Pre-Decisional

ENVIRONMENTAL ASSESSMENT

PREDATOR DAMAGE MANAGEMENT IN NEBRASKA FOR THE PROTECTION OF LIVESTOCK, WILDLIFE, PROPERTY AND PUBLIC HEALTH AND SAFETY

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NEBRASKA NATIONAL FOREST

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Pre-Decisional

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ACRONYMS

ADC	Animal Damage Control
APHIS	Animal and Plant Health Inspection Service
AVMA	American Veterinary Medical Association
BA&FB	Biodiversity Associates and Friends of the Bow
BLM	Bureau of Land Management
CDFG	California Department of Fish and Game
CEQ	Council on Environmental Quality
DOW	Defenders of Wildlife
EA	Environmental Assessment
EIS	Environmental Impact Statement
EJ	Environmental Justice
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FDA	Food and Drug Administration
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FSM	Forest Service Manual
FY	Fiscal Year
GAO	U.S. General Accounting Office
HSUS	Humane Society of the United States
IPM	Integrated Pest Management
IWDM	Integrated Wildlife Damage Management
LPC	Livestock Protection Collar
LRMP	Land and Resource Management Plan
MBTA	Migratory Bird Treaty Act
MFP	Management Framework Plan
MFWP	Montana Department of Fish, Wildlife, and Parks
MOU	Memorandum of Understanding
NAGPRA	Native American Graves Protection and Repatriation Act
NASS	National Agricultural Statistics Service
NDA	Nebraska Department of Agriculture
NDH	Nebraska Department of Health
NEASS	Nebraska Agricultural Statistics Service
NEPA	National Environmental Policy Act
NGPC	Nebraska Game and Parks Commission
NHPA	National Historical Preservation Act
RMP	Resource Management Plan
RNA	Research Natural Area
ROD	Record of Decision
RSN	Revised Statutes of Nebraska
SOP	Standard Operating Procedure
T&E	Threatened and Endangered Species
UNCE	University of Nebraska Cooperative Extension
USACE	U.S. Army Corp of Engineers
USDA	U.S. Department of Agriculture
USDI	U.S. Department of Interior
USFWS	U.S. Fish and Wildlife Service
WA	Wilderness Area

ACRONYMS Cont.

WMA	Wildlife Management Area

WS	Wildlife Services (formerly Animal Damage Control (ADC))
WSR	Wild and Scenic River

CHAPTER 1: PURPOSE AND NEED FOR ACTION

INTRODUCTION

Across the United States, wildlife habitat is being substantially changed as human populations expand and land is used for human needs. These human uses and needs often compete with wildlife which increases the potential for conflicting human/wildlife interactions. In addition, segments of the public strive for protection for all wildlife; this protection can create localized conflicts between human and wildlife activities. The *Animal Damage Control* (ADC) *Programmatic Final Environmental Impact Statement* (EIS) summarizes the relationship in American culture of wildlife values and wildlife damage in this way (USDA 1994):

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

Normally, according to the Animal and Plant Health Inspection Service (APHIS) procedures for implementing the National Environmental Policy Act (NEPA), individual wildlife damage management actions are categorically excluded (7 CFR 372.5(c), 60 Fed. Reg. 6,000, 6,003, (1995)). This Environmental Assessment (EA) has been prepared, however, to evaluate and determine if any potentially significant or cumulative impacts from the proposed and planned damage management program will occur.

Wildlife damage management is the alleviation of damage or other problems caused by, or related to, the presence of wildlife and is recognized as an integral component of wildlife management (The Wildlife Society 1992). Wildlife Services (WS) (formerly Animal Damage Control (ADC)) uses an Integrated Wildlife Damage Management (IWDM) approach, commonly known as Integrated Pest Management (IPM) in which a combination of methods may be used or recommended to reduce wildlife damage. IWDM is described in Chapter 1:1-7 of the ADC EIS (USDA 1994). These methods include practices such as habitat and behavioral modification to prevent or reduce damage or may also require that the offending animal(s) be removed or that local populations or groups of the offending species be reduced through lethal methods.

Given the Congressional directive, efficacy of the program will be evaluated as an issue rather than a need for the program. To fulfill the Congressional direction, the purpose of predator damage management is to prevent or minimize damage to the protected resources. Therefore, wildlife damage management is not based on punishing offending animals, but is a means of reducing damage and is used as part of the ADC Decision Model (Slate et al. 1992) described in the ADC EIS (USDA 1994:2-23 to 2-36). The imminent threat of damage or loss of resources is often sufficient for individual actions to be initiated. The need for action is derived from the specific threats to the resources and the available methods for responding to those threats. This EA documents the analysis of the potential environmental effects of the proposed and planned predator damage management in Nebraska. This analysis relies mainly on existing data contained in published documents (Appendix A) and the ADC EIS (USDA 1994) to which this EA is tiered.

WS is a cooperatively funded, service-oriented program. Before any wildlife damage management is conducted, an agreement for control must be signed by the landowner or administrator for private lands and WS Work Plans or other comparable documents are in place for public lands. When requested, WS cooperates with land and wildlife management agencies (in accordance with any Memoranda of Understanding (MOUs)) to reduce wildlife damage effectively and efficiently according to all applicable federal, state and local laws.

All wildlife damage management that would take place in Nebraska would be undertaken in compliance with relevant laws, regulations, policies, orders, and procedures, including the Endangered Species Act (ESA). Notice of the availability of this EA will be published in newspapers, consistent with APHIS' NEPA procedures, to allow interested parties the opportunity to obtain and comment on this document.

WILDLIFE SERVICES PROGRAM

WS' mission, developed through its strategic planning process, is: 1) to provide leadership in wildlife damage management for the protection of America's agricultural, industrial, and natural resources, and 2) to safeguard public health and safety. WS' policy manual[1] reflects this mission and provides guidance for engaging in wildlife damage management through:

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

PURPOSE

This EA analyzes predator damage management related to the protection of livestock, poultry, designated wildlife, property, and public health and safety on private and public lands within Nebraska. Nebraska encompasses an area of about 77,277 mi^2. In Fiscal Year (FY) 1998, Nebraska WS had agreements to conduct predator damage management on about 5% of Nebraska's lands[2]. In Nebraska, land is owned and managed by private individuals, counties, municipalities, American Indian Tribes, the State (e.g., the Nebraska Game and Parks Commission (NGPC)), and federal agencies (e.g., the U.S. Fish and Wildlife Service (USFWS), Army Corp of Engineers (USACE), U.S. Forest Service (Forest Service), Bureau of Land Management (BLM), etc.).

At present, Nebraska WS primarily protects livestock on land owned or managed by private individuals or the State, however, WS also sometimes protects cattle, goats, and sheep that graze on Forest Service administered lands during the summer months. Nebraska WS currently conducts predator damage management for the protection of livestock on the Nebraska National Forest and Oglala National Grassland under an EA prepared by the Forest Service (1991). Requests to assist in the protection of property, public health and safety or designated wildlife species are not addressed in the Forest Service's EA. Within Nebraska, WS has received requests to protect nesting waterfowl, pronghorn (*Antilocapra americana*), interior least terns (*Sterna antillarum*), and piping plovers (*Charadrius melodus*) from predation. In addition, Nebraska WS responds to requests for assistance with coyotes (*Canis latrans*), red foxes (*Vulpes vulpes*), mountain lions (*Puma concolor*), raccoons (*Procyon lotor*), badgers (*Taxidea taxus*), bobcats (*Lynx rufus*), opossums (*Didelphis virginiana*), mink (*Mustela vison*), weasels (*Mustela* spp.) and striped skunks (*Mephitis mephitis*) thought to be a threat to public health and safety. As proposed in this EA, Nebraska WS would protect livestock, wildlife, property, and public health and safety, as requested, on all land classes in Nebraska. Furthermore, this EA would replace the existing EA prepared by the Forest Service (1991) for the Nebraska National Forest and the Oglala National Grassland.

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[1] The WS Policy Manual provides WS personnel guidance in the form of program directives. Information contained in the WS Policy Manual and its associated directives has been used throughout this document, but has not been cited in the text or referenced in Appendix A.

[2] Information from WS' Management Information System (MIS) is used throughout this document to quantify species take, methods use, and verified and reported damage. Since information from the MIS is considered unpublished data, it has not been cited in the text or referenced in Appendix A.

1.1 NEED FOR ACTION

The need for action is based on the necessity for a program to protect livestock, wildlife, property, and public health and safety from predator damage. Livestock predation, caused primarily by coyotes, is a chronic concern of many livestock producers. A 1990 survey estimated that, of the nearly 6 million lambs born in the 16 western States, 549,000 lambs died of all causes (Connolly 1992a). Nearly 60% of these losses were the result of predation, with coyotes accounting for 70% of the predator-caused mortalities. In 1990, the economic impact of predation on Nebraska livestock producers and consumers was about $11.4 million. Despite intensive historical damage management efforts in livestock production areas, and despite sport hunting and trapping, coyotes continue to thrive and expand their range, occurring widely across North and Central America (Miller 1995).

WS is the federal agency authorized by Congress to manage wildlife damage to livestock, agricultural products, natural resources, property, and threats to public health and safety (Animal Damage Control Act of 1931 as amended (7 U.S.C. 426-426c Stat. 1468), Rural Development, Agriculture and Related Agencies Appropriation Act of 1988 (Public Law 100-202, Dec. 22, 1987. Stat. 1329-1331, 7 U.S.C. 426c)). In a 1993 District Court decision (U.S. District Court of Utah 1993), the court ruled that " . . . *the agency need not show that a certain level of damage is occurring before it implements an ADC program*" and "*Hence, to establish need for an ADC, the forest supervisors need only show that damage from predators is threatened*." WS accepts this standard as appropriate for establishing the need for a WS program in Nebraska.

WS cooperates with federal and state agencies, individuals, and public and private entities in wildlife damage management programs, as directed by law. In addition, WS has analyzed and issued a Record of Decision (ROD) on its nationwide program within the context of a programmatic EIS (USDA 1994).

1.1.1 Summary of the Proposed Action

Currently, Nebraska WS protects livestock, and when requested, designated wildlife species and public health and safety on private, state and National Forest System lands. The proposed action includes expanding the current program to include other federal lands (e.g., BLM, Bureau of Reclamation, USFWS, and USACE) or other areas where a need exists and as requested to protect various resources (livestock, wildlife, threatened and endangered (T&E) species, property, and public health and safety) in Nebraska. The Nebraska WS program intends to continue with an IWDM approach that would allow the prudent use of all legal techniques and methods, either singularly or in combination. Livestock producers would continue to be provided information on nonlethal techniques. Predator damage management methods used by Nebraska WS would include shooting, calling and shooting, aerial hunting, trapping, snaring, M-44s, denning, and the use of dogs. The Livestock Protection Collar (LPC) is not currently registered for use in Nebraska, but if it were to become registered, it could also be used when deemed appropriate. Predator damage management would be allowed, when requested, on federal and state lands where Wildlife Damage Management Work Plans or other comparable documents are in place and on private lands covered by signed agreements for control. All predator damage management would be consistent with other activities in the area and would comply with all federal, state and local laws. Nebraska WS would cooperatively develop Wildlife Damage Management Work Plans with the Nebraska Department of Agriculture (NDA), the BLM Newcastle Resource Area, the Nebraska National Forest, Samuel R. McKelvie National Forest, Oglala National Grassland, NGPC, USFWS, or any American Indian Tribe requesting assistance. These work plans or other comparable documents would be reviewed annually.

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

According to the Nebraska Agricultural Statistics Service (NEASS), agriculture generated more than $10 billion in cash receipts in Nebraska in 1997 (NEASS 1998). Livestock production is one of the primary agricultural industries and accounted for 55% of all agricultural cash receipts (Table 1-1) (NEASS 1998).

Nebraska WS protects a variety of livestock including cattle, sheep, swine, poultry, goats, and horses.

Table 1-1. Cattle and Sheep Inventories by District in Nebraska (NEASS 1998).

District	Cattle			Sheep		
	1996	1997	1998	1996	1997	1998
Northwest[1]	820,000	850,000	870,000	20,000	18,000	18,000
North[2]	1,270,000	1,280,000	1,290,000	5,000	5,500	5,000
Northeast[3]	1,000,000	1,040,000	1,050,000	15,000	14,000	14,000
Central[4]	900,000	930,000	950,000	16,000	16,000	17,000
East[5]	770,000	800,000	800,000	19,000	17,000	18,000
Southwest[6]	600,000	630,000	650,000	4,000	4,000	4,000
South[7]	560,000	580,000	590,000	9,000	7,000	7,000
Southeast[8]	430,000	440,000	450,000	17,000	16,000	17,000
Total	6,350,000	6,550,000	6,650,000	105,000	95,000	100,000

[1]Banner, Box Butte, Cheyenne, Dawes, Deuel, Garden, Kimball, Morrill, Scotts Bluff, Sheridan, and Sioux Counties
[2]Arthur, Blaine, Boyd, Brown, Cherry, Garfield, Grant, Holt, Hooker, Keya Paha, Logan, Loup, McPherson, Rock, Thomas, and Wheeler Counties
[3]Antelope, Boone, Burt, Cedar, Cuming, Dakota, Dixon, Knox, Madison, Pierce, Stanton, Thurston, and Wayne Counties
[4]Buffalo, Custer, Dawson, Greeley, Hall, Howard, Sherman, and Valley Counties
[5]Butler, Cass, Colfax, Dodge, Douglas, Hamilton, Lancaster, Merrick, Nance, Platte, Polk, Sarpy, Saunders, Seward, Washington, and York Counties
[6]Chase, Dundy, Frontier, Hayes, Hitchcock, Keith, Lincoln, Perkins, and Red Willow Counties
[7]Adams, Franklin, Furnas, Gosper, Harlan, Kearney, Phelps, and Webster Counties
[8]Clay, Fillmore, Gage, Jefferson, Johnson, Nemaha, Nuckolls, Otoe, Pawnee, Richardson, Saline, and Thayer Counties

Scope of Livestock Losses

Cows and calves are most vulnerable to predation at calving time; calves are less vulnerable as they get older and larger. Sheep and lambs, however, remain vulnerable to coyote predation throughout the year; lambs are also vulnerable to red foxes and other predators in the spring when they are small.

Livestock predation causes economic loss to livestock owners (Table 1-2). Without effective predator damage management, livestock predation would be higher (Nass 1977, 1980, Howard and Shaw 1978, Howard and Booth 1981, O'Gara et al. 1983).

Studies have shown that coyotes inflict high predation rates on livestock (Henne 1977, Munoz 1977, Nass 1977, O'Gara et al. 1983). In Nebraska, coyotes are the primary predator of hoofed livestock and poultry (Table 1-3). Red foxes primarily depredated poultry (domesticated chickens, turkeys, ducks, and geese) and accounted for 11%, 29%, and 23% of the confirmed losses to this agricultural resource in Nebraska during FY96, FY97, and FY98, respectively. Raccoon depredation accounted for 31%, 5%, and 20% of the poultry

predation in Nebraska during FY96, FY97, and FY98, respectively. During FY97 and FY98, skunks accounted for 9% and 13% of the domestic fowl predation in Nebraska and in FY96, badgers accounted for 10% of the domestic turkey predation. Predation of fowl was also attributed to bobcats, weasels, and badgers.

Table 1-2. Reported Livestock Losses from Predation in Nebraska (NASS 1995, 1996).

Species	Adult Sheep	Lambs	Adult Cattle	Calves
Coyotes	800	1,350	200	1,200
Feral Dogs	75	200	100	100
Red Foxes	0	0	0	0
Mt. Lions	0	0	0	0
Bobcats	0	0	0	0
Bears[1]	25	0	0	0
Eagles	0	0	0	0
All Other Predators	0[2]	50[2]	200[3]	200[3]
Total	900	1,600	500	1,500

[1]There have not been any verified sightings of bears (black or grizzly) in Nebraska in more than 100 years.
[2]Includes wolves, ravens, crows, pigs, etc.
[3]Includes all predators except coyotes, feral dogs, mountain lions, and bobcats.

Connolly (1992b) determined that only a fraction of the total predation attributable to coyotes was reported to WS. Nebraska WS personnel do not attempt to find every head of livestock reported to be killed by predators, but they do verify that a problem requiring management action exists.

Although determining the amount of livestock saved from predation by WS is impossible, it can be estimated. Scientific studies have indicated that losses of adult sheep and lambs to predators could be as high as 8.4% and 29.3%, respectively, in areas without predator damage management (Henne 1977, Munoz 1977, O'Gara et al. 1983). Areas with a damage management program in place have sustained sheep and lamb predation rates of about 0.5% and 4.3%, respectively (USDI 1979).

Table 1-3. Coyote Predation (Verified) as a Percent of Total.

Livestock	FY96	FY97	FY98
Lambs	92%	100%	90%
Adult Sheep	83%	100%	81%
Goats	100%	15%	100%
Calves	100%	100%	100%
Cattle	100%	100%	100%
Piglets	100%	NA	100%
Poultry	57%	35%	70%

Value of Livestock and Poultry Losses

Livestock are an important component of local economies in Nebraska. In 1997-1998, cash receipts for livestock and livestock-derived products totaled more than $5.5 billion or about 55% of the total cash receipts for agricultural products in Nebraska (NEASS 1998).

WS verified livestock predation losses of $41,062, $48,037, and $67,574 in FY96, FY97, and FY98, respectively. These dollar values represent data collected from only those producers that had agreements for control with WS to protect their livestock. The National Agricultural Statistics Service (NASS) estimated Nebraska sheep and lamb annual predation losses at $124,500 (NASS 1995) and Nebraska cattle and calf annual predation losses at $787,000 (NASS 1996). For reasons noted above, the predation verified by or reported to Nebraska WS represents only a small percentage of the total predator-caused losses. It must be noted that these losses occurred with a predator damage management program in place.

Livestock predation is rarely distributed equally among producers and losses may vary from year to year.

Predation on livestock can have a significant economic impact on individual livestock producers. Without effective predator damage management efforts to protect livestock, research suggests that predation losses would be higher (Nass 1977, 1980, Howard and Shaw 1978, Howard and Booth 1981, O'Gara et al. 1983). Predation was the number one reason reported by sheep producers who had gone out of business (U.S. District Court of Utah 1993).

1.1.3 Need for Wildlife Damage Management to Protect Wildlife

Revenue derived from recreation, especially recreation related to wildlife and the outdoors, is increasingly important to the economy of Nebraska. Southwick (1994) estimated the total economic impact from deer hunting in the United States in 1991 to be $16.6 billion.

In Nebraska, local economies benefit from wildlife-related recreational activities. In 1991, 834,000 (53%) of Nebraska's residents participated in wildlife-associated recreational activities (USFWS and U.S. Bureau of Census 1993) and spent a total of $103 million on hunting in Nebraska, not including the cost of licenses (Southwick 1994). Of the $103 million spent on hunting, more than $14 million was spent on deer hunting and an additional $11 million was expended on the hunting of migratory birds. In addition, hunting generated nearly 2,500 jobs (Southwick 1994).

The maintenance of game populations is important to the NGPC, the state agency responsible for managing wildlife in Nebraska (Revised Statutes of Nebraska (RSN) 37-101, 37-204, 37-209, 37-211, 37-213, 37-215, 37-301, 37-432, 37-434). Predator damage management may periodically be requested by the NGPC and/or USFWS to protect big game, upland game, migratory birds, or T&E species. These requests may result from efforts to reintroduce species, intensively manage small critical habitats, or to temporarily assist species recovery. Long-term or widespread predator damage management for the protection of wildlife species is not an objective of the NGPC or the USFWS, but a strategy used to achieve management objectives.

Research data show that predator damage management has the potential to benefit populations of both game and nongame wildlife. Predator damage management undertaken to protect livestock could augment wildlife management objectives set by the NGPC and the USFWS (Table 1-4). Conversely, a lack of predator damage management could adversely affect certain wildlife species (Connolly 1978).

Table 1-4. Wildlife Species that may Require Protection from Predation (D. Figgs, NGPC, Pers. Comm. 1996; W. Jobman, USFWS, Pers. Comm. 1996).

Species to be Protected	Management Agency
White-tailed Deer	NGPC
Mule Deer	NGPC
Pronghorn Antelope	NGPC
Elk	NGPC
Bighorn Sheep	NGPC
Swift Fox	NGPC
Greater Prairie Chicken	NGPC
Ring-necked Pheasant	NGPC
Wild Turkey	NGPC
Mountain Plover	NGPC
Waterfowl	USFWS
Whooping Crane	USFWS
Piping Plover	USFWS
Interior Least Tern	USFWS
Black-footed Ferret	USFWS

Predation on game species is well documented including its potential to adversely impact survival and recruitment, especially when environmental factors (e.g., weather influences, forage conditions, prey populations, etc.) are unfavorable (for additional discussion of

predator/prey relationships, see 2.3.1). Predation has the greatest impact during the spring when prey populations are lowest. Any prey taken at this time would have likely contributed to the future population, had it survived. Prey taken in late summer and fall have a higher likelihood of dying from other causes before reproducing (NGPC 1994). Under certain conditions, predators have been documented as having a significant adverse impact on deer (*Odocoileus* spp.), pronghorn antelope, bighorn sheep (*Ovis canadensis*), game bird populations and T&E species, and this predation was not necessarily limited to sick or inferior animals (Pimlott 1970, Bartush 1978, USDI 1978, 1995, Hamlin et al. 1984, Neff et al. 1985, Wehausen 1996). 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 predation had a significant influence on populations of white-tailed deer (*Odocoileus virginianus*), black-tailed deer (*O. hemionus columbianus*), pronghorn antelope and bighorn sheep.

Based on research and experience, many wildlife management agencies have found that coyote damage management can increase deer, pronghorn antelope, and game bird survival where predation is affecting the ability of these populations to maintain or increase recruitment. Under an existing MOU, WS and the NGPC share a common interest and responsibility in the management of wild species to maximize their benefits while minimizing their detrimental impacts. Thus, the NGPC could request WS' assistance with predator damage management whenever predation is deemed to be detrimental to Nebraska's wildlife populations.

Deer

Mackie et al. (1976) documented high winter losses of mule deer (*Odocoileus hemionus*) due to coyote predation in north-central Montana and stated that coyotes were the cause of most overwinter deer mortalities. Hamlin et al. (1984) studied mule deer fawn mortality in Montana and observed that coyotes caused at least 90% of the summer fawn mortalities. Trainer et al. (1981) reported that heavy mortality of mule deer fawns during the late fall and winter limited recruitment to the deer population in Oregon. Garner (1976), Garner et al. (1976), and Bartush (1978) determined the mortality of radio-collared white-tailed deer fawns in the Wichita Mountains of Oklahoma to be 87.9% to 89.6% with predators being responsible for 88.4% to 96.6% of the mortality. Garner (1976) also indicated that inter-specific behavioral observations suggested that coyotes may find fawns by thoroughly searching near single does. Beasom (1974a) stated that predators were responsible for 74% and 61% of the fawn mortality for two consecutive years on his study area. In a study conducted at the Welder Wildlife Refuge, Texas, Teer et al. (1991) documented that coyote diets contained nearly 90% deer during May and June. They concluded that, "*Unequivocally coyotes take a large portion of the fawns each year during the first few weeks of life*." Cook et al. (1971) stated that, *"Apparently, the neonatal period is a critical one in the life"* of a white-tailed deer. Remains of 4 to 8 week old fawns were common in coyote scats (feces) in studies from Steele (1969), Cook et al. (1971), Holle (1977), Litvaitis (1978), and Litvaitis and Shaw (1980). Other researchers have also observed that coyotes are responsible for the majority of fawn mortality during the first few weeks of life (Knowlton 1964, White 1967, Cook et al. 1971, Salwasser 1976, Trainer et al. 1981). During other studies designed to examine coyote food habits and the impact of coyote predation on deer recruitment, similar observations were noted (Steele 1969, Cook et al. 1971, Holle 1977, Litvaitis 1978, Litvaitis and Shaw 1980).

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

Knowlton and Stoddart (1992) reviewed deer productivity data from the Welder Wildlife Refuge following coyote reduction. Deer densities tripled compared with those outside the enclosure, but without harvest management, ultimately returned to original densities due primarily to malnutrition and parasitism.

Pronghorn Antelope

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

Menzel (1991) concluded that coyotes were primarily responsible for low antelope production during a study within the Box Butte Management Unit in the central portion of Nebraska's Panhandle. Concerns for low antelope populations in Nebraska led to the development of a management plan along with area meetings to allow for public input.

Arrington and Edwards (1951) observed that pronghorn antelope populations increased to huntable levels following coyote damage management in Arizona and that similar population increases were not noted on areas without coyote damage management. Coyote damage management on Anderson Mesa, Arizona allowed the antelope population to increase from 115 animals to 350 in 3 years, peaking at 481 animals in 1971 (Neff et al. 1985). After coyote damage management was discontinued, pronghorn fawn survival dropped to 14 and 7 fawns/100 does in 1973 and 1979, respectively. Initiation of another coyote damage management program began with the removal of an estimated 22% of the coyote population in 1981, 28% in 1982, and 29% in 1983. As a result, fawn production increased from a low of 7 fawns/100 does in 1979 to 69 and 67 fawns/100 does in 1982 and 1983, respectively. Antelope population surveys on Anderson Mesa conducted in 1983 indicated a population of 1,008 antelope, exceeding 1,000 animals for the first time since 1960.

In another study, the removal of 24%, 48%, and 58% of the spring coyote population from a study area in southeastern Oregon resulted in an increase in antelope fawn survival from 4 fawns/100 does in 1984 to 34, 71, and 84 fawns/100 does in 1985, 1986, and 1987, respectively (Willis et al. 1993). Similar observations of improved pronghorn antelope fawn survival and population increases following coyote damage management have been reported by Riter (1941), Udy (1953), and Hailey (1979). Menzel (1991) conducted coyote aerial hunting operations on the Box Butte Wildlife Management Area in Nebraska and reported that fawn:doe ratios were better on the areas with coyote damage management than on areas without damage management (62:100 vs. 25:100 in 1990 and 76:100 vs 42:100 in 1991). He concluded *"that control of coyotes prior to fawning season has a beneficial effect on survival of antelope fawns."* Coyote damage management for the protection of antelope is also cost effective, as shown by Smith et al. (1986).

Upland Game Birds

Thomas (1989) and Speake (1985) reported that predators were responsible for more than 40% of nest failures of wild turkeys (*Meleagris gallopavo*) in New Hampshire and Alabama, respectively. Everret et al.

(1980) reported that predators destroyed 7 of 8 nests on his study area in northern Alabama. Lewis (1973) and Speake (1985) reported that predation was also the leading cause of mortality in turkey poults, and Kurzejeski et al. (1987) used radiotelemetry to determine that predation was the leading cause of mortality in turkey hens. Wakeling (1991) reported that the leading natural cause of mortality among older turkeys was coyote predation, with the highest mortality rate for adult females occurring in winter. Other researchers report that hen predation is also high in spring when hens are nesting and caring for poults (Speake 1985, Kurzejeski et al. 1987, Wakeling 1991).

Dumke and Pils (1973) reported that ring-necked pheasant (*Phasianus colchicus*) hens were especially prone to predation during the nest incubation period. In Minnesota, pheasant hatching success and brood production was more than doubled with an intensive reduction of predators (Chessness et al. 1968). Trautman et al. (1974) stated that during a 5-year study in South Dakota, there was a 19% increase in ring-necked pheasant populations on areas with fox-only predator damage management. During a second 5-year study in South Dakota, ring-necked pheasant populations increased 132% on areas with red fox, raccoon, badger, and skunk damage management (Trautman et al. 1974).

Migratory Birds

Predator damage management is an important tool in maintaining migratory waterfowl populations. Gilbert et al. (1996) stated that waterfowl nest losses to predators were variable with 16.6%, 33.7% and 25.1% of all nests depredated during the periods of 1964-1970, 1971-1980, and 1981-1990, respectively. Depredation rates were lowest in 1964-1970 when poison bait, trapping and aerial gunning were used to reduce predator densities (Gilbert et al. 1996). In 1994 and 1995, the Delta Waterfowl Foundation funded a predator (red fox, raccoon, striped skunk, badger, and mink) removal study on 1-2 mi^2 study areas in northeastern North Dakota to determine if duck nesting success could be improved (Garrettson and Rowher 1994, Garrettson et al. 1995). Predators were removed with traps and snares, and occasionally by shooting. Data from 1994 indicated that the removal of predators resulted in a duck nesting success rate of 51.7% versus a 5.5% nesting rate success on areas without predator removal (Garrettson and Rowher 1994). Data from 1995 also showed an increased duck nesting success rate (52%) on predator removal areas versus areas with no predator removal (6% nesting success).

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

Sargeant et al. (1993) stated that the abundance of red foxes has a profound effect on the survival of adult ducks in the prairie pothole region, however, coyotes probably also prey extensively on adult ducks. Additionally, coyotes, red foxes, and mink are the primary mammalian species affecting duckling survival (Sargeant et al. 1973, Sargeant et al. 1993). At the Agassiz National Wildlife Refuge in Minnesota, Korschgen et al. (1996) found predation to be the cause of mortality for 59% of the female and 60% of the male canvasback ducklings. Mink were responsible for the most mortalities; they accounted for 39%-100% of the deaths each year (Korschgen et al. 1996).

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

Balser et al. (1968) determined that predator damage management resulted in 60% greater production by waterfowl in areas with damage management as compared with areas without damage management. Williams et al. (1980) reported a 72% hatching success of eggs following a predator poisoning campaign, but only 59% hatching success when predators were not poisoned.

Nests of wading birds can be destroyed by mammalian predators, such as red foxes, gray foxes (*Urocyon cinereoargenteus*), and raccoons. These predators destroy nests by preying on nest contents and by causing the abandonment of nests (Burger and Hahn 1977, Southern and Southern 1979, Rodgers 1980, 1987, Frederick and Collopy 1989). Frederick and Collopy (1989) stated that mammals and snakes accounted for 43% of nest failures in a wading bird colony and identified raccoons as the primary mammalian predator.

Threatened and Endangered Species

Predation can have a major impact on T&E species. Massey (1971) and Massey and Atwood (1981) found that predators can prevent least terns from nesting or cause them to abandon previously occupied sites. In another study, mammalian predators were found to have significantly impacted the loss of least tern eggs on sandbars and sandpits (Kirsch 1996). Skunks (Massey and Atwood 1979), red foxes (Minsky 1980), coyotes (Grover and Knopf 1982), and raccoons (Gore and Kinnison 1991) are common predators of least terns. During one 2-year study, coyotes destroyed 25.0% to 38.5% of all interior least tern nests (Grover 1979).

In Massachusetts, predators destroyed 52%-81% of all active piping plover nests from 1985-1987 (MacIvor et al. 1990). Red foxes accounted for 71%-100% of the nests destroyed by predators at the site.

During FY95-98, Nebraska personnel were asked to remove coyotes, striped skunks, opossums, and mink from nesting sites along the Platte River in central Nebraska to protect threatened piping plovers and endangered least terns. As expected, the removal of predators increased plover and tern nesting success and chick survival rates (R. Plettner, Nebraska Public Power District, pers. comm. 1999).

Limited predator removals may also benefit black-footed ferret (*Mustela nigripes*) recovery efforts by reducing predation on newly transplanted individuals, and by supplying baseline data on disease prevalence by monitoring predators from the recovery area. Predation has affected black-footed ferret reintroductions in Wyoming, South Dakota and Montana (E. Stukel, South Dakota Game, Fish and Parks, pers. comm. 1995; USDI 1995). Predator removal may also be useful to enhance survival should ferret reintroductions occur in Nebraska (D. Figgs, NGPC, pers. comm. 1997).

Kilgore (1969) stated that coyotes are logical predators of swift foxes (*Vulpes velox*). Coyotes were implicated for reduced swift fox numbers at prairie dog towns in Colorado (Kahn and Fitzgerald 1995). Egoscue (1979) and Scott-Brown and Herrero (1985) stated that coyotes are known to kill swift foxes. Herrero et al. (1986) stated that higher coyote densities may in fact threaten the establishment and long-term survival of reintroduced swift foxes. Carbyn et al. (1994) reported that 58% of swift fox mortality was caused by predation with the coyote clearly, "*the greatest cause of (predator) mortality*." They go on to state that, "*the greatest proportion of deaths occurred within the first month of release.*" Covell (1992) reported that predation and non-dramatic deaths accounted for 87% and 13% of all determined deaths, respectively, with coyotes responsible for 85% of all predation. Research by Fitzgerald and Roell (1995) on radio-collared swift foxes confirmed that predation accounted for 77% of all mortality with coyotes accounting for 100% of that predation. Research findings by Fox and Roy (1995), Rongstad et al. (1989), and Brechtel et al. (1993) have confirmed that coyote depredation is an important cause of swift fox mortality in many areas.

Badgers may also kill swift foxes. Several studies (Rongstad et al. 1989, Brechtel et al. 1993) have indicated that badgers have killed up to 13% of the swift foxes in a given area, primarily by digging them

out of their dens.

Balser et al. (1968) recommended that predator damage management programs target the entire predator complex or compensatory predation may occur by a species not under control, a phenomena also observed by Greenwood (1986). Trautman et al. (1974) concluded that a single species predator damage management program showed some promise for enhancing pheasant populations, but that a multi-species predator damage management program should substantially increase ring-necked pheasant populations. Clearly, predator damage management can be an important tool for achieving and maintaining game, nongame, and T&E species production and management objectives.

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

According to state law, MOU, and agreement, WS has been requested to assist the NGPC, University of Nebraska, and other agencies to monitor and reduce the risk of disease transmission (e.g., rabies, tick borne diseases, plague, mange, Echinococcus multilocularis) by wild species. Potentially dangerous wildlife requests referred to Nebraska WS are given a higher priority and are scrutinized using the ADC Decision Model (Slate et al. 1992) described in Chapter 3 of this EA.

Requests for Nebraska WS to deal with public health and safety issues may be received from individuals, associations, municipal or county governments, or state, tribal, or federal agencies. In Nebraska, the Nebraska Department of Health (NDH) is responsible for the control and prevention of rabies (RSN 71-4401 to 71-4412). The NDH considers rabies to be a potentially serious public health problem (Safranek and Leschinsky 1996) and lists the following species of animals as capable of harboring and spreading the rabies virus (RSN 71-4402.01, Title 173 Nebraska Administrative Code, Chapter 5):

-"species amenable to rabies protection by immunization;
dogs, cats, ferrets, cattle, horses, and sheep,

-species not amenable to rabies protection by immunization;
carnivorous - skunks, raccoons, foxes, coyotes, bobcats, bats, hybrids of domestic dogs and cats,

noncarnivorous - This category includes but is not limited to the following species of animals. Regard these animals as rabid unless proven negative by the direct fluorescent antibody laboratory test; civet cats, deer, groundhogs, beavers, opossums, badgers."

During the years 1992-1995, 31 animals tested positive for rabies in Nebraska (1% for the 4 year period); 84% were wild animals of which 38% were skunks (Safranek and Leschinsky 1996). Animal rabies occur Gin 20 year cycles; Nebraska reached its 20 year low in 1994 with no confirmed cases of rabies and began its up-swing in 1995 with 7 confirmed cases (5 bats and 2 skunks) (Safranek and Leschinsky 1996). In the State of Nebraska, all laws, codes, ordinances, or rules and regulations concerning the control of rabies are enforced by the county, township, city, and village health and law enforcement officials or those other officers with regulatory authority as specified by the governing political subdivisions (RSN 71-4412). When requests for assistance occur on public lands, the land management agency is also involved in the planning and coordination of the activities.

Nebraska WS may be requested to assist with a variety of wildlife-related public health and safety issues. Nebraska WS has responded to all such requests. In FY96, FY97, and FY98, Nebraska responded to 35, 87, and 80 requests, respectively, for protection of public safety from potentially harmful and/or diseased animals.

1.1.5 Nebraska Wildlife Services Program Objectives

The need for predator damage management in Nebraska was used by WS, with input from the NDA, NGPC, University of Nebraska Cooperative Extension (UNCE), USFWS, BLM, and the Forest Service, to define the objectives for the WS program in Nebraska. They are:

A. Livestock Protection: For cooperative agreements and agreements for control, Nebraska WS' objectives are to:

A-1. Respond to 100% of the requests for assistance with the appropriate action (technical assistance or direct control) as determined by Nebraska WS personnel, applying the ADC Decision Model (Slate et al. 1992).

A-2. Hold sheep losses due to predation to less than 3% per year and calf losses due to predation to less than 2% per year in Nebraska in counties with a federal WS operational program.

A-3. Maintain the lethal take of nontarget animals by Nebraska WS personnel during damage management to less than 2% of the total animals taken.

A-4. Monitor the implementation of nonlethal methods used by livestock producers that cooperate with the federal WS program in Nebraska.

B. Wildlife Protection coordinated with the NGPC or USFWS, tribes and private entities:

B-1. Respond to requests from the NGPC, USFWS, tribes and private entities for the protection of wildlife species dependent on funding.

B-2. Involve the NGPC and USFWS in wildlife damage management planning to consider specific wildlife to be protected and public health and safety when designating a wildlife damage management program.

C. Public Health and Safety Protection:

C-1. Respond to 100% of cooperator requests for public health and safety protection from predators using the ADC Decision Model (Slate et al. 1992).

1.2 RELATIONSHIP OF THIS ENVIRONMENTAL ASSESSMENT TO OTHER ENVIRONMENTAL DOCUMENTS

1.2.1 ADC Programmatic EIS. In 1994, WS issued a final EIS (USDA 1994) and ROD (USDA 1995) on the National APHIS-ADC program. The EIS was subsequently revised in 1997. This EA is tiered to that EIS.

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

1.2.3 Forest Service EAs for Predator Damage Management. The Nebraska National Forest and Oglala National Grassland within Nebraska have an EA and a Decision Record addressing predator damage management (Forest Service 1991). This EA (Predator Damage Management in Nebraska for the Protection of Livestock, Wildlife, Property and Public Health and Safety) will address predator damage management on the National Grassland and Forests in Nebraska. Predator damage management would continue on the

Oglala National Grassland and the Nebraska National Forest under the current document (Forest Service 1991) until superseded by a new decision document. Work plans would be developed by WS on National Forest System lands where predator damage management activities are planned or anticipated and discussed during a work plan meeting(s) with the Forest Service, WS and NGPC. Additional NEPA documentation would be required to conduct wildlife damage management that is outside the scope of this EA, should the need arise.

1.2.4 BLM Resource Management Plans (RMPs) and Management Framework Plans (MFPs). The BLM currently uses RMPs or MFPs to guide management on lands they administer. RMPs generally replace older land use plans known as MFPs. RMP and MFP documents and the decision made from this EA need to be consistent.

1.2.5 BLM EAs for Predator Damage Management. This EA (*Predator Damage Management in Nebraska for the Protection of Livestock, Wildlife, Property and Public Health and Safety*) will address predator damage management on BLM administered lands in Nebraska. Additional NEPA documentation would be required to conduct wildlife damage management that is outside the scope of this EA, should the need arise.

1.3 DECISION TO BE MADE

Based on agency relationships, MOUs, and legislative authorities, Nebraska WS is the lead agency for this EA, and therefore, is responsible for the scope, content and decisions made. The Forest Service, BLM, USFWS, NGPC, NDA and UNCE provided input throughout the EA preparation process to ensure an interdisciplinary approach according to NEPA and agency mandates, policies, and regulations.

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

-Should predator damage management, as currently implemented, be continued in Nebraska (the No Action Alternative)?

-If not, how should WS fulfill their legal responsibilities within Nebraska?

-Would the proposal have significant impacts requiring an EIS analysis?

1.4 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT

1.4.1 Actions Analyzed. This EA evaluates planned predator damage management to protect: 1) livestock and property, 2) designated wildlife species (including T&E species), and 3) public health and safety from mammalian predators within Nebraska. Additional NEPA documentation would be required to conduct wildlife damage management that is outside the scope of this EA, should the need arise.

1.4.2 Wildlife Species Potentially Protected by Nebraska Wildlife Services. The NGPC may request Nebraska WS' assistance to achieve management objectives for white-tailed and mule deer, pronghorn antelope, bighorn sheep, elk *(Cervus canadensis)*, greater prairie chickens (*Tympanuchus cupido*), wild turkeys, ring-necked pheasants, mountain plovers (*Eupoda montana*) and swift foxes. The USFWS or NGPC may request Nebraska WS' assistance in protecting black-footed ferrets, interior least terns, piping plovers, whooping cranes (*Grus americana*) and waterfowl (Table 1-4). If the NGPC, USFWS or American Indian Tribes identify additional species in need of protection, a determination regarding the need for additional NEPA analysis would be made on a case-by-case basis**.**

1.4.3 American Indian Lands and Tribes. Currently, Nebraska WS does not have MOUs with any of the tribes in Nebraska. If a tribe enters into a MOU, this EA would be reviewed to insure compliance with

NEPA.

1.4.4 Period for Which this EA is Valid. This EA would remain valid until Nebraska WS and other appropriate agencies determine that new needs for action, changed conditions or new alternatives having different environmental effects must be analyzed. At that time, this analysis and document would be supplemented pursuant to NEPA. Review of the EA would be conducted each year at the time of the wildlife damage management work planning process by the Nebraska WS, land management agency, and the NGPC to ensure that the EA is sufficient.

1.4.5 Site Specificity. This EA addresses all lands under cooperative agreement, agreement for control, WS Work Plans or other comparable documents in Nebraska. These lands are under the jurisdiction of federal, state, tribal, county, municipal and private administration/ownership. It also addresses the impacts of predator damage management on areas where additional agreements may be signed in the future. Because the proposed action is to reduce predator damage and because the program's goals and directives are to provide services when requested, within available funding and workforce, it is conceivable that additional wildlife damage management efforts could occur. Thus, this EA anticipates this potential expansion and analyzes the impacts of such efforts as part of the program. This EA emphasizes major issues as they relate to specific areas whenever possible, however, many issues apply wherever wildlife damage and resulting management occur, and are treated as such. The standard ADC Decision Model (Slate et al. 1992, USDA 1994) would be the site-specific procedure for individual actions conducted by WS in Nebraska (see Chapter 3 for a description of the ADC Decision Model and its application).

1.4.6 Public Involvement. Issues related to the proposed action were initially developed by an interdisciplinary team process involving the Forest Service, BLM, USFWS, NDA, UNCE, and the NGPC. A Multi-agency Team of WS, Forest Service, BLM, USFWS, NGPC, NDA, and UNCE personnel refined these issues, prepared objectives and identified preliminary alternatives. Due to interest in the Nebraska WS Program, the Multi-agency Team concurred that Nebraska WS include an invitation for public comment in this EA process. An invitation for public comment letter containing issues, objectives, preliminary alternatives, and a summary of the need for action, was sent to 262 individuals or organizations who had identified an interest in Nebraska WS, NGPC, Forest Service or BLM projects. Notice of the proposed action and invitation for public involvement were placed in six newspapers with circulation throughout Nebraska. Public comments were documented from 25 letters or written comments. The responses represented a wide range of opinions, both supporting and opposing the proposal or parts of the proposal. All comments were analyzed to identify new issues, alternatives, or to redirect the objectives of the program. All responses are maintained in the administrative file at the Nebraska WS State Office, P.O. Box 81866, Lincoln, Nebraska 68501-1866.

1.5 AUTHORITY AND COMPLIANCE

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

Wildlife Services

The primary statutory authority for the WS program is the Animal Damage Control Act of 1931, as amended, 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

[3] Detailed discussions of WS' legal responsibilities and key legislation pertinent to wildlife damage are found in Chapter 1 of USDA (1994).

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 changes in societal values, WS' policies and programs have placed 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 directive of WS 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."

Nebraska Game and Parks Commission and Nebraska Department of Agriculture

The NGPC is responsible for managing all protected and classified wildlife in Nebraska, including federally listed T&E species, despite the land class the animals inhabit (RSN 37-101, 37-204, 37-209, 37-211, 37-213, 37-215, 37-301, 37-432, 37-432.01, 37-434). The NGPC is also authorized to cooperate with Nebraska WS and the NDA for controlling predatory animals. Nebraska law allows a farmer or rancher owning or operating a farm or ranch to destroy or have destroyed any predator, including raccoons and opossums, preying on livestock or poultry or causing other agricultural depredation on lands owned or controlled by him or her without a permit issued by the NGPC (RSN 37-201). The NDA is authorized to make funds available for equipment, supplies, and other expenses, including expenditures for personal services by WS, as may be necessary to execute the functions imposed upon NDA as provided by the general appropriation bill (Legislative Bill 392).

Coyotes are not protected in Nebraska and are not classified as furbearers under the RSN administered by the NGPC. The NGPC is responsible for the issuance of aerial hunting permits per the Fish and Wildlife Act of 1956, as amended, and for administering a program to reduce damage caused by predatory animals (RSN 37-232, 37-233). The NDA currently has a MOU, cooperative agreement, and work plan with the Nebraska WS. These documents establish a cooperative relationship between the Nebraska WS, NGPC, NDA, UNCE and the NDH, and outline responsibilities and set forth objectives and goals for each agency for resolving wildlife damage management conflicts in Nebraska.

Nebraska Counties

County boards may enter into cooperative agreements for the purpose of carrying on an organized wildlife damage management program within their respective counties. *"The county boards may cooperate with the Animal and Plant Health Inspection Service of the United States Department of Agriculture and state agencies . . . in the control of coyotes, bobcats, foxes, badgers, opossums,*

raccoons, skunks, and other predatory animals in this State that are injurious to livestock, poultry, and game animals and the public health. The county boards may also undertake the control of . . . other nuisance wildlife if such . . . wildlife are causing or about to cause property damage or represent a human health threat. All control efforts shall be in accordance with the organized and systematic plans of the United States Department of Agriculture and state agencies covering the management and control of animals, birds, and wildlife" (RSN 23-358).

"*In order to support the cost of managing and controlling the animals, birds, or wildlife listed in section 23-358, each county shall match funds supplied by any resident individual or group of individuals either living within the county or owning property therein, up to a maximum of one thousand dollars annually for any specific animal damage control program, and may furnish such additional money as the county board shall deem necessary for the funding of such programs. The county board of each county is authorized to make necessary expenditures from the general fund of the county, except the portion supplied by each county shall not exceed fifty percent of the total animal damage control program cost, unless such county elects to bear the entire program cost under sections 23-358 to 23-361. A county desiring to cooperate with another county or counties for the establishment of animal damage control services as set forth in sections 23-358 to 23-361 may enter into agreements and match funds for the establishment of an area program with the state or federal government*" (RSN 23-358.01). County boards are authorized to make necessary expenditures from any funds of the county to perform animal damage control (RSN 23-359). "*The county board of each county in this state may levy upon every dollar of taxable value of all the taxable property in such county, for the use of the county board in carrying out the animal damage control program . . . The entire fund derived from such levy shall be set apart in a separate fund and expended only for animal damage control as defined by sections 23-358 to 23-360*" (RSN 23-260). Nebraska counties may also tax cattle and sheep, not to exceed twenty cents per head, to provide funding for animal damage control programs for the management and control of coyotes, bobcats, foxes, and other predatory animals destructive of cattle and sheep (RSN 23-361).

U.S. Fish and Wildlife Service

The USFWS has the statutory authority to manage federally listed T&E species through the ESA of 1973 (16 U.S.C. 1531-1543, 87 Stat. 884). Authorization under Section 10 of the ESA allows WS to assist the USFWS with damage management for species such as the gray wolf (*Canis lupus*), should the need arise.

U.S. Forest Service and Bureau of Land Management

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

University of Nebraska Cooperative Extension

The UNCE, through its Educators, Specialists and Assistants provides a wide range of information on the prevention and control of wildlife damage. The UNCE conducts educational programs pursuant to the Smith-Lever Act of 1914 (7 USC 341-349) and subsequent amendments.

1.5.2 Compliance with Federal Laws

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

National Environmental Policy Act

This predator damage management EA, with WS as the lead agency, is the first time that all land classes under cooperative agreements, agreements for control and WS Work Plans for Nebraska will be analyzed in a comprehensive manner. Environmental documents pursuant to NEPA must be completed before work plans, consistent with the NEPA supported decision, can be developed and implemented. Before 1993, each National Forest (or Ranger District) completed its own NEPA document. This resulted in different requirements and procedures for different agencies and omitted analysis of WS wildlife damage management on lands under other ownership or jurisdiction.

WS 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 agency requests for WS' assistance to protect resources outside the species discussed in this EA would be reviewed, and if necessary, the agency requesting the assistance would be responsible for NEPA compliance.

Endangered Species Act

It is WS' and federal policy, under the ESA, that all federal agencies shall seek to conserve T&E species and shall utilize their authorities in furtherance of the purposes of the Act (Sec.2(c)). WS conducts consultations with the USFWS, as required by Section 7 of the ESA, to utilize the expertise of the USFWS to ensure that "*any action authorized, funded or carried out by such an agency . . . is not likely to jeopardize the continued existence of any endangered species or threatened species . . .* " (Sec.7(a)(2)). Nebraska WS completed a consultation with the USFWS and NGPC for those species listed in Nebraska and received concurrence that Alternatives 1 and 3 (No Action and Proposed Action, respectively) were unlikely to adversely affect T&E species.

Federal Insecticide, Fungicide, and Rodenticide Act

The Federal Insecticide, Fungicide, and Rodenticide Act (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 pesticides used or recommended by the WS program in Nebraska are registered with, and regulated by, the EPA and the NDA. Nebraska WS uses all chemicals according to label directions as required by the EPA and NDA.

National Historical Preservation Act of 1966 as Amended

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

Native American Graves Protection and Repatriation Act

The Native American Graves Protection and Repatriation Act (NAGPRA) requires federal agencies to notify the proper authority (the Secretary of the Department that manages the federal lands) upon the discovery of Native American cultural items on federal or tribal lands. Federal projects will discontinue work until a reasonable effort has been made to protect the items and the proper notifications have been made.

1.6 A PREVIEW OF THE REMAINING CHAPTERS IN THIS EA

The remainder of this EA is composed of 4 chapters. Chapter 2 discusses and analyzes the issues and affected environment. Chapter 3 contains a description of each alternative, methods used by WS, alternatives not considered in detail, and mitigation and standard operating procedures (SOPs). Chapter 4 analyzes the environmental impacts associated with each alternative considered in detail, analyzes how well each alternative meets the objectives, and determines consistency with Forest Service LRMPs and BLM RMPs or MFPs. Chapter 5 lists this EA's preparers, reviewers and consultants.

CHAPTER 2: ISSUES AND AFFECTED ENVIRONMENT

INTRODUCTION

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

2.1 ISSUES ANALYZED IN DETAIL IN CHAPTER 4

The Multi-agency Team, consisting of representatives from the lead (WS) and cooperating agencies (BLM, Forest Service, USFWS, NGPC, NDA, and the UNCE) determined the issues to be:

Issue 1. Cumulative impacts on the viability of wildlife populations - the potential for WS' take of predators to cause long-term predator population declines, when added to other mortality.

Issue 2. Effectiveness and selectivity of damage management methods - the potential for WS' methods to take nontarget animals, need for a wide variety of damage management methods, criteria for deciding methods to be used, and use of "preventive" damage management techniques.

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

Issue 4. Concern about WS' impacts on T&E species.

2.2 ISSUES USED TO DEVELOP MITIGATION

2.2.1 Predator Damage Management in Special Management Areas

Many areas on federal and state managed lands within Nebraska have a special designation and/or require special management consideration. These include Wilderness Areas (WAs), Research Natural Areas (RNAs), Wild and Scenic Rivers (WSRs), Wildlife Management Areas (WMAs) and State Recreation Areas. The special management required for each of these different areas varies considerably by designation and land administrator and as directed by different legal mandates.

WS has conducted some wildlife damage activities in special management areas in the past. WS acknowledges that recreationists and others may consider these activities to be an invasion of solitude and an adverse affect on the aesthetic quality of their experience.

WS conducts predator damage management on areas with special designations only in limited instances, when and where a specific need is identified, only when allowed under the provisions of the specific management designation, and with the concurrence of the land management agency as defined by WS Work Plans. WS' activities in special management areas have historically been, and are expected to continue to be, a minor part of the overall WS program. Restrictions on WS' activities are listed in Chapter 3, Section 3.4, Mitigation and Standard Operating Procedures for Predator Damage Management Techniques.

<u>Federal Lands Special Management Areas</u>

Wilderness Areas: WAs are areas designated by Congress to be managed for the preservation of wilderness values. Wildlife and fish damage management in WAs follows direction provided in Forest Service Manual (FSM) 2151, FSM 2323, and FSM 4063 for management of wildlife or fish damage in wilderness and RNAs. Animal damage management is permitted in wilderness only when it was used before wilderness designation; when it conforms with direction in FSM 2323.33 on resources management in wilderness; and when it is needed for the recovery of federally listed T&E species. WAs in Nebraska are listed in Table 2-1.

Table 2-1. Wilderness Areas in Nebraska

WILDERNESS AREA	ACRES
Fort Niobrara	4,635
Soldier Creek	7,794

Research Natural Areas: RNAs are part of a national network of ecological areas designated in perpetuity for research and education and/or to maintain biological diversity on National Forest System lands. RNAs are managed for the protection of unusual, scientific, or special interest natural characteristics for research and education. *Establish Records* have been approved for the RNAs listed in Table 2-2 for the Nebraska National Forest. The RNAs would be managed according to the direction provided in the Nebraska National Forest Plan (Management Area). The management goal is to maintain these areas in their natural condition to be used for non-manipulative research and observation.

Table 2-2. Research Natural Areas in Nebraska

RESEARCH AREA	ACRES
Type K237 - Interior Ponderosa Pine	200
Bessey	571
Eastern Ponderosa Pine (proposed)	900

Wild and Scenic Rivers: WSRs are rivers and streams that must be free-flowing, and with their adjacent land area, must possess one or more *"outstandingly remarkable"* values. Scenic, geologic, historic, cultural, ecologic, or fish and wildlife habitat are examples of such values. *Wild Rivers* are those rivers or sections of river that are free of impoundments, generally accessible only by trail, with the watershed or shorelines essentially primitive and water unpolluted. *Scenic Rivers* are those rivers or sections of river that are free of impoundments, with shorelines and watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads. *Recreational Rivers* are those rivers or sections of rivers that are readily accessible by roads, have some development along their shorelines and may have some history of impoundment or diversion. Nebraska's WSRs are listed in Table 2-3.

TABLE 2-3. Nebraska's Wild and Scenic Rivers

WATERBODY	CLASS	MILES
Niobrara River (Borman Bridge to Hwy 137)	Scenic	76 miles
Niobrara River (Knox County)	Recreational	25 miles
Verdigre Creek (Verdigre to Niobrara River)	Recreational	6 miles

2.2.2 Humaneness of Methods Used by Wildlife Services

The issue of humaneness, as it relates to the killing or capturing of wildlife, is an important but very complex concept that can be interpreted in a variety of ways. Schmidt (1989) indicated that vertebrate pest control for societal benefits could be

compatible with animal welfare concerns, if *" . . . the reduction of pain, suffering, and unnecessary death is incorporated in the decision making process."*

Suffering has been described as a *" . . . highly unpleasant emotional response usually associated with pain and distress*." However, suffering *" . . . can occur without pain . . . ,*" and *" . . . pain can occur without suffering . . . "* (AVMA 1987). Because suffering carries with it the implication of a time frame, a case could be made for *" . . . little or no suffering where death comes immediately . . . "* (CDFG 1991).

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

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

Therefore, humaneness appears to be a person's perception of harm or pain inflicted on an animal, and people may perceive the humaneness of an action differently. The issue of humaneness has two aspects in relation to the proposed action:

1. Animal welfare organizations and individuals are concerned that some wildlife damage management methods expose animals to unnecessary pain and suffering. Kellert and Berry (1980), in a survey of American attitudes toward animals, related that 58% of their respondents *" . . . care more about the suffering of individual animals . . . than they do about species population levels."*

   Research suggests that the blood chemistry of trapped animals indicates "*stress.*" However, similar blood measurements from foxes chased by dogs for about five minutes indicated comparable levels of stress, even though the fox was not physically restrained as it would have been in a trap (USDA 1994). Unfortunately, research has not yet progressed to the development of objective, quantitative measures of pain or stress for use in evaluating humaneness.

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

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

WS has improved the selectivity and humaness of management devices through research and the development of modifications such as pan-tension devices, electronic trap monitors and breakaway snares. Research is continuing to bring new findings and products into practical use, however, a certain amount of animal suffering may occur whenever nonlethal methods are impractical or ineffective. Furthermore, it is possible that the net amount of animal suffering would be less under the proposed action (or any other alternative involving the use of lethal methods) than under the No Action Alternative, since the suffering endured by livestock and pets would be reduced if the action is successful.

Nebraska WS personnel are experienced and professional in their use of management methods and are as humane as possible under the current constraints of technology, workforce, and funding. Mitigation measures and SOPs used to maximize humaneness are listed in Chapter 3.

2.2.3 Cultural and Historical Resources

2.2.3.1 American Indian Concerns

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

In consideration of American Indian cultural and archeological interests, the Nebraska WS program solicited input from the following tribes:

Ogallala Sioux Tribe
Omaha Tribe
Ponca Tribe of Nebraska
Santee Sioux Tribe
Winnebego Tribe
Sac and Fox Tribe of Missouri
Iowa Tribe of Kansas and Nebraska

Each tribe was asked to identify concerns relating to the proposed WS program through an *invitation for public comment* letter. No tribe responded with concerns.

2.2.3.2 Other Cultural and Historical Resources

Concurrence of no impact to properties on or eligible for the National Registry of Historical Places relative to the current program and the proposed action has been received from the Nebraska State Historical Preservation Office (Puschendorf 1997). In most cases, predator damage management has little potential to cause adverse effects to sensitive cultural resources. The areas where predator damage management would be conducted are small and damage management activities cause minimal ground disturbance. Mitigation measures developed to avoid impacts to these sites are listed in Chapter 3.

2.2.4 Environmental Justice and Executive Order 12898 - *"Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations"*

Environmental Justice (EJ) is a movement promoting the fair treatment of people of all races, income and culture with respect to the development, implementation and enforcement of environmental laws, regulations and policies. Fair treatment implies that no person or group of people should endure a

disproportionate share of the negative environmental impacts resulting either directly or indirectly from the activities conducted to execute this country's domestic and foreign policies or programs. EJ has been defined as the pursuit of equal justice and equal protection under the law for all environmental statutes and regulations without discrimination based on race, ethnicity, or socioeconomic status. (The EJ movement is also known as Environmental Equity -- which is the equal treatment of all individuals, groups or communities regardless of race, ethnicity, or economic status, from environmental hazards).

EJ is a priority both within USDA/APHIS and WS. Executive Order 12898 requires federal agencies to make EJ part of their mission, and to identify and address disproportionately high and adverse human health and environmental effects of federal programs, policies and activities on minority and low-income persons or populations. A critical goal of Executive Order 12898 is to improve the scientific basis for decision-making by conducting assessments that identify and prioritize environmental health risks and procedures for risk reduction. APHIS-WS developed a strategy that: 1) identifies major programs and areas of emphasis to meet the intent of the Executive Order, 2) minimize any adverse effects on the human health and environment of minority and low-income persons or populations, and 3) carries out the APHIS mission. To that end, APHIS operates according to the following principles: 1) promote outreach and partnerships with all stakeholders, 2) identify the impacts of APHIS activities on minority and low-income populations, 3) streamline government, 4) improve the day-to-day operations, and 5) foster nondiscrimination in APHIS programs. In addition, APHIS plans to implement Executive Order 12898 through its compliance with the provisions of NEPA.

All APHIS-WS activities are evaluated for their impact on the human environment and compliance with Executive Order 12898 to insure EJ. WS personnel use wildlife damage management methods as selectively and environmentally conscientiously as possible. All chemicals used by APHIS-WS are regulated by the EPA through FIFRA, by the NDA, by MOUs with federal land management agencies, and by program directives. Based on a thorough Risk Assessment, APHIS concluded that when WS program chemicals are used following label directions, they are selective to target individuals or populations and such use has negligible impacts on the environment (USDA 1994, Appendix P). The APHIS-WS operational program, discussed in this document, properly disposes of any excess solid or hazardous waste. It is not anticipated that the proposed action would result in any adverse or disproportionate environmental impacts to minority and low-income persons or populations.

2.2.5 Protection of Children from Environmental Health and Safety Risks (Executive Order 13045)

WS prioritizes the identification and assessment of environmental health and safety risks that may disproportionately affect children. Children may suffer disproportionately from environmental health and safety risks for many reasons, including their physical and mental status. WS has concluded that the proposed management program would not create an environmental health or safety risk to children because the program would only make use of legally available and approved damage management methods applied where such methods are highly unlikely to adversely affect children.

2.3 ISSUES NOT CONSIDERED IN DETAIL, WITH RATIONALE

2.3.1 Wildlife Services' Impact on Biodiversity and Predator/Prey Relationships (Potential for WS' take of predators to result in population increases of rodents and rabbits, which might then increase agricultural damage)

No WS wildlife damage management is conducted to eradicate a native wildlife population. WS conducts activities according to international, federal and state laws and regulations enacted to ensure species viability. Several state statutes direct agencies to consider biological sustainability when making

management decisions. Nebraska's Natural Areas Register legislation states that quality of life is enhanced by the protection of natural diversity and that the protection of species and genetic diversity through habitat protection benefits humans (RSN 37-1401). In addition, ecosystem management goals are provided in two strategic plans adopted by the NGPC: the Stewardship Strategic Plan and the Nongame, Threatened and Endangered Species Strategic Plan. Nebraska's endangered species act, entitled the Nongame and Endangered Species Conservation Act, covers all plant and animal species (RSN 37-430 et. seq.). NGPC consultation is required and was completed by WS.

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

Keith (1974) concluded that: 1) during cyclic declines in prey populations, predation has a depressive effect and as a result, the prey populations may decline further and be held for some time at relatively low densities, 2) prey populations may escape this low point when predator populations decrease in response to the reduced food base, and 3) since rabbit and rodent populations increase at a faster rate than predator populations, factors other than predation must initiate the decline in populations. Wagner and Stoddart (1972) and Clark (1972) independently studied the relationship between coyote populations and jackrabbit *(Lepus californicus)* populations in northern Utah and southern Idaho. Both noted that coyote populations increased as jackrabbit numbers increased, but with a 1-2 year delay, suggesting that the prey population controlled the predator population, rather than the reverse.

Any reduction of a local population or group would be temporary because migration from adjacent areas or reproduction would replace the animals removed (Connolly and Longhurst 1975, Henke 1992). In two studies conducted in south Texas (Beasom 1974b, Guthery and Beasom 1977), intensive short-term predator removal was employed to test the response of game species to reduced coyote abundance. At the same time, rodent and rabbit species were monitored. A marked reduction in coyote numbers did not appear to affect the populations of rabbits or rodents in either study. Similarly, Neff et al. (1985) noted that reducing coyote populations on their study area in Arizona to protect pronghorn antelope fawns did not affect the rodent or rabbit population. The impacts of the current WS program on biodiversity are not significant nationwide or state-wide (USDA 1994, Chap 4). Furthermore, WS' take of wildlife species in Nebraska is insignificant and does not impact the viability and health of any state-wide population (Andelt 1997). Thus, at the levels of predator removal currently being sustained (see Section 4.4.1), it is unlikely that overall rodent or rabbit populations would increase.

2.3.2 The Public's Concern about the Use of Chemicals and Toxicants and that Toxicants/Chemicals Should be Banned

Much of the public's concern over the use of toxicants for predator damage management is based on an erroneous perception that WS uses nonselective, outdated chemical methodologies. In reality, however, the chemical methods currently employed by WS have a high degree of selectivity (see section 4.4.2). WS' use of toxicants is regulated by the EPA through the FIFRA, by MOUs with other agencies, and by program directives. In addition, APHIS conducted a thorough risk assessment and concluded that chemicals used according to label directions are selective for target individuals or populations, and therefore, have negligible impacts on the environment (USDA 1994, Appendix P).

A decision to ban toxicants is outside the scope of WS' authority. WS could elect to discontinue its use of toxicants, but those registered in Nebraska are an integral part of IWDM and their selection for use follows criteria in the ADC Decision Model (see Chapter 3:3.2.3, Slate et al. 1992).

2.3.3 No Wildlife Damage Management at Taxpayer Expense; Wildlife Damage Management Should be Fee-Based

During public involvement, some respondents felt that wildlife damage management was a government subsidy and should be fee-based and not be provided at the expense of the taxpayer. Funding for WS comes from a variety of sources besides federal appropriations. In counties that have cooperative agreements with WS, general tax dollars are used to provide all residents equal access to the WS program. In addition, the NGPC, Forest Service, Omaha Airport Authority, U.S. Air Force, Nebraska Public Power District, and several municipalities currently provide funds to WS for special projects. The NDA and livestock associations also provide funds to WS to protect livestock and other resources. All of these funds are applied to the WS program under cooperative agreements as requested by the cooperator.

WS was established by Congress as the program responsible for providing wildlife damage management to the people of the United States. Federal, state and local officials have decided that funds should be appropriated to WS. Additionally, wildlife damage management is an appropriate sphere of activity for government programs, since wildlife management is a government responsibility. The protection of livestock will always be conducted by someone; a federal WS program conducts an environmentally and biologically sound program in the public interest (Schueler 1993).

2.3.4 Need for Public Awareness and Education

Some individuals suggested that there was a need to educate the public regarding WS activities and the need for wildlife damage management. Although this is a recognized need, WS does not require each state-administered program to undertake efforts to promote public understanding of this issue. Nebraska WS personnel, however: 1) make presentations to elementary and high school classes on wildlife damage management, 2) conduct informational and instructional sessions as requested by individuals or organizations, 3) assist in the teaching of formal wildlife management courses at the University of Nebraska, 4) participate in wildlife damage management workshops with the UNCE and/or other groups or agencies, and 5) participate in Project Wild with the NGPC. In addition, WS maintains information and literature on the use of effective nonlethal methods and livestock guarding animals and provides this information upon request.

2.3.5 Livestock Losses are a Cost of Doing Business and the Need to Consider a Threshold of Loss

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

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

2.3.6 Management Agencies Should Use Hunters/Trappers to Conduct Wildlife Damage Management

The NGPC has the option of increasing hunting quotas, and thus, opportunities for sportsmen and women. However, most of the predator damage management conducted by WS involves coyote damage and

currently there is no regulated season or limit on the coyote take in Nebraska. Bounty systems have also been tried in the U.S. and have generally proved ineffective. A bounty system encourages harvest of the bountied species at times and places when they are easiest and cheapest to harvest and many damage problems occur at times and in places where removing offending animals is difficult.

2.3.7 Appropriateness of Using Rancher-Supplied Data to Quantify Livestock Losses

Some individuals believe that ranchers often intentionally overestimate the extent of their livestock losses to justify more damage management work. Pearson (1986), however, reported that several studies indicated little or no bias in rancher reported losses and Shelton and Klindt (1974) found that some ranchers underestimated their losses due to some husbandry practices. Schaefer et al. (1981) investigated sheep predation and determined that: 1) producers correctly assessed the cause of livestock deaths more than 94% of the time, and 2) the results of two types of loss surveys yielded similar results. Losses attributed to predation by Nebraska sheep producers in 1994 amounted to about 14% of the total reported death loss (NASS 1995). Through intensive monitoring conducted during a study on three typical range sheep operations in southern Idaho, Nass (1977) found that predators were responsible for 56% of the total death losses. This data suggests that attributing an average of 40% of total death losses to predation is realistic and in some cases, losses may be underestimated.

2.3.8 Wildlife Services' Predator Damage Management on Private Versus Public Lands

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

2.3.9 Rancher Responsibility to Protect Their Own Livestock Through Use of Husbandry Methods

Although no law or policy requires livestock producers to employ good husbandry practices to protect their livestock, most Nebraska sheep producers do employ a variety of husbandry practices as a matter of good business. On average, farmers and ranchers spent $1.24 per breeding sheep on nonlethal damage management and $0.68 on lethal damage management (NASS 1995).

Livestock producers in Nebraska employed many nonlethal damage management measures to protect their livestock from predation. In 1996, 406 livestock producers reported 2,946 occurrences in the use of 20 different nonlethal methods (Nebraska WS unpubl. data). Therefore, requests for WS assistance to protect livestock from predation in Nebraska in 1996 came from producers who were already using an average of 7.2 nonlethal methods on each operation, but still experienced predation problems in spite of these practices. The most frequently used nonlethal methods were: 1) husbandry (1,323 occurrences), 2) harassment (878 occurrences), 3) fencing (461 occurrences), and 4) guard animals (290 occurrences). WS' policy is to respond to all requests for assistance within program authority and responsibility. If improved husbandry practices would likely reduce a predation problem, WS makes recommendations regarding these practices.

2.3.10 Compensate Livestock Producers for Wildlife Damage Losses

This issue would be impossible for Nebraska WS or any other federal or state agency to execute. Nebraska WS is charged by law to protect American agricultural and natural resources, property and public health and safety (Animal Damage Control Act of 1931, as amended; and the Rural Development, Agricultural and

Related Agencies Appropriation Act of 1988). Analysis of this issue as an alternative in the ADC EIS (USDA 1994) shows that it has many drawbacks: 1) it would require larger expenditures of money to investigate and validate all losses and to determine and administer appropriate compensation, 2) timely responses to all requests to assess and confirm losses would be difficult and most likely many losses could not be verified, 3) compensation would most likely be below full market value, 4) compensation would give little incentive to livestock owners to limit predation through improved animal husbandry practices and other management strategies, 5) not all livestock owners would rely completely on a compensation program and unregulated lethal control of predators would probably continue and escalate, and 6) neither Congress nor the State of Nebraska has appropriated funds to compensate for livestock predation or to administer a compensation program.

2.3.11 Compensate Livestock Producers to Change the Class of Livestock

Compensating livestock producers to change the class of livestock would be impossible for the Nebraska WS program or any other federal or state agency to do. Nebraska WS is charged by law to protect American agricultural and natural resources, property and public health and safety (Animal Damage Control Act of 1931, as amended; and the Rural Development, Agricultural and Related Agencies Appropriation Act of 1988). Analysis of this issue shows that it has many drawbacks: 1) it would require larger expenditures of money to compensate livestock owners to change the class of livestock, 2) WS has no authority to tell livestock producers to change their class of livestock, 3) not all pasture conditions, equipment used by livestock producers, and education or experience of the livestock producers lend themselves to changing the class of livestock, 4) changing the class of livestock would probably not eliminate all predation, and 5) neither the U.S. Congress or the State of Nebraska has appropriated funds to compensate producers for changing the class of livestock or to administer a compensation program.

2.3.12 Use of the Livestock Protection Collar

The LPC is registered with the EPA (Reg. No. 56228-22) for producer or WS use nationwide. Registrants must also receive approval from the state agency that oversees pesticide usage before using the LPC in individual States, however. Use of the LPC would follow EPA registration and the state agency requirements and would be restricted to specially trained and certified WS employees.

Sodium fluoroacetate (Compound 1080), the chemical in the LPC, has been used since World War II. Sodium fluoroacetate has been the subject of much research in the United States and elsewhere and has been widely used as a toxicant in pest management programs in many countries. Fluoroacetic acid and related chemicals occur naturally in plants in many parts of the world and are not readily absorbed through intact skin (Atzert 1971). Sodium fluoroacetate is discriminantly toxic to predators, being many times more lethal to them than to most nontarget species (Atzert 1971, Connolly and Burns 1990). Sodium fluoroacetate would only be used in the LPC. Many EPA imposed restrictions apply to the use of LPCs.

The LPC is worn around the neck of lambs and kills only the animal attacking collared lambs (Johnson 1984, Burns et al. 1988). In this usage, sodium fluoroacetate is very selective and poses virtually no risk of secondary poisoning (USDA 1994, Appendix P). A decision to ban the use of the LPC is outside the scope of WS' authority. WS could elect not to use the LPC, but its use could be an integral part of IWDM in Nebraska and its selection for use would follow criteria in the ADC Decision Model (see Chapter 3:3.2.3).

2.3.13 Eagle Damage Management and Impacts from Wildlife Services' Activities to Eagles

Some individuals expressed concern about eagle damage and want WS to conduct eagle damage management. The Bald and Golden Eagle Act declares that both bald and golden eagles are protected species and that no person can *" take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or in any manner . . . alive or dead, or any part, nest or egg"* of

these eagles. However, the law does permit the *"taking, possession and transportation of specimens for scientific or exhibition purposes of public museums, scientific societies and zoological parks, or for religious purposes of Indian tribes, or that it is necessary to permit the taking for the protection of wildlife or of agricultural or other interests in any particular locality."* Nebraska WS conducted an informal Section 7 Consultation with the USFWS and a consultation with the NGPC to use their expertise to determine if WS would have any adverse impacts on bald eagles in Nebraska or elsewhere. If a depredation complaint is received by WS, an investigation is conducted to determine if losses have occurred. If losses are verified, WS could capture and relocate an eagle that is causing livestock or wildlife depredations as coordinated with the USFWS or a permit could be issued by the USFWS to the individual experiencing the loss.

When WS responds to such requests for assistance, the USFWS is informed of the incident and consultation is initiated. Nebraska WS has never used lethal methods to resolve eagle damage/hazard complaints. If operational assistance is necessary, WS obtains the necessary approval from the USFWS and nonlethal methods are employed. However, the 1992 USFWS Biological Opinion stipulates that WS is allowed an incidental take of 2 bald eagles nationwide each year, with the exception of the southwestern population. The Biological Opinion also indicates that this level of impact is not likely to result in jeopardy to the species and thus, no cumulative impacts on bald eagles would be expected.

2.3.14 Appropriateness of Preparing an Environmental Assessment Instead of an Environmental Impact Statement and an Environmental Impact Statement has to be Prepared Because of Controversy

Some individuals questioned whether preparing an EA for an area as large as the State of Nebraska would meet the NEPA requirements for site specificity and suggested that an EIS be prepared because of the controversy of the WS program. Council on Environmental Quality (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 WS' predator damage management *are not highly controversial* among wildlife biologists: this is supported by the interagency review process employed during the preparation of this EA. If a determination is made through this EA that the proposed action would have a significant environmental impact, then an EIS would be prepared. In terms of considering cumulative impacts, one EA covering the entire analysis area would provide a better analysis than multiple EAs covering smaller zones within the analysis area. This EA assesses cumulative and significant impacts within the analysis area from an ecosystem perspective. The proposed action would not have an impact on historic properties (Puschendorf 1997) or unique characteristics such as historical or cultural resources, park lands, prime farmlands, wetlands, WSRs, or ecological critical areas, and it will not adversely affect public health and safety. No accidents associated with WS' predator damage management are known to have occurred in Nebraska. The effects on the quality of the human environment are not highly controversial. Although there is opposition to predator damage management, this action is not controversial in relation to size, nature, or effects. Mitigation measures adopted as part of the proposed action minimize any risk to the public, prevent adverse effects on the human environment, and reduce uncertainty and risks.

2.3.15 Wildlife Services Must Consider Cumulative Impacts from Surrounding States

The Nebraska WS Program coordinates its activities with the Forest Service, BLM, USFWS and the NGPC to insure no cumulative effects to any wildlife populations or other resources managed by these agencies. Nebraska WS conducted a Section 7 Consultation with the USFWS and the NGPC to insure no adverse or cumulative impacts to listed and T&E species and has consulted with the Nebraska Historical Preservation Office and American Indian Tribes to insure no adverse impacts to historical or cultural resources. The intent of this coordination and consultation is to draw on the expertise of other agency and tribal personnel to insure there are no cumulative impacts, in Nebraska or surrounding States, from WS' predator damage

management.

2.3.16 Wildlife Services Causes Genetic Loss in the Subspecies of Coyotes Found in Nebraska

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

Coyotes are regarded as predators with generalized food habits that allow them to inhabit a wide variety of habitat types. They are considered widely distributed throughout most of North America and are highly mobile, migrating over large areas. Migration facilitates interbreeding of subspecies, invalidating subspecies classifications (Voigt and Berg 1987). In other words, coyotes are morphologically indistinguishable and so much alike that trained wildlife biologists cannot tell one subspecies from another (Connolly 1994). Young and Jackson (1951) wrote of the great amount of individual variation in color, size and cranial characteristics of coyotes and stated that the actual limits of the geographic range of any subspecies cannot be indicated by distinct boundaries. They also suggested that, within the range of one subspecies, individual coyotes will be found that are typical of other subspecies. Dispersal of *"surplus"* animals is the main factor that keeps coyote populations distributed throughout their habitat. Such dispersal of subdominant animals removes surplus animals from higher density areas and repopulates areas with lower densities.

There is one subspecies of coyote found in Nebraska, *Canis latrans latrans* (plains coyote) (Young and Jackson 1951). Young and Jackson (1951) stated that, *"in its* (plains coyote) *peripheral range there is the usual broad band of intergradition with the adjacent subspecies and subspecific determination of specimens from these borders may be difficult* (to determine) *or a matter of personal judgment."* This means that the average person looking at a coyote on or near the edges of the published geographic range of the plains coyote would find it difficult or impossible to tell if the animal was, in fact, a plains coyote or a member of another subspecies.

WS' take of coyotes is limited to areas where cooperative agreements or work plans are in place in specific livestock grazing areas. Nebraska WS' removal of coyotes, as analyzed in Chapter 4 of this EA, does not and has not impacted genetic variability of the coyote population. Furthermore, there is no indication that the plains coyote in Nebraska is scarce or rare.

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

Two studies (Connolly et al. 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 from pen studies, with known-aged coyotes, that the proclivity of individuals that attacked livestock seemed related to their age and relationship with conspecifics. The dominant males and females attacked sheep most frequently, with the males responsible for most of the attacks and kills. 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. Submissive, younger, and less dominant animals scavenged on carcasses of animals killed by the dominant pair, other carcasses, or had diets that, in part, consisted of other small food items. Windberg et al. (1997) demonstrated that coyotes from unexploited coyote populations readily killed livestock and selectively preyed on smaller goat kids. They determined that 41% of the kid goats exposed during the study were

killed by predators. This remarkably high predation rate occurred despite no recent (>7 years) exposure to goats or sheep as prey on their study area. Thus, it appears the above concern is unfounded because removal of local territorial (dominant) coyotes removes the individuals that are most likely to kill livestock and generally results in the immigration of subdominant coyotes that are less likely to kill livestock.

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

Predator damage management, as analyzed in this EA, would not impact predator populations (Andelt 1997) except possibly in localized areas in the short-term. The take of coyotes is well below the level that would impact any existing wildlife populations, and therefore, fox or other mesopredator populations would not increase unchecked because of WS' predator damage management (Andelt 1997).

Red foxes have been the subject of many studies during the last 20 years and investigations have revealed that red foxes are extremely adaptive and diverse in their behavior and selection of habitats (Sargeant et al. 1984). Voigt and Earle (1983) and Gese et al. (1996) showed that red foxes avoided coyotes but coexisted in the same area and habitats. In the prairie pothole region, Sargeant et al. (1993) stated that coyotes, red foxes, and mink were numerous or common in one or more study areas. Sargeant et al. (1993) stated that the abundance of red foxes has a profound effect on the survival of adult ducks in the prairie pothole region, however, coyotes probably also prey extensively on adult ducks. In their study of the prairie pothole region, Sargeant et al. (1973) and Sargeant et al. (1993) determined that coyotes, red foxes, and mink are the primary mammalian species affecting duckling survival.

2.3.19 Lethal Methods May Actually Increase Predation by Changing Coyote Pack Structure Through Compensatory Reproduction

Mortality in coyote populations can range from 19%-100%, with 40%-60% mortality most common. Several studies of coyote survival rates, which include calculations based on the age distribution of coyote populations, show typical annual survival rates of 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 of "unexploited" coyote populations were reported to be between 38%-56%. Thus, most natural coyote populations are not stable (USDI 1979). In studies where reported coyote mortality was investigated, only 14 of 326 recorded mortalities were due to WS' 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. As noted in 2.3.17, two studies (Connolly et al. 1976, Gese and Grothe 1995) investigated the predatory behavior of coyotes and determined that the more dominant (alpha) animals (adult breeding pairs) were the ones that initiated and killed most of the prey items. Thus, it appears the above concern is unfounded because the removal of local territorial (dominant, breeding adult) coyotes actually removes the individuals that are most likely to kill livestock and generally results in the immigration of subdominant coyotes that are less likely to prey on livestock.

Coyotes in areas of lower population densities may reproduce at an earlier age and have more offspring per litter, however, these same populations generally sustain higher mortality rates. Therefore, the overall population of the area does not change. The number of breeding coyotes does not substantially increase without exploitation and individual coyote territories produce one litter per year independent of the population being exploited or unexploited. Connolly and Longhurst (1975) demonstrated that coyote populations in exploited and unexploited populations do not increase at significantly different rates and that an area will only support a population to its carrying capacity.

2.3.20 Concerns Over the Cost Effectiveness of WS' Activities

The cost-effectiveness of WS' activities was a common concern of many respondents during the public involvement process. However, NEPA does not require preparation of a specific cost-benefit analysis and consideration of this issue is not essential to making a reasoned choice among the alternatives being considered.

It is currently difficult to prepare a cost-benefit analysis of the Nebraska WS predator damage management program because WS cooperates with individual counties, associations or other entities and services are not equally available in all locations. In addition, most livestock statistics (i.e., inventories, loss information, etc.) are gathered on a district or state-wide basis. As there is no direct correlation between these districts and WS' activity areas, any reasonable and reliable economic analysis would currently be impossible.

In addition, it is important to remember that any economic analysis must be limited to quantifiable values and variables that would be difficult to measure often cannot be considered. For example, when sheep on rangelands are repeatedly harassed by predators, they become *nervous* and do not disperse and feed normally. Thus, they graze inefficiently and do not gain as much weight as they would have, had they not been stressed. This is a recognized form of indirect predator damage that would be difficult to quantify in dollars and cents. Jahnke et al. (1987) and Wagner (1988) discussed additional examples of indirect predator damage, including increased labor costs to find sheep scattered by predators, increased producer efforts, and range damage related to the tighter herding required in response to the presence of predators. In addition, any analysis based solely on economics probably would not consider the esthetic value that some individuals associate with the opportunity to see or hear coyotes when they visit Nebraska rangelands, nor would it consider the unintentional harm or indirect benefits predator control has on certain wildlife species.

It is also important to remember that a cost-benefit analysis of WS' activities during the decades of widespread toxicant use would likely show a much higher benefit per unit cost than for predator damage management programs as currently practiced. Although toxicants were cheap and very effective at keeping predator numbers and livestock losses low, concerns were expressed about some of the environmental impacts associated with their wide-spread application. Thus, our social value system has essentially established limits on how cost-effectively predator damage management can be conducted. As other considerations, (i.e., humaneness, selectivity, and safety to humans and animals) are incorporated into a damage management strategy, the use of certain damage management methods often increases and the cost-effectiveness of predator control is reduced.

2.4 ADDITIONAL ISSUES NOT CONSIDERED BECAUSE THEY ARE OUTSIDE THE SCOPE OF THIS ANALYSIS

1. Issue more Deer Permits
2. Establishing/Increasing Hunting Quotas
3. Grazing on Public Lands
4. Prairie Dog Control

CHAPTER 3: ALTERNATIVES

INTRODUCTION

This chapter consists of five parts: 1) an introduction, 2) a description of alternatives considered and analyzed in detail including the Proposed Alternative (Alternative 3), 3) a description of methods used by Nebraska WS personnel, 4) a description of alternatives considered, but eliminated from detailed analysis, and 5) a table of mitigation measures and SOPs. Six alternatives were recognized, developed, and analyzed in detail by the Multi-agency Team (WS, BLM, Forest Service, USFWS, NGPC, NDA, and UNCE); three alternatives were considered but not analyzed in detail. The six alternatives analyzed in detail were:

1) Alternative 1 - Continue the Current Nebraska WS Program (No Action). This alternative consists of the current program of technical assistance and operational integrated wildlife damage management by Nebraska WS on the Nebraska National Forest and Oglala National Grassland, as well as state, county, municipal, and private lands under cooperative agreement and agreement for control. The current program primarily protects agricultural resources and public health and safety.

2) Alternative 2 - No Federal Nebraska WS Program. This alternative would terminate the federal predator damage management program in Nebraska.

3) Alternative 3 - Integrated Wildlife Damage Management for Multiple Resources and Land Classes (Proposed Alternative). This alternative would allow for predator damage management based on the needs of multiple resources (livestock, wildlife, property, and public health and safety) and would be implemented following consultations with the NGPC, NDA, federal agencies and tribes, as appropriate. This alternative would allow Nebraska WS to protect multiple resources on lands owned or managed by federal or state agencies and tribal, county, municipal and private lands as requested and after the appropriate cooperative agreement, agreement for control, MOU, wildlife damage management work plan or other comparable document is in place.

4) Alternative 4 - Nonlethal Damage Management Required Prior to Lethal Control. This alternative would require that livestock owners conduct nonlethal damage management before Nebraska WS could implement lethal control.

5) Alternative 5 - Corrective Damage Management Only. This alternative would require that livestock depredations occur before Nebraska WS could implement control. No preventive lethal management would be allowed.

6) Alternative 6 - Technical Assistance Only. Under this alternative, Nebraska WS would not conduct operational predator damage management in Nebraska. The entire program would consist of only technical assistance.

3.1 DESCRIPTION OF THE ALTERNATIVES (Table 3-1)

3.1.1 Alternative 1 - Continue the Current Nebraska WS Program (No Action)

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

The No Action Alternative would continue the current predator damage management program that relies on cooperation between Nebraska WS and other federal, state and local agencies, private individuals, and

associations to protect livestock, wildlife, property, and public health and safety (as described in Chapter 1). Nebraska WS conducts technical assistance, operational preventive predator damage management (based on historic loss data) and corrective predator control (in response to current losses, hazards or threats to public safety) as allowed by MOUs, cooperative agreements and agreements for control. All wildlife damage management is based on interagency relationships which require close coordination and cooperation because of overlapping authorities. Nebraska WS has a MOU with the NDA, NGPC, NDH and UNCE. At present, predator damage management for the protection of wildlife is conducted as requested and as separate projects.

3.1.2 Alternative 2 - No Federal Nebraska WS Program

This alternative would eliminate all Nebraska WS predator damage management (operational and technical assistance) on all land classes in Nebraska. However, state and county agencies and private individuals could conduct wildlife damage management. Nebraska WS would not be available to provide technical assistance or make recommendations to livestock producers.

Due to interest in this alternative, an analysis has been included. A "No Program" Alternative was also evaluated in the ADC EIS (USDA 1994).

3.1.3 Alternative 3 - Integrated Wildlife Damage Management for Multiple Resources and Land Classes (Proposed Action)

This alternative proposes to combine Nebraska WS' livestock protection program with damage management activities for the protection of designated wildlife resources, property, and public health and safety on all land classes. Management would be conducted following consultation with the NGPC and USFWS for T&E and migratory bird species. In addition, the appropriate land management agency would be consulted before any action would occur on lands under their jurisdiction. Damage management strategies would be selected based on the combined needs of multiple resources and would be mitigated to prevent any potentially adverse impacts to wildlife. This strategy provides for more of an ecosystem management approach for areas where Nebraska WS conducts predator damage management. For any specific area of public land, the NGPC and USFWS could attend the wildlife damage management work plan meeting between Nebraska WS and the land or wildlife management agency. In addition, the tribes residing in Nebraska are responsible for management of wildlife species on tribal lands and could request Nebraska WS' assistance. At that time, a work plan or other comparable document consistent with this EA would be developed. Nebraska WS would identify areas where requests for assistance to protect livestock have been received or are anticipated (based on historic loss data). The cooperating agency or tribe would identify areas where protection of wildlife may be necessary to achieve their management objectives and where mitigation is necessary to protect resources under their jurisdiction. The appropriate predator damage management strategy would be developed based on the combined resource needs and mitigation requirements.

Legal mechanical and chemical management methods (including the LPC, if registered) would be applied where appropriate, under this alternative. In addition, predator damage management could be conducted in designated special management areas when requested, necessary, allowed by legislation, and coordinated with the land management agency. However, predator damage management in designated areas is expected to comprise a small segment of the program under Alternative 3.

For federal lands, Nebraska WS Work Plans would describe the predator damage management that could occur. These plans would be developed in cooperation with the BLM, Forest Service or other federal land management agency and would include maps and other information that describe and delineate where predator damage management would be conducted, the methods to be used, and any management

considerations. Before management would be conducted on private lands, agreements for control would be signed with the landowner or manager. These agreements would describe the methods to be used and the species to be managed. Management would be directed toward localized predator populations or groups and/or individual offending animals, depending on the circumstances.

3.1.4 Alternative 4 - Nonlethal Control Required Prior to Lethal Control

This alternative would require livestock producers to implement nonlethal management before Nebraska WS could conduct lethal control. Producers could employ techniques such as livestock husbandry and/or animal behavior or habitat modification methods. Nebraska WS would be responsible for verifying producer-employed methods. At present, no standard exists to determine producer diligence in applying these methods, nor are there any standards to determine how many nonlethal applications are necessary before lethal control is initiated. Thus, only the presence or absence of nonlethal methods could be evaluated (Table 4-1). The mechanical and chemical methods available in Alternatives 1 and 3 would apply, where appropriate, once the criteria for nonlethal control has been met. The producers would not be required to consider mitigation measures before implementing nonlethal methods, nor would Nebraska WS base predator damage management strategies on the needs of designated wildlife or T&E species.

3.1.5 Alternative 5 - Corrective Control Only

This alternative would restrict predator damage management to places where livestock depredations are occurring and would require Nebraska WS to verify losses and the species responsible. Producers could still implement practical and effective nonlethal methods. Lethal management would be limited to the immediate area surrounding the damage to maintain the integrity of the corrective-only situation. All mechanical and chemical damage management methods available in Alternatives 1 and 3 could be used once losses have occurred and were verified.

3.1.6 Alternative 6 - Technical Assistance Only

This alternative would eliminate WS' operational predator damage management in Nebraska. WS would only provide technical assistance and make recommendations as requested. Private landowners, contractors, or others, however, could conduct their own predator damage management on federal, state, county, and private lands.

The *"Technical Assistance Only"* Alternative would place the burden of operational control on state or county agencies, property owners and livestock producers. Individuals experiencing predator damage would, independently or with Nebraska WS' recommendations, carry out and fund control activities. Individual producers could implement predator damage management as part of the cost of doing business or a state or county agency could assume a more active role in providing operational predator damage management. If this alternative were selected, Nebraska WS could not direct how state agencies or individuals would implement damage management. Some agencies or individuals could choose not to take action to resolve predator damage, while other situations could be addressed using all legally available methods. Methods and control devices could be applied by people with little or no training or experience and with no professional oversight or monitoring for effectiveness.

Table 3-1. Comparison of WS' Predator Damage Management Alternatives

	Alt 1 Current Program	**Alt 2** No Program	**Alt 3** Proposed Program	**Alt 4** Nonlethal	**Alt 5** Corrective Only	**Alt 6** Technical Assistance
Nonlethal	Yes	NA	Yes	Yes	Yes	Yes
Lethal	Yes	NA	Yes	No	Yes	Yes
M-44s	Yes	NA	Yes	No	Yes	No
Traps	Yes	NA	Yes	Yes	Yes	No
Neck Snares	Yes	NA	Yes	No	Yes	No
Foot Snares	Yes	NA	Yes	Yes	Yes	No
Gas Cartidge	Yes	NA	Yes	No	Yes	No
Aerial Hunting	Yes	NA	Yes	No	Yes	No
Dogs	Yes	NA	Yes	No	Yes	No
Calling/ Shooting	Yes	NA	Yes	No	Yes	No
Preventive	Yes	NA	Yes	Yes	No	Yes
LPC[1]	Yes	NA	Yes	No	Yes	Yes

[1] The LPC would not be used on BLM or Forest Service lands, nor on private lands until registered in Nebraska.

3.2 PREDATOR DAMAGE MANAGEMENT STRATEGIES AND METHODOLOGIES USED BY WS IN NEBRASKA

The strategies and methodologies described below are common to Alternatives 1, 3, 4 and 5 of this EA. Under Alternative 6, WS personnel would only make technical assistance recommendations, as requested, based on practical and legal strategies supported by the ADC Decision Model (Slate et al. 1992, USDA 1994). Alternative 2 would eliminate WS' predator damage management in Nebraska.

3.2.1 Integrated Wildlife Damage Management

For more than 80 years, WS has considered, developed, and used numerous methods of managing wildlife damage problems (USDA 1994:3). WS' efforts have included the research and development of new methods and the implementation of effective strategies to resolve and prevent wildlife damage.

Usually, 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 reduction of damage caused by wildlife based on local problem analyses and the informed judgement of trained personnel.

The philosophy behind IWDM is to implement effective management techniques in a cost-effective manner[4] while minimizing the potentially harmful effects to humans, target and nontarget species, and the environment. IWDM draws from the largest possible array of options to create a combination of appropriate techniques for the specific circumstances.

3.2.2 Integrated Predator Damage Management Strategies Used by WS in Nebraska

Technical Assistance (implementation is the responsibility of the requester): Nebraska WS personnel provide information and conduct demonstrations on the use of predator damage management devices and techniques (propane exploders, electronic guards, cage traps, guarding animals, wildlife habitat management, animal behavior modification, etc.). Technical assistance is usually provided during an on-site visit or verbal consultation when several management strategies are prescribed as short and long-term solutions. Technical assistance may require substantial effort by WS personnel during the decision making process, but the requester is ultimately responsible for implementing the management techniques.

Direct Assistance (management conducted or supervised by WS personnel): Direct assistance is implemented when the problem cannot be resolved through technical assistance and when cooperative agreements, work plans, or other comparable documents provide for WS' operational management. The initial investigation defines the nature and history of the problem, extent of damage, and the species responsible. WS personnel are often required to resolve problems effectively and safely, especially if restricted use pesticides are required; they consider 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.

1. **Preventive Damage Management.** Preventive damage management is the application of damage management strategies before damage occurs (based on historic problems and data). WS personnel provide information and conduct demonstrations or take direct action to prevent losses from occurring.

   Preventive predator damage management differs little in principle from holding controlled hunts for deer in areas where agricultural crop damage has been a historic problem. By reducing the number of deer near agricultural fields or the number of predators near a protected resource, the likelihood of damage is reduced.

   Shelton and Klindt (1974) documented a correlation between coyote densities and levels of sheep loss in Texas, and Robel et al. (1981) found a similar correlation in Kansas. In southeastern Idaho, Stoddart and Griffiths (1986) documented an increase followed by a decrease in lamb losses as coyote populations rose and fell. Gantz (1990) concluded that late winter removal of territorial coyotes from mountain grazing allotments would reduce predation on sheep pastured on those allotments the following summer.

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

[4] The cost of management may be secondary because of over-riding environmental, legal, public health and safety, or animal welfare concerns.

2. **Corrective Damage Management.** Corrective damage management occurs when predator damage management is implemented to stop or reduce current losses. WS personnel may provide information and conduct demonstrations or take direct action to prevent additional losses. For example, WS personnel may use traps, snares, calling and shooting, M-44s or aerial hunting to alleviate or reduce depredations. Coyotes and other predators are highly adaptable and damage-causing individuals sometimes need to be removed from the population as soon as possible to avoid additional losses. The U.S. General Accounting Office (GAO) acknowledged the need for corrective control when they concluded that, according to available research, localized lethal damage management is effective in reducing predator damage (GAO 1990).

3.2.3 WS Decision Making

The ADC EIS (USDA 1994, Appendix N) describes the procedures used by WS' personnel to determine specific damage management strategies. For example, this source provides detailed examples of how WS implements its decision process when coyotes depredate sheep on public and private lands. The ADC Decision Model (Figure 3-1) (Slate et al. 1992) facilitates consideration of the following factors:

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

WS personnel are frequently contacted after requesters have tried nonlethal techniques and found them to be inadequate for reducing damage to an acceptable level. WS personnel assess the problem and methods are evaluated for their availability (legal and administrative) and suitability based on biological, economic and social considerations. Following this evaluation, practical methods are formed into a management strategy. After implementation, the strategy is monitored and evaluated to assess its effectiveness. If the strategy is effective, management is reduced or terminated.

On most farms and ranches, predator damage may occur whenever vulnerable livestock are present because no cost-effective method(s) are 100% effective in preventing predator problems. When intermittent damage continues, WS personnel and the producer monitor and reevaluate the situation frequently. If a method or combination of methods fail to stop the damage, a different strategy is implemented. Most damage management efforts consist of a continuous feedback loop between receiving the request and monitoring the results, with the strategy reevaluated and revised periodically.

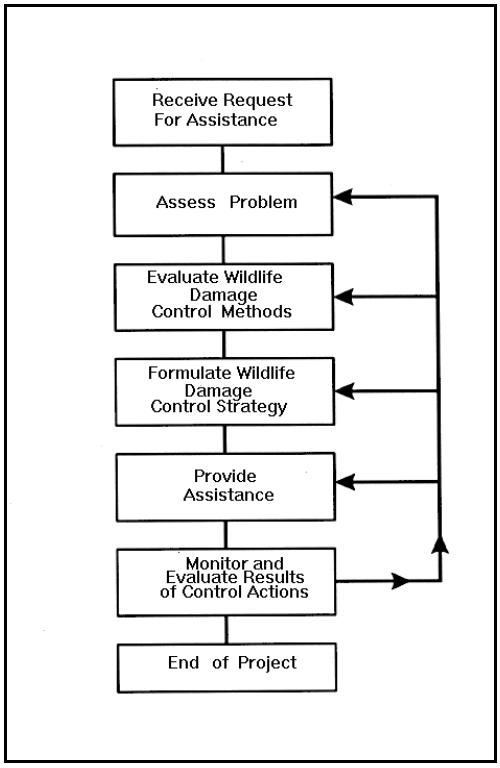


Figure 3-1
APHIS ADC Decision Model

3.2.4 Predator Damage Management Methods Recommended or Used by WS in Nebraska

Producer-Implemented Methods

Producer-Implemented Methods generally consist of nonlethal preventive techniques such as the use of animal husbandry and animal behavior and habitat modification. Producers are encouraged to use these methods based on the level of risk, need, and practicality.

- **Animal husbandry** practices include modifications in the level of care or attention given to livestock (depending on the age and size of the livestock). Animal husbandry practices include, but are not limited to, the use of:

    - guard animals
    - herders
    - shed lambing
    - carcass removal
    - temporary fencing
    - pasture selection

- **Habitat modification** is used whenever practical to attract or repel certain wildlife species or to separate livestock from predators. For example, WS may recommend that a producer clear brush from lambing or calving pastures to reduce available cover for predators.

- **Animal behavior modification** refers to tactics that deter or repel predators and thus, reduce predation. Unfortunately, many of these techniques are only effective for a short time before wildlife habituate to them (Pfeifer and Goos 1982, Conover 1982). Devices used to modify behavior include:

    - predator-proof fences
    - electronic guards (siren strobe-light devices)
    - propane exploders
    - pyrotechnics

Nebraska WS personnel maintain and distribute information on livestock guarding dogs and other nonlethal techniques. In FY96, those Nebraska sheep producers that requested WS' assistance used fencing (89.5%), night penning (86.8%), guard dogs (56.6%), and harassment (71.0%) to protect their animals, while Nebraska cattle producers used fencing (81.4%), carcass removal (80.5%), harassment (66.7%) and habitat manipulation (53.1%) to protect their cows and calves (Nebraska WS unpubl. data). On average, each Nebraska livestock producer that requested WS' assistance used 7.2 nonlethal methods while attempting to protect their livestock.

Mechanical Damage Management Methods

Mechanical management methods consist primarily of tools or devices used to repel, capture or kill a particular animal or local population of wildlife to alleviate resource damage. Mechanical methods may be nonlethal (e.g., fencing, frightening devices, etc.) or lethal (e.g., M-44 devices, snares, etc.). If WS personnel apply mechanical methods on private lands, an *Agreement for Control on Private Property* must be signed by the landowner or administrator authorizing the use of each damage management method. On BLM and National Forest System lands, a work plan would be in place that identifies where and when damage management requests may be expected based on livestock use and historic information. Federal land managers are responsible for identifying areas where other multiple use priorities may conflict with predator damage management activities. Mechanical methods used by WS include:

- **Leghold traps** can be utilized to live-capture a variety of mammals, but are most often used within Nebraska to capture coyotes and red foxes. Two advantages of the leghold trap are: 1) they can be set under a wide variety of conditions, and 2) pan-tension devices can be used to reduce the probability of capturing smaller nontarget animals. Effective trap placement and the use of appropriate lures by trained WS personnel also contribute to the leghold trap's selectivity. In addition, leghold traps allow for the release or relocation of animals.

  Leghold traps are difficult to keep operational during inclement weather and they lack selectivity where nontarget species are of a similar or heavier weight than the target species. The use of leghold traps also requires more time and labor than some methods, but they are indispensable in resolving many depredation problems.

- **Cage traps**, typically constructed of wire mesh or plastic, are sometimes used or recommended to capture smaller animals like raccoons or skunks. Cage traps pose minimal risks to humans, pets and nontarget wildlife and allow for on-site release or relocation of animals. Cage traps, however, cannot be used effectively to consistently capture wary predators such as coyotes and red foxes.

- **Snares** may be used as either lethal or live-capture devices. They are placed wherever an animal moves through a restricted area (e.g., crawl holes under fences, trails through vegetation, etc.) and are easier to keep operational during periods of inclement weather than leghold traps. Snares set to catch an animal by the neck are usually lethal, while snares positioned to capture an animal around the body or leg can be a live-capture method. Careful attention to details when placing snares and the use of a *"stop"* on the cable can also allow for live-capture of neck-snared animals. Nebraska WS is incorporating some*"break-away"* snares that allow larger nontarget animals to break the snare and escape (Phillips 1996). In addition, spring-activated foot snares could be used to capture depredating mountain lions, if necessary.

- **Ground shooting** is selective for a target species and may involve the use of spotlights, decoy dogs, and predator calling. Removal of one or two specific animals by calling and shooting in the problem area can sometimes provide immediate relief from a predation problem. Calling and shooting is often tried as one of the first lethal damage management options because it offers the potential of solving a problem more quickly and selectively than some other methods. Shooting is sometimes the only predator damage management option available if other factors preclude the setting of equipment such as traps and snares.

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

- **Denning** is the practice of finding coyote or red fox dens and eliminating the young, adults, or both to stop an ongoing predation problem or prevent future depredation on livestock. Till and Knowlton (1983) documented denning's cost-effectiveness and high degree of efficacy in resolving predation problems due to coyotes killing lambs in the spring. Coyote and red fox depredations on livestock often increase in the spring and early summer due to the increased food requirements associated with feeding and rearing litters of pups. Removal of pups will often stop depredations even if the adults are not taken (Till 1992). Pups are typically euthanized in the den using a registered gas fumigant cartridge (see discussion of gas cartridge under *Chemical Management Methods*).

- **Aerial hunting**, the shooting of coyotes or red foxes from an aircraft, is used on all lands where authorized and deemed appropriate. Aerial hunting consists of visually sighting target animals in the problem area and shooting them with a shotgun from an aircraft. Local depredation problems (particularly lamb and calf predation by coyotes) can often be resolved quickly through aerial hunting.

  Cain et al. (1972) rated aerial hunting as *"very good"* in effectiveness for problem solving, safety, and lack of adverse environmental impacts. Smith et al. (1986) cited cost-effectiveness and efficacy as benefits of aerial hunting for the protection of pronghorn antelope from coyote predation. Connolly and O'Gara (1987) documented the efficacy of aerial hunting in taking confirmed sheep-killing coyotes. Wagner (1997) found that aerial hunting may be an especially appropriate tool as it reduces risks to nontarget animals and minimizes contact between damage management operations and recreationists. She also stated that aerial hunting was an effective method for reducing livestock predation and that aerial hunting 3 to 6 months before sheep are grazed on an area was cost-effective when compared with areas without aerial hunting.

  Good visibility and relatively clear and stable weather conditions are required for effective and safe aerial hunting. Summer conditions limit the effectiveness of aerial hunting as heat reduces coyote activity and visibility is greatly hampered by vegetative ground cover. Air temperature, which influences air density, affects low-level flight safety and may also restrict aerial hunting activities.

Chemical Management Methods

All chemicals used by WS are registered under the FIFRA and administered by the EPA and NDA. All WS personnel in Nebraska that use pesticides are certified as restricted-use pesticide applicators by the NDA; the NDA requires pesticide applicators to adhere to all certification requirements set forth in the FIFRA. No chemicals are used on public or private lands without authorization from the land management agency or property owner or manager. The chemical methods used and/or available for use in Nebraska are:

- **Sodium cyanide in the M-44 device** - The M-44 can be used effectively during winter months when leghold traps are difficult to keep in operation and M-44s are typically more selective for target canid species than leghold traps. The M-44 is a spring-activated ejector device developed specifically to kill coyotes, although it is also registered with the EPA (EPA Reg No. 56228-15) to kill red foxes and feral dogs. The M-44 consists of a capsule holder wrapped in an absorbent material, an ejector mechanism, a capsule containing about 0.9 grams of a powdered sodium cyanide mixture, a fluorescent marker, and a 5-7 inch hollow stake. To set a M-44, a suitable location is found, the hollow stake is driven into the ground, and the ejector unit is cocked and fastened into the stake by a slip ring. The wrapped capsule holder containing the cyanide capsule is then screwed onto the ejector unit and a coyote attractant is applied to the capsule holder. A canine attracted to the bait will try to bite and pick up the baited capsule holder. When the M-44 capsule holder is pulled, the spring-activated plunger propels sodium cyanide into the animal's mouth, resulting in death within seconds. Coyotes killed by M-44s present no secondary poisoning risks (USDA 1994, Appendix P, pgs. 269-271). Bilingual (English-Spanish) warning signs are posted at major entries into the area where M-44s are placed, and two bilingual warning signs are placed within 25 feet to warn of each device's presence.

  The M-44 is very selective for canids because of the attractants used and because the device is triggered by pulling upward. Connolly (1988), in an analysis of M-44 use by the WS program from 1976-1986, documented about a 99% selectivity rate for target species (excluding skunks) in Nebraska. Domestic dogs are susceptible to M-44s, and this limits the areas where the devices can

be safely used. In addition, the 26 EPA use restrictions preclude the use of M-44s in areas where they may pose a danger to T&E species.

M-44s are used for corrective and preventive damage management on all land classes where authorized. WS personnel comply with the EPA label and 26 use restrictions (see USDA 1994, Appendix Q).

- The **gas cartridge** is registered as a fumigant by the EPA (Reg. No. 56228-21) and is used in conjunction with denning operations in Nebraska. When ignited, the cartridge burns in the den of an animal and produces large amounts of carbon monoxide, a colorless, odorless, and tasteless, poisonous gas. The combination of oxygen depletion and carbon monoxide exposure kills the animals in the den. Carbon monoxide euthanasia is recognized by the AVMA as an approved and humane method to kill animals (AVMA 1987).

- **Chemical immobilization/euthanasia -** Several chemicals are authorized for immobilization and euthanasia by WS. Nebraska WS personnel have received and will continue to receive training in the safe use of authorized immobilization/euthanasia chemicals and are certified by WS. This training involves classroom and hands-on application of state-of-the-art techniques and chemicals.

  Telazol™ , Ketaset™, Rompun™, and Capture-All 5™ are the immobilizing agents that may be used by WS, and are approved by the Food and Drug Administration (FDA). Telazol, Ketaset, and Capture-All 5 are rapid-acting, nonnarcotic, nonbarbituate, injectable, anesthetic agents, having a wide margin of safety. All three drugs produce unconsciousness known as "dissociative" whereby protective reflexes needed to sustain life (breathing, coughing, swallowing, etc.) are not affected by the drugs. These agents are used to immobilize live-trapped animals for relocation or they are administered before euthanasia. They may also be used in tranquilizer darts to capture predators. As other drugs are approved by the FDA and WS, they could be incorporated into the Nebraska WS program.

  Telazol is a combination of equal parts of tiletamine hydrochloride and zolazepam hydrochloride. The product is generally supplied sterile in vials, each containing 500 mg of active drug, and when dissolved in sterile water has a pH of 2.2 to 2.8. Telazol produces a state of unconsciousness in which protective reflexes, such as coughing and swallowing, are maintained during anesthesia. Before using Telazol, the weight, age, temperament, and health of the animal are considered. Following a deep intramuscular injection of Telazol, onset of anesthetic effect usually occurs within 5 to 12 min. Muscle relaxation is optimum for about the first 20 to 25 min after the administration, then diminishes. Recovery varies with the age and physical condition of the animal and the dose of Telazol administered, but usually requires several hours (see Schobert (1987) for the dosage rates for many wild and exotic animals).

  Ketaset (ketamine) is supplied as a slightly acidic solution (pH 3.5 to 5.5) for intramuscular injection. Ketaset also produces a state of unconsciousness that interrupts association pathways to the brain and allows for the maintenance of the protective reflexes, such as coughing, swallowing, and pedal and corneal activity. Ketaset is detoxified by the liver and excreted by the kidney. Following administration of recommended doses, animals become immobilized in about 5 min with anesthesia lasting from 30 to 45 min. Depending on dosage, recovery may be within 4 to 5 hrs or may take as long as 24 hrs. Recovery is generally smooth and uneventful.

  Rompun (xylazine) is a sedative which produces a transitory hypertension followed by prolonged hypotension and respiratory depression. Recommended dosages are administered through intramuscular injection allowing the animal to become immobilized in about 5 min and lasting

from 30 to 45 min.

Capture-All 5 is a combination of ketaset and rompun and is regulated by the FDA as a new investigational animal drug. The drug is available, through licensed veterinarians, to individuals sufficiently trained in the use of immobilization agents. Capture-All 5 is administered by intramuscular injection; it requires no mixing and has a relatively long shelf life without refrigeration which make it ideal for the sedation of animals by wildlife professionals working in field conditions.

Potassium chloride is approved by the AVMA as an euthanizing agent (AVMA 1987). It is a common laboratory chemical which could be injected by WS personnel after an animal has been anesthetized.

Beuthanasia-D^{R} (sodium pentobarbital) is approved by the AVMA as an euthanizing agent. It is regulated by the Drug Enforcement Agency (DEA) and the FDA for euthanization of dogs, but legally may be used on other animals if the animal is not intended for human consumption.

3.3 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL, WITH RATIONALE

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

3.3.1 The Humane Society of the United States Alternative

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

The components of this proposed alternative by the HSUS have been analyzed in detail in the alternatives contained in this EA and through court rulings. The HSUS Alternative would not allow for a full range of IWDM techniques to resolve predator damage management problems. In addition, WS is directed by Congress to protect American agriculture, natural resources, property, and to safeguard public health and safety, despite the cost of damage management, and it is program policy to aid each requester to minimize losses. Furthermore, in the Southern Utah Wilderness Society et al. vs. Hugh Thompson et al. U.S. Forest Service (U.S. District Court of Utah 1993), the court clearly states that, "*The agency need not show that a certain level of damage is occurring before it implements an ADC program. . . .Hence, to establish need for an ADC, the forest supervisors need only show that damage from predators is threatened.*" In other words, it is not necessary to establish a criterion, such as percentage of loss of a herd to justify the need for wildlife damage management. If damage management efforts are not initiated soon after a damage problem is detected, losses may sometimes escalate to excessive levels before the problem is solved. The alternatives and option selected for detailed analysis in this EA include many of the suggestions in the HSUS proposal. 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 WS.

3.3.2 Defenders of Wildlife Alternative

The Defenders of Wildlife (DOW) proposed an alternative that requires: *1) "use of lethal methods only*

after the onset of depredation occurs and only once all practical non-lethal controls have been attempted and shown to be ineffective at meeting the program goals, 2) same as above, but with lethal controls initiated only once the level of predator damage to livestock has surpassed a specified threshold of damage. This threshold would be higher on public lands than on private lands, and 3) a policy by which livestock producers who use non-lethal controls receive priority service from ADC when they do experience loss, and/or policy whereby livestock producers who have chronic losses yet do not utilize non-lethal approaches or best management practices do not qualify for ADC services. These policies would provide an incentive for producers to use the best available management practices."

The components of this proposed alternative by the DOW have been analyzed in detail in the alternatives contained in this EA and through court rulings. The DOW Alternative would not allow for a full range of IWDM techniques to resolve predator damage management problems when they occur. In addition, WS is directed by Congress to protect American agriculture, natural resources, property, and to safeguard public health and safety, despite the cost of damage management, and it is program policy to aid each requester to minimize losses. Further, in the Southern Utah Wilderness Society et al. vs. Hugh Thompson et al. U.S. Forest Service (U.S. District Court of Utah 1993) the court clearly states that, "*The agency need not show that a certain level of damage is occurring before it implements an ADC program. . . .Hence, to establish need for an ADC, the forest supervisors need only show that damage from predators is threatened*." In other words, it is not necessary to establish a criterion, such as percentage of loss of a herd to justify the need for wildlife damage management. If damage management efforts are not initiated soon after a damage problem is detected, losses may sometimes escalate to excessive levels before the problem is solved. The alternatives and option selected for detailed analysis in this EA include many of the suggestions in the DOW proposal. 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 WS.

3.3.3 Biodiversity Associates and Friends of the Bow Alternative

The Biodiversity Associated and Friends of the Bow (BA&FB) proposed an alternative that requires: *1) "Require livestock owners to implement non-lethal methods as a condition of ADC support,"* and *2) "conduct no ADC activities on private lands; include economic analysis of costs to taxpayers of ADC work on private land."*

The components of this proposed alternative by the BA&FB have been analyzed in the issues discussion in Chapters 2 and 4, in the alternatives contained in this EA, and through court rulings. WS is directed by Congress to protect American agriculture, natural resources, property, and to safeguard public health and safety, despite the cost of damage management, and it is program policy to aid each requester to minimize losses. Additionally, wildlife damage management is an appropriate sphere of activity for government programs, since wildlife management is a government responsibility. The protection of livestock will always be conducted by someone; a federal WS program not only provides a service to the livestock producers but also protects property, natural resources, and public health and safety and conducts an environmentally and biologically sound program in the public interest (Schueler 1993). Further, in the Southern Utah Wilderness Society et al. vs. Hugh Thompson et al. U.S. Forest Service (U.S. District Court of Utah 1993), the court clearly states that, "*To establish need for an ADC, the forest supervisors need only show that damage from predators is threatened*." In other words, it is not necessary to establish a criterion, such as requiring implementation of nonlethal methods, to justify the need for wildlife damage management. WS' activities on private lands are carried out only after the landowner/lessee has requested services from WS and after an *Agreement for Control* has been signed. This agreement stipulates which methods may be used on the property.

The issues and alternatives selected for analysis in this EA include the suggestions in the BA&FB proposal.

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 WS.

3.4 MITIGATION AND STANDARD OPERATING PROCEDURES FOR PREDATOR DAMAGE MANAGEMENT TECHNIQUES

3.4.1 Mitigation Measures

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 WS program, nationwide and in Nebraska, uses many such mitigation measures and these are discussed in detail in Chapter 5 of USDA (1994).

3.4.2 Additional Mitigation Measures and SOPs Specific to the Issues

Following is a summary of additional mitigating measures and SOPs that are specific to the issues found in Chapter 2 and the alternatives found in Chapter 3 of this document:

Mitigation Measures	Alternatives				
	1	**3**	**4**	**5**	**2/6**
WS' Activities in Special Management Areas (BLM and National Forest System Lands)					
M-44s, the LPC and gas cartridges would not be used on federal lands without authorization of the BLM or Forest Service.	X	X	X	X	
Predator damage management would follow guidelines as specified and agreed upon in WS Work Plans.	X	X	X	X	
Vehicle access would be limited to the same restrictions and regulations as those imposed upon the land management agency.	X	X	X	X	
Predator damage management would be conducted only with the concurrence of the land management agency.	X	X	X	X	
Predator damage management would be conducted only when and where a need exists.	X	X	X	X	
No toxicants would be used in any WA or other special management area unless authorized by the land management agency.	X	X	X	X	
No preventive control work would be conducted in any WA unless authorized by the land management agency.	X	X	X	X	
Should any of the Forest Service's existing Wildlife Study Areas (WSAs) be officially designated as WAs, predator damage management would be performed according to the Forest Service Wilderness Management Policy.	X	X	X	X	
Animal Welfare and Humaneness of Methods Used by WS					
Research would continue to improve the selectivity and humaneness of management devices.	X	X	X	X	X

	1	3	4	5	2/6
Pan-tension devices would be used to reduce the incidence of nontarget animal captures in leghold traps.	X	X	X	X	
Break-away snares have been developed and would continue to be implemented into the program. (Break-away snares are designed to break open and release under the tension exerted by larger nontarget animals such as deer, antelope and livestock.)	X	X	X	X	
Chemical immobilization/euthanasia procedures that minimize pain would be used.	X	X	X	X	
All Nebraska WS personnel who use restricted chemicals and immobilization/euthanasia drugs would continue to be trained and certified by program personnel or others who are experts in the safe and effective use of these materials.	X	X	X	X	
Safety Concerns Regarding WS' use of Toxicants, Traps and Snares					
All pesticides used by WS would be registered with the EPA and NDA.	X	X	X	X	
EPA-approved label directions would be followed by WS personnel for all chemicals used in Nebraska.	X	X	X	X	
The use of traps and snares would conform to current rules and regulations administered by the NGPC.	X	X	X	X	
Traps and snares would not be set within 30 feet of exposed carcasses to prevent the capture of scavenging birds. Foot snares set to capture mountain lions would be exempted from this policy because the weight of these target animals allows foot snare tension adjustments to exclude the capture of smaller nontarget animals.	X	X	X	X	
Leghold trap pan-tension devices would be used throughout the program, as appropriate, to reduce capture of nontarget wildlife that weighs less than the target species.	X	X	X	X	
Nontarget animals captured in leghold traps or foot snares would be released unless WS personnel determine that the animal would not survive.	X	X	X	X	
All WS damage management would be conducted in areas with signed agreements for control, work plans, cooperative agreements, or MOUs.	X	X	X	X	
The ADC Decision Model (Slate et al. 1992), designed to identify the most appropriate wildlife damage management strategies and their impacts, would be used for WS activities.	X	X	X	X	
WS employees that use pesticides would be trained to use each specific material and would be certified to use pesticides under EPA approved certification programs.	X	X	X	X	

	1	3	4	5	2/6
WS employees who use pesticides would participate in continuing education programs to keep abreast of developments and to maintain their certifications.	X	X	X	X	
Traps and snares would be placed so that captured animals would not be readily visible from any designated recreation road or trail shown on Forest Transportation Maps or from federal, state, or county roads.	X	X	X	X	
Bilingual (English-Spanish) warning signs would be posted on main roads and/or trails leading into any areas where traps, snares or M-44s would be used. These signs would be removed at the end of the control period.	X	X	X	X	
In addition to area warning signs, two (English-Spanish) warning signs would be placed within 25 feet of each M-44 device.	X	X	X	X	
A Pesticide Use Proposal would be completed by WS and approved by the Forest Service authorizing pesticide use on National Forest System lands, if appropriate.	X	X	X	X	
Traps, snares, or M-44s would not be allowed within ¼ mile of any residence, community, or developed recreation site, unless requested by the owner of a privately-owned property or an official from the appropriate land management agency.	X	X	X	X	
Concerns about Impacts of WS' Activities on T&E Species, Other Species of Special Concern, and Cumulative Effects					
WS has consulted with the USFWS regarding the nationwide program and would continue to implement all applicable measures identified by the USFWS to ensure protection of T&E species.	X	X	X	X	
WS consulted with the USFWS on the impacts of the program to T&E species in Nebraska and adopted reasonable and prudent measures.	X	X	X	X	
WS consulted with the NGPC on the impacts of the program to State listed T&E species and adopted NGPC reasonable and prudent measures.	X	X	X	X	
WS personnel are directed to resolve depredation problems by taking action against individual problem animals, local populations, or groups.	X	X	X	X	
Animals taken by WS would be considered with the statewide *"Total Harvest"* (WS' take and sport harvest) when estimating the impact on a wildlife species. This data would be used to maintain a magnitude of harvest below the level that would affect the viability of a population.	X	X	X	X	
No leghold traps or snares would be set within 30 feet of any exposed bait or animal carcass (except when attempting to catch mountain lions) to preclude capture of eagles or other birds.	X	X	X	X	
Leghold traps or foot snares set near exposed baits to capture mountain lions would incorporate tension devices to preclude capture of nontarget species.	X	X	X	X	

	1	3	4	5	2/6
WS personnel would contact the NGPC to determine where existing populations of T&E species occur.	X	X	X	X	
If nesting bald eagles are encountered during aerial gunning operations, the aircraft would leave the vicinity immediately.	X	X	X	X	
If wintering big game are encountered during aerial hunting operations and begin reacting to the aircraft, the aircraft would leave the area.	X	X	X	X	
The use of nonlethal methods, such as guard dogs, scare devices, and llamas, would be encouraged when appropriate.	X	X	X	X	X
Cultural Resources/American Indian Concerns					
WS solicited input from American Indian Tribes in Nebraska.	X	X	X	X	X
This EA was provided to the American Indian Tribes in a Pre-Decisional form to determine if all cultural issues had been addressed.	X	X	X	X	X
The Nebraska State Historical Preservation Office has reviewed WS' activities in relationship to archeological interests.	X	X	X	X	X

3.4.3 Consultation with Other Agencies

The WS program in Nebraska consults with the USFWS, federal land management agencies, NGPC, and other appropriate agencies regarding program impacts. Frequent contact is maintained with the Forest Service when WS is conducting predator damage management on public lands administered by this agency. The BLM and Forest Service are interested in the numbers of livestock killed, injured, and harassed by predators and the predator damage management methods used to limit or stop losses. In addition, the WS program maintains close coordination with the NGPC to manage indigenous and non-migratory wildlife species that cause damage.

The WS program in Nebraska is conducted under cooperative agreements and MOUs with federal and state agencies. National MOUs with the BLM and Forest Service delineate expectations for wildlife damage management on public lands administered by these agencies. WS Work Plans are developed with BLM and National Forest Districts to detail damage management activities, target species and mitigation measures to be implemented on lands where predator damage management is needed.

CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

Chapter 4 provides information needed for making informed decisions on the predator damage management objectives outlined in Chapter 1 and the issues and affected environment discussed in Chapter 2. This chapter: 1) analyzes how each alternative meets the objectives, 2) assesses the consistency of the alternatives with existing management plans, and 3) analyzes the environmental consequences of each alternative.

4.1 OBJECTIVE ANALYSIS AND CONSISTENCY DETERMINATION

4.1.1 Objective A-1 - Respond to 100% of the requests for assistance with the appropriate action (technical assistance or direct control) as determined by Nebraska WS personnel applying the ADC Decision Model (Slate et al. 1992).

4.1.1.1 Alternative 1 - Continue the Current Nebraska WS Program (No Action):

The current Nebraska WS predator damage management program responds to requests for livestock protection on the Nebraska National Forest, Oglala National Grassland, and state, county, and private lands covered by signed cooperative agreements, agreements for control or wildlife damage management work plans.

Fully meeting Objective A-1 would be impossible because Nebraska WS could not protect designated wildlife and T&E species on Forest Service lands under the current program as requested by the NGPC or USFWS. Furthermore, implementation of the ADC Decision Model (Slate et al. 1992) on federal lands is compromised under the current program. Alternative 1 only partially allows Nebraska WS to meet Objective A-1.

4.1.1.2 Alternative 2 - No Federal Nebraska WS Program:

Under Alternative 2, no operational or technical assistance would be provided by WS in Nebraska. State agencies, individuals, livestock producers or other entities would be responsible for conducting all predator damage management without support or advice from Nebraska WS.

Based on these restrictions, Alternative 2 would not allow Nebraska WS to meet Objective A-1.

4.1.1.3 Alternative 3 - Integrated Wildlife Damage Management for Multiple Resources and Land Classes (Proposed Alternative):

Alternative 3 would allow Nebraska WS to coordinate with other resource management agencies to develop an integrated predator damage management program based on the needs of livestock, wildlife (including T&E species), property, and public health and safety. Other resource needs would be considered during the development of a livestock protection program and integrated into the program using the ADC Decision Model (Slate et al. 1992). Ultimately, the program would be based on both the needs of the livestock producers and the management objectives of the responsible management agency (i.e., NGPC, USFWS, Forest Service, BLM, and/or tribes).

Alternative 3 would allow Nebraska WS to fully meet Objective A-1, since WS could respond to all requests with the appropriate action on all land classes, as mitigated by other concerns.

4.1.1.4 Alternative 4 - Nonlethal Damage Management Required Prior to Lethal Control:

Alternative 4 would limit lethal damage management of predators to situations where nonlethal predator damage management had been practiced. In reality, most livestock producers practice some measure of nonlethal predator damage management. In 1994, the top four nonlethal techniques used by Nebraska sheep producers were husbandry (38.6%), guard animals (24.3%), fencing (20.0%), and fright tactics (8.1%) (NASS 1995). Nebraska sheep producers spent an average of $0.68 per breeding animal for nonlethal measures in 1994 (NASS 1995).

Nebraska WS' data indicates that 99% of sheep and 89% of goat producers with signed cooperative agreements practice at least one nonlethal measure and 86% of sheep and 78% of goat producers use three or more nonlethal methods (Table 4-1) (Nebraska WS unpubl. data). Nonlethal options for cattle producers are more limited, however, 95% of cattle producers with signed cooperative agreements practice one nonlethal measure and 74% use three or more nonlethal methods (Table 4-1) (Nebraska WS unpubl. data).

Alternative 4 is similar to Alternative 1 with all the nonlethal usage. Alternative 4 would require Nebraska WS' documentation of nonlethal method use, in effect reducing the workforce available for damage management. In addition, implementation of the ADC Decision Model (Slate et al. 1992) would be compromised under Alternative 4. Thus, Nebraska WS would only partially meet Objective A-1.

4.1.1.5 Alternative 5 - Corrective Damage Management Only:

Alternative 5 would limit lethal damage management to situations where livestock losses from predators have been verified. This alternative would preclude Nebraska WS' preventive damage management in areas where losses have historically occurred. Many sheep and cattle producers have documented predictable historic patterns of depredations which result in requests for damage management before damage begins.

Alternative 5 would not allow Nebraska WS to fully meet Objective A-1 and the ADC Decision Model (Slate et al. 1992) would be compromised.

4.1.1.6 Alternative 6 - Technical Assistance Only:

Alternative 6 would limit Nebraska WS to providing technical assistance to livestock producers concerning the use of available and legal methods, making recommendations, and providing instructional information on predator damage management. Nebraska WS would not provide any operational predator damage management on federal, state, tribal, county, city or private lands within Nebraska. State agencies, individuals, livestock producers or other entities would be responsible for conducting all predator damage management. In addition, Nebraska WS could not provide operational assistance to protect public health and safety.

Based on these restrictions, Alternative 6 would not always allow Nebraska WS to respond with the appropriate predator damage management strategies and methods, and Objective A-1 could not be met.

4.1.2 Objective A-2 - Hold sheep losses due to predation to less than 3% per year and calf losses due to predation to less than 2% per year in the State in counties with a federal WS operational program.

4.1.2.1 Alternative 1 - Continue the Current Nebraska WS Program (No Action):

Table 4-1. Nonlethal methods used by cattle, sheep, and goat producers having cooperative agreements with Nebraska WS.

Method	Cattle Producers		Sheep Producers		Goat Producers	
	Number	Percent	Number	Percent	Number	Percent
Carcass removal	256	80.5	67	88.1	5	55.5
Fencing, conventional	259	81.4	68	89.5	7	77.8
Fencing, electric	92	28.9	32	42.1	3	33.3
Confinement	63	19.8	48	63.1	2	22.2
Night penning	137	43.1	66	86.8	5	55.5
Husbandry	229	72.0	59	77.6	5	55.5
Herding	133	41.8	41	53.9	2	22.2
Guard burro	6	1.9	3	3.9	0	0
Guard dog	149	46.8	43	56.6	4	44.4
Guard llama	2	0.1	2	2.6	1	11.1
Habitat manipulation/ brush cutting	169	53.1	33	43.4	3	33.3
Harassment, electrical devices	85	26.7	30	39.5	2	22.2
Harassment, guns	195	61.3	53	69.7	1	11.1
Harassment, vehicle	212	66.7	54	71.0	2	22.2
Exploders, gas	0	0	5	6.6	0	0
Lights, all types	118	37.1	47	61.8	4	44.4
Flags, all types	16	5.0	8	10.5	1	11.1
Radios	18	5.7	17	22.4	3	33.3
Scarecrows, all	4	1.2	2	2.6	1	11.1
Total Producers	318		76		9	

The Nebraska WS program has limited the average annual sheep losses to less than 3% and calf losses to less than 2%. The Nebraska 1994 loss data from sheep producers showed that of the 95,000 sheep in Nebraska, 1,500 (1.5%) were reported to be killed by predators (NASS 1995). The Nebraska loss data for calf producers showed that of the 100,000 calves in Nebraska, 1,500 (1.5%) were reported to be killed by predators (NASS 1996). However, losses to individual producers could, at times, exceed the 3% for sheep and the 2% for calves criteria established in Objective A-2. Loss of sheep and calves to predators in some areas may vary for several reasons including: 1) terrain, weather, and vegetative cover that restricts access and limits the array of available methods, 2) too few WS personnel for the work load, 3) restrictions on method use, and 4) insufficient funding.

We believe that Alternative 1 could meet the criteria of Objective A-2 for the average sheep and calf losses, but may not be met for every producer in Nebraska.

4.1.2.2 Alternative 2 - No Federal Nebraska WS Program:

Alternative 2 would eliminate the federal Nebraska WS program and place the responsibility for predator damage management with the state, tribal and/or local governments or individual producers. Without an effective predator damage management program, lamb losses could be 3 to 6 times higher than those currently being experienced (Gee et al. 1977, O'Gara et al. 1983). In addition, under Alternative 2, no agreements for control would be maintained. These documents and their unique numbers are the mechanisms for collecting and managing most of the information assembled by Nebraska WS; without them, no comprehensive program information could be compiled.

Alternative 2 would not allow Nebraska WS to meet Objective A-2.

4.1.2.3 Alternative 3 - Integrated Wildlife Damage Management for Multiple Resources and Land Classes (Proposed Alternative):

Alternative 3, an integrated predator damage management program with considerations for multiple resources, would best permit Nebraska WS to meet Objective A-2. By considering all resources, Nebraska WS could vary the timing, areas, and methods of damage management to better achieve multiple resource needs and objectives.

We believe that Alternative 3 would best meet the criteria of Objective A-2 for the average sheep and calf losses, including those livestock pastured on BLM and Forest Service lands, but may not meet the criteria for each individual producer in Nebraska for reasons stated under 4.1.2.1.

4.1.2.4 Alternative 4 - Nonlethal Damage Management Required Prior to Lethal Control:

As stated in 4.1.1.4, 99% of sheep and 95% of cattle producers in Nebraska implement nonlethal predator damage management measures. Therefore, Alternative 4 is similar to the current program and the impacts on sheep and calf losses would be the same as those for Alternative 1.

We believe that Alternative 4 would meet the criteria of Objective A-2 for the average sheep and calf losses, but may not meet the criteria for each individual producer in Nebraska.

4.1.2.5 Alternative 5 - Corrective Damage Management Only:

Without preventive damage management for coyote and red fox damage, losses from these species could increase, although not to the extent under Alternative 2. We believe that with corrective control only, it is feasible that sheep and calf losses from coyote and red fox predation could double. The overall sheep loss rate could increase from 1.5% to an estimated 3.0% and the overall calf loss rate could increase from 1.5% to an estimated 3.0%.

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

4.1.2.6 Alternative 6 - Technical Assistance Only:

The impacts of Alternative 6 would be similar to those for Alternative 2. Alternative 6, a technical assistance only program, would not allow Nebraska WS to meet Objective A-2.

4.1.3 Objective A-3 - Maintain the lethal take of nontarget animals by Nebraska WS personnel during damage management to less than 2% of the total animals taken.

4.1.3.1 Alternative 1 - Continue the Current Nebraska WS Program (No Action):

The WS program in Nebraska killed 12 nontarget animals in FY96, representing 0.28% of the total animals killed by Nebraska WS in the State. Nebraska WS killed 43 nontarget animals in FY97, representing 1.08% of the total animals killed by WS in Nebraska. And in FY98, Nebraska WS killed 24 nontarget animals, representing 0.67% of the total animals killed by WS in Nebraska.

Alternative 1, the Current Program, is currently meeting Objective A-3.

4.1.3.2 Alternative 2 - No Federal Nebraska WS Program:

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

Alternative 2 would allow Nebraska WS to meet Objective A-3.

4.1.3.3 Alternative 3 - Integrated Wildlife Damage Management for Multiple Resources and Land Classes (Proposed Alternative):

Alternative 3 could increase predator damage management activities in Nebraska by allowing Nebraska WS to design a predator damage management program to protect multiple resources on all land classes. These activities could increase the take of nontarget animals, however, we do not believe that the increase would be different from the current ratio of nontarget to target animals.

Alternative 3 would meet Objective A-3.

4.1.3.4 Alternative 4 - Nonlethal Damage Management Required Prior to Lethal Control:

As noted in 4.1.1.4, most livestock producers currently use nonlethal predator damage management and the current level and type of predator damage management would not change substantially under this alternative. Therefore, Alternative 4 would allow Nebraska WS to meet Objective A-3.

4.1.3.5 Alternative 5 - Corrective Damage Management Only:

Under Alternative 5, Nebraska WS' lethal damage management could only be implemented following documented losses of livestock and poultry or to protect public health and safety from coyote, red fox, raccoon, bobcat, mountain lion, weasel, striped skunk, badger or mink predation. Following documented losses, Nebraska WS could employ the same methods currently available. We believe that the ratio of nontarget to target captures would remain about the same as under the current program and the analysis is similar to Alternative 1.

Alternative 5 would allow Nebraska WS to meet Objective A-3.

4.1.3.6 Alternative 6 - Technical Assistance Only:

Under Alternative 6, no operational predator damage management would occur, and therefore, no target or nontarget animals would be killed by Nebraska WS.

Alternative 6 would allow Nebraska WS to meet Objective A-3.

4.1.4 Objective A-4 - Monitor the implementation of nonlethal methods used by livestock

producers that cooperate with the federal WS program in Nebraska.

4.1.4.1 Alternative 1 - Continue the Current Nebraska WS Program (No Action):

The Nebraska WS program collects data on nonlethal methods employed by producers. Thus, Alternative 1 would allow Nebraska WS to meet Objective A-4.

4.1.4.2 Alternative 2 - No Federal Nebraska WS Program:

Alternative 2 would not allow Nebraska WS to meet Objective A-4 as no program or personnel would be available to accumulate and evaluate data.

4.1.4.3 Alternative 3 - Integrated Wildlife Damage Management for Multiple Resources and Land Classes (Proposed Alternative):

The analysis for Alternative 3 is the same as that for Alternative 1. Alternative 3 would allow Nebraska WS to meet Objective A-4.

4.1.4.4 Alternative 4 - Nonlethal Damage Management Required Prior to Lethal Control:

Nothing in Alternative 4 precludes the monitoring of producer-implemented nonlethal methods and the analysis is the same as for Alternative 1.

Alternative 4 would allow Nebraska WS to meet Objective A-4.

4.1.4.5 Alternative 5 - Corrective Damage Management Only:

Nothing in Alternative 5 precludes the monitoring of producer implemented nonlethal methods and the analysis is the same as for Alternative 1.

Alternative 5 would allow Nebraska WS to meet Objective A-4.

4.1.4.6 Alternative 6 - Technical Assistance Only:

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

Alternative 6 would allow Nebraska WS to only partially meet Objective A-4.

4.1.5 Objective B-1 - Respond to requests from the NGPC, USFWS, tribal and private entities for the protection of wildlife species dependent on funding.

4.1.5.1 Alternative 1 - Continue the Current Nebraska WS Program (No Action):

The WS program in Nebraska has responded to requests from the NGPC and the USFWS to protect specific wildlife species. To date, none of the NGPC or USFWS requests have required WS to conduct predator damage management on Forest Service or BLM lands. Under the Current Program (No Action) Alternative, WS must complete individual NEPA documents and issue separate decisions for each management project to be completed on Forest Service or BLM lands.

Alternative 1 would allow Nebraska WS to only partially meet Objective B-1.

4.1.5.2 Alternative 2 - No Federal Nebraska WS Program:

Under Alternative 2, no Nebraska WS program would be available, therefore, Alternative 2 would not allow Nebraska WS to meet Objective B-1.

4.1.5.3 Alternative 3 - Integrated Wildlife Damage Management for Multiple Resources and Land Classes (Proposed Alternative):

Alternative 3 would permit predator damage management to protect designated wildlife species when requested by the NGPC and USFWS.

Alternative 3 would allow Nebraska WS to fully meet Objective B-1.

4.1.5.4 Alternative 4 - Nonlethal Damage Management Required Prior to Lethal Control:

Nonlethal methods that effectively protect wildlife species from predation are currently limited. Alternative 4 pertains to predator damage management to protect livestock and would not permit the protection of wildlife or T&E species.

Alternative 4 would not allow Nebraska WS to meet Objective B-1.

4.1.5.5 Alternative 5 - Corrective Damage Management Only:

As with Alternative 4, Alternative 5 basically directs predator damage management for the protection of only livestock.

Alternative 5 would not allow Nebraska WS to meet Objective B-2.

4.1.5.6 Alternative 6 - Technical Assistance Only:

Under Alternative 6, no operational Nebraska WS program would be available.

Alternative 6 would not allow Nebraska WS to meet Objective B-1.

4.1.6 Objective B-2 - Involve the NGPC and USFWS in wildlife damage management planning to consider specific wildlife to be protected and public health and safety when designing a wildlife damage management program.

4.1.6.1 Alternative 1 - Continue the Current Nebraska WS Program (No Action):

The current Nebraska WS program involves the NGPC and USFWS in the design of a wildlife damage management program and the implementation of mitigation to preclude adverse impacts to target and nontarget wildlife. It does not, however, allow for the consideration of wildlife resources to be protected in conjunction with livestock, nor does it allow protection of wildlife on BLM or Forest Service administered lands.

Alternative 1 would allow Nebraska WS to partially meet Objective B-2.

4.1.6.2 Alternative 2 - No Federal Nebraska WS Program:

Under Alternative 2, no federal predator damage management would be available, therefore there would be no opportunity to coordinate with the NGPC and USFWS on other resources to be protected. Producer-implemented control programs would give less consideration to wildlife resources and probably would be less target-animal specific.

Alternative 2 would not allow Nebraska WS to meet Objective B-2.

4.1.6.3 Alternative 3 - Integrated Wildlife Damage Management for Multiple Resources and Land Classes:

Alternative 3 provides for NGPC and USFWS involvement in wildlife damage management planning to consider specific wildlife to be protected and public health and safety when designing a wildlife damage management program.

Alternative 3 would allow Nebraska WS to fully meet Objective B-2.

4.1.6.4 Alternative 4 - Nonlethal Damage Management Required Prior to Lethal Control:

Alternative 4 basically directs Nebraska WS' actions toward livestock programs where nonlethal methods have already been implemented. Therefore, the analysis is similar to Alternative 1. This alternative would not provide for predator damage management planning with other agencies to achieve multiple resource protection objectives.

Alternative 4 does not allow Nebraska WS to meet Objective B-2.

4.1.6.5 Alternative 5 - Corrective Damage Management Only:

As with Alternative 4, Alternative 5 directs Nebraska WS' action for the protection of livestock after a documented loss to predators has occurred. This alternative would not allow predator damage management planning with other agencies to achieve multiple resource objectives. The analysis is the same as for Alternative 1.

Alternative 5 does not allow Nebraska WS to meet Objective B-2.

4.1.6.6 Alternative 6 - Technical Assistance Only:

Under Alternative 6, no operational Nebraska WS program would be available, therefore there would be no opportunity to coordinate with the NGPC, USFWS, or other agencies regarding the protection of wildlife resources. The analysis is the same as for Alternative 2.

Alternative 6 would not allow Nebraska WS to meet Objective B-2.

4.1.7 Objective C-1 - Respond to 100% of cooperator requests for public health and safety protection from predators using the ADC Decision Model (Slate et al. 1992).

4.1.7.1 Alternative 1 - Continue the Current Nebraska WS Program (No Action):

Under Alternative 1, Nebraska WS would continue to respond to 100% of cooperator requests for public health and safety protection from predators using the ADC Decision Model (Slate et al. 1992).

Alternative 1 would permit Nebraska WS to meet Objective C-1.

4.1.7.2 Alternative 2 - No Federal Nebraska WS Program:

Under Alternative 2, no federal Nebraska WS program would be available. Alternative 2 would not permit Nebraska WS to meet Objective C-1.

4.1.7.3 Alternative 3 - Integrated Wildlife Damage Management for Multiple Resources and Land Classes (Proposed Alternative):

Under Alternative 3, Nebraska WS would respond to requests to manage wildlife damage to protect public health and safety using the ADC Decision Model (Slate et al. 1992) to determine the appropriate course of action. Alternative 3 would permit Nebraska WS to meet Objective C-1.

4.1.7.4 Alternative 4 - Nonlethal Damage Management Required Prior to Lethal Control:

Alternative 4 directs predator damage management to protect livestock.

Alternative 4 allows Nebraska WS to only partially meet Objective C-1.

4.1.7.5 Alternative 5 - Corrective Damage Management Only:

As with 4.1.7.4, under the strictest interpretation, Alternative 5 would only allow Nebraska WS to respond to public health and safety complaints after public health or safety has been jeopardized. Under a more conventional interpretation, Alternative 5 directs corrective predator damage management to protect livestock.

Alternative 5 would not allow Nebraska WS to meet Objective C-1.

4.1.7.6 Alternative 6 - Technical Assistance Only:

Under Alternative 6, no operational Nebraska WS program would be available.

Alternative 6 would not allow Nebraska WS to meet Objective C-1.

4.1.8 Summary

Table 4-2 summarizes how each alternative addresses each objective.

Table 4-2. Objectives/Alternatives Comparison

Program Objectives	Alternative 1 *No Action*	Alternative 2 *No Program*	Alternative 3 *Proposed*	Alternative 4 *Nonlethal*	Alternative 5 *Corrective*	Alternative 6 *Technical*
A-1 *Requests*	Partially Meets	Does not Meet	Meets	Partially Meets	Partially Meets	Does not Meet
A-2 *Losses*	Meets	Does not Meet	Meets	Partially Meets	Does not Meet	Does not Meet
A-3 *Nontarget*	Meets	Meets	Meets	Meets	Meets	Meets

Program Objectives	Alternative 1 *No Action*	Alternative 2 *No Program*	Alternative 3 *Proposed*	Alternative 4 *Nonlethal*	Alternative 5 *Corrective*	Alternative 6 *Technical*
A-4 *Monitor*	Meets	Does not Meet	Meets	Meets	Meets	Partially Meets
B-1 *Wildlife*	Partially Meets	Does not Meet	Meets	Does not Meet	Does not Meet	Does not Meet
B-2 *Design*	Partially Meets	Does not Meet	Meets	Does not Meet	Does not Meet	Does not Meet
C-1 *Safety*	Meets	Does not Meet	Meets	Partially Meets	Does not Meet	Does not Meet

4.2 ALTERNATIVE CONSISTENCY WITH FOREST SERVICE LRMPS AND BLM RMPS

Before an alternative can be considered for implementation on Forest Service or BLM lands, it must be consistent with land management and/or resource management plans. In the Forest Service, these are LRMPs or more commonly *"Forest Plans."* On BLM lands, the equivalent documents are called RMPs or MFPs. If the selected alternative is consistent with LRMPs, RMPs, or MFPs, no further action would be necessary by the Forest Service, BLM or WS. If an alternative that is inconsistent with the LRMPs, RMPs, or MFPs is selected in the decision process, the Forest Service or BLM could amend their plans to be consistent with the EA. The decision would not be implemented on Forest Service or BLM lands until the inconsistency is resolved either through amendment of the plans or modification of the selected alternative(s).

4.2.1 Nebraska National Forest LRMP

The Forest Service is responsible for: 1) managing land to maintain viable populations of existing native and desirable nonnative vertebrate species, 2) to promote the conservation of federally listed T&E species, and 3) to coordinate and cooperate with appropriate federal, state, and private agencies to assure all management aspects of wildlife species are considered (Forest Service 1984). Predator damage management, within Nebraska, will be provided by the Nebraska WS program (Forest Service 1984). The proposed action is consistent with the direction in the Nebraska National Forest LRMP.

4.2.2 Newcastle Resource Area Resource Management Plans

Livestock grazing is permitted under the Newcastle Resource Area RMP, however, predator damage management is not specifically addressed. Predator damage management would be considered as support for livestock grazing management, unless otherwise prohibited, but would be mitigated wherever it could jeopardize any federally listed T&E species. The RMP requires Endangered Species Act, Section 7 Consultation with the USFWS, which has been completed by WS for Nebraska. The proposed action conforms with the intent of the Newcastle Resource Area RMP. All the predator damage management methodologies discussed in Chapter 3 of this EA are available for use.

4.3 ENVIRONMENTAL CONSEQUENCES

This section analyzes the environmental consequences using Alternative 1 (The Current Program) as the baseline for comparison. Table 4-12 summarizes the issues and impacts.

The following resources within Nebraska would not be significantly impacted by any of the alternatives analyzed; soils, geology, minerals, water quality/quantity, flood plains, wetlands, visual resources, air quality, prime and unique farmlands, aquatic resources, timber, and range. These resources will not be analyzed further.

Social and Recreational Concerns: Social and recreational concerns identified during public involvement are discussed throughout this EA and the ADC EIS (USDA 1994).

Cumulative and Unavoidable Impacts: Cumulative and unavoidable impacts to key wildlife species are discussed and 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 Nebraska WS' "*take*" during FY96 through FY98, combined with other mortality, indicates that cumulative impacts were not significant. The Nebraska WS program is not expected to have any adverse cumulative impact on T&E species, WSAs, or WAs. Furthermore, predator damage management would not jeopardize public health and safety.

Target and Nontarget Wildlife Species: Cumulative impacts to wildlife species are addressed in section 4.4.1.

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. Based on these estimates, the Nebraska WS program produces very negligible impacts on the supply of fossil fuels and electrical energy.

4.4 ISSUES ANALYZED IN DETAIL

4.4.1 Cumulative impacts on the viability of wildlife populations.

The species evaluated in this chapter were selected for analysis because they are taken by Nebraska WS in response to livestock and wildlife predation, property damage, or threats to public health and safety. The "*Magnitude*" analysis for this EA follows the process described in the ADC EIS (USDA 1994, Table 4-2). Magnitude is defined in the ADC EIS as *". . . a measure of the number of animals killed in relation to their abundance."* Magnitude may be determined either quantitatively or qualitatively. Quantitative analysis is used whenever possible as it is more rigorous and is based on allowable harvest levels, population estimates and harvest data. Qualitative analysis is based on population trends, harvest data or trends, and modeling. Allowable harvest levels were determined from research studies cited in the ADC EIS (USDA 1994, Table 4-2) and from NGPC data. The NGPC is the state agency charged by law with the responsibility for protecting, preserving and perpetuating fish, game, furbearer, and nongame wildlife populations within Nebraska (RSN 37-101, 37-204, 37-209, 37-211, 37-213, 37-215, 37-301, 37-432, 37-434).

For purposes of this EA, "*Other Harvest*" includes the known fur harvest, sport harvest, and other information obtained from the NGPC. "*Total Harvest*" is the sum of Nebraska WS' kill and the "*Other Harvest*." The principle of sustained yield suggests that wildlife populations produce an annual increment of animals that can be harvested without causing the population to decline. The size of the annual surplus fluctuates considerably from year to year and varies by species and according to local conditions. Annual harvest is managed at a level corresponding to the capacity of the population to compensate (via reproduction and recruitment) (D. Figgs, NGPC, per. commun. 1997).

4.4.1.1 Alternative 1. - Continue the Current Nebraska WS Program (No Action):

In FY96, 97 and 98, coyotes were responsible for about 81%, 69%, and 79% of the verified and 63%, 84% and 80% of the reported statewide livestock losses to predators, respectively. NASS (1995, 1996) indicated that the coyote is the primary predator on sheep (89%), lambs (84%), cattle (40%), and calves (80%). In 1995, the total reported loss to coyotes in Nebraska was $116,800 for cattle, $396,000 for calves, $55,207 for sheep, and $52,666 for lambs (NASS 1995, 1996).

Coyote Population Information

The cost to accurately determine absolute coyote densities over large areas would be prohibitive (Connolly 1992b) and would not appear to be warranted for this EA given the coyote's relative abundance. Because determinations of absolute coyote densities are frequently limited to educated guesses (Knowlton 1972), many researchers have estimated coyote populations throughout the west and elsewhere (Pyrah 1984, Camenzind 1978, Knowlton 1972, Clark 1972, USDI 1979). The presence of unusual food concentrations and non-breeding helpers at the den can influence coyote densities and complicate efforts to estimate abundance (Danner and Smith 1980). Coyote densities range from 0.2/mi^2 when populations are low (pre-whelping) to 3.6/mi^2 when populations are high (post-whelping) (USDI 1979, Knowlton 1972). Knowlton (1972) concluded that coyote densities may approach a high of 5-6/mi^2 under extremely favorable conditions with densities of 0.5 to 1.0/mi^2 possible throughout much of their range, while Roy and Dorrance (1985) identified a positive relationship between coyote densities in mid to late winter and the availability of dead livestock.

The literature on coyote spatial organization is confusing (Windberg and Knowlton 1988, Messier and Barrette 1982). Coyotes are highly mobile animals with home ranges that vary by sex, age of the animal, and season of the year (Pyrah 1984, Althoff 1978, Todd and Keith 1976). Coyote home ranges may vary from 2.0 to 21.3 mi^2 (Andelt and Gipson 1979, Gese et al.1988[5]). Ozoga and Harger (1966), Edwards (1975), and Danner (1976) observed overlap between coyote home ranges and did not consider coyotes to be territorial. Other studies have shown that coyotes occupy territories and that each territory may have several non-breeding helpers at the den during whelping (Allen, et al. 1987, Bekoff and Wells 1982). Therefore, each coyote territory may support more than just a pair of coyotes. Gese et al. (1988) reported that coyote groups of 2, 3, 4, and 5 comprised 40%, 37%, 10% and 6% of the resident population, respectively, and Messier and Barrette (1982) reported that during November through April, 35% of the coyotes were in groups of 3 to 5 animals.

Coyote Population Impact Analysis

Currently, *"Total Harvest"* estimates derived by combining WS' take with *"Other Harvest"* figures represent some of the best information available on the viability of coyote populations in Nebraska (Figure 4 -1), even though *"Total Harvest"* is affected by factors such as snow cover, prey base, and the number of sport trappers. In Nebraska, the coyote population appears to fluctuate in a cyclical pattern. Nebraska coyote densities

Table 4-3. Coyote Harvest for Nebraska (NGPC unpubl. data, MIS data).

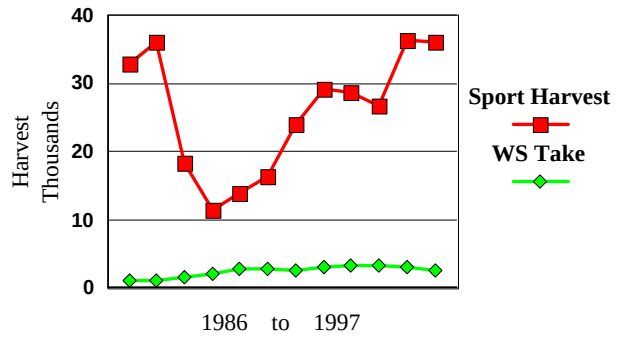
Coyote Harvest Statistics	1996	1997
Estimated Other Take	36,443	36,213
WS Kill	3,060	2,683
WS Kill (% of harvest)	7.7%	6.9%

(Figure 4-1) are higher today than they were in the late '80s and early '90s, suggesting that coyote numbers are stable or increasing.
In FY96 and FY97, WS took an average of 2,872 coyotes annually in Nebraska, while private individuals killed 36,443 and 36,213, respectively (Table 4-3). Additional coyotes were undoubtedly taken by the public, but were not reported and could not be included in this analysis. Harvest information suggests that the coyote population in Nebraska is viable and healthy (Figure 4-1) and WS' take of coyotes has remained relatively consistent from 1986 to 1997.

The unique resilience of the coyote, its ability to adapt, and its perseverance under adverse conditions is commonly recognized among biologists and rangeland managers. Despite intensive historical damage management efforts in livestock production areas and despite sport hunting and trapping for fur, coyotes continue to thrive and expand their range, occurring widely across North and Central America (Miller 1995). 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."* However, the authors go on to explain that their *"model suggests that coyotes, through compensatory reproduction, can withstand an annual population mortality of 70%"* and that coyote populations would regain pre-control densities (through recruitment, reproduction and migration) by the end of the fifth year after control was terminated even though 75% mortality had occurred for 20 years. In addition, other researchers (Windberg and Knowlton 1988) recognized that immigration, (not considered in the Connolly and Longhurst (1975) model) can result in rapid occupancy of vacant territories, which helps to explain why coyotes have thrived in spite of early efforts to exterminate them (Connolly 1978). Thus, WS does not impact the Nebraska coyote population even if "*Other Harvest*" is under-reported (Andelt 1997) and evaluation of the data using standards established in USDA (1994) to determine the *Magnitude* to which *"Total Harvest"* impacts the species, results in a determination of "low magnitude."

Figure 4-1

Nebraska Coyote Harvest

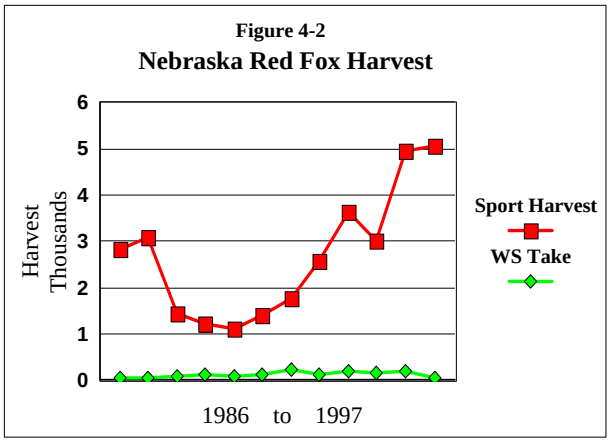


Red Fox Population Information

In Nebraska, red foxes have killed poultry, kid goats, and lambs. In FY96, red foxes were responsible for 4.2% of the Nebraska WS verified and 2.1% of the reported statewide livestock losses. In FY97 and FY98, red foxes were responsible for 2.0% and 2.0% of the Nebraska WS verified and less than 1.0% and 1.3% of the reported statewide livestock losses, respectively. In addition, red fox predation on waterfowl, ring-necked pheasants, and prairie chickens concerns the NGPC and USFWS.

Red foxes are the most common and well-known species in the genus *Vulpes* and are the most widely distributed nonspecific predators in the world (Voigt 1987). Red foxes are regarded as nuisance predators in many regions, preying on wildlife and livestock, and have become notorious in many areas of the world as carriers of diseases (Ables 1969, Andrews et al. 1973, Tabel et al. 1974, Tullar et al. 1976, Pils and Martin 1978, Sargeant 1978, Voigt 1987, Allen and Sargeant 1993). Red foxes have been the subject of many studies during the last 20 years and investigations

have revealed that foxes are extremely adaptive and diverse in their behavior and use of habitats. For example, Voigt and Earle (1983) and Gese et al. (1996) showed that red foxes were adaptive enough to avoid coyotes while coexisting in the same area and habitats.



Red fox densities are difficult to determine because of the species' secretive and elusive nature. However, researchers have documented that the red fox has high reproductive and dispersal rates and thus, can withstand high mortality (Allen and Sargeant 1993, Voigt 1987, Voigt and MacDonald 1984, Harris 1979, Pils and Martin 1978, Storm et al. 1976, Andrews et al. 1973, Phillips and Mech 1970). Storm et al. (1976) stated that 95% of red fox females (44% were less than 1 year old) bred successfully in a population in Illinois and Iowa. Rowlands and Parkes (1935) and Creed (1960) reported that male red foxes successfully bred females during their first year. Red foxes average 4.7 pups per litter with litters of 14 to 17 pups documented (Storm et al. 1976, Voigt 1987). Ables (1969) and Sheldon (1950) reported that more than 1 female was observed at the den and suggested that red foxes have *"helpers"* that assist with raising pups, a phenomena observed in coyotes and other canids. Red fox population densities ranged from more than 50/mi^2 (Harris 1977, Harris and Rayner 1986, MacDonald and Newdick 1982) where food was abundant, to 2.6/mi^2 in Ontario (Voigt 1987), and to 1 fox den/3 mi^2 in Nebraska (Sargeant 1972).

Dispersal serves to equalize fox densities over large areas. Annual harvests in localized areas in 1 or more years will likely have little impact on the overall population in subsequent years, but may reduce localized predation (Allen and Sargeant 1993). Phillips (1970) stated that fox populations are resilient and in order for fox control (by trapping) to be successful, pressure on the population must be almost continuous. Phillips (1970) and Voigt (1987) also concluded that habitat destruction affects fox populations to a greater extent than short-term over-harvest.

Red Fox Population Impact Analysis

The NGPC reported that 4,941 and 5,053 red fox were harvested by fur trappers and hunters in 1996 and 1997, respectively (NGPC, unpubl. data). In comparison, WS' take of fox has remained relatively consistent from 1986 to 1997; Nebraska WS captured 195 red fox in FY96 and 69 red fox in FY97 (Table 4-4). Harvest information suggests that the red fox population in Nebraska is viable and healthy (Figure 4-2).

Table 4-4. Red Fox Harvest for Nebraska (NGPC unpubl. data, MIS data).

Red Fox Harvest Statistics	1996	1997
Estimated Other Take	4,941	5,053
WS Kill	195	69
WS Kill (% of harvest)	3.8%	1.3%

Raccoon Population Information

In FY96, raccoons were responsible for 26.5% of the Nebraska WS verified poultry and other fowl losses in Nebraska. In addition, raccoons caused losses of $6,355 in grains, crops, and livestock feed, $4,976 to property, and were responsible for a damage threat to least terns and piping plovers. Raccoons were also responsible

for
10.5% and 17.3% of the verified, and 6.2% and 8.1% of the reported poultry and other fowl losses documented by WS in FY97 and FY98, respectively.

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

Sanderson (1987) stated that absolute population densities of raccoons are difficult, if not impossible, to determine. Twichell and Dill (1949) reported one of the highest densities after they removed 100 raccoons from a winter denning area on 101 acres of a waterfowl refuge in Missouri. Other studies have documented raccoon densities that ranged from 9.3 to 80/mi^2 (Yeager and Rennels 1943, Urban 1970, Sonenshine and Winslow 1972, Hoffman and Gottschang 1977, Rivest and Bergeron 1981).

Table 4-5. Raccoon Harvest for Nebraska (NGPC unpubl. data; MIS data).

Raccoon Harvest Statistics	1996	1997
Estimated Other Take	232,000	252,525
WS' Take	664	539
WS' Take (% of population)	0.29%	0.21%

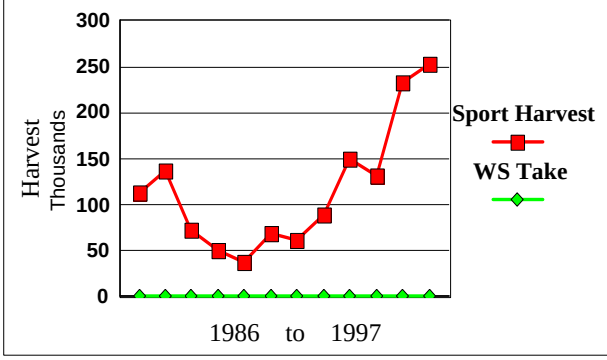
Raccoon Population Impact Analysis

The allowable harvest level for raccoons in USDA (1994) was established at 49% of the total population. In FY96 and FY97, Nebraska WS' kill was 0.29% and 0.21% of the *"Total Harvest"*, respectively (Table 4-5). Harvest information suggests that the raccoon population in Nebraska is viable and healthy (Figure 4-3), and that WS' take of raccoons has remained relatively consistent from 1986 to 1997.

Striped Skunk Population Information

Skunks primarily cause odor problems around homes, transmit diseases such as rabies to humans and domestic animals, and prey on poultry. Twenty-eight, 65 and 54 public health and safety requests for assistance were received by Nebraska WS in FY96, FY97, and FY98, respectively. In FY96, skunks were responsible for 63 incidences of property damage, 15 threats to public health and safety, 12 incidences of poultry and egg damage, eight incidences of pet damage/harassment, and two incidences of crop damage with an associated verified damage loss value of $3,907. In FY97, skunks were responsible for $5,746 in damage to property and poultry, and in FY98 they damaged resources worth $5,812.

Figure 4-3
Nebraska Raccoon Harvest



The striped skunk is the most common member of the *Mustelidae* family. Striped skunks have increased their geographic range in North America with the clearing of forests, however there is

no well-defined land type that can be classified as skunk habitat (Rosatte 1987). Striped skunks are capable of living in a variety of environments, including agricultural lands and urban areas.

The home range of striped skunks is not sharply defined over space and time, but is altered to accommodate life history requirements such as raising young, winter denning, feeding activities, and dispersal (Rosatte 1987). Home ranges averaged 0.85 to 1.9 mi^2 for striped skunks in rural areas (Houseknecht 1971, Storm 1972, Bjorge et al. 1981, Rosaette and Gunson 1984) and skunk densities ranged from 0.85 to 67/mi^2 (Jones 1939, Ferris and Andrews 1967, Verts 1967, Lynch 1972, Bjorge et al. 1981). Many factors (including diseases, season of the year, geographic area, and the availability of suitable foods and habitats) contribute to the differing population densities (Storm and Tzilkowski 1982).

Spotted Skunk Population Information

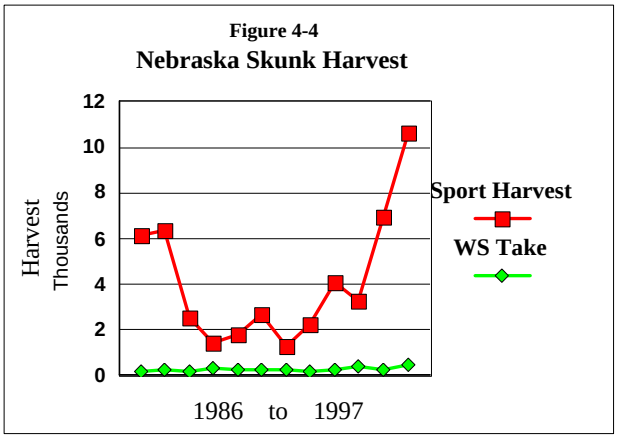
The geographic range of the western spotted skunk extends from central Mexico through the western United States to British Columbia (Rosatte 1987). The spotted skunk is only an occasional visitor to the southeastern part of Nebraska (Adams 1961). They prefer open lowlands but are equally at home in mountainous country and in a variety of habitats including farmyards, wastelands and chaparral (Orr 1943, Baker and Baker 1975). Few studies have been published on the home range, population density and mortality of spotted skunks. Crabb (1948), however, found that the western spotted skunk in Iowa occupied a home range of about 160 acres at densities of 5.7/mi^2. He also stated that spotted skunks are nomadic, traveling up to 3 mi/night, and do not defend a territory.

Table 4-6. Striped Skunk Harvest Data for Nebraska (NGPC unpubl. data; MIS data).

Skunk Harvest Statistics	1996	1997
Estimated Other (Harvest) Take	6,753	10,643
WS' Take	286	473
WS' Take (% of harvest)	4.1%	4.3%

Striped and Spotted Skunk Population Impact Analysis

During FY96 and FY97, Nebraska WS personnel killed 286 and 473 striped skunks, respectively (Table 4-6). Furthermore, "*Other Harvest*" of skunks by the public occurred, but reliable estimates of harvest totals are not available. Best "*Total Harvest*"estimates, however, suggest that the striped skunk population in Nebraska is viable and healthy (Figure 4-4), and that WS' take of striped skunks has remained relatively consistent from 1986 to 1997. Nebraska WS has not verified any damage caused by spotted skunks nor taken any spotted skunks during the last 7 years.



Mink Population Information

During FY94, mink killed 20 endangered least terns and were a damage threat to piping plovers in Nebraska. In FY95, mink were a damage threat to endangered least terns and threatened piping plovers. During FY96, WS verified and had reported that mink killed domestic fowl valued at $200 and were a damage threat to endangered least terns and threatened piping plovers. In FY97 no mink damage was verified or reported to WS, and in FY98, mink only caused $30 in damage to domestic fowl.

Mink are a semiaquatic mustelid and are associated with semipermanent and permanent wetlands, streams, and rivers. Mink are distributed throughout North America, except the desert southwest where stream flows are irregular (Jones et al. 1985).

Mink are opportunistic predators that feed primarily on birds and mammals including waterfowl, grebes (*Podicipedidae*), blackbirds (*Icterinae*), gulls (*Larinae*), partridges (*Perdix* spp.), ground squirrels (*Sciuridae*), and muskrats (*Ondatra zibethica*) (Sargeant et al. 1973, Yeager 1943). They have also been found to prey on tiger salamanders (*Ambystoma tigrinum*) (Sargeant et al. 1973), crayfish (Decapod), and fish (Osteichthyes).

During the spring of the year, territorial males occupy large areas and females occupy small areas (Gerell 1970, Whitman 1981, Eagle and Whitman 1987, Eagle 1989). Female mink with kits restrict their activities to an average of one wetland (Eberhardt and Sargeant 1977, Eagle 1989), while in the prairie pothole region, male mink tend to occupy circular habitats that may encompass many wetlands (Sargeant et al. 1993). Home ranges of adult male mink during May through July in pothole habitats in Manitoba averaged 2.5 mi^2 (range = 1.2-6.3 mi^2) and included all or parts of 285 wetlands (Arnold 1986).

Mink lead a precarious existence in prairie habitats because annual fluctuations in water levels affect abundance of food and availability of shelter. Eberhardt (1974) stated that the frequent widespread and local droughts characteristic of the prairie pothole region lowered reproductive performance by mink. However, Sargeant et al. (1993) found that mink were common in two study areas in southeastern Nebraska during the drought years of the mid to late 1980s.

Mink Population Impact Analysis

No mink were taken by WS in Nebraska during FY94, but fur harvesters reported taking 2,809 animals (NGPC unpubl. data). The Nebraska WS program took one mink each in FY95 and FY96, no mink in FY97 and one mink in FY98, while fur harvesters reported taking 4,442, 2,218, 5,188, and 4,236, or less than 0.05% of the *"Total Harvest"* (MIS data; NGPC unpubl. data). Because Nebraska WS' take is less than 0.05% of the *"Total Harvest"*, the magnitude of impact is determined to be low.

Badger Population Information

In Nebraska, badgers typically damage cemeteries, pastures, croplands, shrubs, property, and livestock, and occasionally threat public health and safety. In FY96, badgers caused two incidents of crop damage and 30 incidents of property damage amounting to $7,760 in damages. During FY97, WS verified 46 incidences of badger damage valued at $4,640 and received seven reported incidents of badger damage valued at $1,285. During FY98, WS verified 28 incidences of badger damage valued at $2,925 and received four reported incidents of badger damage valued at $750. Nebraska WS primarily takes badgers as a target species, but they are also occasionally captured as a nontarget species in leghold traps set to capture coyotes.

Badgers are members of the *Mustelidae* family. The badger is a large, broad-bodied animal with strong legs and long claws adapted for digging. Male badgers average 19 lbs and females average 14 lbs (Hegdal and Harbour 1991). Badgers are inhabitants of grassland communities, but can also be found inhabiting forest edges. Badgers are opportunistic feeders preying on a wide variety of birds, mammals, eggs, reptiles, amphibians, invertebrates, and even plant material (Long and Killingley 1983).

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

Badger Population Impact Analysis

Badger populations are reported to be able to sustain harvest rates of about 30-40% annually (Boddicker 1980). The NGPC reported 2,224 badgers purchased by fur buyers statewide during the 1995-1996 season (NGPC unpubl. data). Nebraska WS removed 74 badgers during FY96 (Table 4-7). The combined private and Nebraska WS harvest of badgers was about 2,298 badgers in FY96 with the Nebraska WS take being 3.3% of the *"Total Harvest"*. The NGPC also reported 3,093 badgers purchased by fur buyers statewide during the 1996-1997 season (NGPC unpubl. data). Nebraska WS removed 80 badgers during FY97. The combined private and Nebraska WS harvest of badgers was about 3,173 badgers in FY97 with the Nebraska WS take being 2.6% of the "Total Harvest". Because Nebraska WS' take is minimal in comparison to the *"Total Harvest"* and substantially less than the allowable state harvest, the magnitude of impact is determined to be low.

Table 4-7. Badger Harvest Data for Nebraska (NGPC unpubl. data; MIS data).

Badger Harvest Statistics	1996	1997
Estimated Other Take	2,224	3,093
WS' Take	74	80
WS' Take (% of harvest)	3.2%	2.5%

Bobcat Population Information

Bobcats reach reproductive maturity at approximately 9 to 12 months of age and give birth to one to six kittens following a 2-month gestation period (Crowe 1975, Koehler 1987). In Oklahoma, bobcat densities range from 0.1 to 7.0/mi^2. Bobcats live up to 14 years, but annual mortality is as high as 47% (Rolley 1985).

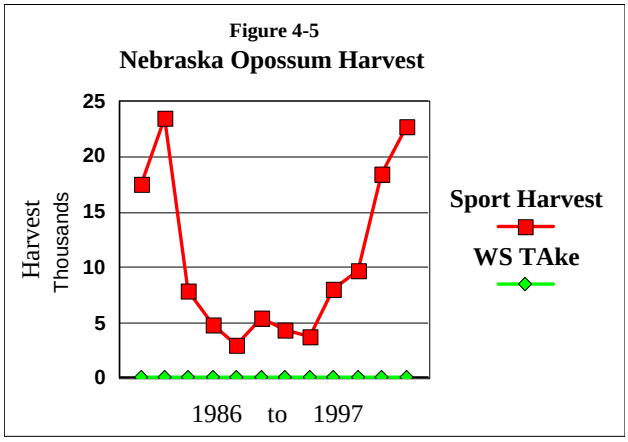
The NGPC manages bobcats as furbearing animals with a regulated and controlled trapping season. Each harvested bobcat is tagged so that the disposition of each animal can be monitored.

In Nebraska, bobcats infrequently depredate poultry and domestic rabbits and Nebraska WS typically removes fewer than five annually. The NGPC has stated that the number of bobcats taken by WS is insignificant with regard to local and/or statewide population viability (Andelt 1997).

Virginia Opossum Population Information

In Nebraska, Virginia opossums most often damage property, consume livestock feed or poultry, or become a nuisance. During FY96, opossums were responsible for three incidents of damage valued at $9. In FY97, they were responsible for five incidents valued at $210, and in FY98 they were

responsible for eight incidents valued at $200.



The opossum is the only native marsupial in North America. Adults weigh from < 1 kg to 6 kg depending on the sex and time of year, with males being larger than females (Seidensticker et al. 1987). Opossums are omnivorous, feeding on insects, fruits, crustaceans, and mammals (Gardner 1982, Seidensticker et al. 1987). Female opossums are capable of breeding from five to seven times throughout the season (Reynolds 1952, Jurgelski and Porter 1974) which extends from January through November (Gardner 1982). If the female loses her young, she will go into estrus two to eight days later (Reynolds 1952). Female opossums are capable of raising two litters per year (Gardner 1982, Seidensticker et al. 1987) with a mean litter size of 8.5 for earlier litters and 6.6 for later litters (Llewellyn and Dale 1964). The female has functional nipples for 13 young (Gardner 1982) and it is capable of producing 15 (Seidensticker et al. 1987), 16 or even 17 young (Gardner 1982). Opossums are primarily associated with three habitats: 1) wet, shrubby thickets with small trees and abundant ground cover, 2) forest edges removed from water sources with a variety of trees and tree sizes, and 3) areas near water with many small trees, a few large ones, and an open canopy (Seidensticker et al. 1987). Densities of opossums vary from 3.8/mi^2 for mixed pasture and woodlands in Iowa (Wiseman and Hendrickson 1950) and 6.5/mi^2 for cultivated farmland in Illinois (Verts 1963), to a high of 166/mi^2 at the Montezuma National Wildlife Refuge (VanDruff 1971). High mortality and rapid population turnover are characteristic of Virginia opossums (Hunsaker 1977, Gardner 1982). The life expectancy of an opossum is one year with only 8% of the males and 5% of the females surviving for longer (Seidensticker et al. 1987). Other accounts have stated that only 3% of opossums survive longer than one year in Maryland (Llewellyn and Dale 1964), none were older than 15 months in Illinois (Sanderson 1961), and none survived beyond one year in Wisconsin (Gillette 1980). Longevity records for the wild are 3 years for males (Llewellyn and Dale 1964) and 28 months for females (Seidensticker et al. 1987).

Virginia Opossum Population Impact Analysis

Harvest data alone will not predict future population trends of Virginia opossums; environmental conditions during the reproductive season preceding the harvest must also be considered (Seidensticker et al. 1987). Because the reproductive season is limited to one year for >90% of females, the survival of the species in an area primarily depends on how predictable the availability of food resources will be from one year to the next (Seidensticker et al. 1987).

WS removed 53 opossums in FY 96, 110 in FY97, and 96 in FY98. It is recognized that "*Other Take*" of opossums occurs, but no reliable system exists for recording this information. Harvest information suggests that the opossum population in Nebraska is viable and healthy (Figure 4-5), and that WS' take of opossums has remained relatively consistent from 1986 to 1997. WS' take of opossums in Nebraska has no impact on the viability of the statewide population.

Weasel Population Information

WS does not distinguish between species of weasels in the collection of MIS data. In Nebraska, weasels infrequently kill poultry and Nebraska WS typically removes fewer than two weasels annually. In FY96, seven chickens worth $35 were killed by weasels. Weasels also caused $35

and $25 in damages in Nebraska in FY97 and FY98, respectively.

Three species of weasels potentially occur in Nebraska; the long-tailed weasel (*Mustela frenata*), the ermine, stoat or short-tailed weasel (*M. erminea*), and the least weasel (*M. nivalis*). The long-tailed weasel is found throughout Nebraska and the least weasel is found in the eastern two-thirds of Nebraska (Jones et al. 1983). Hall and Kelson (1959) speculated that the ermine could be found in the northwest corner of Nebraska, because populations of ermines occur in eastern Wyoming and the Black Hills of South Dakota.

Svendson (1982) reported reproductive maturity for long-tailed weasels at 3-4 months, but Gamble (unpubl. data as cited in Fagerstone 1987) suggests that females do not produce litters until they are 2 years old. Long-tailed weasels have only one litter per year, during April or May, and produce 4 to 9 young (Fagerstone 1987). Heidt (1970) found that captive weasels produced an average of 6-8 young. In Michigan, long-tailed weasels were documented to have home ranges in mixed habitat that ranged from 79 to 395 acres (Quick 1944). In mixed habitat in Colorado, long-tailed weasels maintained home ranges of 198-297 acres (Quick 1951), while male long-tailed weasels had home ranges of 15 to 59 acres on farmland in Kentucky (DeVan 1982). Population densities of long-tailed weasels vary due to a variety of factors including habitat and prey availability. Population densities range from a high of 65/mi^2 in chestnut oak (*Quercus prinus*) forest in Pennsylvania, to 3 to 30/mi^2 on Kentucky farmland, and to a low of 0.6 to 1.3/mi^2 in western Colorado and lower Michigan (Quick 1951, Craighead and Craighead 1956).

Ermine also have only one litter of young per year which are usually born in the spring (Deanesly 1935). Litter sizes range from 4 to 13 young (Stubbe 1973) with the average being six young in North America (Hamilton 1933). The females mate during their first summer, sometimes before they are weaned or their eyes are open (Hamilton 1958, Muller 1970, Rowlands 1974). There is a rapid turnover of resident males and at times the young mate with the same adult male with which their mothers mated (Erlinge 1979, Simms 1979). Almost all females are pregnant by the end of summer (Wright 1963) due to an extended estrus period (Ternovsky 1983). The life expectancy of an ermine is 1.0-1.5 yrs with an annual survival rate of 40% (Sandell 1984) and longevity record of seven years (Fagerstone 1987). The majority of home range studies for ermine come from Europe where the species is much larger (Nyholm 1959, Erlinge 1977). Male home ranges overlap female home ranges by 2-3 times (Simms 1979) and can be as large as six times the size of the female home range (Erlinge 1979). In Ontario, male home ranges averaged 49 to 62 acres and female home ranges averaged 25 to 37 acres (Simms 1979). California winter home ranges averaged 8.6-17.0 acres (Fitzgerald 1977). Home ranges for Eurasian ermines are reportedly larger; 627 acres for males and 282 acres for females on farmland in Scotland (Pounds 1981), 20 to 32 acres during the winter for males and 5 to 17 acres for females on Swedish pastures and marshes (Erlinge 1977), 20 to 99 acres for males and 5 to 17 acres for females on Swiss alpines (Debrot and Mermod 1983), and 72 to 99 acres for males and 10 to 42 acres for females in Finland (Nyholm 1959). In Russia, males and females had a home range of 27 to 170 acres for meadows and scrub and both sexes had a home range of 296 to 306 acres in forests (Vaisfeld 1972). Ermine populations in North America typically range from 7/mi^2 (Soper 1919) to 10/mi^2 with populations reaching a high of 18/mi^2 in preferred habitat (Simms 1979).

The least weasel is the smallest mustelid and the smallest member of the Order Carnivora in North America. Least weasels are capable of breeding year round (Hall 1951) and they can reach sexual maturity at 3 to 4 months (Hartmann 1964, East and Lockie 1964, Svendson 1982). The number of litters per year and the rate of development of the young is strongly influenced by prey availability (Fagerstone 1987). If prey species are abundant, a female can produce up to three litters per year (Heidt et al. 1968). Litter sizes range from 1 to 10 with an average of 4 to 5 young (Hall 1951,

Heidt 1970). The life expectancy of least weasels is 1 year with a 20% survival rate for males and a 25% survival rate for females (King 1990, Fagerstone 1987). During a long term study conducted from 1925-1957, Polder (1968) found that the home ranges for least weasels on Iowa farmland ranged from 4-10 ha. In a Finnish study, where least weasels are larger than North American least weasels, male weasels had a home range of 0.6-3.0 ha and females had a home range of 0.2-2.1 ha (Nyholm 1959).

Weasel Population Impact Analysis

During the late 1800s and early 1900s, one half of Britain was under an intensive predator management program that included the use of trapping, shooting, and poisoning (King 1990). Although targeted by the predator elimination program, weasels were resilient because of their opportunistic life style, variable productivity, and constantly high natural mortality, which enabled the species to compensate for sudden population decreases due to predator management (King 1990).

Stuttard (1986) stated that weasels generally do not need protection, because of their high recovery rates. Consequently, the lack of food may be the most important mortality issue for long-tailed weasels, ermine, and least weasels (Fagerstone 1987). Nebraska removed no weasels in FY97 and one weasel in FY98.

Mountain Lion Population Information

Nebraska WS personnel began receiving mountain lion depredation complaints in FY91 when they first responded to two individual complaints involving damage to agriculture and natural resources, respectively. In FY92, mountain lions were reported to be responsible for three agriculture-related damage complaints and one incident involving the death of a mule deer.

Since FY91, the number of mountain lion-caused livestock depredations reported to Nebraska WS has increased. In FY94, mountain lions were reported to have killed calves valued at $800; in FY95, lions reportedly killed an elk worth $250 and several calves valued at $1,500; and in FY96, lions killed a foal worth $500 and were involved in one threat to human health and safety. No damages were verified or reported in FY97, however, in FY98, five incidents of mountain lion damage were reported including the death of two calves valued at $1,000.

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). Since 1986, there have been nine verified attacks on humans with two fatal attacks on adult women in California (Torres et al. 1996). Within Nebraska, human interactions with mountain lions could occur wherever humans and mountain lions coexist.

Mountain lions are widely distributed across North America (Anderson 1983). They inhabit many habitat types from desert to alpine environments, suggesting a wide range of adaptability. Female mountain lions typically breed for the first time between 22 and 29 months of age (Ashman et al. 1983), but initial breeding may be delayed until a territory has been established (Hornocker 1970). Mountain lions breed and give birth year-round, but most births occur during late spring and early summer following a 92-day gestation period (MFWP 1996, Ashman et al. 1983, Seidernsticker et al. 1973, Robinette et al. 1961). Mountain lions average two to three young per litter, but one to six offspring are possible (Robinette et al. 1961). Young mountain lions stay with the female for 10 to 24 months (MFWP 1996).

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

Mountain lions were extirpated from the eastern two-thirds of Nebraska during the 1890s, but are still occasionally reported from western Nebraska (Jones et al. 1983). Recent sightings and depredation complaints suggest that mountain lion populations may be increasing in Nebraska.

Mountain Lion Population Impact Analysis

Mountain lion populations can sustain moderate to heavy losses of adults and still maintain viable populations. Robinette et al. (1977) reported an annual mortality of 32% in Utah, while Ashman et al. (1983) noted a sustained annual mortality of at least 30% in Nevada. In addition, Ashman et al. (1983) believed that under "*moderate to heavy exploitation (30%-50%),"* mountain lion populations on their study area had the capability to rapidly replace annual losses through recruitment (reproduction and immigration).

The allowable annual harvest for mountain lions is 30% of the population (USDA 1994). WS has never taken any mountain lions in Nebraska, but would closely coordinate any efforts to do so with the NGPC.

4.4.1.2 Alternative 2 - No Federal Nebraska WS Program and Alternative 6 - Technical Assistance Only:

Both Alternative 2 and Alternative 6 would result in no Nebraska WS operational program and the potential effects would be similar, therefore they will be analyzed together. Some type of predator damage management would most likely be conducted by producers, various state or local governmental agencies, or other entities. The impacts on wildlife populations could vary considerably from those described in Alternative 1, because of the potential for the improper or inappropriate selection and use of damage management methods, emphasis on lethal methods, duplication of effort, and/or possible misuse of pesticides.

A thorough review of the potential impacts of these two alternatives can be found in USDA (1994). The USDA EIS (1994) summarized the biological impacts of the No WS Program Alternative as follows:

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

Predator damage management would certainly be handled differently without WS' assistance. State agencies and private individuals would not be subject to the same restrictions and operating policies adhered to by Nebraska WS (such as the requirements of NEPA and the need to coordinate and plan with the BLM and Forest Service). We assume that a state agency such as the NGPC or NDA would administer a program, but there would be an interim period, while funds were secured and an organization was established, where livestock producers would have limited or no assistance and would conduct needed control by whatever means available to them. Any assumption of predator damage management by the state would probably dilute resources needed for other wildlife management and/or state functions.

Alternatives 2 and 6 would likely have greater adverse impacts on wildlife populations than the current program.

4.4.1.3 Alternative 3 - Integrated Wildlife Damage Management for Multiple Resources and Land Classes (Proposed Alternative):

Alternative 3 would authorize Nebraska WS predator damage management on BLM, Forest Service, USFWS, state, tribal, private, city, and county lands, as requested to protect livestock, wildlife, property, and public health and safety. The actual area where wildlife damage management activities would be carried out is unknown and could vary from year to year, based on need. However, the area that would be worked in any one year would be similar to the area worked under Alternative 1. Alternative 3 differs from Alternative 1 in the timing of control and the species considered as targets, based on the combined needs to protect wildlife and livestock, property, public health and safety, and public lands.

Nebraska WS estimates that predator damage management conducted under this alternative could increase the kill of coyotes, but any increase probably would not exceed 2% of WS' current take. A 2% increase, based on 1997 data, would mean that 54 additional coyotes would be taken each year. Furthermore, if WS' take of red foxes were increased by 50% due to the need to protect wildlife, Nebraska WS would kill about 327 red foxes statewide. (Note: this estimate is based on WS' FY94 "take" of 218 red foxes, the highest number taken in the last six years.) The NGPC coyote and red fox population data indicates that the viability of predator populations in Nebraska would not be significantly affected by WS activities conducted as a result of Alternative 3, The Proposed Action (Andelt 1997).

Alternative 3 would have a minimal impact on targeted wildlife populations.

4.4.1.4 Alternative 4 - Nonlethal Damage Management Required Prior to Lethal Control:

As noted in Table 4-1, all Nebraska sheep producers and many cattle producers surveyed by WS already practice some form of nonlethal predator damage management. Nebraska WS predator damage management techniques implemented under Alternative 4 would be similar to those practiced under the current program. The impacts to target populations would then be identical to those described in 4.4.1.1 for Alternative 1.

4.4.1.5 Alternative 5 - Corrective Damage Management Only:

Under Alternative 5, Nebraska WS would only initiate lethal damage management of predators after verifying the loss of livestock due to predation. Nebraska WS' coyote kill could be reduced under Alternative 5, but the impacts to target populations would be similar to those described under Alternative 1.

The impacts to target populations would be similar to those described in 4.4.1.1 for Alternative 1.

4.4.2 Effectiveness and selectivity of damage management methods.

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

The effectiveness and selectivity of each alternative is based on the methods employed under that alternative. WS personnel are trained in the use of each method and are certified by the NDA, Plant Industry as *Commercial Pesticide Applicators*. Effectiveness of the various methods may vary depending on circumstances at the time of application. Method effectiveness and/or applicability depends on factors such as weather conditions, the time of year, biological and economic considerations, legal and administrative restrictions, or other issues. Because various factors may preclude the use of certain tools, it is important to maintain the widest possible selection of damage management methods for use in selectively and effectively resolving predator damage management problems.

4.4.2.1 Alternative 1 - Continue the Current Nebraska WS Program (No Action):

Several methods employed under the current program are typically 100% selective for target species. These methods include aerial hunting, shooting from the ground, and denning. Cage trapping may capture a few nontarget animals, but these animals are typically released unharmed. While the methods discussed above are nearly 100% selective in capturing/killing only the target species, other methods such as leghold traps and snares can be somewhat less selective.

WS uses leghold traps with offset jaws to reduce injuries, pan-tension devices to make traps more selective, and checks traps according to NGPC regulations. Pan-tension devices increase the amount of weight required to set off the trap and effectively reduce the capture of smaller nontarget animals (Turkowski et al. 1984, Phillips and Gruver 1996). Pan-tension devices are always used by WS unless their use would preclude capture of the intended target species. During 1996-98, 1,605 target and only 45 nontarget animals were trapped or snared and killed in Nebraska (Table 4-8). WS personnel often try to reduce the need for setting traps or snares by first trying to remove target animals by shooting. If shooting is not successful or feasible, traps and/or snares may be used to resolve the problem. Nontarget animals captured in traps or snares are typically released unless WS personnel believe that they would not survive.

As used by WS in Nebraska, snares are more selective than traps (Table 4-8). The selectivity of snares is largely a function of how and where they are set. Break-away snare locks are also sometimes used to provide for the release of larger animals that could be accidentally caught.

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

Table 4-8. Selectivity of Traps, Snares and M-44s as used by Nebraska WS Personnel during FY93-95.

	Traps[1]	Snares[1, 2]	M-44s
Target			
Coyote	354	476	5,577
Red Fox	89	25	48
Striped Skunk	147	23	0
Badger	154	22	0
Bobcat	3	0	0
Raccoon	153	88	0
Opossum	67	5	0
3-Year Total	967	639	5,625
Nontarget			
Red Fox	1	0	0
Striped Skunk	3	1	6
Badger	3	0	0
Porcupine	3	1	0
Bobcat	2	0	0
Raccoon	5	3	10
Opossum	2	0	3
Coyote	1	0	0
Weasel	1	0	0
Rabbit	2	0	0
3-Year Total	23	5	19
% Selectivity	97.6	99.4	99.7

[1] These figures only refer to target animals caught in leghold traps and snares. Nontarget animals caught and released are not included in these totals.
[2] These figures refer primarily to animals caught in neck snares.

Hunting dogs are moderately expensive to use due to feeding and care. However, they are useful for denning where they are highly selective, not only for the offending species, but for offending individuals. Denning is the practice of finding the burrow of the targeted predator(s) and asphyxiating the young with a gas cartridge that produces carbon monoxide when ignited. Denning is highly selective because positive identification of the species is possible and is very effective in reducing livestock losses to predators (Till and Knowlton 1983, Till 1992). Dogs are also valuable for trailing and decoying target predators that are to be removed by shooting.

In Nebraska, non-capture methods (aerial hunting, calling and shooting, shooting, denning, M-44s and dogs) accounted for 2,361or 90.3%, of the coyotes taken in 1998. Capture methods (leghold traps and neck snares) accounted for 257 or 9.6%, of the coyotes taken in 1998.

4.4.2.2 Alternative 2 - No Federal Nebraska WS Program and Alternative 6 -Technical Assistance Only:

Under Alternatives 2 and 6, no federal operational predator damage management program would exist, therefore no methods would be employed by WS personnel and the selectivity and

effectiveness of methods used by WS would not be an issue. Livestock producers or state and local agencies would likely conduct predator damage management and would probably be less selective due to their lack of training, experience, adequate time to devote to predator problems, and a reduced emphasis on the need to adhere to regulations. Illegal use of pesticides could occur, along with indiscriminant trapping. State law currently provides that red foxes and coyotes may be taken by livestock producers without a license and outside of normal hunting and trapping seasons. Without WS' program, producer-employed nonlethal methods would likely decrease as producers would undoubtedly focus their attention on lethal methods.

4.4.2.3 Alternative 3 - Integrated Wildlife Damage Management for Multiple Resources and Land Classes (Proposed Alternative):

Alternative 3 would be as selective as Alternative 1, but would be more effective due to WS' increased ability to conduct predator damage management on other public lands as requested and when necessary. WS policies and methods and producer-implemented nonlethal damage management methods would not
change and the cost of implementing Alternative 3 would be comparable to the costs associated with Alternative 1.

4.4.2.4 Alternative 4 - Nonlethal Damage Management Required Prior to Lethal Control:

Alternative 4 is similar to the current program in that livestock producers are, on average, currently using about 7.2 nonlethal predator management methods (Nebraska WS unpubl. data). The selectivity and effectiveness of Alternative 4 would not differ substantially from the selectivity and effectiveness for Alternative 1, except that livestock producers might lose additional livestock while they implement the nonlethal methods required under Alternative 4.

4.4.2.5 Alternative 5 - Corrective Damage Management Only:

Under Alternative 5, WS would still be able to respond with all the methods included under Alternative 1, but would not be authorized to employ any of these methods under a lethal preventive damage management strategy. Selectivity of methods would be similar to Alternative 1, but WS would be less effective at minimizing livestock losses. By restricting corrective control to the immediate vicinity of predation losses, WS would be unable to effectively resolve some depredation problems. Till (1992), for instance, found that depredating coyotes traveled an average of 2 miles and as far as 6 miles from their den site to the sheep flocks where they killed lambs. Similarly, Shivik et al. (1996) used radiotelemetry to document that coyotes traveled up to 4.2 miles and through other coyote territories to kill lambs.

In addition, WS would probably be less effective at reducing coyote predation on spring and summer livestock grazing areas due to the logistics of getting to remote areas and the necessity of using less effective coyote damage management methods. Till and Knowlton (1983) noted that coyotes with pups are more likely to kill sheep than those without, and Gantz (1990) suggested that late winter aerial hunting of coyotes on summer sheep grazing allotments removes coyotes that might otherwise produce pups. Gantz (1990) went on to conclude that late winter aerial hunting of coyotes on summer sheep range was effective in reducing coyote predation. By conducting preventive damage management in late winter or early spring, the likelihood of transient coyotes reoccupying and establishing their own territories in time to produce pups is greatly reduced. Furthermore, Wagner (1997) determined that aerial hunting 3 to 6 months before sheep are grazed on an area was cost effective and reduced the number of traps, snares and M-44s needed in the field, thereby reducing potential risks to nontarget species.

Alternative 5 is slightly more selective than Alternative 1, due to the increased use of aerial hunting and calling and shooting. The cost of predator damage management would increase under Alternative 5, however, because more intensive corrective predator damage management would be required. Livestock losses to predators would be expected to increase under Alternative 5 when compared to Alternatives 1 and 3, because damage management would only occur after livestock depredations were verified.

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

WS' predator damage management program in Nebraska is guided by program directives, cooperative agreements, MOUs and federal and state laws. Predator damage management may have both positive and negative effects on public health and safety; WS may create a safer environment by removing threatening predators or may expose the public to potentially harmful damage management methods. WS uses appropriate chemical and non-chemical methods to minimize a variety of wildlife damage problems and WS personnel are aware of the potential risks to nontarget animals and humans. WS' use of toxicants is regulated by the EPA through the FIFRA, by state law and the NDA, Plant Industry, and by WS Directives. Along with effectiveness, cost, and social acceptability, risk is an important criterion for selection of an appropriate damage management strategy. Determination of risks to nontarget animals, the public, and WS personnel is thus an important prerequisite for successful application of the IWDM approach. Based on a thorough Risk Assessment (USDA 1994, Appendix P), APHIS concluded that WS' methods have negligible impacts on the environment when used according to directives, policies, laws and label directions.

4.4.3.1 Alternative 1 - Continue the Current Nebraska WS Program (No Action):

The current Nebraska WS predator damage management program is based on an IWDM approach to protect livestock, property, wildlife, and to safe-guard public health and safety on public and private lands as described in Chapter 3 of this EA. Based on the risk assessment from USDA (1994), the environmental and public health and safety risks associated with WS' damage management is low. The greatest risks to public health and safety from WS' use of mechanical and chemical methods are incurred by the WS personnel who apply the methods. During the 1994-98 analysis period, no injuries (to WS personnel or members of the public) related to WS' use of any chemical or mechanical predator damage management method in Nebraska were reported. Mitigation measures that address safety concerns about WS' use of wildlife damage management methods are listed at the end of Chapter 3.

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

The two chemical methods used in predator damage management (sodium cyanide in the M-44 device and the gas cartridge) pose possible risks, but USDA (1994) noted that the risks associated with these methods are mitigated through specific direction provided by WS program policies. Risks identified in the evaluation process for these chemicals were primarily environmental risks addressed by the EPA rather than safety or health risks to the public. EPA use restrictions preclude use of the M-44 in areas where it may pose a danger to T&E species. Furthermore, M-44s and the gas cartridge do not present secondary poisoning risks to other animals that may scavenge on the carcass of an animal killed by these methods (USDA 1994, Appendix P). M-44s present some risk

to free-roaming dogs and thus, are not placed on designated public lands during the regular bird hunting seasons or at any other time when exposure to the public or pets is probable. In addition, warning signs are placed in the general area and adjacent to each device whenever M-44s are used.

For these reasons, the risks posed to the public and domestic pets from WS' methods is low.

4.4.3.2 Alternative 2 - No Federal Nebraska WS Program and Alternative 6 -Technical Assistance Only:

Both alternatives would result in no federal operational predator damage management program in the analysis area. Therefore, the use of methods would be at the discretion of individuals or agencies that would conduct wildlife damage management activities. WS would make recommendations (Alternative 6), but implementation of the recommendation would be by another entity. Increased use of the same methods by less skilled or experienced individuals, coupled with reduced over-sight of how predator damage management is conducted, could result in an increased risk to the public. In addition, no program would be available to the NGPC, NDA, or NDH in case of a public health and safety threat caused by wildlife.

This alternative would likely result in increased risks to public health and safety when compared to Alternative 1. Lacking professional assistance, some livestock producers might use illegal toxicants, a cheap form of predator control that represents one of the greatest threats to the environment, T&E species, domestic animals, and public safety. Risks to T&E species would probably be greater under Alternatives 2 and 6 than from any other alternative.

4.4.3.3 Alternative 3 - Integrated Wildlife Damage Management for Multiple Resources and Land Classes (Proposed Alternative):

The analysis for Alternative 3 is the same as for Alternative 1. Thus, the impacts to public health and safety and domestic pets would be minimal because of direction and over-sight provided by program policies and directives, MOUs, EPA restrictions, and mitigation methods.

4.4.3.4 Alternative 4 - Nonlethal Damage Management Required Prior to Lethal Control:

As noted before, Alternative 4 is similar to the existing program in that producers are currently using about 7.2 nonlethal wildlife damage management methods per livestock operation (Nebraska WS unpubl. data). The impacts of Alternative 4 on public health and safety and domestic pets would be the same as those identified for Alternative 1.

4.4.3.5 Alternative 5- Corrective Damage Management Only:

The analysis for Alternative 5 would be similar to the analysis for Alternatives 1 and 3. The risks posed by corrective control only would be no different than the risks posed by the same methods used under a strategy that included preventive damage management.

4.4.4 Concerns about WS' Impact on T&E species.

WS has consulted with the USFWS regarding the nationwide program and the NGPC for state-listed species and would continue to implement all applicable *Reasonable and Prudent Measures* to ensure protection of T&E species. Endangered species consultations with the USFWS have been completed on those species for which a *"may affect determination"* has been made (as listed in the EIS), and where applicable, the *Reasonable and Prudent Measures* have been implemented (USDA

1994). Chapter 3 lists all mitigation measures and SOPs that have, or would be implemented to insure that T&E species wouldn't be adversely affected by the program.

4.4.4.1 Alternative 1 - Continue the Current Nebraska WS Program (No Action):

Nebraska WS conducted an informal Section 7 consultation with the USFWS and NGPC for state-listed species regarding the potential impacts of the current program and the proposed action. The USFWS and NGPC have concurred with Nebraska WS' assessment that neither the current program nor the proposed action is likely to adversely affect any T&E species that may occur in Nebraska. Mitigation measures to address concerns about impacts to T&E species are listed at the end of Chapter 3.

4.4.4.2 Alternative 2 - No Federal Nebraska WS Program and Alternative 6 -Technical Assistance Only:

No operational WS activities would be conducted pursuant to either of these alternatives and therefore, there would be no risks to T&E species from federal WS program actions. Some type of damage management would most likely be implemented by livestock producers or other private individuals, however, and any such management initiated by individuals with limited training and experience would be more likely to affect nontarget species, including T&E species. Lacking professional assistance, some livestock producers might use illegal toxicants, a cheap form of predator control that represents one of the greatest threats to the environment, T&E species, domestic animals, and public safety. Risks to T&E species would probably be greater under Alternatives 2 and 6 than from any other alternative.

4.4.4.3 Alterative 3 - Integrated Wildlife Damage Management for Multiple Resources and Land Classes (Proposed Alternative):

The analysis is the same as that for Alternative 1.

4.4.4.4 Alternative 4 - Nonlethal Damage Management Required Prior to Lethal Control:

The analysis is the same as that for Alternative 1.

4.4.4.5 Alternative 5 - Corrective Damage Management Only:

The analysis for Alternative 5 would be similar to the analysis for Alternatives 1 and 3. The risks posed by corrective control only would be similar to the risks posed by the same methods used under a strategy that included preventive damage management.

4.4.5 Summary of Nebraska WS' Impacts.

Table 4-12 compares the alternatives and issues (impacts) discussed in this EA. The impacts are rated as: Neutral, Neutral/Low, Low, Low/Moderate, Moderate, Moderate/High, and High. Some impacts are also rated in a positive (+) or negative (-) manner, reflecting society's perception of how the impact could affect the environment.

Table 4-12. A Comparison of the Issues/Impacts with the Alternatives

Issues/Impacts	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
Coyote	Neutral/Low	Low	Low	Low	Low	Neutral/Mod
Red Fox	Low	Low	Low	Low	Low	Neutral/Mod
Raccoon	Low	Low	Low	Low	Low	Neutral/Mod
Striped Skunk	Low	Low	Low	Low	Low	Neutral/Mod
Mink	Low	Low	Low	Low	Low	Neutral/Mod
Badger	Low	Low	Low	Low	Low	Neutral/Mod
Bobcat	Neutral/Low	Low	Low	Low	Low	Neutral/Mod
Nontarget	Low	Mod/High	Low	Low	Low	Mod
Game Species	Low	Mod (-)	Mod	Low	Low	Mod
T&E Species	Low	Mod/High (-)	Mod	Low	Low	Mod/High
Methods[1]	Mod	Low	Mod	Mod	Low	Low
Selectivity	Low	Neu/Low	Low	Low	Low	Neutral/Low
Humaneness[1]	Low	Low	Low	Low	Low	Low
WSAs/WAs[1]	Low	Low	Low	Low	Low	Low
Public Lands[1]	Low	Low	Low	Low	Low	Low
Public Health & Safety	Mod (+)	Low	High (+)	Low	Low	Low

[1]Public perception was not considered in the comparison of these issues/impacts.

The analysis in this EA failed to identify any cumulative impacts nor are any significant impacts to the human environment expected because of predator damage management conducted by the Nebraska WS program. Any localized reduction of predator populations would soon be replaced and habitats reoccupied as Nebraska WS personnel would only conduct predator damage management on areas with agreements for control, cooperative agreements, or wildlife damage management work plans. Nebraska WS personnel work on about 5% of the total state acreage, annually. The effects (*"Other Take + Nebraska WS' Take"*) to predator populations that Nebraska WS targets during damage management are neutral to low/moderate and do not have a long-term adverse impact on any species.

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APPENDIX A

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APPENDIX B

GLOSSARY

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

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

Animal Behavior Modification: The use of scare tactics/devices (such as electronic distress sounds, propane exploders, pyrotechnics, lights, scarecrows, etc.) to deter or repel animals that cause damage to resources or property or threaten human health and safety.

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

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

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

Behavior Modification: See *Animal Behavior Modification*.

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

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

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

Compensation: Monetary reimbursement for loss of resources.

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

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

Denning/Den Hunting: The process of locating predator (primarily coyote) burrows and destroying the pups. The adult predators may also be killed.

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

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

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

Diversity: The distribution and abundance of living organisms.

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

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

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

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

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

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

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

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

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

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

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

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

Integrated Pest Management: The procedure of integrating, applying, and assessing practical pest management methods while minimizing potentially harmful effects to humans, nontarget species, and the environment.

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

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

Local Population: The population within an immediate specified geographical area.

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

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

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

Nontarget Species/Animal: An animal species or local population that is inadvertently captured, killed, or injured during wildlife damage management.

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

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

Open Range: Unfenced grazing lands.

Pesticide: A toxic chemical substance used to control pest animals.

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

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

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

Predator: An animal that kills and consumes another animal.

Preventive Damage Management: Management applied before damage begins.

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

Public Land: Land that is managed by a government agency (i.e., federal, state, regional, county or municipal jurisdiction).

Pyrotechnics: Specialized fireworks used to frighten wildlife.

Range Lambing: Lambs born on the open range or in large pastures.

Rangeland: Land covered with native grasses, forbs, and/or shrubs valuable for forage.

Raptors: Carnivorous birds (e.g., owls, hawks, falcons, etc.) that prey on other animals.

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

Repellent: A substance with taste, odor, or tactile properties that discourages specific animals or species from using a food or place.

Requester: Individual(s) or agency(ies) that request wildlife damage management assistance from WS.

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

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

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

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

Take: The capture or killing of an animal.

Target Species/Animal/Population: An animal, species, or population at which wildlife damage management is directed.

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

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

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

Toxicant: A poison or poisonous substance.

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

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

Wildlife: Any wild mammal, bird, reptile, or amphibian.

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

Work Plan: A management plan developed jointly by WS and the BLM, Forest Service, NGPC, and/or NDA specifying when, where, how, and under what constraints wildlife damage management will be conducted. Work plans generally include a map showing areas designated for planned control, restricted control, no control, and special protection.