations in northern Utah and southern Idaho. Both concluded that coyote populations seemed to respond to an abundance of jackrabbits. When a broad range of prey species is available, coyotes will generally feed on all species available; therefore coyote populations may not vary with changes in the availability of a single prey species (Knowlton 1964, Clark 1972).
>
> The impact analysis on rodents and lagomorphs (rabbits and hares) showed that predators generally prolong the low points in rodent population cycles and spread the duration of the peaks. Predators generally do not "control" rodent populations (Keith 1974, Clark 1972, Wagner and Stoddart 1972). It is more likely that prey abundance

controls predator populations. The USDI (1979, p. 128) concluded that "ADC Program activities have no adverse impacts to populations of rodents and lagomorphs." The USDA (1994) did not specifically deal with this issue.

Henke (1995) reviewed literature concerning coyote-prey interactions and concluded that short term (≤6 months) coyote removal efforts typically do not result in increases in small mammal prey species populations, but that longer term intensive coyote removal (9 months or longer) can in some circumstances result in changes in rodent and rabbit species composition which may lead to changes in plant species composition and forage abundance. The latter conclusion was based on one study (Henke 1992) which was conducted in the rolling plains area of Texas that involved one year of pretreatment and two years of treatment. Whether such changes would occur in all ecosystems in general remains to be proven. Nevertheless, most PDM actions in the District are not year round but occur for short periods after damage occurs (corrective control situations) or for short periods (< 6 months) at the time of year when benefits are most likely such as the 2 -3 month period immediately preceding calving. This factor, combined with the fact that ADC conducts PDM on less than 20% of the land area of the District, and kills a low percentage (< 10%) of the District population of coyotes, means ecosystem impacts should be low in magnitude. Also, take of other carnivores that prey on rodents and rabbits is too low to indicate any potential for a significant effect. Evidence also exists to suggest other carnivores such as badgers, bobcats, and foxes increase in number in New Mexico when coyote populations are reduced (Robinson 1961, Nunley 1977). Therefore, even if coyote numbers were reduced substantially, other species that prey on rodents and rabbits would probably increase in number to naturally mitigate any reduction in coyote predation on those prey species that might occur.

Other prey species of coyotes include white-tailed and mule deer, and pronghorn antelope. Based on the information presented in section 1.1.3, it is clear that local short term predator population reductions can enhance deer and antelope populations. This could be either a beneficial or detrimental effect depending upon whether local deer populations were at or below the capacity of the habitat to support them. However, as stated above, since ADC only conducts PDM on less than 20% of the land area of the District and takes less than 10% of the coyote population in any one year, it is unlikely that positive effects on deer or antelope populations would be significant, except in isolated instances. If [redacted] or an Indian tribe requested coyote removal for the purpose of enhancing antelope or deer herds, an increase in local populations would be desired and considered a beneficial impact on the human environment. In those situations, it is likely that coyote control would be ended when herd management goals have been met. In any event, it is unlikely that impacts would be significant in major portions of the District under the current program.

4.2.3.2 Alternative 2. - No Federal ADC PDM and Alternative 3. - Technical Assistance Only.

Under this alternative, lethal PDM by ADC would not occur and there would be no potential for ADC to impact prey species populations. However, private efforts to control predation could mean untrained and less experienced individuals would attempt to conduct control which could lead to impacts described in section 4.2.1.2. Individuals would not be bound to standard operating procedures and mitigating measures such as pan tension devices on traps and could therefore be expected to take more nontarget carnivores than would ADC personnel. As indicated by USDA (1994), such actions combined with potential illegal pesticide use could have unknown adverse impacts on target and nontarget predator species populations. Depending on the level of such activities, the increases in nontarget carnivore populations that generally follow local coyote population reduction, which could naturally mitigate a reduction in predation on rodents and rabbits, would be less likely to occur since private control efforts would tend to be less selective than ADC's. While ADC would still be available to advise producers under Alternative 3, compliance with ADC advice would be voluntary. Thus, although ADC would have no potential to impact prey species populations, the impacts of no operational ADC could be greater than those of the current program.

4.2.3.3 Alternative 4 - Nonlethal Required Before Lethal Control.

As has been noted in Chapter 3, Alternative 4 is not substantially different from the current program in that more than 80% of cooperating livestock producers use or have tried one or more nonlethal methods. However, preventive lethal

PDM by ADC would not occur. Thus ADC's potential impacts on prey species populations would be less. If producers become frustrated and drop out of the program, private efforts to control predation could result in potential impacts similar to Alternatives 2 and 3 but to a lesser degree.

4.2.3.4 Alternative 5. - Corrective Control Only When Lethal PDM Methods are Used.

Under this alternative, ADC PDM would have less potential of impacting prey species populations than the current program because no preventive control would be conducted. The impacts would probably be similar to those under Alternative 4.

4.2.3.5 Alternative 6 - Expanded IWDM for Predator Damage Management.

Under this alternative, ADC PDM would have slightly greater potential than the current program for indirectly causing increases in prey species populations. However, the degree of expansion in preventive control efforts is not expected to involve a substantial increase in areas where lethal control of coyotes would be extended to more than 6 months of continuous effort in several year periods. As discussed in section 4.2.3.1, increases in populations of nontarget carnivores that also prey on rodents and rabbits generally result from reductions in coyote numbers which would provide a form of natural mitigation for any reduction in coyote predation on those prey species that might occur. Also, the percentage of land area on which PDM would be conducted is not expected to exceed 30% under this alternative. Thus, there would be little or no potential for significant ecosystem impacts under this alternative.

4.2.4 Impact of ADC predator damage management activities on public use of public lands.

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

Under Alternative 1, wildlife damage management is integrated into other activities on public lands at work plan meetings held between ADC, [redacted] and Forest Service. At each meeting, the needs for WDM are discussed, as well as factors pertinent to PDM decisions, such as changes in the grazing season, planned recreational or other events, logging operations, hunting seasons, and others. ADC Work Plans contain provisions when appropriate for the establishment of public safety zones around areas of known high use on [redacted] and [redacted] lands, and for restrictions on certain methods during certain periods, e.g., no M-44 use in bird hunting areas during bird hunting season (to reduce risks to hunting dogs). These are factored into the ADC Decision Model thought process. Other mitigation measures or standard operating procedures were listed in section 3.4.2.5 and include the posting of warning signs at main entrance points into areas where traps, snares and M-44s are in use and smaller but visible warning signs within 25 feet of each M-44 to warn persons to avoid tampering with the devices and to keep pets restrained. Although there has been concern expressed by some individuals that these devices pose an undue hazard to people, no fatal human accidents or instances of permanent impairment involving M-44s have occurred since the devices were registered in 1975. A formal risk assessment of ADC's chemical methods found no evidence of hazardous exposures to recreationists from any such method, including M-44 use (USDA 1994, Appendix P). Although incidents involving exposures have occurred, most have involved applicators who are using the devices, and adverse effects were minor and short term in nature.

Over the past several years, no significant conflicts with other public land uses have been identified in the work planning process. The types of mitigation described above have, in effect, been sufficient to preclude conflicts. In actuality, the extent of ADC PDM activities on [redacted] and [redacted] lands has been limited. For example, ADC conducted no PDM activity on nearly 3/4 of the [redacted] and on about 95% of the [redacted] in the District during 1994 and 1995. Under the current program, the amount of public land worked by ADC could increase but is not expected to encompass a majority of livestock grazing allotments. Aerial hunting on [redacted] land has not occurred in a number of years in the District and has been very limited on [redacted] -- only 12 hours of such activity occurred in 1994 and 10.9 hours occurred in 1995. Put in perspective, this is equivalent to an average of about 1.3 *minutes* of aerial hunting per 10 mi^2 *per year* on the maximum amount of [redacted] and [redacted] land area that ADC might operate on under the current program, or

less than *½ minute* per 10 mi^2 of *all* [redacted] and [redacted] land in the District. Such activity could increase many times the current level and still be relatively inconspicuous to the public. Because of the large expanses of area involved, it is rare for even ADC ground crew personnel to actually observe coyotes being shot by aerial hunters. Thus, the chance that recreationists might be disturbed by observing such activity is exceedingly low.

Livestock grazing is one of the authorized multiple uses of public lands in addition to recreation. ADC PDM assists public land grazers by protecting livestock while they are on public lands and is recognized by [redacted] and [redacted] policy as well as authorized by the ADC Act of 1931 as a legitimate government function on public land areas. PDM activities by ADC most often involve only brief amounts of actual time spent by ADC personnel on individual grazing allotments. For example, only one trip per week to an allotment is required to inspect M-44 devices and, under current state policy, two trips to inspect traps. The workloads of ADC Specialists generally prevent them from making more frequent visits. Thus, the chance that presence of ADC personnel or vehicles will disturb recreational users in some way is low. Also, most public land grazing allotments worked by ADC are not areas of high recreational use, and recreationists are very infrequently observed by ADC personnel in the course of performing their duties.

Despite the relatively inconspicuous presence of ADC PDM activities on public land areas, some persons would continue to believe their recreational experiences on public lands is being negatively impacted by such activity under the current program.

4.2.4.2 Alternative 2. - No Federal ADC PDM Program, and Alternative 3. - Technical Assistance Only.

Under these two alternatives, there would be no potential for the Federal ADC program to conflict with recreational or other public uses of public lands. However, as stated in previous sections, private control efforts would probably increase under this alternative, and it is doubtful that the public would detect much of the increased private PDM activity that might occur. Depending on the level of frustration felt by cooperators, such activity could involve illegal pesticide use. Such use, as well as private use of other methods on public lands, would not include the use of warning signs to alert the public as does ADC use of traps, snares, and M-44s. Without such warnings and without the opportunity of concerned and interested persons to obtain information from [redacted], [redacted], or ADC to remain apprised of areas in which PDM activities are occurring, the risk to pets or hunting dogs could actually be greater than under the current program. It is doubtful that aerial hunting by private persons would occur in such areas because of restrictions by [redacted], the [redacted] and the state, which would mean that persons who feel this activity might impair their public land recreational experiences would probably not be impacted. However, a state agency could exercise the right to conduct such activity, and, in that case, the impacts might be similar to the current program.

4.2.4.3 Alternative 4. - Nonlethal Required Before Lethal Control.

Under Alternative 4, the potential for ADC PDM activities to conflict with the public's use of public land areas would be less than under the current program since ADC would not conduct any preventive control actions. Similar to Alternatives 2 and 3 but to a lesser degree, private control efforts would probably increase under this alternative if cooperators became frustrated at reduced effectiveness. Depending on the level of frustration felt by cooperators, such activity could involve illegal pesticide use. Such use, along with private use of other methods, would not include the use of warning signs to alert the public as does ADC use of traps, snares, and M-44s. Without such warnings and without the opportunity of concerned and interested persons to obtain information from [redacted], or ADC to remain apprised of areas in which PDM activities are occurring, the risk to pets or hunting dogs could actually be greater than under the current program.

4.2.4.4 Alternative 5. - Corrective Control Only When Lethal PDM Methods are Used.

Under Alternative 5, ADC PDM would only take place after documentation of ongoing depredation on livestock by predators. The potential for ADC PDM activities to conflict with the public's use of public land areas would be less than

under the current program since ADC would not conduct any lethal preventive control actions. Potential impacts on public use of public lands from increased private PDM efforts if cooperators become frustrated at reduced effectiveness and drop out of the program are similar to Alternative 4.

4.2.4.5 Alternative 6 - Expanded IWDM for Predator Damage Management.

Under this alternative, ADC's PDM activities on public land areas would likely increase. Persons who believe their use of public lands is being negatively impacted by such activity would feel they are being more adversely affected than under the current program. However, even with a substantial increase in ADC PDM on public land areas, ADC presence should still be relatively inconspicuous. For example, aerial hunting hours on [redacted] and [redacted] lands would probably not exceed 200 hours per year over the entire District. That number may seem high to some persons, but when put in perspective, it would mean an average of only 22 minutes of aerial hunting per 10 mi^2 of cooperating [redacted] and [redacted] grazing allotments in any one year (or only 6.9 minutes per 10 mi^2 of *all* [redacted] land in the District). The chances of significant numbers of recreationists being in the vicinity of aerial hunting operations when they are occurring are low. The overall impacts on recreational users would therefore be low under Alternative 6.

4.2.5 Impact of ADC predator damage management on private recreational and commercial fur harvest.

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

Under the current program, it is ADC practice to avoid conducting lethal PDM in private land areas where there is a conflict with private trappers. As pointed out previously, 80% or more of the land area in the District is not impacted by ADC PDM activity. Of the 20% or less that is impacted, many pastures within cooperating ranches are not worked on by ADC in many years. Thus, there is no potential for conflict with private fur harvesters on more than 80% of the District. On public land areas in the District, which are the areas in which a conflict has the greatest potential, ADC PDM would not operate on about 60% of the [redacted] or more than about 80% of the [redacted] land. This means considerable public land areas are available to private fur harvesters with no potential conflict with ADC. Occasionally, private fur trappers are found to be working the same area of public land where ADC has been requested to provide PDM service. In such situations, the ADC Specialist generally tries to work with the private trapper to resolve any conflicts and may in many cases decide not to work in the area when the private trapper is operating there. In recent years, fur prices have been low and private take of furbearers has been much less than what it was when fur prices were high in the late 1970s and early 1980s (see section 2.4.1). For all the above reasons, significant conflicts with fur harvesters have not been apparent to ADC in recent years. Despite this perception, however, some fur harvesters will likely perceive that ADC's take of coyotes conflicts with their interests under the current program.

4.2.5.2 Alternative 2. - No Federal ADC PDM Program, and Alternative 3. - Technical Assistance Only.

Under these alternatives there would be no potential for ADC to conflict with private fur takers because no operational ADC PDM would be conducted. The increased efforts of livestock producers that would occur might be perceived as a conflict in some situations. Since such efforts are likely to be less selective than ADC's PDM activities, and since some producers might resort to highly unselective methods such as illegal pesticide-laced baits, it is possible that nontarget furbearer numbers might be substantially reduced in localized areas so they are not available to be harvested by fur takers.

4.2.5.3 Alternative 4. - Nonlethal Required Before Lethal Control.

Under Alternative 4 there would be less chance of conflicts with private fur takers because ADC would probably kill fewer target and nontarget furbearers in the absence of preventive lethal PDM. Producer PDM efforts would likely increase with similar effects and potential conflicts with private fur takers as under Alternatives 2 and 3 but to a lesser degree.

4.2.5.4 Alternative 5. - Corrective Control Only When Lethal PDM Methods are Used.

Potential conflicts under this alternative would be about the same as under Alternative 4.

4.2.5.5 Alternative 6 - Expanded IWDM for Predator Damage Management.

This alternative would present a greater chance of conflict with private fur takers because of the increased level of PDM activity by ADC. Since private fur harvest is linked to fur prices (McDonnell 1996), and there is some indication that coyote predation problems tend to be less overall when private harvest is greater, it is probable that ADC PDM would be requested less when fur prices are high, which would lessen the potential for conflict with fur takers. Even under an expanded program, ADC PDM would probably not occur on about 60% of the [redacted], 80% of the [redacted], or 75% of the [redacted] in the District which would leave considerable areas of public access land where there would be no potential for conflict with private fur takers. Despite these mitigating factors, some private fur takers will consider ADC PDM to conflict with their interests.

Impacts on private fur takers should be of low magnitude under Alternative 6.

4.2.6 Social and Economic Impacts of ADC predator damage management on the agricultural community and on other agencies.

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

Social and economic impacts on the agricultural community

The ADC FEIS addressed this topic by examining impacts on "Service Recipients" which includes a number of segments of the agricultural industry. The following is from the FEIS (USDA 1994):

> A study of New Mexico livestock owners by Buys (1975) suggests that over 90 percent of sheep producers feel that a large amount of predator control is necessary for the survival of the sheep industry. Similarly, over 50 percent of cattle ranchers felt that a large amount of predator control is necessary for the survival of the cattle industry. During the scoping process for this EIS, many producers reported a high level of frustration with the extent of the losses and with the restrictions on chemical control methods that they believe are necessary to reduce losses.

Another excerpt from the FEIS:

> In the 1982 presentation "Economic Effect on the Family, the Community, and the County," Dr. Robert Kensing, an economist with the Texas Agricultural Extension Service, reported, "Predation is a major cause of the almost complete liquidation of sheep and goats [operations] from central Texas." Kensing (1982) also reported that most sheep and goat operations are family farms, and the effects of predation on these operations include a decline in total income, loss of benefits from diversification, and the necessity to seek off-farm income. In addition, when these operations are discontinued, the family loses the opportunity to work together, a factor benefiting family life.

Recent livestock industry publications tend to reflect these same societal attitudes from the agricultural industry. One fourth-generation sheep producer in Wyoming was quoted as follows in the July 1996 issue of the National Lamb & Wool Grower: "We can live without the wool incentive payment, but if we don't get something done about these predators, it isn't going to matter."

In analyzing the social impacts on agricultural producers, the FEIS stated the following:

> To the extent that the program is successful or perceived to be effective, economic loss and stress are reduced for individual farmers and ranchers. Numerous factors threaten the U.S. agricultural economy, including foreign

> competition, unfavorable prices, labor scarcity, and wildlife damage. Of these, farmers and ranchers feel they may be able to control wildlife damage. Many feel that they need continued access to APHIS personnel and wildlife damage control methods to stay in operation (Kensing 1982).

The preceding excerpt indicates that even if predation is only part of the problems of livestock producers, it frequently is the problem for which there is a solution which means PDM can be the difference between a profitable and unprofitable enterprise.

Based on informal feedback from cooperating livestock producers, ADC's PDM program is currently believed to be of benefit to the agricultural industry in the State. The social impacts of the current program on the agricultural industry are probably in line with the impacts as described above in the FEIS.

The analysis in section 4.2.7.1 shows an estimate of the value of livestock losses avoided by the current ADC PDM program in the District in 1995. That value, or $700,000, represents an estimate of livestock cash receipts that would not be collected by ranchers in the District in the absence of ADC PDM. Thal et al. (1992) estimated the economic impacts of cattle ranching, in terms of monetary revenues, to local government and schools in [redacted] counties (5 of the 8 counties in the District) to average $23 per cow in 1990. Assuming the same impacts occur throughout the District, the economic impact of total beef cows protected by ADC was $1.6 million for local governments and schools in 1995. The benefits from sheep and other livestock protected by ADC have not been quantified. Without effective PDM, fewer livestock producers would be able to stay in business, and economic returns to local communities and schools would likely decline.

Economic impacts on other agencies

ADC currently assists the [redacted] in addressing black bear and mountain lion depredation problems. [redacted] pays for 100% of the field operational cost of providing such services under a [redacted] that authorizes the transfer of funds. The current agreement limits charges for this service to no more than $50,000 per year. This relationship is considered to be a positive economic benefit to the [redacted] because its costs for providing the same service in the absence of ADC would be considerably greater. ADC has personnel distributed around the state that are either currently trained, or have rapid access to other personnel who are trained, to use proper equipment and/or dogs for capturing problem bears and lions. Without ADC, [redacted] would have to either hire additional personnel for the specific purpose of handling bear and lion problems, or would have to conduct extensive training of their current personnel to perform such duties. They would also have to purchase additional equipment. The use of their current field personnel to perform bear and mountain lion damage management would require redirecting efforts away from law enforcement, wildlife surveys, and other wildlife management activities. Because ADC is already equipped and positioned strategically around the state, it can handle bear and mountain lion problems as directed by [redacted], but at less cost to [redacted].

Similar to the current program of bear and mountain lion PDM, if the [redacted] requested PDM to enhance identified populations or herds of big game species, ADC could most likely provide the service at less cost to [redacted] than the cost [redacted] would incur without ADC. Although such activities are currently not conducted in the current program, they could be under the current program alternative.

The [redacted], as the state agency with predator control authority for the protection of [redacted] in the State, currently cooperates with ADC to meet a majority of their PDM responsibilities. To have the same level of service that the program is able to currently provide, [redacted] would require additional State funding of more than $850,000 per year. This would be a 3-fold increase over current state appropriations for the cooperative ADC program. [redacted] would have to hire additional personnel to supervise the PDM program and to conduct field activities.

State agencies' costs for providing PDM services in the absence of federal PDM assistance might be less than the current program by about 2-5% because they would not be required to comply with NEPA. Federal land managing agencies

would likely have to revise current policies pertaining to ADC on [redacted] and [redacted] lands, and may have to meet NEPA compliance requirements for allowing state PDM on federal lands, depending on how those policies were revised and to what level such revisions established the power to approve/deny state agency PDM actions on federal lands.

4.2.6.2 Alternative 2. - No Federal ADC PDM Program.

Under this alternative no operational ADC PDM or technical assistance program would be conducted. Private efforts to control predation would increase and state agencies would likely increase their PDM efforts as well, depending on the level of funding they received from the legislative process. Many producers would probably feel their PDM needs were not being adequately met. It is expected that some livestock producers would go out of business under this alternative, with negative impacts on local governments and schools caused by reduced tax revenues that would likely result from lower overall economic returns to ranching enterprises. State agencies might be able to offset the loss of the federal PDM program by increasing state-operated PDM, but this would depend on the magnitude of the increase in state and local funding which is speculative. Local rural communities and schools would likely be worse off than under the current program Alternative.

Impacts of no federal program on other agencies in the absence of ADC PDM are described in the previous section (4.2.6.1).

4.2.6.3 Alternative 3. - Technical Assistance Only.

Under this alternative, no operational ADC PDM would occur, but ADC would provide advice on methods and strategies to resolve predation problems. It is expected that some livestock producers would go out of business under this alternative because they would not be able to effectively implement PDM recommendations and their losses would increase. Many producers would most likely feel their PDM needs were not being adequately met. This would result in negative impacts on local governments and schools caused by reduced tax revenues that would likely result from lower overall economic returns to ranching enterprises. State agencies might be able to offset the loss of the federal PDM program by increasing state-operated PDM, but this would depend on the magnitude of the increase in state and local funding which is speculative. The impacts would probably be slightly less than under Alternative 2, however.

The [redacted] would have to conduct bear and mountain lion PDM with no operational assistance from ADC, which would increase their costs. If they determined the need for PDM to enhance a big game population, their cost would also be greater than what it would be under the current program without ADC operational assistance.

To achieve the same level of operational PDM service currently provided under the current program, [redacted] would have to increase state and local funding by the same amount as under the no program Alternative.

4.2.6.4 Alternative 4. - Nonlethal Required Before Lethal Control.

Under this alternative, operational lethal PDM could not be conducted until nonlethal methods have been employed in a given damage situation and found to be ineffective or inadequate. As indicated previously, 83% of cooperating producers in the State use or have tried one or more nonlethal methods. Thus, the primary difference between this alternative and the current program could be the curtailment of lethal preventive PDM. Impacts on cooperating livestock producers, local governments, and schools would probably be worse than under the current program but less than under Alternatives 2 and 3.

ADC's bear and mountain lion PDM service provided to [redacted] might not change much under this alternative because such service is primarily provided following the confirmation of losses, and, as shown previously, a majority of cooperating producers already have tried or are using one or more nonlethal methods. [redacted] would have to conduct

its own PDM to enhance big game populations with no potential for operational assistance from ADC because nonlethal methods would not be effective in that type of PDM situation.

[redacted] cost for meeting its PDM responsibilities would probably be similar to the current program, unless reduced effectiveness of this alternative resulted in a push for a state-operated program which would require additional state and local funding.

4.2.6.5 Alternative 5. - Corrective Control Only When Lethal PDM Methods are Used.

Under this alternative, operational lethal PDM could not be conducted until losses have been confirmed in each damage situation. Impacts on cooperating livestock producers, local governments and schools would probably be worse than under the current program, less than under Alternatives 2 and 3, and slightly less than under Alternative 4.

ADC's bear and mountain lion PDM service provided to [redacted] might not change much under this alternative because such service is primarily provided following the confirmation of losses. If and where such needs are identified in the future, [redacted] would likely decide to conduct its own PDM to enhance big game populations without operational assistance from ADC because of logistical difficulties in confirming depredation losses of big game fawns each season prior to conducting PDM, and because such a strategy would be less effective.

[redacted] cost for meeting its PDM responsibilities would probably be similar to the current program, unless reduced effectiveness of this alternative resulted in a push for a state-operated program which would require additional state and local funding.

4.2.6.6 Alternative 6 - Expanded IWDM for Predator Damage Management.

Under this alternative, there would be greater benefit to cooperating livestock producers, local governments, and schools because predation losses of livestock would be less than under the current program.

[redacted] would benefit if they identify a need for PDM for big game enhancement because ADC would have greater capability to respond with operational assistance. It is doubtful that bear and mountain lion PDM service would change much under this alternative since ADC has been able to respond to all requests from [redacted] for such service under the current program.

Under this alternative, [redacted] costs for cooperating in the ADC PDM program would probably remain the same as under the current program.

4.2.7 Cost of providing PDM services for livestock protection compared to the value of livestock losses avoided.

The three major livestock classes on which ADC PDM focuses in the District are sheep, lambs, and calves. The following analysis pertains just to those classes. Other classes that are also protected and for which predation losses are avoided by PDM include goats, kid goats, adult cattle, poultry, ratites (emus and ostriches), horses, and donkeys. No data were available to estimate avoided losses for those resources.

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

Costs of ADC PDM services provided for livestock protection in the District for Fiscal Year 1995 included salary and benefits for field, supervisory and administrative staff, supplies, equipment, vehicles and transportation, aerial hunting, and all other related program expenditures. During FY 95, ADC's cost (including expenditures of both federal and nonfederal funds) was about $586,000 for livestock protection in the District.

Sheep and Lamb Losses. Scientific studies have revealed that in the absence of PDM, 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) whereas in studies in which PDM was conducted, losses were about 0.5 and 4.3%, respectively (USDI 1979). In analyzing the value of sheep and losses avoided by PDM, USDA (1994) used an unweighted average rate of loss in studies without PDM to be 4.5% for sheep and 17% for lambs. These are the loss rates assumed to occur in the absence of PDM for purposes of this analysis.

Cattle and Calf Losses. No studies of cattle and calf losses in the absence of PDM have been conducted. Survey data discussed in USDI (1978) showed that 85% of cattle producers in the southwest U.S. had *no* losses of calves to coyotes, that 13% had coyote predation losses of up to 5% of calves born alive, and that 2% had losses to coyotes greater than 5%. Those data indicate a minority of cattle producers have most of the coyote predation problems that are experienced by cattle producers as a whole. It is within reason to assume that producers who experience higher losses are more likely to become ADC cooperators; thus, it is reasonable to predict that losses on cooperating cattle ranches would be as great as the higher loss producers in the data shown by USDI (1978). Therefore, we predict that cooperating cattle ranches would have an average of around 5% losses to coyotes on cooperating ranches in the absence of PDM.

Value of Avoided Losses Compared to Cost of PDM Service. Table 4-5 shows the estimated losses of sheep, lambs, and calves that were avoided by cooperating farms and ranches because of ADC PDM services in the District. It shows the estimated value of those resources that were saved by PDM was about $720,000 in 1994 and $706,000 in 1995, even without considering losses of other classes of livestock saved. Table 4-5 indicates that the value of livestock saved exceeded the cost of providing service by a factor of 1.4 in 1994 and by 1.2 in 1995. Other less apparent benefits not considered in this comparison include maintenance of local economic stability, price benefits to consumers (USDA 1994), and a relatively higher degree of environmental protection from use of more selective PDM methods and from less risk of private individuals resorting to illegal chemical uses.

Table 4-4. Estimated value of livestock losses avoided vs. costs for ADC Predator Damage Management (PDM) in the Las Cruces ADC District in 1994 and 1995. Data on resources protected and per head values were from ADC MIS data. Percent loss estimates for sheep and lambs without PDM were taken from the ADC FEIS (USDA 1994); percent loss estimates for calves without PDM were estimated using an analysis of survey data from USDI (1978). The data exclude eagle predation losses on lambs because ADC is not able to provide assistance with such losses.

Year	Resource	# Protected by ADC	% Lost to Predation w/ ADC PDM	Predicted % Lost to Predation w/o PDM	# Losses Avoided by PDM	$ Value per Head	Estimated Value of Avoided Losses	Cost of Providing PDM Service
1994	Lambs	10,350	6.3%	17.0%	1,107	$55	$60,910	
	Sheep	14,430	0.5%	4.5%	577	$69	$39,827	
	Calves	54,209	2.5%	5.0%	1,355	$456	$617,983	
	TOTAL	NA	NA	NA	NA	NA	$718,719	$515,045
1995	Lambs	8,767	2.3%	17.0%	1,289	$56	$72,170	
	Sheep	10,374	0.4%	4.5%	425	$68	$28,923	
	Calves	61,017	2.1%	5.0%	1,769	$342	$605,167	
	TOTAL	NA	NA	NA	NA	NA	$706,259	$586,125

4.2.7.2 Alternative 2. - No Federal ADC Program.

No federal ADC program expenditures for PDM would occur under this alternative. Federal funds in FY 1995 were 49% of total funding for the ADC program in the State. Thus, about 50% of the funds (from State, County, and private sources) would remain and would presumably be used for PDM. Losses would increase with the loss of the federal portion of the program and therefore, fewer losses would be *avoided*. Thus, costs of providing PDM service, although lower than under the current program, might exceed the value of losses avoided by the remaining PDM program.

4.2.7.3 Alternative 3. - Technical Assistance Only.

Under this alternative, ADC's cost would be reduced because no operational PDM would be conducted. Predation losses would likely increase to a level slightly less than that of the no program alternative, since some cooperating producers would benefit somewhat from technical assistance, which would mean fewer losses would be avoided than under the current program. Costs of providing PDM service, although lower than under the current program, might exceed the value of losses avoided by the remaining PDM program, but to a lesser degree than under Alternative 2.

4.2.7.4 Alternative 4. - Nonlethal Required Before Lethal Control.

Under this alternative, ADC's cost for providing PDM service would probably not be reduced, but would be partially redirected away from conducting operational lethal PDM toward verifying losses and the use of nonlethal methods. Predation losses would increase because of reduced effectiveness, which means fewer losses would be avoided than under the current program. The ratio of cost to avoided losses would therefore increase, potentially to the point that cost exceeds the value of avoided losses.

4.2.7.5 Alternative 5. - Corrective Control Only When Lethal PDM Methods are Used.

Under this alternative, ADC's cost for providing PDM service would probably not be reduced, but would be partially redirected away from conducting operational lethal PDM toward monitoring for the start of predation damage on cooperating properties. Predation losses would increase because of reduced effectiveness which means fewer losses would be avoided than under the current program, although not quite to the degree that they would under Alternatives 2, 3, and 4. The ratio of cost to avoided losses would therefore increase, potentially to the point that cost exceeds the value of avoided losses, but not to the degree that would result from Alternatives 2, 3, and 4.

4.2.7.6 Alternative 6 - Expanded IWDM for Predator Damage Management.

ADC's costs for PDM service would increase under this alternative. It is expected that more losses of livestock would be avoided, however, which means that the ratio of cost to avoided losses would likely remain about the same as the current program, or could improve.

4.2.8 Selectivity and humaneness of ADC predator damage management methods.

Selectivity of PDM methods is related to the issue of humaneness in that greater selectivity results in less perceived suffering of nontarget animals. The selectivity of each method is based, in part, on the skill and discretion of the ADC Specialist in applying such methods and also on specific measures and modifications designed to reduce or minimize nontarget captures. The humaneness of a given wildlife damage management method is based on the human perception of the pain or anxiety experienced by an animal because of 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 2.2.8. The selectivity and humaneness of each Alternative are based on the methods employed under that alternative.

Schmidt et al. (1995) conducted a public attitude survey in which respondents were asked to rate a variety of WDM methods on humaneness (1=not humane, 5= humane) based on their individual perceptions of the methods. No further instructions on how to base their scores were given to respondents (Table 4-4). Some people appear to view any animal's death as being inhumane if it is not caused by apparently painless chemical euthanasia (i.e., when an animal is "put to sleep"). Animal suffering can be viewed as a function of pain occurring over a period of time. It is not just a function of death. The American Veterinary Medical Association (AVMA) describes killing methods that are considered euthanasia or "a good death" as the Latin roots of the term imply. Gunshot is a method of euthanasia when applied correctly which means the animal is shot in the brain. The advantages are the fact that the method causes instantaneous unconsciousness and is inexpensive in terms of materials, training and administrative costs. However, the disadvantages are that it can be dangerous to personnel if firearms safety practices are not strictly adhered to, and it is considered by many to be aesthetically unpleasant (AVMA 1986). ADC's primary shooting methods used in PDM (shooting from the ground or from aircraft) do not generally offer the opportunity to administer shots to the brain because of the difficulty in hitting such a small target under the distances involved in field situations. Thus, although animals killed by shooting are generally dead within a few seconds, the death is not in strict accordance with the AVMA's definition of euthanasia. This is, in terms of humaneness, a limitation of current PDM technology. Shots to the brain are the standard practice for animals captured in traps and snares that are to be killed, and for animals taken with the use of trail hounds.

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

The following discussions of the relative humaneness of each alternative are related to the above data.

4.2.8.1 Alternative 1. - Continue the Current Program.

Table 4-6 shows the relative and overall selectivity of lethal PDM methods as used by ADC in the District over a two-year period.

Table 4-6.
Selectivity of Lethal PDM Methods as Used by the ADC Program in the Las Cruces ADC District in 1994 and 1995 combined. Numbers are animals killed.

Species	Method							
TARGETS:	**Leghold Trap**	**Foot Snare**	**Neck Snare**	**M-44**	**Livestock Protection Collar**	**Aerial Hunting**	**Shooting (ground based)**	**Dogs**
Coyote	799	--	109	2,608	4	333	740	--
Black Bear	--	1	--	--	--	--	--	1
Mt. Lion	--	4	--	--	--	--	--	--
Bobcat	11	--	9	--	--	--	1	--
Kit fox	1	--	--	--	--	--	--	--
TOTAL TARGETS	811	5	118	2,608	4	333	741	1
NONTARGETS:								
Badger	2	--	--	--	--	--	--	--
Bobcat	5	--	1	--	--	--	--	--
Gray Fox	10	--	2	31	--	--	--	--
Kit Fox	3	--	--	13	--	--	--	--
Black bear	--	--	--	1	--	--	--	--
Mule Deer	--	--	1	--	--	--	--	--
Jackrabbit	1	--	2	--	--	--	--	--
St. Skunk	6	--	--	1	--	--	--	--
Porcupine	5	--	9	--	--	--	--	--
Raccoon	2	--	--	--	--	--	--	--
Fer./FR Dog	15	--	--	35	--	--	--	--
Fer./FR Cat	2	--	--	--	--	--	--	--
TOTAL NONTARGETS	51	0	15	81	0	0	0	0
% SELECTIVITY[1]	94%	100%	89%	97%	100%	100%	100%	100%

[1]Target take as a percentage of total lethal take.

The following discussion analyzes the relative selectivity and humaneness of each method used for PDM in the current program:

Leghold Traps and Foot Snares. The survey results in Table 4-4 indicate leghold traps are perceived as less humane than other methods. ADC currently employs traps with offset rounded jaws to reduce injury, and with pan-tension devices to improve selectivity. Many traps are also equipped with shock absorbing springs in the chain attached to the anchoring device in order to further reduce injury. Captured animals are euthanized, or in case of a nontarget capture, released if capable of surviving. By policy, ADC traps are equipped with pan-tension devices to impede nontarget captures unless the use of the device would exclude the capture of a target animal. Nontarget capture rates of less skilled trappers, or trappers that do not use pan-tension devices, probably contribute to the perception that leghold traps are not selective. However, traps as employed by ADC Specialists are selective to a great degree (95%, Table 4-6) because of mitigation measures and ADC policy restrictions and the skill that ADC Specialists generally have in selecting locations for trap placement that have relatively good chances at catching target animals. In 1994 and 1995 combined, 811 target animals were captured in leghold traps while 92 nontarget animals were captured. Of the 92 nontargets, 41 were released and 51 were euthanized. One of the nontargets released was a mountain lion which was tranquilized before release, and another was a black bear released from a snare. Nontargets killed were 6% of the total number of animals captured, indicating that ADC's use of leghold traps was 94% selective for lethal take of target species over the two-year period.

Foot snares are employed for mountain lion and bear damage management, although they are generally checked daily. Technological advances such as the use of remote transmitters to signal when a foot snare has been disturbed could allow for easier monitoring of foot snares, further increasing humaneness. Additional funds would likely be needed before widespread use of such devices could be employed. Foot snares have been used infrequently in the District, but are highly selective for bears and mountain lions when used by ADC Specialists. In 1994 and 1995 combined, 5 target and no nontarget animals were captured. Because of the greater weight of target black bears and mountain lions, underpan tension devices can be adjusted to require a much heavier trip weight than those used with leghold traps set for coyotes which contributes to their high degree of selectivity.

Under current state law, the cooperative ADC program is exempt from trap check requirements as set for private trappers by the New Mexico State Game and Fish Commission. Current policy for the NM ADC program is to check traps as often as possible but at least twice per week. Under current funding (and therefore staffing) limitations, field personnel cannot meet their workloads with a more frequent trap check interval. Obviously, exceptions are allowed such as when snow or mud conditions prevent access to equipment and prevent personnel from meeting the twice per week requirement. However, traps are normally rendered incapable of being triggered by such conditions so target and nontarget animals generally cannot be caught until the traps are reset. A more frequent trap check interval could be established if it becomes required by a change in state law which would require sacrificing efficiency and effectiveness in the interest of increasing humaneness. However, such a requirement would not necessarily reduce animal suffering overall if livestock deaths and injuries from predation increased as a result (see par. at the end of this section).

Neck Snares. Table 4-4 indicates neck snares are not generally perceived as humane. A successful capture of an animal around the neck generally results in a fairly rapid death by strangulation. However, strangulation 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 are checked as frequently as possible, weather conditions permitting, and cooperators frequently assist in checking snares. Neck snares are not a major method of take in the District -- less than 3% of total target animals taken in 1994 and 1995 were taken with neck snares. As employed in the ADC program, neck snares are quite selective for target animals. In 1994 and 1995 combined, 118 target and 18 nontarget animals were captured. Of the 18 nontargets, 15 were killed indicating the method was 89% selective for lethal take of target species over the two-year period.

Aerial hunting. Aerial hunting is perceived as inhumane by the public (Table 4-4). However, this perception is probably based on confusion with the issue of "fairness" rather than actual pain or suffering because ground based shooting received a higher rating than aerial shooting even though the end result to the animal is the same. (R.

Schmidt pers. comm. 1995). As a method of sport hunting take, aerial hunting would be perceived by most persons, including ADC personnel, as being "unfair" and is in fact illegal for such purposes. Whether a method constitutes "fair chase" is not a concern in the ADC Decision Model process. Aerial hunting is chosen when it is determined to be effective and economically affordable. In actuality, aerial hunting results in less anxiety than ground based capture devices because there is no period in which the animal is restrained, and death most often occurs rapidly from one or more gunshots fired in a matter of a few seconds. The use of a "ground crew" provides for a quick follow-up if a wounded animal escapes in thick cover. Aerial hunting is also virtually 100% selective for target species. It not only allows for clear identification of the target species, but it can also be highly selective for offending individuals in certain situations in which areas frequented by such individuals have been determined by ground based investigations of an ADC Specialist. A total of 333 target (all coyotes) and no nontarget animals were taken by this method in the District in 1994 and 1995 combined. This represented only 7% of target animals killed by ADC PDM activities during that time.

Ground Shooting. Shooting from the ground, which includes calling and shooting and shooting during chance observations are regarded as more humane than restraining type capture devices or even aerial hunting. Both methods are highly selective in that positive identification of the target predator is made before shots are fired. These methods have been relatively important in the District PDM program. In 1994 and 1995 combined, 741 target animals, representing 16% of target animals killed, and no nontargets were taken by these two methods. Shooting with rifles or shotguns, when done properly, causes nearly instantaneous death of the target animal. ADC personnel strive to make kills as quickly and cleanly as possible with this method.

Trail or Decoy Dogs. Dogs are sometimes used during coyote damage management to attract target animals to a caller who may then shoot the animal. This use is similar in humaneness and selectivity to calling and shooting methods. For mountain lion and bear damage situations, hounds are used to follow the scent trail of the offending animal from the site of the depredation and to hold the animal at bay, usually in a tree, until the ADC Specialist arrives. Target animals are generally euthanized by shooting although they can be captured alive using immobilizing drugs and relocated if directed by [redacted]. The use of hounds may be perceived as inhumane, presumably because of anxiety experienced by the predator during pursuit and at bay and because of the death by shooting. Dogs as a PDM method can be highly selective, not only for the offending species but for offending individuals. Usually, if a bear or mountain lion is pursued and then found to be a nontarget (i.e., nonoffending individual), the dogs are restrained and the animal is allowed to escape unharmed. Dogs are not a major method of take in the District -- in 1994 and 1995 combined, only 1 animal (a black bear) was killed with the use of hounds with no nontarget animals killed. One nontarget lion was treed but was released unharmed in 1995.

M-44 Device. The M-44 device is perceived by ADC Specialists as humane because it causes a relatively rapid death in approximately 2 minutes (USDA 1994, Appendix P). Respondents were not asked to rate the humaneness of the device in Schmidt et al. (1995) because the authors believed the public would not be at all familiar with the concept of how it functions. The question asked of respondents that was closest in relation to the M-44 was whether "poisons for predators" were humane, and the general response was that they were not. The M-44 is the most-used method of take for coyotes in the District -- 56% of target animals were taken by use of the device in the District in 1994 and 1995 combined. 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 1994 and 1995 combined, 2,608 target (all coyotes), and 82 nontarget animals were killed by ADC use of M-44s in the District, indicating the method was 97% selective for lethal take of target species over the two-year period.

Denning. Denning is the practice of finding the den of a target species and asphyxiating the offspring with a gas cartridge. Table 4-4 indicates denning is not generally perceived as humane. However, the use of carbon monoxide is considered a form of euthanasia by the AVMA. Again, respondents may have confused their feelings of "fairness" in rating humaneness of the method. Denning is very selective in that positive identification of the species occupying a den is possible. Denning has been a very minor method of take in the District -- only 4 target

predators (all coyotes), representing .09% of all target animals killed, and no nontargets were taken by the method in 1994 and 1995 combined.

Livestock Protection Collar (LPC). The toxicant in the LPC, which is Compound 1080 or sodium monofluoroacetate, causes death after a target predator punctures the collar and ingests some of the toxicant. 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, is perhaps the most selective method for offending individual coyotes ever devised, because it requires an attack at the throat of a collared sheep, lamb, or goat. Nontarget hazards are almost nonexistent -- research to support registration of this method showed that the bird and canid scavengers tend to feed on the exposed flesh and the open thoracic cavity of collared sheep or goats killed by target predators and avoided the neck area which is the only area that typically is contaminated by toxicant when collars are punctured (Connolly 1980). This factor, combined with the requirement that contaminated animal remains be removed from the field and disposed of, means nontarget hazards from LPCs are low. No target or nontarget animals have been taken with LPCs in the District in 1994 or 1995. LPCs have somewhat limited application in the District, and it is doubtful that more than 10 or 20 coyotes would be taken in any one year using these devices.

DRC-1339. DRC-1339 has not been used in the District for controlling raven, crow or magpie depredation on young livestock, but could be under the current program. As discussed in Chapter 3, it poses little risk of secondary poisoning to nontarget animals, is relatively high in toxicity to most targeted bird species, but is of low-to-moderate toxicity to most raptors and is almost nontoxic to mammals. The method is most frequently used in boiled egg baits strategically placed near the area of depredation where it is judged that the depredating ravens will find the baits. The baits are left for no more than 3-5 days and uneaten baits are removed. The method is highly selective for the target species -- ravens are the only species that have ever been found dead in the District following treatment. DRC-1339 causes the buildup of uric acid deposits in the kidneys and blood vessels which results in circulatory impairment. Death in target birds results from uremic poisoning and congestion of major organs. The chemical causes a quiet and apparently painless death and death occurs without convulsions or spasms (USDA 1995b). Thus, although respondents in the Schmidt et al. (1995) survey would probably have rated DRC-1339 as inhumane because it is a "poison", the chemical actually causes death with little or no pain or discomfort which makes it a relatively humane method.

Nonlethal methods. Nonlethal methods are generally perceived as humane, although increased familiarity with the impacts of the methods may change this perception. Although guard dogs rarely if ever actually kill coyotes, they have been documented to kill deer fawns, chase adult deer and presumably other ungulates (elk and antelope) and can adversely affect wild turkey (*Meleagris gallopavo)* distribution (Timm and Schmidt 1989). Thus, there may be situations on private and public land areas where guard dogs would not be desired because of adverse impacts on such species. Fencing adequate to exclude predators would in most cases inhibit movement of other wildlife, particularly ungulate big game species, resulting in restricted migration and possibly death through starvation which would be a nontarget impact that would likely be perceived as inhumane. Modifying husbandry practices, such as use of confined lambing and calving, may decrease livestock depredations, but can sometimes result in increased nutritional, disease and parasite problems, and disruption of mother-young bonds which can lead to starvation of young and might result in losses as severe as those that would have occurred due to predation (Wade 1982). Therefore, many "nonlethal" methods have real or potential impacts on animals that would likely be perceived as inhumane if the general public were made aware of them.

The current program uses, recommends, or has available to it the above methods for the resolution of predator damage problems in the District. Noncapture lethal methods (aerial hunting, calling and shooting, shooting, denning, and M-44s) accounted for 3,686 target predators taken by ADC in the District, or 80% of the target predators taken in 1994 and 1995 combined. Restraining type capture methods that can involve injury and anxiety (leghold traps, foot snares and neck snares), accounted for 935 target animal captures, or about 20% of the target animals taken. Thus, the program's current use of available lethal PDM methods is dominated by those that are relatively more humane. The current program is also

highly selective and avoids killing substantial numbers of nontarget animals -- only 147 or 3% of 4,768 animals killed by ADC during PDM activities in 1994 and 1995 combined were nontargets. This indicates impacts perceived as inhumane are avoided to a high degree for nontarget species.

Under this alternative, methods viewed by some persons as inhumane would continue to be employed. On the other hand, if the PDM actions of the current program were successful, fewer livestock would suffer from injuries caused by depredations. Thus, a balance of sorts between the two aspects of humaneness might be achieved under the current program. Table 4-4 shows a "best estimate" of numbers of calves, sheep, and lambs that are not killed by predators as a result of PDM. The total numbers for the District were about 3,000 in 1994 and 3,500 in 1995 or a two-year total of 6,500 animals saved. The total number of target and nontarget animals killed was less than 4,800 for the same period. Thus, it appears that ADC PDM saves far more animals from injury and death than it kills which suggests that overall animal suffering may be less with the current PDM program than with no program at all. Although predators sometimes kill smaller animals such as lambs relatively quickly, they frequently do not do so with larger prey animals such as calves and sheep. Coyotes typically begin feeding on larger prey animals as soon as they stop struggling, and, as indicated in section 2.2.8, the prey are often alive and conscious when feeding begins (Wade and Bowns 1982). Livestock producers sometimes find animals that are still alive after a day or two even after having several pounds of flesh removed by predators. Such animals must be destroyed. To many people, the sight of this type of occurrence is more disturbing and perceived to result in much more pain and suffering to individual animals than that which results to individual predators from PDM methods.

4.2.8.2 Alternative 2. - No Federal ADC Program, and Alternative 3. - Technical Assistance Only.

These two Alternatives, which would provide no Federal operational ADC program, could be argued to be the most humane, as no wildlife would be killed by the Federal government. However, use of leghold traps, snares, M-44s and shooting by private individuals and state agency personnel would probably increase. This could result, in the case of private persons, in less experienced individuals implementing such devices with much less selectivity than ADC achieves. For example, private and state agency personnel would not be bound to using pan-tension devices or rounded trap jaws. Greater take and suffering of nontarget wildlife could result. Frustration caused by the inability to reduce losses could lead to illegal use of chemical toxicants and failure to check traps and snares as often as ADC which might result in increased animal suffering.

More livestock could be expected to suffer from injuries caused by depredations under these Alternatives than under the current program. The number of livestock saved from suffering because of predation would decrease while the number of animals killed for PDM could remain the same or even increase depending on the level of private and state agency efforts. Overall animal suffering could actually increase under these alternatives, but the public's perception of humaneness would probably be that less suffering was occurring because they would not be aware of the livestock losses and private PDM activities that would occur without ADC PDM.

4.2.8.3 Alternative 4. - Nonlethal Required Before Lethal Control.

The humaneness of PDM as perceived by the public would be expected to increase under Alternative 4. However, actual animal suffering would probably either not change much or could even be greater than that which occurs under the current program. As pointed out previously, 83% of cooperating producers currently use or have tried one or more nonlethal methods which means the main difference between this alternative and the current program would likely be the lack of preventive lethal PDM. Also, as identified in section 4.2.8.1, certain methods that are commonly viewed as "nonlethal", can, in practice result in lethal effects on other wildlife which could involve suffering. Similar to but to a lesser degree than under Alternatives 2 and 3, some cooperators could be expected to drop out of the program altogether and/or increase their own use of lethal control methods resulting in less experienced individuals implementing such methods with less selectivity and humaneness than ADC achieves. Frustration caused by the inability to reduce losses

could lead to illegal use of chemical toxicants and failure to check traps and snares as often as ADC which might result in greater take and suffering of target and nontarget wildlife.

It is probable that the number of livestock animals that would be expected to suffer from predation injuries under this Alternative would be more than under the current program, but less than under Alternatives 2 and 3. Overall animal suffering would probably be less than under Alternatives 2 and 3 but could be greater than the current program depending on how much livestock losses increased because of no preventive PDM and because of delays in implementing lethal PDM while waiting to determine whether nonlethal control is not effective.

4.2.8.4 Alternative 5. - Corrective Control Only When Lethal PDM Methods are Used.

The perceived humaneness of this Alternative would likely be greater than the perception of the current program, because fewer target and nontarget animals would be killed by ADC in the absence of preventive lethal PDM. However, as is probable for Alternatives 2, 3, and 4, some cooperators could be expected to drop out of the program altogether and/or increase their own use of lethal control methods resulting in less experienced individuals implementing such methods with less selectivity and humaneness than ADC achieves. Frustration caused by the inability to reduce losses could lead to illegal use of chemical toxicants and failure to check traps and snares as often as ADC which might result in greater take and suffering of target and nontarget wildlife.

It is probable that the number of livestock animals that would be expected to suffer from predation injuries under this Alternative would be more than under the current program, less than under Alternatives 2 and 3, and about the same as Alternative 4. Overall animal suffering would probably be the same as under Alternative 4.

4.2.8.5 Alternative 6 - Expanded IWDM for Predator Damage Management.

The perceived humaneness of this Alternative would be less than the current program because more target and nontarget animals would be killed by ADC. However, the number of livestock animals that would suffer from predation injuries would likely be reduced. Thus overall animal suffering might remain about the same or could actually improve.

4.2.9 Summary of ADC's Impacts

Table 4-5 is a summary comparison of the environmental consequences (impacts) of each alternative. The level of impacts on each of the issues is based on the preceding analyses and rated as: Neutral, Neu/Low, Low, Low/Moderate, Moderate, Moderate/High, and High. The impacts are also denoted with a (+) or (-) to show whether the impact is likely to be beneficial or adverse, respectively.

Table 4-5. Issues/Impacts/Alternatives/Comparison

Issues/Impacts	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
Coyote Popns.	Low (-)	Low (-)	Low (-)	Low (-)	Low (-)	Low (-)
Black Bear Popns	Low (-)	Low (-)	Low (-)	Low (-)	Low (-)	Low (-)
Mountain lion Popns.	Low (-)	Low (-)	Low (-)	Low (-)	Low (-)	Low (-)
Nontarget Species Popns.	Low (-)	Mod./High (-)	Mod./High (-)	Mod. (-)	Mod. (-)	Low (-)
T&E Species	Neu./Low (-)	Mod./High (-)	Mod./High (-)	Mod. (-)	Mod. (-)	Neu./Low (-)
Prey Species	Low (-)	Low (-)	Low (-)	Low (-)	Low (-)	Low (-)
Public Land Use	Low (-)	Low (-)	Low (-)	Low (-)	Low (-)	Low (-)
Private Fur Harvest	Low (-)	Neutral	Neutral	Low (-)	Low (-)	Low/Mod. (-)
Social & Econ. /Agric.	Mod. (+)	Mod. (-)	Mod. (-)	Low/Mod. (-)	Low (-)	Mod./High (+)
Econ./ Other Agencies	Low (+)	Low (-)	Low (-)	Low (-)	Low (-)	Low/Mod. (+)
Cost:Avoided Losses	Low (+)	Neutral	Neu/Low (-)	Low/Mod. (-)	Low/Mod. (-)	Low (+)
Humaneness[1]	Low (+)	Mod. (-)	Mod. (-)	Low/Mod. (-)	Low/Mod. (-)	Low (+)

[1] Ratings based on both components of humaneness as related to PDM, i.e., the perceived pain and suffering of predators/nontargets taken vs. perceived pain and suffering of livestock animals whose deaths or injuries from predators are avoided through PDM.

The preceding analyses failed to identify any significant cumulative impacts nor are any significant impacts expected because of PDM conducted by ADC in the District program.

Final

APPENDIX A

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Final

APPENDIX B

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United States
Department
of Agriculture

Animal and Plant Health
Inspection Service
Animal Damage Control

FINDING OF NO SIGNIFICANT IMPACT
AND
DECISION
FOR
PREDATOR DAMAGE MANAGEMENT
IN THE LAS CRUCES ADC DISTRICT
IN SOUTHWESTERN NEW MEXICO

The U.S. Department of Agriculture, Animal and Plant Health Inspection Service (USDA-APHIS), Animal Damage Control (ADC) program responds to a variety of requests for assistance from individuals, organizations and agencies experiencing damage caused by wildlife in the Las Cruces ADC District of Southwestern New Mexico (District). Ordinarily, according to APHIS procedures implementing the National Environmental Policy Act (NEPA), individual wildlife damage management actions are categorically excluded (7 CFR 372.5(c), 60 Fed. Reg. 6000-6003, 1995). In order to evaluate and determine if there might be any potentially significant impacts to the human environment from ADC's planned and proposed program, an environmental assessment (EA) was prepared. The predecisional EA released by ADC in November 1996, documented the need for predator damage management in southwestern New Mexico and assessed potential impacts of various alternatives for responding to predator damage problems. ADC's proposed action was to allow the use of the full range of predator damage management methods currently authorized.

Public Involvement

Prior to development of the EA, 1,888 letters were mailed to individuals and organizations previously identified as having an interest in ADC issues. Notice of the proposed action and availability of the public involvement letter was also published in major newspapers within the District. A total of 66 comment letters were received during the initial public involvement period. These letters were reviewed to identify any additional substantive issues and alternatives to be addressed in the EA.

A predecisional EA was prepared and released to the public for a 30-day comment period. Notice of availability of the predecisional EA was also published in two major newspapers in the State as well as five other newspapers of more local circulation within the State on or before November 12, 1996. A news release and copies of the EA were hand delivered to four newspapers, four television stations, and one radio station in the District. A total of 9 comment letters were received in response to the predecisional EA. The predecisional EA has been revised to address a number of the comments and is now available in final form. Although many other concerns raised were already addressed in the EA, some of the comments indicated areas that warranted additional clarification or treatment. These are:

1. APHIS NEPA implementing regulations require an EIS instead of an EA for an area the size of the District.

One of the commentors cited portions of APHIS NEPA regulations (7 CFR 372.5(a)) as requiring an EIS for actions "characterized by their *broad scope* (emphasis added)." However, additional language in the regulation cited indicates an EIS was not required in this case -- e.g., that an EIS is normally required for actions ". . . characterized by their broad scope (often *global or nationwide* (emphasis added))." The scope of the District ADC program is neither global nor nationwide. The purpose of an EA is to determine whether an EIS is necessary (40 CFR 1501.3 and 1501.4). As stated on page 1-1 of the EA, APHIS NEPA implementing procedures allow for individual wildlife damage management actions of the kind described in the EA to be categorically excluded from the requirement for preparation of either an EIS or an EA (7CFR 372.5(c), 60 Fed Reg. 6,000-6,003, 1995). Nevertheless, this EA was prepared to evaluate and determine if there may be any potentially significant impacts to the human environment from the proposed program. The ADC program has determined that an EIS is not required and that preparation of an EA for this District program complies with NEPA, the Council on Environmental Quality (CEQ) NEPA implementing regulations (40

CFR 1500), and with APHIS NEPA implementing regulations (7 CFR 372). The commentor further suggested an EIS was necessary because of the following reasons, each of which is followed by ADC's response:

o The proposed action has the potential to directly impact a wide variety of wildlife species.

The actual number of wildlife species that are taken to any degree by the current District ADC PDM program (less than 20) is minor compared to the number of vertebrate species (more than 770) that occur in the State (Findley et al. 1975; Ligon 1961; Degenhardt et al. 1996; Sublette et al. 1990). That fact, in addition to the analysis in Chapter 4 which shows that the impacts on populations of taken species are minor, clearly support a finding of no significant impact, which means that no EIS is required.

o The proposed action will result, directly or indirectly, in the killing of thousands of animals.

This fact, in itself, does not mean an EIS is required. Animals are killed by the millions across the country for human consumption, sport hunting, fur harvest, and to dispose of unwanted pets, and such activities are condoned as acceptable components of the human environment by society as a whole. In analyzing environmental impacts under NEPA, the number of animals killed is not important, but rather, whether populations can sustain the mortality that does occur, or, if they cannot, whether a reduction in populations is desired by the governmental entities with legislated management or control authority over the species in question (in this case, the entities with authority are the [redacted]). The analyses in the EA clearly support a conclusion that ADC's impacts on species should remain well within the ability of populations to sustain such impacts, and the cooperative relationships between ADC and the above state agencies assure impacts will remain within the desired parameters established by those agencies under their respective authorities.

o Sufficient knowledge is lacking on wildlife populations in the area, and an EIS would include a public comment period where additional biological information could be collected and analyzed.

ADC used estimates and analyses similar to those in the programmatic EIS to which this EA was tiered. ADC used the best available information to arrive at population estimates, and those estimates were reviewed by state agency and public land management biologists before the Pre-Decision EA was released. Although any population estimates can be criticized, we feel our estimates are reasonable and, in most cases, conservative which means that impacts analysis, if in error, erred toward the side of *overstating* impacts. Interagency participation and review and the extensive public involvement process used in preparation of this EA provided ample opportunity for the identification of better population information and ADC believes an EIS would not have improved the quality of such information used in the analysis.

o The EA implies game species manipulation would have "beneficial" results, and CEQ regulations (40 CFR 1508.27) state that "a significant effect may exist even if the Federal agency believes that, on balance, the effect will be beneficial." Thus, an EIS is required.

This comment implies that an EIS is required if beneficial impacts occur. However, an EIS is required only when a beneficial impact is determined by the action agency to be "significant" in terms of the criteria contained in the CEQ NEPA Implementing Regulations (40 CFR 1508.27). The proposed action includes PDM for game species enhancement in the event that the [redacted] or an American Indian Tribe identifies the need for and requests such activity to meet current or future management goals for certain localized game populations. Populations of game species such as deer and pronghorn antelope are cyclic depending on rainfall patterns and other habitat and mortality factors, including predation. Any increases in a localized population that result from PDM would be within those cyclical limits that can occur in the absence of any federal PDM programs, and would thus not be "significant." Under the current program in the District, PDM for game species enhancement is not currently being conducted. If it did occur, however, such activities would be at the specific request of the [redacted] or a Tribe based on needs they have identified and would most likely be very limited and not significant in terms of NEPA compliance.

o The analysis area includes individuals of threatened and endangered species and species of special concern which may be affected by the proposed action. See 40 CFR §1508.27(b)(9).

The regulation referred to does not suggest an EIS is required merely by the presence of threatened or endangered species, but requires a determination of *the degree to which* a proposed action may *adversely affect* such federally listed species. The EA presented information on threatened and endangered species in Chapter 2, addressed potential impacts in Chapter 4, and described or referenced mitigation measures already in place as a result of ADC's standard operating procedures or established as a result of Section 7 consultation with the U.S. Fish and Wildlife Service. The analysis supports a conclusion of no significant impact regarding T&E species.

o Predator management, especially involving lethal toxicants such as Compound 1080 in LP collars, is highly controversial and therefore requires an EIS.

ADC recognizes that there is opposition to predator damage management and the use of certain chemical control methods. However, this in itself does not require an EIS. CEQ regulations state that a significant impact may be determined depending on the degree to which the *effects* on the quality of the human environment are likely to be highly controversial. The effects of ADC's predator damage management are not highly controversial among wildlife biologists, and this is supported by the interagency review process employed during preparation of the EA.

By this decision and FONSI, I have determined that an EIS is not necessary.

2. PDM in the District should halt until the EA is completed and a Decision is rendered.

As stated on page 1-1 of the EA, individual PDM actions are normally categorically excluded from the requirement to prepare an EA or EIS under APHIS NEPA Implementing Regulations (7CFR 372.5(c), 60 Fed Reg. 6,000-6,003, 1995). ADC elected to prepare the EA to evaluate and determine if there may be any potentially significant impacts to the human environment. Because an EA was not necessarily required under APHIS regulations, it is not necessary to halt ongoing program activities during the preparation of this EA. In addition, CEQ, in interpreting the requirement that the "no action" alternative be considered, has provided guidance to federal agencies stating that the "no action" alternative can be interpreted as continuing with an ongoing program initiated under existing legislation and regulations. Because the ADC program was initiated in 1931, it is considered an ongoing program. Thus, even if an EA was necessary in this case, there is support from CEQ to conclude that the ongoing program would not have to cease until the EA was completed.

3. Several commentors felt the EA fails to demonstrate need for PDM, particularly on [redacted], [redacted], and [redacted], and thus fails to justify the need for the program.

The CEQ NEPA Implementing Regulations only require that an EA "include brief discussions of need" and do not establish standards for justifying the need for proposed actions. Pages 1-4 through 1-8 of the EA discuss losses experienced by cooperating livestock producers under the current program. Table 1-5 and additional discussion have been added to Chapter 1 to show livestock losses specific to [redacted] and [redacted] in the District. The analysis in section 4.2.7 provides an indication of losses that could be expected to occur on cooperating ranches without effective PDM, which further establishes need. Because of difficulties in obtaining approval for PDM on [redacted] lands under previous Memoranda of Understanding and [redacted] policies, many [redacted] grazing permittees that previously contacted ADC for assistance stopped doing so, and ADC stopped receiving loss reports from those producers. Although losses probably continued to occur on former cooperating ranches, as well as other noncooperating ranches, (and ADC personnel have received anecdotal reports of such losses), no data were compiled. Under the new MOUs, ADC can provide assistance where losses are occurring or are threatened -- thus, a key point to be made in responding to the above concern is that the *need* on any given area where PDM is to be conducted would be established before the work commences.

[redacted] are mostly intermingled with private land on cooperating ranches, and the land status of individual depredation events on ranches with intermingled state lands have not traditionally been distinguished in loss records.

The losses that are reported to occur apply to both the private land and the [redacted] that comprise these ranches. On any given ranch property, the need for PDM is the same regardless of the specific land status of individual depredation events.

4. The public will not have ample opportunity for involvement in the development of ADC work plans for ADC activities on public lands.

One of the purposes of the extensive public involvement process ADC elected to use in the development of this EA was to provide ample opportunity for the public to express and identify concerns about the proposed action which includes activities on public lands. This process exceeded that required by APHIS NEPA implementing regulations. When individual work plans are developed by ADC for individual [redacted] and Forest Service land management units, those plans will be available, upon request, to members of the public. Specific questions about ADC activities in specific public land areas can always be directed to the District ADC office.

5. A discussion of the use or non-use of antifertility agents should be incorporated into the document.

A discussion of this methodology has been added to the EA as section 3.2.8.

6. One commentor questioned the ability to determine whether a captured bear or mountain lion is a "nonoffending" individual.

In bear and mountain lion damage situations, it is sometimes possible to identify the relative size of the offending animal by observing tracks or drag marks at or near the site of depredation. When a treed or foot-snared animal is obviously different in size from the one that was at the site, it can be assumed to be a nonoffending animal and can most often be released or allowed to escape unharmed. Another determining factor can be hair patterns or color on depredating animals that have actually been observed in the act (this has occurred in bear damage cases). Another could be a situation in which a female with cubs is captured but there was no evidence of cubs at the depredation site.

7. The EA relies too heavily on non-peer-reviewed literature than is currently accepted by other scientists or peer-reviewed publications, ignores peer-reviewed scientific evidence that indicates predator control does not work, uses outdated literature from prior to 1984, and fails to discuss the limitations of each study cited.

The EA contains nearly 200 literature citations, far more than any previous EA prepared by other agencies to assess impacts of ADC activities in New Mexico. Many of the citations are from peer-reviewed journals. The purpose of the review of literature demonstrating the need for and effectiveness of predator damage management was not to provide an exhaustive review of all literature available but to show the extent and severity with which predator damage can occur and whether PDM can be successful in resolving predator damage problems. The EA's review clearly met this purpose and to a greater degree than any previous analysis of PDM in the District. ADC recognizes that there are situations in which PDM may not be successful, and, in fact, experiences failure to achieve success in some situations. Overall, however, ADC believes its PDM programs are successful and this has been supported by a U.S. General Accounting Office review (GAO 1990).

A review of recent history provides a very logical explanation for the relatively heavier reliance on pre-1984 science in this and many other EAs on predator damage management. Following the release of the Cain Report (Cain et al. 1972) and President Nixon's Executive Order 11643 in 1972, there was a great proliferation of research on issues related to predator control and the livestock industry. The two tables on pages 47 and 48 of USDI (1978) are illustrative of the increase in funding for this type of research. This period of increased emphasis on funding and research lasted from about 1973-1979. There has not been any period since then when the emphasis has been as great as it was during those years (Guy Connolly, APHIS-ADC National Wildlife Research Center, 1996, personal communication). To ignore much of the landmark research that occurred during this period would not be a good use of science.

The commentor cited studies (Pulliam 1988; Van Horne 1983) that suggest control activities may create "biological sinks," or areas where the level of control exceeds reproduction, and that immigration from adjacent source populations

can actually increase animal densities in the treatment area. Connolly and Longhurst (1975) and Connolly (1995) showed that coyote populations can sustain a 70% annual mortality rate indefinitely. In other words, the level of control would need to exceed 70% in order to even come close to exceeding the level of reproduction. As noted on page 4-12 of the EA, the total known mortality in the District is probably no more than about 13% of the population and would not exceed 30% even if cumulative take more than doubled. ADC acknowledges that this phenomenon can occur in certain localized areas and occasionally sees evidence of it -- for example, when a resident pair of coyotes is removed from the vicinity of a lambing area and signs of several more coyotes are observed in the area within several weeks. This does not mean, however, that predation problems necessarily increase. Section 2.4.5 of the EA discusses evidence suggesting that immigrating coyotes are generally younger and less likely to be depredators. Also, the time it takes for immigrants to arrive is often long enough that the affected livestock resource is no longer vulnerable (e.g., calves have grown larger than coyotes can handle or lambs have been shipped). If immigration occurs quickly and additional depredation occurs or is threatened, additional PDM efforts are most often able to remove the immigrating coyotes to prevent substantial losses.

ADC recognizes that *all* published scientific studies have limitations that can be construed to cast doubt on their conclusions. The state of the art in wildlife management is such that wildlife managers must make decisions based on studies with such limitations while incorporating intuition and judgement based on professional experience. Managers cannot afford the luxury of conducting rigorous, extensive, scientific research before each management decision -- to establish such a requirement would effectively curtail *all* natural resource management. That the studies cited in the EA, as well as studies cited by commentors, have limitations is merely a fact, and ADC feels that discussing the limitations would add bulk to the EA without substantially improving the analyses. The EA presents a careful appraisal of pertinent scientific information, and, in recognition of the limits of science, attempts to be conservative in analyzing impacts so that conclusions, if in error, tend to err toward the side of *overestimating* impacts. This should assure that, even with errors, a conclusion of no significant impact is still valid.

8. It is not clear how cumulative impacts of "preventative controls" and "aerial hunting where determined appropriate" can be assessed without definitions of these terms.

The cumulative impacts on wildlife populations are measured by numbers killed. Whether the animals are killed by corrective or preventive PDM activities, or whether killed by aerial hunting or some other lethal method, is of minimal importance in measuring such cumulative impacts. The EA clearly shows cumulative impacts on such populations because of current ADC PDM activities would be insignificant. In determining the appropriateness of aerial hunting in a given depredation situation, ADC takes into account such factors as terrain and vegetative cover. An example of an area where aerial hunting would not be appropriate is a forested area with large trees that prevent sighting of animals from the air.

9. The EA fails to provide any estimate of the future expansion of ADC activities in the analysis area, and significant expansion of ADC activities will result in a marked increase in the program's environmental impacts.

The EA analyzed impacts of the current program based on the previous two years of program activities. The current program is a somewhat dynamic entity in that the level of PDM activities can fluctuate between years depending on changes in funding, laws, and policies at federal, state, and local levels. The EA's analyses showed impacts on populations of target and nontarget species were insignificant to those populations at the kill levels that have resulted from the current program, and would remain insignificant even if kill levels increased dramatically. Thus, although no substantial expansion is anticipated, environmental *impacts* would remain insignificant even if a substantial expansion occurred in the future. Monitoring of annual take levels will be used to determine whether impacts on populations become significant for the current, as well as any future expanded, program. If monitoring indicates a significant imipact, a new analysis will be conducted.

10. The EA does not consider "meso-predator" release, or the increase of small carnivores following coyote removal, which could have negative impacts on bird species populations.

This comment gave the impression that the commentor believes ADC engages in general population suppression of coyotes across the District, which is not true. The EA mentions the phenomenon of increasing small carnivore

abundance as a possible natural mitigation against increased rodent and rabbit numbers that might occur in localized areas where coyote numbers are reduced (EA, page 4-18). Meso-predator release in response to ADC's coyote removal is unlikely to be significant in the District, based on the small proportion of land area upon which ADC PDM is conducted (<15%), the relatively low level of coyote removal by ADC, which is currently less than 7% of the population (see Table 4-3 of the EA), and the immigration of coyotes from surrounding areas (see item response no. 7 above and section 2.4.5 in the EA for discussions of why this does not mean PDM is ineffective).

11. The EA fails to consider the critical role predators play in ecosystems.

ADC does recognize the role of predators and other wildlife species in ecosystems. ADC's PDM activities are minor from an ecosystem standpoint as discussed in the EA (p. 4-18) and as reemphasized in item no. 10 above. It is also important to recognize that the ecosystems in the Las Cruces District have been heavily influenced by human activities and management for more than a century, and are continually changing in many areas due to human development and other factors. ADC is directed to deal with conflicts that result from this interaction, and the program strives to do so with minimal impacts on ecosystems.

12. Several commentors expressed concerns about ADC's use of objectives in the analysis and decision-making process.

The objectives identified in the EA are directly relevant to ADC's mission and were established because they were believed to be realistically attainable. The current program (the no action alternative) was the standard used for a relative comparison showing how all the other alternatives would meet the objectives. Through this comparison, ADC has gone beyond the requirements of NEPA. The comparison of the objectives with the various alternatives (Table 4.2 in the EA) suggests that Alternative 6 (an expanded program) would be the logical choice to implement. However, funding limitations do not currently allow an expanded program, and Alternative 1 (the current program) is the next best choice for meeting objectives. Regardless of whether objectives were developed and used in the analysis process, the analysis of the anticipated impacts from the various alternatives (Table 4.5 in the EA) suggests that Alternatives 1 or 6 are logical alternatives to implement.

13. Several commentors criticized the citation of studies conducted outside the District, particularly in the section on need for PDM to protect other wildlife species.

The EA included references to a number of studies conducted in other parts of the country. ADC feels that, in the absence of more localized data specific to an issue, studies conducted elsewhere can provide valid inferences that can apply to the District. For example, in identifying the potential need for PDM to enhance certain game species populations, a number of studies from around the country were cited that showed coyote impacts on such species and the potential results of PDM in enhancing populations. ADC recognizes that caution must be taken when applying results of such studies to the District; therefore, the responsibility for determining if predation is a limiting factor that can or even should be managed to benefit another wildlife species is left with the responsible state or federal wildlife agency or Tribal officials.

14. One commentor stated that the EA violates section 7 of the Endangered Species Act (ESA) by failing to consider and implement recommendations of the U.S. Fish and Wildlife Service (USFWS). The commentor quoted the USFWS that "Section 7 of the ESA requires a biological assessment should be completed for each of the listed species and should be included in the EA."

ADC consulted with the USFWS on this EA for listed and proposed species that might be affected by ADC PDM activities. Page 2-11 contains a detailed discussion of T&E species that may occur in the District (p. 2-11). The EA references (1) the 1992 Biological Opinion from USFWS that establishes reasonable and prudent measures and/or alternatives that ADC follows to avoid adverse impacts on a majority of the listed species, (2) a pending formal Section 7 consultation covering several other of the listed species that were not included in the 1992 consultation, and (3) a pending informal consultation regarding potential impacts on bald eagles from the use of DRC-1339 for controlling ravens, crows, or magpies, and potential impacts on the ridge-nosed rattlesnake from use of denning gas cartridges. The FWS has concurred that use of DRC-1339 for raven control is not likely to adversely affect bald eagles and that,

with a restriction against use in critical habitat, ADC denning gas cartridges are not likely to adversely affect the ridge-nosed rattlesnake. The only listed or proposed species potentially occurring in the District that were not or are not covered by these consultations are two bat species (the Mexican long-nosed bat and the lesser long-nosed bat). ADC determined that its PDM actions will not affect these two species, which is consistent with the USFWS's determination in the 1992 Biological Opinion that ADC activities would not affect any listed bat species, as well as any fish, invertebrate, or plant species. The FWS has concurred with that determination. Section 7 of the ESA and 50 CFR Part 402 only require biological assessments for "major construction activities." ADC PDM actions do not involve major construction activities. Therefore, it is my determination that ADC has met its responsibilities under the ESA regarding the proposed action.

15. One commentor stated that the EA violates NEPA by failing to have mitigation measures that are thorough enough to mitigate the potential adverse impacts.

The EA presents mitigation measures in section 3.3 that are currently in place and would remain in place as part of the current program. The analysis in Chapter 4 clearly shows that mitigation measures have been adequate to avoid significant adverse impacts on any species as well as on any other aspect of the human environment. Therefore, it appears the above concern is unfounded.

16. The EA should estimate predator populations for [redacted] lands.

It is neither feasible nor appropriate to try to differentiate predator populations by administrative land management boundaries that are not recognized by the predator species being managed. Thus the EA takes a broader look when estimating species abundance and evaluating impacts. This is more in line with an ecosystem approach and more conducive to adequately evaluating cumulative impacts.

17. The EA is misleading in that ADC does not actually employ Integrated Wildlife Damage Management (IWDM) as claimed because IWDM involves use preventive measures such as shed lambing (and other nonlethal husbandry practices).

This commentor has apparently interpreted IWDM as requiring the use of nonlethal measures such as husbandry practices to resolve depredation problems prior to the use of lethal methods. As stated on page 3-2 of the EA, IWDM is not as restrictive as the commentor's interpretation -- the philosophy is to implement an optimal mix of management techniques in a manner that is not only effective but that also minimizes potentially harmful effects on humans, target and nontarget species, and the environment. This can include nonlethal as well as lethal techniques but neither category is necessarily required before the other. Because many nonlethal techniques for resolving predator damage are only practical for implementation by the resource owners or managers, ADC must often limit its involvement to *recommending* them. In many cases, ADC has found that such recommendations are moot because producers have already tried or are currently implementing the only potentially practical nonlethal means for their particular situations. Thus, ADC frequently commences with lethal direct control assistance when requested by the resource manager. In such cases, the lethal control employed has been within the philosophy of IWDM because, as shown by the analyses in the EA, "potentially harmful effects on humans, target and nontarget species (populations), and the environment" have been minimized.

18. It seems incongruous that "there is more public land proportionately involved in PDM activities (than private land)."

This concern leaves the impression that the commentor feels ADC *purposely* directs PDM activities more to public land areas than to private land. The commentor cited the EA, p. 1-2, which stated that ADC conducted predator damage management activities (PDM) on 36% of the private, 39% of the [redacted], and 41% of the [redacted] area *under agreement* (emphasis added), and concluded this shows disproportionate activities on public land. However, the statistics cited do not allow such a conclusion because they are only percentages of each land type that are under PDM agreement. Of all of the [redacted] in the District (which total about 14.6 million acres), ADC only conducted PDM activities on properties totaling 2 million acres, or 14%, in 1995. Of the total amount of private land in the District (5.4 million acres), ADC conducted PDM on properties totaling less than 2 million acres, or 36%, in 1995.

Thus, proportionately, ADC conducted less activity on public land areas, not more. Regardless, however, of these statistics, ADC only conducts PDM where there is need, and does not discriminate against cooperators that have such needs merely because of the land status of their operations. This, of course, is with the recognition that land management policies can inhibit ADC's ability to respond on public lands.

19. The argument that ADC does not have negative effects on coyote populations seems to argue against effectiveness of ADC in controlling coyote populations.

ADC understands the confusion that this comment implies. The EA pointed out that coyote populations can withstand 70% mortality because of compensatory reproduction, and that immigration from surrounding populations can generally be expected to restock areas where numbers have been reduced by PDM activities. Although this can be interpreted to mean the PDM effort was wasted, what in fact happens most of the time is that the local population is reduced for a long enough period during the current production season that the livestock resource is no longer vulnerable, or as vulnerable. An example is a calving pasture where it is only necessary to reduce coyote numbers for a 2-3 month period until the calves can reach a large enough size that they are no longer suitable prey for most coyotes. PDM efforts are generally successful in these situations, because they reduce the local coyote population for the period necessary to prevent substantial losses during the current production year. *Long term*, however, the overall coyote population over the broader area is relatively unaffected. It is important to remember that, when lethal PDM is determined to be necessary, ADC's goal is not to reduce coyote populations indiscriminately over broad areas, but to remove individual depredating coyotes or *local* populations of coyotes. In most cases, the local population reduction is only temporary but adequate to prevent substantial losses. In certain limited rangeland areas where livestock of high vulnerability (e.g., sheep or goats) are grazed year round, localized population reduction efforts may be conducted year-round, and the experience of ADC personnel is that PDM is most often effective at keeping populations low in those situations. Sheep/goat production is a minor part of the District's livestock industry in terms of area because it primarily occurs in locales within the eastern half of one of the District's eight counties (County). Therefore, the areas impacted by year-round local population reduction comprise a minor portion of the District's land area.

New Information Considered

In addition to the above concerns, new information concerning mountain lions in New Mexico has recently become available to ADC since the beginning of this EA process. A 10-year study of an unexploited mountain lion population in the San Andres Mountains showed cougar densities of 4.5 to 11.0 per 100 mi.^{2} (Logan et al. 1996). In recent public meetings on future mountain lion management held by , , the author of the study, provided an estimate of Statewide mountain lion numbers to be about 1,270 based on suitable cougar habitat of 17,132 mi.^{2} as determined by the New Mexico Gap Analysis Project (Thompson et al. 1996). That estimate is much lower than the total of estimates (2,940) determined by ADC in three District EAs covering PDM in NM (including this EA). mountain lion pelt tag reports indicate annual sport harvest has ranged from 105 to 150 per year since 1989. From Fiscal Year 1990 through 1996, ADC killed an average of 7 mountain lions in the State and the maximum killed in any one year was 11. Other depredation take (i.e., by private persons or personnel) was 17 (including 6 lions taken in the preventive depredation project) in 1994, and 12 in 1995 (including 6 for preventive control) (data from , pers. comm.). Thus, it appears total known take has been less than 180 in any one year, or less than 14% of the population estimate cited above. This suggests current cumulative take levels are well within the sustainable harvest level of 30% determined in USDA (1994). In addition, ADC's take is a minor component of the total (4-6%). Nevertheless, ADC mountain lion PDM will only be conducted under the direction of in accordance with any management plan they establish to avoid significant impacts on the State's lion population.

Major Issues

Cooperating agencies and the public helped identify a variety of issues deemed relevant to the scope of this EA. These issues were consolidated into the following 8 primary issues to be considered in detail:

1. Impact on target species populations.

2. Impact on nontarget species populations, including Threatened, Endangered and sensitive species.
3. The potential for coyote take to cause increases in rodent, rabbit, and other prey species populations to the point that detrimental effects on vegetation resources occur.
4. Impact on public use of public lands.
5. Impact on private recreational and commercial fur harvest.
6. Social and economic impacts on the agricultural community and on other agencies.
7. Cost of providing PDM services for livestock protection compared with the value of livestock losses avoided.
8. Humaneness and selectivity of ADC predator damage management methods.

Alternatives Analyzed in Detail

Six potential alternatives were developed to address the issues identified above. Eight additional alternatives were considered but not analyzed in detail. A detailed discussion of the anticipated effects of the alternatives on the objectives and issues is described in Chapter 4 of the EA. The following summary provides a brief description of each alternative and its anticipated impacts.

Alternative 1. Continuation of Current Program (No Action). Consideration of the No Action alternative is required under 40 CFR 1502.14(d), and provides a baseline for comparing the potential effects of all the other alternatives. This alternative consists of using all currently authorized control methods in an integrated approach to resolve predator damage problems in the District. Control actions may be initiated under either a corrective or preventive strategy, in response to current or historic livestock losses. Alternative 1 benefits individual resource owners/managers, local economies and cooperating agencies, while resulting in only low levels of impact on wildlife populations, minimal potential to adversely impact ecosystems, very low risks to or conflicts with the public, and low risk to T&E species. The value of livestock losses avoided appear to exceed the cost of providing the service. Currently used methods are effective, selective for target species, and appear to present a balanced approach to the issue of humaneness when all facets of the issue are considered.

Alternative 2. No Federal ADC Predator Damage Management. This alternative would consist of no federal involvement in PDM in the District -- neither direct operational management assistance nor technical assistance to provide information on nonlethal and/or lethal management techniques would be available from ADC. A portion of the formerly federal PDM responsibility would be born by the remaining state agency programs. Private individuals would increase their efforts which would mean more PDM would be conducted by persons with little or no experience and training, and with little oversight or supervision. Risks to the public and risks to T&E species would probably be greater than under Alternative 1, and effectiveness and selectivity would probably be lower. Adverse impacts on individual producers and local economies would probably be greater. Less control over private or state managed PDM on federal public lands could lead to greater, although probably not significant, conflicts with recreational public land users.

Alternative 3. Technical Assistance Only. Under this alternative, ADC would not provide any direct control assistance to persons experiencing predator damage problems, but would instead provide only advice, recommendations, and limited technical supplies and equipment. Predator damage management would likely be conducted by persons with little or no experience and training, and with little oversight or supervision. Risks to or conflicts with the public and risks to T&E species would probably be greater than under Alternative 1 but slightly less than or about the same as Alternative 2, and effectiveness and selectivity would probably be lower. Adverse impacts on individual producers and local economies would probably be similar to or slightly less than Alternative 2.

Alternative 4. Nonlethal Control Required Before Lethal. This alternative would allow no use of lethal methods by ADC as described under the proposed action until nonlethal methods have been employed in a given damage situation and found to be ineffective or inadequate. No preventive lethal control would be allowed. Producers and state agencies would still have the option of implementing their own lethal control measures without a requirement that nonlethal methods be conducted first. Risks to or conflicts with the public and risks to T&E species would probably be about the same as Alternative 1 but slightly less than or about the same as Alternative 2. Program effectiveness

would probably be lower. Adverse impacts on individual producers and local economies would probably be slightly greater than Alternative 1. Selectivity of PDM activities would likely be less than Alternative 1 if reduced effectiveness leads to greater PDM efforts by less experienced and proficient private individuals, but greater than Alternatives 2 and 3.

Alternative 5. Corrective Control Only When Lethal PDM Methods are Used. This alternative would require that livestock losses or other resource damage by predators must be presently occurring, or must have occurred recently enough to predict that the loss or damage will continue to occur in the near future, before any lethal PDM methods could be used by ADC. This alternative would not allow preventive lethal control actions. This alternative is already part of the current program with regard to black bear and mountain lion depredation problems in the District (with the exception of Game Management Unit 30 that includes part of southeastern [redacted] County in which up to 14 lions may be taken for preventive purposes each year) in that a livestock kill must have occurred before [redacted] will request and authorize the take of a target bear or lion by ADC. Impacts in relation to the issues would be similar to Alternative 4.

Alternative 6. Expanded Federal PDM. This alternative would be similar to the current program but would use additional funding to increase field personnel, equipment, and aerial hunting in the District for the purpose of reducing predation losses of livestock below the rates occurring under the current program. Alternative 6 would increase benefits to individual resource owners/managers, local economies and cooperating agencies, while still resulting in only low levels of impact on wildlife populations, minimal potential to adversely impact ecosystems, very low risks to or conflicts with the public, and low risk to T&E species. This alternative would most likely increase or at least keep stable the value of livestock losses avoided in relation to the cost of providing the service. The program would become more effective while remaining selective for target species, and, similar to the current program alternative, would present a balanced approach to the issue of humaneness when all facets of the issue are considered.

Alternatives considered but not analyzed in detail were:

1. **Compensation for Predator Damage Losses**. The Compensation alternative would require the establishment of a system to reimburse persons impacted by predator damage. This alternative was eliminated from further analysis because no federal or state laws currently exist to authorize such action and because of other drawbacks discussed in the EA and the ADC FEIS.

2. **Bounties**. Bounties are payment of funds for killing predators of certain species that cause or are suspected of causing economic losses. This alternative was eliminated from further analysis because it is not supported by New Mexico State agencies such as [redacted] nor is it supported by ADC because of problems discussed in the EA.

3. **Eradication and Long Term Population Suppression**. An eradication alternative would direct all ADC program efforts toward total long term elimination of coyotes and perhaps other predator species within large defined areas or across the entire District. This alternative was eliminated from further analysis because ADC, [redacted] oppose eradication of any native wildlife species, and because it is generally impossible to achieve. Long term population suppression is not a desired goal of state agencies or of ADC for the District as a whole but could be implemented for localized areas prone to predator damage under the current program alternative. The impacts of localized population suppression are analyzed in the EA.

4. **The Humane Society of the United States (HSUS) Alternative.** This alternative would require that: 1) "permittees evidence sustained and ongoing use of nonlethal/husbandry techniques aimed at preventing or reducing predation prior to receiving the services of the ADC Program"; 2) "employees of the ADC Program use or recommend as a priority the use of appropriate nonlethal techniques in response to a confirmed damage situation"; 3) “lethal techniques be limited to calling and shooting and ground shooting, and used as a last resort when use of husbandry and/or nonlethal controls have failed to keep livestock losses below an acceptable level”; and 4) “establish higher levels of acceptable loss levels on public lands than for private lands.” This alternative was not considered in detail because the proposed action already embodies the first two components of the HSUS

alternative, the detailed analysis contained in the EA includes most facets of the HSUS proposal, and it is believed that inclusion of this alternative would not contribute new information or options for consideration and analysis that are not already being considered and available in IWDM as used by ADC.

5. **Lithium Chloride as an Aversive Agent.** Aversive conditioning with lithium chloride baits was not considered in detail as an alternative because the efficacy of the technique remains unproven, and the chemical is not registered (and thus not legal) for this use.

6. **Rely on Private Fur Harvesters to Reduce Coyote Depredation on Livestock.** This alternative was eliminated from detailed analysis because private fur harvesters cannot be expected to necessarily operate in areas where depredation occurs but tend to focus on areas with high coyote populations. Also, recent fur prices are low and fur harvest of coyotes is much less than historic levels. Other concerns are expressed in the EA.

7. **No Wildlife Damage Management Within any Wilderness or Proposed Wilderness.** This alternative was eliminated from detailed analysis because under the Current Program Alternative (Alternative 1), the Corrective Control Only Alternative (Alternative 5), or the Expanded Program Alternative (Alternative 6), the amount of predator damage control that would occur in wilderness areas is so minor that the effects of either of those alternatives would not likely be significantly different from the effects of a "No Control in Wilderness Areas" alternative.

8. **Antifertility Agents for Coyote Population Control.** This alternative was eliminated from detailed analysis because antifertility agents have not yet been proven to be effective or safe to use, and none are currently legal for use.

Finding of No Significant Impact

The analysis in the EA indicates that there will not be a significant impact, individually or cumulatively, on the quality of the human environment as a result of this proposed action. I agree with this conclusion and therefore find that an EIS need not be prepared. This determination is based on the following factors:

1. Predator damage management, as conducted by ADC in the Las Cruces District, is not regional or national in scope.

2. The proposed action would pose minimal risk to public health and safety. No injuries to any member of the public are known to have resulted from ADC activities in the District.

3. There are no unique characteristics such as park lands, prime farm lands, wetlands, wild and scenic areas, or ecologically critical areas that would be significantly affected.

4. The effects on the quality of the human environment are not highly controversial. Although there is some opposition to predator control, this action is not highly controversial in terms of size, nature, or effect.

5. Based on the analysis documented in the EA, the effects of the proposed predator damage management program on the human environment would not be significant. The effects of the proposed activities are not highly uncertain and do not involve unique or unknown risks.

6. The proposed action would not establish a precedent for any future action with significant effects.

7. No significant cumulative effects were identified through this assessment. The number of animals taken by ADC, when added to the total known other take of all species, falls well within levels sustainable by populations.

8. The proposed activities would not affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places, nor would they likely cause any loss or destruction of significant scientific, cultural, or historical resources.

9. An evaluation of the proposed action and its effects on T&E species determined that no significant adverse effects would occur to such species.

10. The proposed action would be in compliance with all Federal, State, and local laws imposed for the protection of the environment.

Decision

I have carefully reviewed the EA and the input resulting from the public involvement process. I believe the issues and objectives identified in the EA would be best addressed through implementation of Alternative 6 (expanded federal PDM program), but that current funding limitations prevent such implementation. Alternative 1 (continuing the current program) is the next best alternative at addressing the issues and meeting objectives, although the objective for calf depredation rates may not be met. That objective may need to be revised to a more achievable level for the current program. It is possible that the ability to meet the calf loss objective may improve under Alternative 1 because of the new MOUs with [redacted] and [redacted] and if an agreement is reached with the [redacted]. Program results will be monitored to determine the continued appropriateness of the objectives. Alternative 1 is therefore selected because (1) it offers the greatest chance at maximizing effectiveness and benefits to agricultural producers and other agencies within current program funding constraints; (2) it will maximize selectivity of methods available; (3) it offers a balanced approach to the issue of humaneness when all facets of the issue are considered; (4) it will continue to minimize risk to or conflicts with the public; and (5) it will minimize risks to nontarget and T&E species. ADC will continue to use an IWDM approach in compliance with all the applicable mitigation measures listed in Chapter 3 of the EA. The decision to implement Alternative 1 will become effective 30 days after publication of legal notice in the Albuquerque Journal, Albuquerque Tribune, Alamogordo Daily News, Las Cruces Sun News, Silver City Press, Deming Headlight, and Hatch Courier.

For additional information regarding this decision, please contact Alex Lara, APHIS-ADC, 2113 Osuna Road NE, Suite B, Albuquerque, New Mexico 87113, telephone (505) 761-4640.

/s/

Michael V. Worthen, Regional Director
APHIS-ADC Western Region

Date

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