

# Black-Tailed Prairie Dog Status and Future Conservation Planning

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Abstract.-The black-tailed prairie dog is one of five prairie dog species estimated to have once occupied up to 100 million ha or more in North America. The area occupied by black-tailed prairie dogs has declined to approximately 2% of its former range. Conversion of habitat to other land uses and widespread prairie dog eradication efforts combined with sylvatic plague, *Yersinia pestis*, have caused significant reductions. Although, the species itself is not in imminent jeopardy of extinction, its unique ecosystem is jeopardized by continuing fragmentation and isolation.

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With the exception of Arizona, from which it has been extirpated, the species still occurs in all the states (including Canada and Mexico) within its historic range. Yet, widespread reductions have occurred in population numbers and occupied areas throughout this broad range. Historic evidence suggests that the total area occupied by all species of prairie dogs may have declined by as much as 98% during the first half of this century (Miller et al. 1994).

## INTRODUCTION

The black-tailed prairie dog, *Cynomys ludovicianus* Ord, is the most widespread and abundant of five species of prairie dog in North America. Two species, the Utah prairie dog, *C. parvidens* J.A. Allen and the Mexican prairie dog, *C. mexicanus*, are currently listed as threatened and endangered, respectively, under the Endangered Species Act of 1973. The two other widespread species are the white-tailed prairie dog, *C. leucurus* Merriam and the Gunnison's prairie dog, *C. gunnisoni* Baird.

The black-tailed prairie dog is native to the short and midgrass prairies of North America. Its historic range stretches from southern Canada to northern Mexico and includes portions of Arizona, Colorado, Kansas, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, and Wyoming (Hall and Kelson 1959). The eastern boundary of prairie dog range is approximately the western edge of the zone of tallgrass prairie, from which prairie dogs are ecologically excluded. The western boundary of this species is roughly the Rocky Mountains. Its range is contiguous with, but generally does not overlap, ranges of other prairie dog species.

## METHODS

We sent letters of inquiry to state and federal conservation and land management agencies and consulted published reports. This information was augmented by telephone interviews with individuals knowledgeable about prairie dog management. The area surveyed included all states within the original range of the black-tailed prairie dog. Although responses were received from all states and agencies queried, the quality of survey information varied. Therefore, this report is a picture of prairie dogs in the mid-1980s rather than an accurate assessment of 1995 populations.

Prairie dog abundance and distribution is probably better documented at present than at any previous time due to improved mapping techniques and greater interest in prairie dogs by land management agencies. Yet, prairie dog occupied acreage can still only be grossly estimated. A primary factor contributing to this uncertainty is that much of the mapping effort is temporally distributed over a decade or more and there is no method available to assess prairie dog abundance over a broad area within a short span of time. Typically, prairie dog populations change substantially within a few years due to the threats discussed below and to climatic factors and prairie dog reproductive ecology. Another factor contributing to errors in determining prairie dog abundance is a lack of information from private and state lands.

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## THREATS TO THE PRAIRIE DOG

A number of causes have been identified or proposed to account for the reductions in the acreage occupied by black-tailed and other prairie dog species. We believe that four areas of threat warrant further discussion: 1) loss of habitat due to conversion of prairie to other land uses; 2) intentional poisoning or other eradication or control efforts, primarily prompted by the livestock industry; 3) shooting for recreation or as a control effort; and 4) sylvatic plague, *Yersinia pestis*.

## LOSS OF PRAIRIE

Prairie dominated by blue grama, *Bouteloua gracilis* (H.B.K.) Lag. ex Griffiths, and buffalograss, *Buchloe dactyloides* (Nutt.) Engelm., possibly due to its relatively flat topography, is among the first grassland converted to agriculture (Dinsmore 1983). As a result, Graul (1980) noted that as much as 45% of this prairie type has been lost to other land uses. Reductions in all shortgrass and midgrass prairies is expected to be similar or possibly greater in some midgrass regions where precipitation may be more suitable for agriculture. Although National Grassland acreage in the northcentral region of the Forest Service represents only about 5% of that agency's land base, it also represents the majority of the native prairie remaining in this region of North and South Dakota (Knowles and Knowles 1994).

Currently, with the exception of some areas of the northwestern portion of the black-tailed prairie dog's range, conversion of prairie to agricultural has lessened. This is because much of the arable land is already in cultivation or has been converted to non-native grasses for forage. Municipal and industrial development probably account for most of the present losses to native prairies in the United States. While these losses are minor compared with those that occurred during settlement of this country, they continue to reduce habitat availability for prairie dogs and other species.

## ERADICATION OR CONTROL EFFORTS

Eradication efforts have been carried out against prairie dogs on a very large scale, affecting several million ha of land (Anderson et al. 1986; Bell 1921).

Clark (1979) reported that in some years prairie dogs were intentionally poisoned on more than 8 million ha in the United States. During the early 1980s, 185,600 ha of prairie dogs were eradicated on the Pine Ridge Indian Reservation in South Dakota (Hanson 1988; Sharps 1988). In 1986 and 1987, a South Dakota black-tailed prairie dog complex of 110,000 ha was destroyed, eliminating the largest remaining complex in the United States (Tschetter 1988).

Virtually every federal land management agency has been involved in this effort. The U.S. Fish and Wildlife Service used compound 1080 until its ban in 1972. In 1976, this agency approved the use of zinc phosphide as a prairie dog control agent, hoping to avoid secondary poisoning of nontarget species while maintaining its prairie dog poisoning program. It is estimated that permitting activities by both the Environmental Protection Agency and the Animal and Plant Health Inspection Service account for the annual poisoning of 80,000 ha of prairie dogs in the United States (Captive Breeding Specialist Group 1992). Much of this effort occurs on federally-owned and managed land, despite the fact that less than 5% of the United States beef weight is produced on these lands (United States General Accounting Office 1988). Most poisoning on federal land is due to private land concerns, not necessarily federal forage concerns.

The legal designation indicating the regulatory status of the black-tailed prairie dog varies among the 10 states in which it still occurs. In four states the species is designated a legal agricultural pest, with some level of either state or local mandatory controls in effect. This includes statewide legislation mandating control of prairie dogs in Wyoming. In Colorado, Kansas, and South Dakota, state legislation allows counties or townships to mandate controls on landowners. In 1995, Nebraska repealed their long-standing legislation that mandated statewide control, thereby joining the states of Montana, New Mexico, North Dakota, Oklahoma, and Texas, where control is not mandatory but assistance may be provided to landowners who believe they have a prairie dog population problem that requires control.

## PRAIRIE DOG SHOOTING

Shooting of prairie dogs, either for recreation or to reduce or control their numbers, is widespread across the range of all species in the United States.

The impact this activity has on overall populations remains unclear, but preliminary monitoring results by the Bureau of Land Management (BLM) in Montana indicate that some level of shooting might impact the growth and expansion of prairie dog colonies (Reading et al. 1989). Fox and Knowles (1995) suggested that persistent unregulated shooting over a broad area of the Fort Belknap Indian Reservation in Montana might have significantly influenced prairie dog populations. However, they further concluded that it would require approximately one recreational day of shooting for every 6 ha of prairie dogs to result in such an impact. This level of shooting pressure is unlikely over the hundreds of thousands of ha of currently occupied range.

### SYLVATIC PLAGUE

Prairie dogs have coexisted with a variety of predators for many centuries on the plains and have adapted means of persisting in spite of this predation. However, a more recent threat has arrived to

which the prairie dog has no adaptive protection. A flea-borne bacterium, the sylvatic plague, was introduced into North America just before the turn of the century. First discovered in black-tailed prairie dogs in Texas in the 1940s (Cully 1989), small rodents such as prairie dogs apparently have no natural immunity to the plague, which now occurs virtually throughout the range of the black-tailed prairie dog.

The impacts of plague are more adverse than just the killing of many individuals. The plague persists in a colony resulting in a longer population recovery time than is common in colonies that have been poisoned (figure 1). Four years following impact, plague-killed colonies on the Rocky Mountain Arsenal National Wildlife Refuge had recovered to only 40%, while poisoned colonies had recovered to over 90% (Knowles 1986). Knowles and Knowles (1994) suggested that prairie dogs have survived the introduction of this disease simply due to their large, highly dispersed populations. Further reductions in these populations could make prairie dogs much more susceptible to local or regional extirpations due to the plague.

## Poison and Plague Impact and Recovery

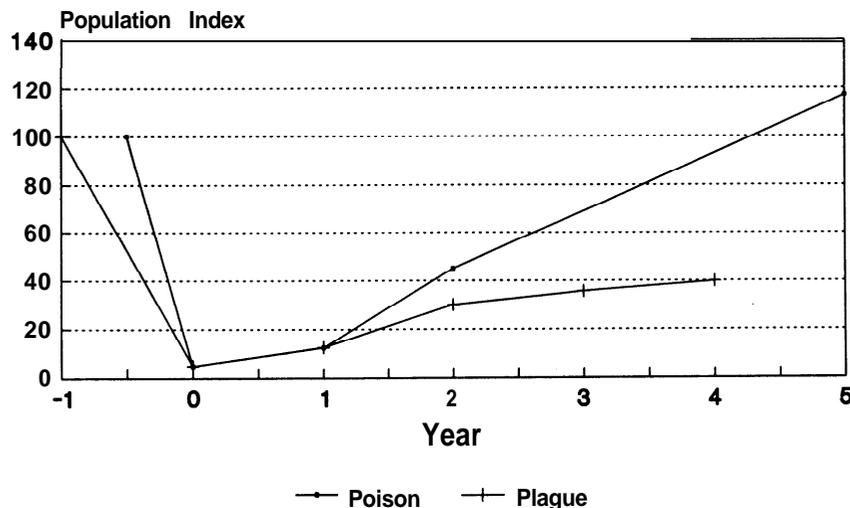


Figure 1. Comparison of prairie dog population recovery at the Rocky Mountain Arsenal National Wildlife Refuge following plague and at two colonies following control with zinc phosphide (Knowles 1986).

## HISTORIC AND CURRENT STATUS

### Rangewide

Seton (1929) estimated that in the early part of this century, there may have been 5 billion prairie dogs in North America. Around that time, prairie dog colonies were estimated to occupy 40 million to 100 million ha of prairie in North America, but by 1960 this area was reduced to approximately 600,000 ha (Anderson et al. 1986; Marsh 1984). These estimates result in the often-cited figure of a 98% decline in population among the five species of prairie dog. So, while the black-tailed prairie dog still occurs in all but one of the states in its historic range, significant reductions in its total colony area have taken place rangewide.

### PRAIRIE DOG STATUS IN EACH STATE

Current status information was solicited from state and federal agencies and from tribal authorities in all eleven states in the historic range of the black-tailed prairie dog (table 1). The following summary provides updated status and population data for those states.

#### Arizona

The Arizona Game and Fish Department (Duane L. Shroufe, Director, *in litt.* 1995) confirms that the black-tailed prairie dog, in the form of the Arizona subspecies *C. ludovicianus arizonensis*, is extirpated from the state. However, it still occurs nearby in Mexico and New Mexico. Arizona still supports populations of Gunnison's prairie dogs.

#### Colorado

On the Comanche and Pawnee National Grasslands, the Forest Service (*in litt.*) currently estimates a total of 2,455 ha of active prairie dogs, compared with 910 ha from 1978 to 1980 (Schenbeck 1982). This represents more than a doubling in area, but also represents only 0.5% of the area available on these public lands. Bent's Old Fort National Historic Site contains 325 ha of black-tailed prairie dogs (NPS, *in litt.*). Fort Carson and surrounding private lands contain approximately 1,620 ha, Pinyon Canyon less

Table 1. Historic 1920 and recent (post-1980) estimates of total area (ha) occupied by black-tailed prairie dogs in the United States.

State	Historic	Recent	% Change
AZ	1	extirpated	-100
CO	2,833,000		
KS	810,000	18,845	-98
MT	595,000	35,545	-94
NE		24,415	1
NM2	4,838,460	201,220	-96
ND	85,000	8,500	-90
OK		3,850	1
SD	711,000	100,000	-86
TX	23,000,000	12,145	-99.9
WY		82,590	-75
United States	40,000,000 to 100,000,000	550,000	-98 to -99

<sup>1</sup> Reliable data unavailable for analysis.

<sup>2</sup> Includes black-tailed and Gunnison's prairie dogs.

than 810 ha of prairie dogs (FWS, *in litt.*). The Rocky Mountain Arsenal NWR (FWS, *in litt.*) prairie dog population declined from 1,850 ha to 100 ha between 1988 and 1989, due to plague. Burnett (1918) estimated that three combined species of prairie dog occupied 5,665,720 ha in Colorado in the early 1900s. Based on geographic distribution of black-tailed, white-tailed, and Gunnison's prairie dogs in the state, it may be assumed that black-tailed prairie dogs accounted for approximately half this figure. There is no reliable estimate of the total area occupied by black-tailed prairie dogs statewide at this time.

#### Kansas

The National Park Service (*in litt.*) reports approximately 16 ha of prairie dogs at the Fort Larned National Historic Site. On the Cimarron National Grassland, the Forest Service (*in litt.*) currently estimates 440 ha of active prairie dog colonies compared with 20 ha estimated from 1978 to 1980 (Schenbeck 1982). This represents more than a twenty-fold increase on this 44,000-ha area, yet still only 1% of the total area of the Grassland. Both Lee and Henderson (1988) and Powell and Robel (1994) reported that selected counties had reductions of 84% since the beginning of the century (Lantz 1903, cited in Lee and Henderson 1988). A survey completed in 1992

(Vanderfoof et al. 1994) estimates 18,845 ha of prairie dogs in Kansas, just over 2% of the 810,000 ha estimated by Lantz (1903) some 90 years ago.

### Montana

Flath and Clark (1986) estimated that black-tailed prairie dogs occupied 595,000 ha of land in Montana from 1908 to 1914. Estimated prairie dog occupied area by the early 1980s had declined to 50,600 ha (Flath and Clark 1986) and subsequent estimates show further declines in prairie dogs (40,500 ha, Campbell 1986; 35,545 ha, FaunaWest Wildlife Consultants 1995). This most recent estimate indicates a statewide reduction in occupied area of approximately 94% since the early 1900s.

### Nebraska

On the Oglala National Grassland and Nebraska National Forest, the Forest Service (*in litt.*) currently estimates 105 ha of active prairie dog colonies, compared with 145 ha estimated from 1978 to 1980 (Schenbeck 1982). Current estimates represent 1.4% of land available. In 1973, prairie dog occupied area in Nebraska was estimated at 6,075 ha (Lock 1973). By 1982, this figure had increased to an estimated 32,400 ha (Frank Andelt, Nebraska Game and Parks Commission, cited in FaunaWest Wildlife Consultants 1995). By 1989, prairie dogs statewide occupied approximately 24,415 ha (Kevin Church, Nebraska Game and Parks Commission, *in litt.*). Plague and increased eradication efforts, resulting from state legislation mandating prairie dog control, have reduced this figure significantly since the 1980s, with less than 0.22% of the Nebraska landscape currently occupied by the species (FaunaWest Wildlife Consultants 1995). Historic estimates are unavailable.

### New Mexico

The BLM (*in litt.*) reports that prairie dogs may be extirpated from several sites, with only 140 ha remaining on BLM land in the state. The White Sands Missile Range (Department of Army, *in litt.*) contains just over 300 ha of prairie dogs. Around 1919 the area in New Mexico occupied by prairie dogs, both Gunnison's and black-tailed (including *C. l. arizonensis*), was approximately 4,838,460 ha, but was estimated to have been reduced to 201,220 ha by 1980

(Hubbards and Schmitt 1984). This is a 96% reduction. Hubbards and Schmitt (1984) further estimated that the range of the black-tailed prairie dog in New Mexico has been reduced by one-fourth, primarily from the range of *arizonensis*.

### North Dakota

Theodore Roosevelt National Park reportedly contains less than 360 ha of prairie dogs (NPS, *in litt.*), approximately 1% of the total Park land area. There are believed to be currently 2,690 ha of prairie dogs on the 660,435 ha of Custer National Forest in North and South Dakota (Forest Service, *in litt.*). This represents 0.4% prairie dog occupancy of these lands. The Forest management plan calls for an occupancy level at or around 2,225 ha. The North Dakota Game and Fish Department (*in litt.*) reports approximately 8,300 ha of prairie dogs statewide, which may be a reduction of 90% or more from historic levels. In 1992, only six complexes of over 400 ha were identified.

### Oklahoma

The Department of the Army (*in litt.*) has no current estimate of prairie dog areas on Fort Sill, but report that they have declined markedly in the past 10 years. Shackford et al. (1990) reported a statewide estimate of 3,850 ha in 1967, increasing by 93% to 7,440 ha in 1989.

### South Dakota

On the Buffalo Gap and Fort Pierre National Grasslands, the Forest Service (*in litt.*) estimates 3,025 ha of active prairie dog colonies and an additional 2,600 ha of colonies are subject to periodic rodenticide treatments. This compares to 17,600 ha estimated from 1978 to 1980 (Schenbeck 1982). The 500,285 ha Black Hills National Forest and Custer and Elk Mountain Ranger Districts currently support 53 ha of prairie dogs. In the early 1920s there may have been 711,000 ha of prairie dogs statewide (FaunaWest Wildlife Consultants 1995). The South Dakota Animal Damage Control office currently estimates 80,000 to 100,000 ha of active prairie dog colonies in the state; the Bureau of Indian Affairs estimates 65,000 ha of these on tribal lands (Cheyenne River Sioux Tribe, *in litt.*). These estimates suggest at least an 86% decline in prairie dog occupied area across the state.

lands and Wind Cave National Parks currently contain 1,660 and 3,085 ha of prairie dogs, respectively (NPS, *in litt.*). These numbers represent 2 and 4 % respectively, of the area available on these public lands.

### **Texas**

There were an estimated 31,385 ha of prairie dogs in northwest Texas in 1973 (Cheatham 1973). In 1991, there were at least 12,145 ha of prairie dogs estimated in Texas (Peggy Horner, Texas Parks and Wildlife, *in litt.*). Comparing this with a statewide historic estimate of 23,000,000 ha (Merriam 1902) results in a decline of over 99% in this century.

### **Wyoming**

On Thunder Basin National Grassland, the Forest Service (*in litt.*) currently estimates 1,500 ha of active prairie dog colonies, with an additional 4,900 ha subject to periodic rodenticide treatment. Colony area for the period 1978 to 1980 was reported to be 2,550 ha (Schenbeck 1982). These numbers represent 0.6% of this 231,500 ha public grassland area. Devil's Tower National Monument contains approximately 16 ha of black-tailed prairie dogs (NPS, *in litt.*); 3% of the area available. Black-tailed prairie dogs in Wyoming may have increased in abundance near the turn of the century as a result of sheep and cattle grazing, with an estimated 53,650 ha by 1971 (Clark 1973). However, Campbell and Clark (1981) estimated a 75% reduction in prairie dog occupied areas since 1915. Current estimates indicate between 53,000 and 82,590 ha statewide (Wyoming Game and Fish Department, cited in FaunaWest Wildlife Consultants 1995).

## **SUMMARY OF PRAIRIE DOG STATUS IN EACH STATE**

FaunaWest Wildlife Consultants (1995) attempted to estimate the amount of land area within the range of the black-tailed prairie dog that is currently occupied by the species. They included seven Great Plains states in their analysis and concluded that the states have less than a 1% occupancy of land surface within the species' range. The states included in this assessment and the percent of prairie dog occupancy within available area are Colorado (0.35%), Kansas (0.14%),

Montana (0.17%), Nebraska (0.22%), North Dakota (0.17%), South Dakota (0.80%), and Wyoming (0.60 to 0.88%).

While these individual state accounts do not represent an exhaustive rangewide status review, they unfortunately provide the best information available. Significant reductions in occupied area have and continue to occur throughout the species' range; losses in some places exceeded 95%. Although the species still occurs in all but one state in its historic range, the eastern boundary of this distribution may be receding to the west. Figures indicate that there may be more than 550,000 ha of occupied black-tailed prairie dog range remaining in the United States, which is consistent with the estimate of 600,000 ha (Marsh 1984) cited previously. Over half the known prairie dog acreage in the central and northern Great Plains occurs on private land, almost 30% is on Indian reservations, and about 6% each occurs on Forest Service and Bureau of Land Management property (figure 2, FaunaWest Wildlife Consultants 1995). Neither Park Service nor Fish and Wildlife Service lands support significant acreage of any prairie dog species.

There is a need to develop a standardized survey technique for assessing prairie dog status. Presently, two methods are commonly employed and both involve mapping of individual prairie dog colonies either by ground reconnaissance or from aerial photo interpretation. Both methods are time consuming and expensive, making it unreasonable to expect a survey of over 500,000 ha of prairie dog colonies on the Great Plains within a short time period. Prairie dog colonies represent clumped patches on a broad landscape and there already exist nonmapping techniques that might be capable of statistical sampling of this distribution (Marcum and Loftsgaarden 1980). A statistical approach to monitoring prairie dog colony acreage may be a more appropriate technique than trying to map all prairie dog colonies.

## **PRAIRIE DOGS AND LIVESTOCK**

Efforts to eradicate the prairie dog by the livestock and agricultural industry have existed for most of this century. Merriam (1902) estimated that prairie dogs caused a 50 to 75% reduction in range productivity. Taylor and Loftfield (1924) concluded that the prairie dog is "one of the most injurious rodents of the

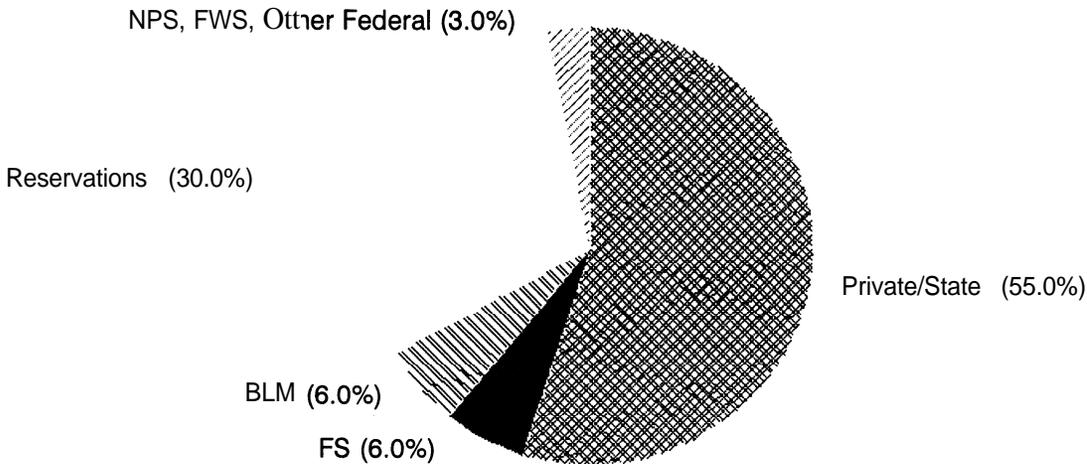


Figure 2. Distribution of black-tailed prairie dog colonies by land ownership in seven states in the northern and central Great Plains.

southwest and plains regions,” and results in “the removal of vegetation in its entirety from the vicinity.” Reports such as these were largely responsible for the escalating effort by range managers on the Great Plains to eradicate the prairie dog.

The conflict between the livestock industry and the prairie dog will likely not end easily or quickly, despite reports that prairie dog foraging does not significantly affect weight gain of cattle (O’Meilia et al. 1982; Hansen and Gold 1977). Others have reported the beneficial effects of prairie dogs on long-term range condition, including increased plant species diversity, richness, and overall plant production in prairie dog colonies (Archer et al. 1987; Uresk and Bjugstad 1983; Bonham and Lerwick 1976; Gold 1976). Uresk (1985) demonstrated that up to four years following prairie dog control, plant production was not increased whether the range was grazed or ungrazed by cattle.

Conversely, Hanson and Gold (1977) reported dietary overlap between cattle and prairie dogs, suggesting there may be some competition for the same species of forage plants. An estimation of true competition would be dependent on a variety of factors, including density of prairie dogs, stocking rate of cattle, ground cover, forage species present, and others (Uresk and Paulson 1988). Collins et al. (1984)

reported that the annual cost of prairie dog poisoning was higher than the annual value of the forage gained by these measures. This issue requires more study, with input from both sides of the debate.

## PRAIRIE DOGS AND BIODIVERSITY

The prairie dog, an integral component of the shortgrass prairie biotic community, is capable of transforming its own landscape and creating habitat alterations on a scale surpassed only by humans on the Great Plains. The ecosystem that is maintained by the prairie dog is valuable to many other species, with over 100 species of vertebrate wildlife reportedly using prairie dog colonies as habitat (Sharps and Uresk 1990; Clark et al. 1989; Reading et al. 1989). While few of these species are critically dependent on prairie dogs for all their life requisites, the increased biodiversity associated with prairie dog colonies indicates the importance of this habitat. Agnew et al. (1986) reported greater avian densities and species richness on prairie dog colonies. Also, numerous researchers have documented the preferential feeding of wild and domestic ungulates on prairie dog colonies (Coppock et al. 1983; Detling and 1987; Knowles 1986; Krueger 1986; Wydeven and Dahlgren 1985).

A number of rare and declining species are associated with prairie dogs and the habitat they provide. The black-footed ferret, *Mustela nigripes* Audubon and Bachman, 1851, is considered a true prairie dog obligate because it requires the prairie dog ecosystem for its survival. As one of the most endangered mammals in North America, this species has come to symbolize the decline in native grassland biodiversity. At least two species that are candidates for listing under the Endangered Species Act are also associated to a lesser degree with prairie dogs. The mountain plover, *Charadrius montanus* Townsend, 1837, and the swift fox, *Vulpes velox* Say, 1823, are attracted to the vegetative changes and possibly increased food availability in prairie dog colonies. The association of other species that are either declining or vulnerable indicate the problems facing this habitat.

## CONSERVATION EFFORTS

Prairie dogs are managed either directly or indirectly within the survey area by at least six federal agencies, 11 state wildlife departments, state agriculture departments, departments of state lands, and numerous weed and pest districts, counties and private landowners. Prairie dog management goals and objectives vary significantly among these entities. Even management within agencies but between areas varies significantly. This variation can range from total protection of prairie dogs to a legal mandate to exterminate. All states have simultaneously classified the prairie dog as a pest and as wildlife, often with opposing management goals. Federal policy regarding prairie dogs has been inconsistent over time and across geographic regions. The legal mechanisms responsible for the decline of prairie dogs during this century are still intact. Restoration of the prairie dog ecosystem may not be possible without major changes in management policy.

At least two federal agencies have taken the initiative to begin to address the problems associated with declining prairie dog occupied areas and to involve other interested parties. The Forest Service initiated a working group comprised of various federal land and resource agencies throughout the northern states in the Great Plains, involving the Bureau of Land Management, Park Service, Bureau of Indian Affairs, and Fish and Wildlife Service. The function of

this group is to encourage development of conservation assessments and strategies for the species across broad landscapes.

In January 1995, the Fish and Wildlife Service convened a meeting of federal, state, and nongovernmental entities to discuss problems facing the short-grass prairie ecosystem, including the prairie dog as a focal species. Consensus recommendations were: 1) Fish and Wildlife Service will develop conservation strategies to keep prairie species from becoming listed under the Endangered Species Act and to recover declining species before a listing occurs; and 2) work with the Western Governor's Association to investigate ways to coordinate and communicate with all involved parties on prairie issues. The Fish and Wildlife Service recognizes that prairie dog management remains within the jurisdiction of the various state and federal land management agencies. Therefore, this agency is particularly interested in participating in cooperative agreements with other agencies so that the prairie dog may be managed as a wildlife species rather than simply controlled as a pest.

## CONCLUSION

The black-tailed prairie dog does not appear to be in danger of becoming extinct in the foreseeable future, given current management. However, the additional negative impacts resulting from habitat fragmentation (Wilcox and Murphy 1985) could seriously impact the ability of some prairie dog populations to persist or become re-established. Habitat fragmentation adversely quickly affects highly specialized species (Miller et al. 1994) and the myriad of species associated with prairie dog colonies recover from habitat or population losses at different rates. This could result in a significant disruption of the ecosystem overall functioning, further delaying its recovery. Such effects are already evident for the endangered black-footed ferret. The future recovery or extinction of this species is inextricably entwined with the decisions resource managers make today regarding the conservation of the prairie dog ecosystem.

Management of the black-tailed prairie dog must give greater consideration to developing an abundance and distribution of prairie dogs that will ensure long-term population persistence of associated

species. As a minimum, we believe that broad areas of suitable grasslands should have from 1 to 3% of the area occupied by prairie dogs. Federally-owned lands should assume a greater share of this responsibility, with a goal of from 5 to 10% occupancy by prairie dogs. Maintaining this level of occupancy may allow resource managers to determine what actually constitutes a functioning prairie dog ecosystem, so attempts may be made to preserve this system into the future.

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