12-MONTH ADMINISTRATIVE FINDING, BLACK-TAILED PRAIRIE DOG

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1. SUMMARY OF SERVICE CONSIDERATIONS AND DECISIONS

1.1 SUMMARY OF 12-MONTH ADMINISTRATIVE FINDING

The Fish and Wildlife Service has determined that the current status of the black-tailed prairie dog warrants its listing as a Threatened species pursuant to section 4(b)(3)(A) the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.), subject to the approval of a final rule. This species has undergone significant reductions in its historic range and also in the amount of habitat within its remaining range which it presently occupies. Moreover, recent population trends indicate that its overall numbers are declining and will likely continue to decline within the foreseeable future within a significant portion of its range. Accordingly, the species is likely to become endangered in the foreseeable future in a significant portion of its range; the listing of the species as Threatened is appropriate at this time.

Notably, black-tailed prairie dog populations respond to disease impacts in aggregate with long-term depressant effects from which only limited recovery has been observed. Disease appears to be adversely affecting the species across a majority of its range and in areas where it was not observed a few years ago. Although there have been population increases in some areas in recent decades subsequent to the Executive Order that banned the use of some toxicants in 1972, there also have been significant reductions in many populations within the past 10-15 years. Overall, cumulative population totals and population trends for the species are declining across a majority of its range. Population declines have been due to—(1) previous and continuing adverse modifications of habitat, (2) localized overutilization for recreational purposes, (3) catastrophic disease impacts related to an exotic pathogen to which individuals of the species have little or no immunity and to which its populations are not resilient, (4) inadequate regulatory mechanisms that if modified could moderate other impacts, and (5) control efforts usually designed for the maximum degree of extirpation possible. The impact of these factors, separately and in combination with each other, on the species has varied through both time and space; however, at present, the major influences affecting the species appear to be disease and inadequate regulatory mechanisms.

1.2 DESCRIPTION OF THE PETITION AND RELATED INTERESTS

On July 31, 1998, the Service received a petition dated July 30, 1998, from the National Wildlife Federation (1998). The Petitioner requested that the Service list the black-tailed prairie dog (*Cynomys ludovicianus*) as threatened throughout its range. The Petitioner also requested that the species be afforded emergency listing. Section 4 of the Act and regulations of 50 CFR 424 do not provide for petitions to request the listing of species on an emergency basis. However, provisions of the Act and the Service's Listing Priority Guidance (63 FR 25502) direct that all petitions are to be reviewed to determine if an emergency listing is appropriate. The Service determined, and advised the Petitioner by letter dated August 27, 1998, that it would be inappropriate to list this species on an emergency basis given its then known status. The Service may revisit this issue if the immediacy or magnitude of threats increases such that the black-tailed prairie dog may require immediate protection through emergency listing. In September 1999, the Petitioner requested the Service to readdress this issue based on reports of

increased control efforts (Graber, National Wildlife Federation, in litt. 1999). For example, a Federal prison near Denver, Colorado, reportedly controlled approximately 40 acres (16 hectares) of black-tailed prairie dog occupied habitat (area with existing prairie dog towns) to avoid potential future conflicts with the Act (Associated Press 1999). The Service is further reviewing this issue, but has not reached any conclusion at this time.

On August 26, 1998, the Service received another petition regarding the black-tailed prairie dog from the Biodiversity Legal Foundation, the Predator Project, and Jon C. Sharps (Biodiversity Legal Foundation et al. 1998). They requested that the Service list the black-tailed prairie dog as threatened throughout its known historic range in the contiguous United States. The Service accepted this second request as supplemental information to the National Wildlife Federation petition.

The Petitioner and the Biodiversity Legal Foundation et al. (1998) requested that the black-tailed prairie dog be considered for listing as threatened. However, if a species' status warrants listing, the Service is responsible for determining a classification of threatened or endangered.

1.3 SOLICITATION OF INFORMATION FOR A STATUS REVIEW SUBSEQUENT TO A POSITIVE 90-DAY FINDING

A notice of a 90-day finding for the National Wildlife Federation petition regarding the black-tailed prairie dog was published in the Federal Register on March 25, 1999 (64 FR 14425), which indicated that it and other readily available scientific and commercial information presented substantial information that the petitioned action may be warranted. The notice also indicated that the Service would conduct a status review of the black-tailed prairie dog and requested that any additional information relevant to a proposed 12-month administrative finding be submitted to the Service by May 24, 1999. Notice of a reopening of the comment period for an additional 45 days was published in the Federal Register on June 4, 1999 (64 FR 29983). This additional comment period closed July 19, 1999. On October 4, 1999, the comment period was again reopened for additional comments, especially pertaining to a draft black-tailed prairie dog conservation assessment and strategy developed by various States and its potential influence on the status of the species. Notice of this reopening was published in the Federal Register (64 FR 53655). This comment period closed November 3, 1999.

The Service has made an effort to keep interested agencies and organizations informed of status review activities. Copies of all available references pertinent to various States were sent to appropriate Service Field Offices and State Wildlife Agencies. Copies of all references cited in the 90-day finding were sent to appropriate Service Regional Offices, Service Washington Office, the Petitioner, Biodiversity Legal Foundation, and the Colorado Association of Home Builders. Several responses were provided to Freedom of Information Act requests from the National Wildlife Federation and the Colorado Association of Home Builders. Copies of the Federal Register notice regarding the 90-day finding were sent to appropriate State, tribal, and Federal entities. Copies of the 90-day finding were requested by and sent to approximately 50 entities. Numerous requests for specific references were accommodated. The Service staff

attended several meetings regarding the petition with State, tribal, and Federal Agencies and other interested parties. The Service also provided comments on several drafts of the States' Black-tailed Prairie Dog Conservation Assessment and Strategy (Strategy). A population viability analysis has been initiated with participation from experts in several fields of study relevant to the black-tailed prairie dog. A peer review group was established to evaluate portions of this finding. Individual contacts have been made by telephone with affected State Wildlife Agencies, State Department of Agriculture Offices, Tribes, and other State and local organizations in an effort to obtain all relevant information related to the species.

The Service received approximately 14,500 comments during the development of this finding. This is an extraordinarily large number of comments for a single action, which has translated into a large workload for the Service in reviewing and evaluating them. It was not possible to answer each of these individually, nor was it possible to respond to them categorically in this finding since a thorough content analysis and classification was not conducted. However, pertinent and substantive information provided in these comments was considered and is reflected herein. The following summaries describe the sources and general content of various information received by the Service.

1.4 SUMMARY OF PETITIONER'S COMMENTS

The National Wildlife Federation addressed the following subjects in its petition: the biology and ecology of the black-tailed prairie dog, the current status of the species based upon criteria specified in the Act, the Service policies and findings regarding the species, and the use of the Acts's emergency powers to list the species (National Wildlife Federation 1998). The Petitioner's views on these subjects are summarized below:

- The biology and ecology of the black-tailed prairie dog.

  The Petitioner presented extensive information regarding the biology of the black-tailed prairie dog. This information included a description of the species and its range, as well as comments related to the dynamics of its population biology.

  The Petitioner described the black-tailed prairie dog as a colonial ground squirrel that is one of five species in the genus *Cynomys*, all of which occur in western North America. The range of the black-tailed prairie dog was described as extending from the most southerly portion of Saskatchewan, Canada; through the eastern portions of Montana, Wyoming, Colorado, and New Mexico; through the southwestern portion of North Dakota; in the western and central portions of South Dakota, Nebraska, Kansas, and Oklahoma; in the western, northwestern, and northern portions of Texas; and in the northeastern portion of Mexico. The Petitioner noted the species as present historically in eastern Arizona, but as extirpated in recent years.

The Petitioner noted that the species still occurs intermittently throughout most of its historic range, although much reduced in numbers and in the amount of habitat that it occupies. The Petitioner contrasted reports that the black-tailed prairie dog once occupied as much as 100-200 million acres (40-80 million hectares) of the western North American prairie with current estimates of occupied habitat and concluded that the species' habitat has been reduced by at least 99 percent.

- The current status of the black-tailed prairie dog.

  The Petitioner addressed the criteria for listing evaluations noted in the Act. The Petitioner attributed reductions in occupied habitat to habitat loss and degradation related to the conversion of prairie grasslands to cropland, extensive control, disease, urban development, unregulated shooting, and other factors.

  The Petitioner asserted that the small size and widely spaced distribution of most remaining black-tailed prairie dog colonies create concerns regarding the adverse influences of habitat fragmentation, dispersal limitations, and other factors on the viability of the species. It also asserted that the cumulative effect of these and other factors increases the probability of extinction for the species. It acknowledged that the number of individual black-tailed prairie dogs appeared to be significant when compared with many other species that are not thought to be in danger of extinction, but asserted that the species is threatened as evidenced by (and due to) its precipitous historic population decline, its recent population declines, and the number and variety of threats to it.

  The Petitioner asserted that all States within the range of the black-tailed prairie dog have classified it as a pest for agricultural purposes, either permitting or requiring eradication of the species. It also asserted that these States allow or promote unlimited recreational shooting. The Petitioner noted that there are inconsistent Federal policies regarding all species of prairie dogs and that the legal mechanisms under which they have declined remain in place. The Petitioner asserted that some Tribes have a sophisticated management program for the black-tailed prairie dog and play an important role in its conservation.

- Service policies and findings regarding the species (according to the Petitioner).

  The Petitioner noted guidelines developed by the Service in 1983 which are used to help determine whether a particular species should be listed as threatened or endangered. The guidelines consider the magnitude and immediacy of threats and the species' taxonomic importance. The Petitioner also noted that in response to a previous petition addressing the species (Biodiversity Legal Foundation and Sharps 1994), the Service concluded that while the species was not in immediate risk of extinction, the ecosystem which this species creates is imperiled or will be in the near future (U.S. Fish and Wildlife Service 1995). The Petitioner asserted that management actions recommended in this response have not been initiated. The Petitioner believes that the Service's consideration of "backlash from angry ranchers and landowners" was beyond the scope of the listing criteria. The Petitioner

discussed other wide-spread species which have merited listing, including the bull trout (*Salvelinus confluentus*) and bald eagle (*Haliaeetus leucocephalus*).

- Emergency listing.

  The Petitioner expressed concern that continuing human activities could pose a threat to the black-tailed prairie dog and that additional threats might be anticipated following the filing of its petition. The Petitioner predicted that poisoning and shooting would increase and result in significant population declines for the species during the normal rulemaking process. The Petitioner noted that under 16 U.S.C. 1533(b)(7) the Secretary of the Department of the Interior has the authority to suspend normal rulemaking procedures for a species, and to issue emergency regulations for it, when there is a significant risk to its well-being and where the routine listing process is not adequate to prevent losses that may result in extinction.

The Service addresses the pertinent scientific and commercial information in these comments as they relate to the biological status of the species in later portions of this document.

1.5 SUMMARY OF COMMENTS OF THE BIODIVERSITY LEGAL FOUNDATION, THE PREDATOR PROJECT, AND JON C. SHARPS

As noted previously, the Service has considered the Biodiversity Legal Foundation et al. (1998) petition as supplemental information to the National Wildlife Federation petition. The Biodiversity Legal Foundation et al. (1998) addressed several subjects including background information, management history, ecosystem considerations, and criteria for listing. These subjects are summarized as follows:

- Background information.

  The Biodiversity Legal Foundation et al. (1998) provided estimates of historic and current distribution of the black-tailed prairie dog, both regionally and by State. They also discussed the population dynamics of the species. They noted that the species breeds and produces one litter yearly and has an average life expectancy of 2-3 years for males and 3-4 years for females. They noted that the species' populations are impacted by eradication programs, sylvatic plague, recreational shooting, land conversion, and natural predation.

- Management history.

  The Biodiversity Legal Foundation et al. (1998) presented the history of black-tailed prairie dog management for each State and provided estimates of the historic and current number of acres of occupied habitat. This information also was available from the National Wildlife Federation petition and from other sources, much of which is included hereinafter under the Listing Factors Discussion.

- Ecosystem considerations.

  The Biodiversity Legal Foundation et al. (1998) discussed the threat to prairie ecosystems, particularly from agricultural land conversion. They noted the ecological importance of the black-tailed prairie dog as a keystone species.

- Criteria for listing.

  The Biodiversity Legal Foundation et al. (1998) addressed each of the five criteria for listing evaluations noted in the Act. All of these criteria were considered by the Biodiversity Legal Foundation to be relevant to the current status of the black-tailed prairie dog.

The Service addresses the pertinent scientific and commercial information in these comments as they relate to the biological status of the species in later portions of this document.

1.6 SUYMMARY OF STATE AGENCY COMMENTS

Prior to the 90-day finding for the National Wildlife Federation petition, the Service received related written comments from all State wildlife agencies within the historic range of the black-tailed prairie dog, with the exception of North Dakota. Two State agriculture departments (New Mexico and Wyoming) and two State legislatures (North Dakota and Wyoming) provided comments. In general, the States opposed listing the black-tailed prairie dog, but supported the development of conservation measures for the species. The Kansas Department of Wildlife and Parks noted that the species should not be listed as threatened or endangered, but "may merit candidate species status" (Williams, Kansas Department of Wildlife and Parks, in litt. 1998).

Subsequent to the 90-day finding, several State agencies provided additional comments. The Arizona Game and Fish Department provided comments acknowledging population declines for the species, but stated that it believed insufficient information had been presented to warrant listing of the species (Shroufe, Arizona Game and Fish Department, in litt. 1999). The State of Colorado (Department of Natural Resources, Department of Agriculture, and Colorado Attorney General) provided additional comments opposing listing and regarding the quality of the available data (Walcher et al., State of Colorado, in litt. 1999). The Montana Department of Fish, Wildlife, and Parks provided information regarding the State's prairie dog conservation plan (Graham, Montana Fish, Wildlife, and Parks, in litt. 1999). The New Mexico Department of Agriculture provided additional comments opposing listing and suggested that the States were the appropriate entity to address species issues (DuBois, New Mexico Department of Agriculture, in litt. 1999). The North Dakota Game and Fish Department provided comments opposing listing (McKenna, North Dakota Game and Fish Department, in litt. 1999). The Oklahoma Department of Wildlife Conservation provided information on black-tailed prairie dogs in Oklahoma (Duffy, Oklahoma Department of Wildlife Conservation, in litt. 1999). The South Dakota Department of Game, Fish, and Parks provided comments supporting efforts currently underway to establish a cooperative conservation strategy for the species (Cooper, South Dakota Department of Game, Fish, and Parks, in litt. 1999). The Texas Parks and Wildlife

Department reiterated points made in an earlier comment letter and emphasized that the States are best suited for managing the species (Sansom, Texas Parks and Wildlife Department, in litt. 1999). The Wyoming State Geological Survey (Cook, Wyoming State Geological Survey, in litt. 1999), Game and Fish Department (Wichers, Wyoming Game and Fish Department, in litt. 1999), Department of Agriculture (Micheli, Wyoming Department of Agriculture, in litt. 1999), and Office of the Governor (Geringer, State of Wyoming, in litt. 1999) provided comments suggesting that the development of conservation strategies involving State and local governments and private citizens was preferable to listing. Additional information regarding distribution and abundance was provided by New Mexico, North Dakota, Oklahoma, and Wyoming; and information regarding disease was provided by Arizona. Most comments provided by the States focused on policy and jurisdictional concerns rather than information related to the biological status of the species.

The Service addresses the pertinent scientific and commercial information in these comments as they relate to the biological status of the species in later portions of this document.

1.7 SUMMARY OF TRIBAL COMMENTS

Prior to the 90-day finding, the Service received written comments regarding the petition from three Tribes in South Dakota—the Cheyenne River Sioux Tribe, the Crow Creek Sioux Tribe, and the Rosebud Sioux Tribe. Generally their views were as follows, additional specific comments are addressed hereinafter. Information was provided by these Tribes regarding distribution and abundance and existing regulatory mechanisms. The Cheyenne River Sioux Tribe believes that it is adequately managing the black-tailed prairie dog and that it should be excluded from any listing (Bourland and Dupris, Cheyenne River Sioux Tribe, in litt. 1998). The Crow Creek Sioux Tribe (Miller, Crow Creek Sioux Tribe, in litt. 1998) and the Rosebud Sioux Tribe (Finnegan et al., Rosebud Sioux Tribe, in litt. 1998) opposed listing of the black-tailed prairie dog. The Cheyenne River Sioux Tribe provided additional comments supporting their views subsequent to the 90-day finding (Dikeman et al., Cheyenne River Sioux Tribe, in litt. 1999).

The Service addresses the pertinent scientific and commercial information in these comments as they relate to the biological status of the species in later portions of this document.

1.8 SUMMARY OF FEDERAL AGENCY COMMENTS

Prior to the 90-day finding, the Bureau of Indian Affairs (BIA) provided comments on the petition (Deerinwater, Bureau of Indian Affairs, in litt. 1998 and Jenison, Bureau of Indian Affairs, in litt. 1998). The BIA supported conservation measures and acknowledged a possible need to list the species.

Subsequent to the 90-day finding, the Forest Service provided supplemental information regarding the current status of black-tailed prairie dogs on National Grasslands (Sidle, U.S. Forest Service, in litt. 1999). The National Park Service (NPS) also provided comments subsequent to the 90-day finding (Soukup, National Park Service, in litt. 1999). The NPS noted restoration efforts being undertaken at Guadalupe Mountains National Park in Texas and also provided information on its control efforts. The NPS noted its preference for the development and implementation of cooperative management strategies among State, tribal, and Federal Agencies rather than a listing of the species. The Corps of Engineers Omaha District also reviewed information provided in the petition, but had no specific comments (Thomas, Corps of Engineers, in litt. 1999).

The Service addresses the pertinent scientific and commercial information in these comments as they relate to the biological status of the species in later portions of this document.

1.9 SUMMARY OF COUNTY AGENCY COMMENTS

Twenty-three county agencies (county commissions and weed/pest councils) in Colorado, Montana, Nebraska, South Dakota, and Wyoming, provided comments on the petition. Seven comment letters were received prior to the 90-day finding and 16 letters subsequent to the 90-day finding. All of these agencies were opposed to listing the species. Economic considerations were a common concern, although the Act directs that only biological considerations are to be addressed in the listing process.

The Service addresses the pertinent scientific and commercial information in these comments as they relate to the biological status of the species in later portions of this document.

1.10 SUMMARY OF ORGANIZATION COMMENTS

One hundred forty-four organizations, largely either wildlife/conservation organizations or livestock/land management organizations, submitted comments to the Service. Thirty-seven comment letters were received prior to the 90-day finding and 107 letters were received subsequent to the 90-day finding. Forty-two wildlife/conservation groups supported listing of the black-tailed prairie dogs. Eighty-seven livestock/land management organizations were opposed to listing the species. Fifteen organizations provided recommendations, but did not indicate a position.

The Black-footed Ferret Recovery Foundation (BFF Recovery Foundation) (1998 and 1999) provided additional supplemental information via several letters both prior to and after the 90-day finding. This information included data regarding the activities of the Animal and Plant Health Inspection Service (APHIS) as related to control of black-tailed prairie dogs, data from a phone survey of county weed and pest control officials and extension agents, data regarding impacts to the species from recreational shooting, information regarding the distribution and abundance of the species across its range, data regarding reduction in black-tailed prairie dog occupied habitat on National Grasslands managed by the Forest Service, data regarding habitat

availability, data regarding species distribution in Montana, and information regarding sylvatic plague distribution.

The Service addresses the pertinent scientific and commercial information in these comments as they relate to the biological status of the species in later portions of this document.

1.11 SUMMARY OF INDIVIDUAL COMMENTS

Public awareness regarding the black-tailed prairie dog appears to have increased in the past 4-5 years. Only 266 comment letters were received from individuals during the review period for the 1994 petition to classify the black-tailed prairie dog as a Category 2 Candidate species (Biodiversity Legal Foundation and Sharps 1994). However, approximately 14,300 comment letters were received from individuals during the development of this finding. Approximately 90 percent of these comments supported listing the black-tailed prairie dog as threatened. The issues most frequently noted in these letters were impacts from the loss of 99 percent of the species' habitat, recreational shooting, control, habitat destruction, and disease. Individuals opposed to listing the species most frequently expressed the view that sport shooting does not impact the species, that adequate numbers of black-tailed prairie dogs are present, that the species multiplies rapidly in response to adverse impacts, and that adverse economic impacts can occur. The Service is required to make a decision regarding the petition based on the best scientific and commercial information available; it does not consider public opinion.

Several comments from individuals noted increasing or decreasing populations of black-tailed prairie dogs in various areas of the country. Generally, these observations were not useful because they were anecdotal and without adequate quantification. It was not possible to evaluate these fragmented reports in any context reflecting population trends for the species. Accordingly, the Service relied on more comprehensive reports from the literature and from various agencies for a more comprehensive evaluation.

The Service addresses the pertinent scientific and commercial information in these comments as they relate to the biological status of the species in later portions of this document.

Many of the letters from individuals noted concerns not applicable to any of the listing factors considered by the Service during a status review. These concerns included—significance of black-tailed prairie dogs as a keystone species, impacts to individuals possessing black-tailed prairie dogs as pets, animal rights issues, adverse economic impacts related to black-tailed prairie dogs, disease impacts on humans, increased soil erosion on prairie dog towns, livestock injuries related to stepping in prairie dog holes, and other issues. While the Service recognizes that these may be important concerns for some individuals, this finding addresses only the biological aspects of whether or not listing of this species is warranted.

Some individual concerns that are not applicable or only indirectly applicable to the listing factors have been addressed by other parties. Several authors have concluded that the black-tailed prairie dog is a keystone species (Agnew et al. 1986, Barko 1997, Clark et al. 1982, Forrest et al. 1988, Kotliar et al. 1999, Miller et al. 1996, Reading et al. 1989, Sager 1996), although Stapp (1998) questioned this conclusion. The Service recognizes the importance of the black-tailed prairie dog as a keystone species; however, this factor is not directly pertinent to the listing process. Impacts to individuals having black-tailed prairie dogs as pets and issues related to animal rights also are not pertinent to the listing process.

Several authors have concluded that although some degree of grazing competition may exist between livestock and prairie dogs, that competition is offset by increased nutrient content of clipped forage (Barko 1997, Bonham and Lerwick 1976, Coppock et al. 1983, Detling 1998, Detling and Whicker 1987, Uresk and Bjugstad 1980, Whicker and Detling 1988, Whicker and Detling 1993). Other authors have noted that control is generally not economically justified (Collins et al. 1984, Klatt and Hein 1978, O'Melia 1980, O'Melia et al. 1982, Sharps and Uresk 1990, Uresk 1985, Uresk et al. 1981). Regarding sylvatic plague, Barnes (1993) stated that from the perspective of human morbidity and mortality, prairie dogs are unimportant, since fewer than 3 percent of the infections of humans with plague in the United States are acquired from prairie dogs or their fleas. Research pertaining to the effects of prairie dogs on soil that was reviewed by the Service either made no mention of increased soil erosion on prairie dog towns (Carlson and White 1987, Carlson and White 1988, White and Carlson 1984), or concluded that erosion was primarily due to other factors (Koford 1958). Koford (1958) concluded that "prairie dogs rarely cause harmful erosion except where livestock, cultivation or other land use has greatly altered the natural vegetation." Several comments from individuals mentioned concerns regarding broken legs of livestock and horses; however, little documentation was available regarding this issue.

The Service recognizes that these reports are not inclusive of all situations that may occur and that site and time specific conditions may result in different observations. For example, numerous letters from landowners reported range deterioration and forage competition with livestock where prairie dogs occur. These reports may differ from others in part due to the smaller scale perspective of specific locations where prairie dog colonies have remained in one place for long periods, where drought and overgrazing may have exacerbated impacts by prairie dogs, and where economic concerns override wildlife considerations.

1.12 SUMMARY OF CONSERVATION PLANS

The Biodiversity Legal Foundation (1999) developed and submitted a plan for black-tailed prairie dog conservation. Their recommendations for conservation included the following measures:

- Issue immediate directions and guidelines to manage and protect the species as if it were already listed and protected under the Act.

- Prohibit poisoning of the species on all sections of public lands that are required for the recovery of the species.

- Prohibit shooting of prairie dogs on all public lands.

- Prohibit significant destruction and adverse modification of the species' habitat on all public lands.

- Reclassify the species from its status as a pest or small game animal to a protected nongame species.

- Implement a scientifically sound, peer reviewed species recovery program on public land.

- Encourage species recovery on private land, particularly through positive incentive voluntary programs.

- Implement current laws in order to maximize protection for the species.

- Educate the public about the need to conserve the species.

State wildlife agencies and other interested parties have developed a Strategy that may lead to a Conservation Agreement for the black-tailed prairie dog (Van Pelt in prep.). The Service supports these efforts. At this stage of development the plan is primarily a conservation assessment and strategy. State participation in and funding for the conservation plan is voluntary. Service policy recommends that a conservation agreement should identify parties responsible for initiating various actions with commitments for sufficient staffing and funds (Policy for Candidate Conservation Agreements, 64 FR 32726). Although the current draft plan remains tentative at this time and does not commit to specific actions that would improve status for the species, implementation of specific actions could have an impact on the status of the species in the future. A Memorandum of Understanding has been signed by 8 of the 11 participating State wildlife agencies for the purpose of implementing the conservation assessment and strategy for the black-tailed prairie dog. At this time it does not include participation by the States of New Mexico, North Dakota, or Colorado, other State (non-wildlife) agencies, Federal Agencies, tribal agencies, or any private interests. We recognize the significant effort that went into the development of this Strategy, and believe that this is a good beginning to addressing the conservation needs of the black-tailed prairie dog. However, the lack of commitments to specific immediate actions to improve the status of the species makes it difficult to assess any long-term benefits that the Stategy may offer the species. While the coordinated efforts of the States are a positive sign, we can only consider the current status of, and threats to, the species in making our listing decision.

Major proposals in the States' Strategy include the following measures:

- Implement a conservation strategy.

- Establish a black-tailed prairie dog conservation team and State working groups.
- Determine species distribution and status.
- Cooperate with Mexico and Canada.
- Identify, maintain, and promote existing and other suitable habitat.
- Provide public education.
- Identify research needs.
- Review State regulations.
- Complete annual evaluations.

1.13 SUMMARY OF COMMENTS ON THE STATES' DRAFT CONSERVATION ASSESSMENT AND STRATEGY

Several State wildlife agencies requested that the Service reopen the comment period related to the 90-day finding for the black-tailed prairie dog for the purpose of receiving comments pertaining to their related Strategy (Shroufe, Arizona Game and Fish Department, in litt. 1999). They requested that the Strategy and related comments be considered before the Service made a listing decision for the species. During this third comment period (October 4 to November 3, 1999) approximately 9,000 letters were received. However, only 84 letters mentioned the States' Strategy and only a few provided specific comments other than a position for or against this initiative.

Twenty-five letters opposed the States' Strategy. The most common views expressed within this group were that proposed measures were inadequate to avoid listing, proposed actions were only voluntary, timeframes were too lengthy, and funding was not guaranteed. Specifically, the National Wildlife Federation (Johnson and Graber in litt. 1999) stated that the Service cannot legally rely on future, voluntary State management actions under the draft Strategy as a basis for not listing the species. Additionally, the National Wildlife Federation questioned the States' reliance on participation by Native American Tribes in the Strategy. The National Wildlife Federation also asserted that effective conservation results cannot be attained absent fundamental changes in State statutory and regulatory provisions governing prairie dogs. The Predator Conservation Alliance (Proctor in litt. 1999) believes that the States continue to show a lack of sincerity and ability to adequately restore and maintain black-tailed prairie dog communities. Additionally, the Predator Conservation Alliance believes that the multi-State plan lacks specifics that could potentially affect a listing decision. It asserts that discussion of pertinent issues does not necessarily equate to their resolution. The Predator Conservation Alliance also asserts that the multi-State plan does not address several issues beyond the control of State agencies.

Fifty-six letters supported the States' Strategy. The most common views expressed were that proposed measures were sufficient to avoid listing and that State management was preferable to Federal management. Shroufe (Arizona Game and Fish Department, in litt. 1999) provided the Service with a Memorandum of Understanding signed by 8 of 11 Directors from State Fish and Wildlife agencies within the range of the black-tailed prairie dog. This Memorandum of Understanding supports the Strategy and while it has many laudable goals, we cannot identify any implemented conservation improvements for the black-tailed prairie dog at this time. The Strategy, Memorandum of Understanding, and attendant correspondence discuss the identification of concerned staff, the formation of workgroups, review of regulations (and some very limited changes), preliminary reintroduction efforts, and some temporary closures by Federal agencies. These may be important steps in conservation efforts for the species, but in themselves they do not result in an improved status for the species at this time.

Three letters that mention the States' Strategy did not express a position.

2. BACKGROUND INFORMATION

The Service reviewed numerous scientific publications and reports in the preparation of this 12-month finding. Many of these were available from peer reviewed journals, but some were unpublished reports from various sources. Additionally, the Service acquired information and professional opinions from scientific experts and other parties through personal communication and from comments made in response to the 90-day finding. Although considerable site and issue specific information related to the black-tailed prairie dog was available, most large scale evaluations related to the species were challenged by the extensive range of the species and the numerous factors which have affected it for over a century. Deliberations for this 12-month finding were similarly challenged; however, the Service believes that a reasonable, accurate evaluation of status trends for the species is possible from the best available scientific and commercial information. In particular, the absolute precision of current population estimates (or lack thereof) did not prove as useful as evaluations of various threats and related examinations of the relative magnitude and trends of recent population changes.

2.1 TAXONOMY

There are five species of prairie dogs in North America. They are rodents within the squirrel family (*Sciuridae*), and include the black-tailed prairie dog, the white-tailed prairie dog (*Cynomys leucurus*), the Gunnison's prairie dog (*C. gunnisoni*), the Utah prairie dog (*C. parvidens*), and the Mexican prairie dog (*C. mexicanus*) (Pizzimenti 1975). The Utah and Mexican prairie dogs are currently listed as threatened (49 FR 22339) and endangered (35 FR 8495), respectively. Generally, the black-tailed prairie dog occurs east and north of the other four species in more mesic habitat.

The black-tailed prairie dog was first described by Ord in 1815 from a specimen local to the Upper Missouri River (Hall and Kelson 1959), although the species was first collected by members of the Lewis and Clark expedition of 1804-1806. Pizzimenti (1975) researched the evolutionary divergence of the various taxa and populations of *Cynomys* using chromosomal studies and serum protein studies of individuals throughout the range of the genus and concluded that the black-tailed prairie dog should be considered a monotypic species. Other authors (Davis 1974, Hall and Kelson 1959, Hollister 1916, Hubbard and Schmitt 1983, Koford 1958, Sager 1996) indicated that there are two subspecies of the black-tailed prairie dog, the Arizona black-tailed prairie dog (*C. l. arizonensis*) and the major subspecies (*C. l. ludovicianus*). The lack of an additional descriptive name for the major group has created some confusion; although it is the most numerous and widespread of the two entities, and is usually what is thought of when the species is considered.

The Arizona subspecies (or variety) is found in northeastern Mexico (Ceballos et al. 1993), is extirpated in Arizona (Alexander 1932, Bureau of Sport Fisheries and Wildlife 1961, Van Pelt, Arizona Game and Fish Department, in litt. 1998) and is remnant in southwestern New Mexico (Hall and Kelson 1959) and in the Trans-Pecos region of Texas (Davis 1974, Hall and Kelson 1959). Individuals of the variety in Chihuahua, Mexico, comprise the largest remaining prairie dog complex of any prairie dog species or subspecies (Ceballos and Pacheco 1997). Sager (1996) reported the Arizona subspecies as extirpated from southwestern New Mexico where it once occurred, and described the taxonomy of the black-tailed prairie dog in portions of New Mexico as unclear (the major subspecies occurs in the eastern portion of the State). A debate concerning the subspecies classification of the few remaining black-tailed prairie dogs in southwestern New Mexico continues (Hubbard and Schmitt 1983). Accordingly, the Arizona subspecies (or variety), if recognized, is remnant in the United States since none exist in Arizona, and only a few occur west of the Pecos River in southwestern New Mexico and western Texas.

The remainder of the species is found in eastern Montana, eastern Wyoming, eastern Colorado, eastern New Mexico, southwestern North Dakota, western and central South Dakota, western and central Nebraska, western and central Kansas, western and central Oklahoma, northwestern Texas, and in a small area of south-central Canada.

For the remainder of this finding the use of the common name “black-tailed prairie dog” includes both groups discussed above. Based upon the information currently available, the Service concurs with Pizzimenti’s (1975) assessment of the species as monotypic.

2.2 BIOLOGY

Prairie dogs are small, stout, ground squirrels. The total length of an adult black-tailed prairie dog is approximately 14-17 inches. The weight of an individual ranges from approximately 1 to 3 pounds. Individual appearances within the species vary in mixed colors of brown, black, gray, and white. The black-tipped tail is characteristic (Hoogland 1995).

Black-tailed prairie dogs are diurnal, burrowing animals. Individuals spend most of the day above ground. They do not hibernate as do white-tailed, Gunnison's, and Utah prairie dogs (Hoogland 1995, Tileston and Lechleitner 1966). The species is very social, living in population aggregations called colonies, towns, or villages (King 1955). Historically, they generally occurred in large colonies that contained thousands of individuals, covered hundreds of thousands of acres, and extended for miles (Bailey 1905). Most existing colonies are much smaller. When unsuitable habitat such as a hill, tall vegetation, or a stream divides a prairie dog colony, the resulting sub-colonies are called wards (King 1955). Within colonies, prairie dogs live in territorial, harem-polygamous family groups called coteries (Hoogland 1995). Groups of colonies comprise a complex.

The colonial nature of prairie dogs, especially the black-tailed prairie dog, is a significant characteristic of the species. Hoogland (1995) described the sociality, demography, and population dynamics of the black-tailed prairie dog. Coloniality offers an effective defense mechanism by aiding in the detection of predators and by deterring predators through mobbing behavior. It increases reproductive success through cooperative rearing of juveniles and it aids parasite removal via shared grooming. However, it has been noted that coloniality promotes the transmission of disease, which can significantly suppress populations (Olsen 1981, Hoogland 1995). Accordingly, disease may play a major factor in the population dynamics of the species.

Black-tailed prairie dogs are not prolific in comparison to many other rodents. Several biological factors determine the reproductive potential of the species. Females usually do not breed until their second year and live 3-4 years (Hoogland 1995, King 1955, Knowles and Knowles 1994). A common misconception in many of the comment letters the Service received was that prairie dogs produce multiple litters in a year. Female black-tailed prairie dogs produce a single litter, usually 4-5 pups, annually (Hoogland 1995, Knowles and Knowles 1994). Therefore, 1 female may produce from 0 to 20 young in its lifetime. In contrast, another female rodent, the meadow mouse (*Microtus*), can become pregnant at 3 weeks of age, have up to 17 litters in 1 year, and produce as many as 83 young before 1 year of age (Bailey 1924). Conversely, survival of young prairie dogs can be high in some circumstances, especially in low density populations where habitat resources are plentiful and repressive factors such as control or disease are not operative (Garrett et al. 1982); although much lower rates of annual increase or even reductions in colony size can occur where vegetation hinders expansion or constricts existing colonies (Osborn and Allan 1949). For example, on Buffalo Gap National Grassland in South Dakota, during periods of drought and heavy stocking (both conducive to black-tailed prairie dog expansion), annual colony expansion rates approached 25 percent, while ungrazed areas showed expansion rates of 1-2 percent (Schenbeck, U.S. Forest Service, pers. comm. 1999b).

Another misconception in comment letters to the Service is that female black-tailed prairie dogs produce very large litters. Unfortunately, some older scientific literature furthers this perception. For example, Cottam and Caroline (1965) report a colony in Texas that expanded from 3 pairs in 1961 to 2,000 individuals 3 years later. This rate of expansion and survival is not supported by available demographic information (Hoogland 1995, Knowles and Knowles 1994, Miller et al.

1996). A large group of juveniles observed on the top of a single prairie dog mound does not indicate a very large litter, but may reflect communal nursing. Hoogland et al. (1989) found that multi-litter groupings are common among black-tailed prairie dogs because mothers do not discriminate between their own young and the offspring of others. Most pups receive milk from foster mothers. The same author also found that early infanticide resulted in partial or total elimination of 39 percent of all litters born.

Knowles (1985) noted that roads were frequently utilized during dispersal for distances up to 6 miles (10 kilometers). However, prairie dog dispersal is usually limited to approximately 3 miles (5 kilometers) or less, and individuals dispersing from home colonies generally move into an established colony rather than attempting to initiate a new colony (Garrett and Franklin 1988, Hoogland 1995). These limitations could restrict recruitment of animals into small and declining isolated populations and favor reestablishment of individuals in nearby, recently abandoned colonies over the establishment of new colonies. King (1955) observed two types of emigration among black-tailed prairie dogs. The first type occurred when yearling males move in the spring following the appearance of young in the colony. The second type of emigration consisted of older adults leaving a colony in the spring or summer, possibly to avoid excessive attention and interference by the young-of-the-year.

2.3 ECOLOGY

Prairie dogs act in several roles inasmuch as they are prey, provide shelter, modify vegetation, and influence ecological processes in a manner not entirely duplicated by other prairie herbivores (Ceballos and Pacheco 1997, Kotliar et al. 1999, List et al. 1997, Miller et al. 1994, Wuerthner 1997). While the black-tailed prairie dog creates habitat for itself and other species, it also is affected by other species. For example, prairie dogs can create preferential grazing opportunities for herbivores who in turn create opportunities via grazing for the expansion of prairie dog colonies at their perimeters. However, the degree to which the black-tailed prairie dog itself is influenced by these and other prairie species, particularly ungulates, is not well understood. For example, the removal of large numbers of bison (*Bison bison)* and other native ungulates from the North American prairie may have had effects on the ecology of the black-tailed prairie dog that can no longer be fully evaluated. Similarly, the periodic effects of fire no longer influence much of the remaining fragmented prairie environment.

The Petitioner described the importance of the black-tailed prairie dog to other species; noting that the black-footed ferret (*Mustela nigripes*), swift fox (*Vulpes velox*), mountain plover (*Charadrius montanus*), ferruginous hawk (*Buteo regalis*), burrowing owl (*Athene cunicularia*), and numerous other species are dependent upon prairie dogs to varying degrees. Although reports vary as to those species that require prairie dogs for their survival, at least 9 species depend directly on prairie dogs or their activities to some extent, and another 137 species are associated opportunistically (Kotliar et al.1999). The most obligatory species of this group is the

black-footed ferret. Probably no other species has a more clearly documented dependence on another species than does the black-footed ferret on the prairie dog (Anderson et al. 1986, Biggins et al. 1986, Clark 1989, Forrest et al. 1988, Henderson et al. 1974, Hillman 1968, Miller et al. 1996).

Many authors have recognized the biological importance of the black-tailed prairie dog as a keystone species (Agnew et al. 1986, Ceballos and Pacheco 1997, Clark et al. 1982, Kotliar et al. 1999, Miller et al. 1994, Reading et al. 1989). Keystone species influence ecosystem functions through their activities in unique and significant ways. The ecological effect caused by a keystone species is disproportionate to its numerical abundance and its removal or decline initiates changes in ecosystem structure and a decline in overall species diversity (Kotliar et al.1999, Miller et al. in press, Mills et al. 1993, Paine 1980, Power et al. 1996, Terborgh 1988). However, Stapp (1998) questioned whether the black-tailed prairie dog is truly a keystone species. He recognized various ecological values of the species, but challenged other authors' view of the overall role of the species. Kotliar et al. (1999) concluded that prairie dogs provide some unique functions compared to other herbivores in the system and that continued decline of the species may lead to a substantial erosion of biological diversity; and, therefore, keystone status is appropriate. The extent to which these interrelationships directly affect the black-tailed prairie dog itself is largely unknown.

2.4 DISTRIBUTION, ABUNDANCE, AND TRENDS

2.4.1 Distribution—Rangewide

The historic range of the black-tailed prairie dog included portions of 11 States, Canada, and Mexico. Today it occurs from extreme south-central Canada to northeastern Mexico and from approximately the 98th meridian west to the Rocky Mountains. The species is currently present in 10 States including—Colorado, Kansas, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, and Wyoming. It has been extirpated in Arizona since as early as 1932 (Alexander 1932).

The Petitioner noted that remnant populations of black-tailed prairie dogs are widely distributed within the exterior boundaries of the species' original range, but that significant range contractions have occurred in Kansas, Oklahoma, Texas, and Arizona. The Service believes that significant range contractions have occurred in Arizona; in western New Mexico and western Texas in the southwestern portion of the species' historic range; and in Kansas, Nebraska, Oklahoma, South Dakota, and Texas in the eastern portion of the species' historic range. The Service has determined that these range contractions represent approximately 20 percent of the species' original range. Only a few individuals, or none at all, remain in these areas.

The BFF Recovery Foundation (1999) estimated that approximately 37 percent of the species' potential habitat in the United States, has been fundamentally converted to cropland or similar farming practices. This estimate addresses habitat loss that is essentially permanent, but not a range contraction in the usual sense at the periphery of a species' range. Although the species

will occupy abandoned cropland, these lands are generally unavailable for use by the species by virtue of continued disturbance.

Information from State, tribal, and Federal Agencies indicates that approximately 70 percent of all black-tailed prairie dog occupied habitat in the United States is on private or State lands, approximately 20 percent is on tribal lands, and approximately 10 percent is on Federal lands. A disproportionately large percentage of occupied habitat occurs on tribal and Federal lands, based upon the amount of available habitat on tribal and Federal lands as compared with the much larger amount of available habitat on private lands. These percentages are comparable to Knowles' (1995) conclusions of over 50 percent of occupied habitat occurring on private lands and 30 percent occurring on tribal lands.

Black-tailed prairie dogs are absent from most of the range which they occupied historically, although remnant populations are widely scattered across much of this area. Notably, many land tracts within the historic range have no black-tailed prairie dogs, some have a few black-tailed prairie dogs, and very few have significant numbers of black-tailed prairie dogs.

2.4.2 Abundance—Difficulty and Accuracy of Evaluations

The Service notes the unavailability of any recent, comprehensive, original, single-source, rangewide estimate of occupied habitat for the black-tailed prairie dog and recognizes that such an evaluation would be very difficult to conduct. Several authors have attempted to combine reports of occupied habitat from various sources to provide an overall estimate across the species' range (Fagerstone and Ramey 1996, Knowles 1995, Knowles 1998, Mulhern and Knowles 1995). However, these efforts have been limited because the range of the species is vast and much of it is remote, and accordingly accurate, comparable information is difficult to obtain. Populations are located irregularly, at varying densities, and may be periodically expanding and/or contracting over time and space due to various combinations of factors. For example, Johnson (South Dakota State University, in litt. 1999) suggested that early estimates vary and some populations at the turn of the century may have increased from pre-European levels. Moreover, census techniques are highly variable. The Service believes that many estimates of black-tailed prairie dog occupied habitat are subject to considerable error. However, precise estimates of occupied habitat may not be necessary to determine general population trends and the vulnerability of the species to various threats. The Service has relied more on some reports than on others based on the methodologies involved and the quality of the information available.

Most estimates of prairie dog population trends are not based on numbers of individual animals, but on estimates of the amount of occupied habitat. The actual number of animals present depends upon the density of animals in that locality. Estimates of black-tailed prairie dog density vary seasonally, but range from 2 to 18 individuals per acre (5 to 45 per hectare) (Fagerstone and Ramey 1996, Hoogland 1995, King 1955, Koford 1958, Miller 1996). Most prairie dog surveys do not estimate density because of the associated effort and cost. The Service believes that a review of various estimates of black-tailed prairie dog occupied habitat

provides the best available and most reasonable means of determining population trends and the status of the species.

Throughout the past century, various parties have attempted estimates of black-tailed prairie dog occupied habitat with varying degrees of precision. Agricultural, pest control, or wildlife managers at the county or regional level have conducted many surveys; however, many of these estimates have not been very accurate. For example, Powell (1992) reported that Kansas conducted questionnaire surveys of prairie dog colonies in Kansas in 1989. Those surveys consisted of questions to USDA Soil Conservation Service (now Natural Resources Conservation Service) personnel and Kansas Conservation Officers about the size and location of prairie dog towns in their counties. A 1990 survey to assess the accuracy of the 1989 survey, using high resolution aerial photography and ground truthing, pointed out the overall lack of value of the questionnaire surveys previously conducted. Results of the questionnaire surveys varied widely, and the accuracy depended on the familiarity of field personnel with their area of jurisdiction.

Another example of the difficulty of obtaining accurate recent estimates of the amount of black-tailed prairie dog occupied habitat is available from Colorado. In a 1990 report the Colorado Department of Agriculture estimated from mail surveys of landowners that Colorado contained approximately 1.5 million acres (600,000 hectares) of prairie dog occupied habitat (Colorado Department of Agriculture 1990). Approximately 973,300 acres (394,200 hectares) of this amount was black-tailed prairie dog occupied habitat. A phone survey to county weed and pest control officials or extension agents in approximately 20 of the 37 counties within the black-tailed prairie dogs' historic range in Colorado was completed in 1998 (Black-footed Ferret Recovery Foundation in litt. 1998). The intent of the 1998 survey was to revisit the Colorado Department of Agriculture's estimates from 8 years earlier. In most cases, the 1998 estimates of black-tailed prairie dog occupied habitat were considerably less than those provided by the Colorado Department of Agriculture. Although different methodologies and different sampling times likely affected these results, further comparisons with field studies conducted by Bissell et al. (1979) and a contemporary effort by Patton and Leachman (1991) suggest that reports from Colorado Department of Agriculture (1990) overestimated occupied habitat on a county basis by a factor of as much as 4-10 fold.

The Service has observed that questionnaire efforts generally over-estimate the amount of occupied habitat. For example, the entire amount of occupied habitat in Oklahoma was estimated to be 8,600 acres (3,500 hectares) in a field study by Lomolino (University of Oklahoma, in litt. 1999), while a questionnaire based estimate from one county in Oklahoma for the same year was 50,000 acres (Black-footed Ferret Recovery Foundation in litt. 1998).

Some other types of estimates of occupied habitat are probably more reliable than questionnaire surveys. For example, the State of Montana produced a 1998 Statewide estimate based on field surveys assisted by Global Positioning System technology (Montana Department of Fish, Wildlife, and Parks 1998). Similar efforts have been conducted on some Federal and tribal lands. Studies in Oklahoma have followed black-tailed prairie dog populations for several years

(1967, 1972, 1990, 1991, 1992, 1999). Several of these types of efforts in various States have been related to black-footed ferret recovery efforts. Black-footed ferret reintroduction has prompted various black-tailed prairie dog studies and resulted in a good understanding of the location of the remaining, large black-tailed prairie dog complexes (Lockhart, U.S. Fish and Wildlife Service, in litt. 1998). The Forest Service has conducted aerial line transect estimates for the States of Nebraska, North Dakota, South Dakota, and Wyoming, and many National Grasslands Administrative Units, although preliminary estimates are currently available for only North Dakota and South Dakota (Sidle 1999; Sidle, U.S. Forest Service, pers. comm. 1999).

2.4.3 Abundance—Rangewide

The black-tailed prairie dog may be found intermittently in remnant populations throughout much of the range that it once occupied. However, Barko (1997), Fagerstone and Ramey (1996), Knowles (1998), Mulhern and Knowles (1995), and Wuerthner (1997) concluded that there has been an approximate 94-99 percent reduction in the amount of black-tailed prairie dog occupied habitat within this range since about 1900. Generally State wildlife agencies confirm this decline, but some point out that disproportionately more occupied habitat remains in some areas than in others.

Historically, black-tailed prairie dogs were one of the most conspicuous and characteristic residents of the short-grass and mixed-grass prairies of the United States. Merriam (1902) provides one of the earliest accounts of the species' abundance. He described a colony in Texas of about 25,000 square miles (approximately 16 million acres/6.5 million hectares), with an estimated population of at least 400 million individuals. Bailey (1932) described the Arizona subspecies in the Animas Valley, New Mexico as "an almost continuous prairie-dog town for its whole length and breadth." He estimated that as many as 6.4 million prairie dogs occupied 1,000 square miles (640,000 acres/259,000 hectares) in that region. These accounts provide descriptions of black-tailed prairie dog abundance that may have been representative in the Great Plains at the turn of the last century and no longer occur anywhere in the species' range. No black-tailed prairie dog populations, or only a few individuals, remain in either the Animas Valley of New Mexico or the area described in Texas.

Seton (1953) estimated that in the late 1800's there were 5 billion black-tailed prairie dogs over their entire range of 600,000 square miles (384 million acres/155.5 million hectares). Anderson et al. (1986) noted that as a conservative estimate for the early 1900's, 104 million acres (42 million hectares) of rangeland may have been occupied by all species of prairie dogs. Miller et al. (1996) and Mulhern and Knowles (1995) provide a range for historic occupied habitat by all species of prairie dogs based upon estimates from other authors of 99-247 million acres (40-100 million hectares). Black-tailed prairie dogs had the most extensive range of all the species of prairie dogs; they probably occupied more area than all other species combined (Hoogland 1995).

Historic and recent estimates from several sources of the amount of black-tailed prairie dog occupied habitat for pertinent States, the United States, Mexico, and Canada are summarized in

Table 1. The final column contains an acreage figure which the Service believes is a reasonable estimate of current occupied habitat for the species, based upon the best information available. More detailed information for each of the States is presented in Section 2.4.6.1 Distribution, Abundance, and Trends—Specific Areas. It should be noted that the estimates provided by cited authors and others often repeat each others' estimates. It also is important to remember that many of these historic and recent estimates are variable and subject to error due to their methodologies.

At present, the black-tailed prairie dog may be found scattered in remnant populations throughout much of the range that it once occupied. A significant portion of existing black-tailed prairie dog occupied habitat rangewide occurs in a few large complexes. Approximately 36 percent of the remaining occupied habitat for the species in North America occurs in seven complexes, each larger than 10,000 acres (4,000 hectares). We believe that approximately 768,000 acres (311,000 hectares) of black-tailed prairie dog occupied habitat currently exists rangewide. This estimate is based on the sum of Service estimates from various States in the United States, from Canada, and from Mexico, as discussed under the Statewide Distribution, Trends, and Abundance section below.

Historic abundance also can be estimated by evaluating current land use categories within the historic range of the black-tailed prairie dog. The BFF Recovery Foundation (1999) summarized land use types in the United States using data available from the U.S. Geological Survey. Land use types were grouped into three major categories—grasslands/shrublands, croplands, and other (forest, wetlands, rocky areas, urban areas, etc.). The aerial extent of each category was determined using a Geographic Information System (GIS). Grasslands/shrublands and croplands within the historic range of the species were assumed to have provided suitable potential habitat historically. It has been estimated that approximately 20 percent of all potential habitat was inhabited historically by the species at any given time (Whicker and Detling 1988). Table 2 presents this data. The author noted that these calculations rely on a number of assumptions, but believes they provide a reasonable estimate for historic abundance. This method also has the advantage of presenting a single source comparison of relative abundance between States; whereas other historic estimates for States are variable, since estimates were made both before and after initiation of control efforts, by different individuals, at different points in time, and using different methodologies. It should be noted that the total potential habitat estimate of 393,540,257 acres (159,383,800 hectares) in Table 2 is similar to Seton's (1953) estimate of 384 million acres (155.5 million hectares) within the range of the species; and the total for 20 percent of potential habitat (occupied habitat) of 78,708,051 acres (32 million hectares) is comparable to Knowles' (1998) estimate of 111 million acres (45 million hectares) of occupied habitat.

2.4.4 Trends—Rangewide

The U.S. Geological Survey estimated that the black-tailed prairie dog may occupy less than 0.5 percent of its original range and has experienced an estimated 98 percent decline in

population throughout North America (Mac et al. 1998). The estimate by the BFF Recovery Foundation (1999) for historic occupied habitat of approximately 79 million acres (32 million hectares) in the United States is less than the estimate by Knowles (1998) of approximately 111 million acres (45 million hectares). However, it is apparent that regardless of which estimate is considered, tens of millions of acres of black-tailed prairie dog occupied habitat once existed in the United States. Moreover, it appears that the amount of occupied habitat has declined from approximately 100 million acres (40.5 million hectares) in the late 1800's to less than 1 million acres (0.4 million hectares) at present; a decline of approximately two orders of magnitude. A major reduction in historic black-tailed prairie dog occupied habitat has occurred. The species is absent from a significant portion of its historic range despite perceptions to the contrary engendered in part by its conspicuous life history, e.g., its diurnal behavior, its modifications to the landscape, and its persistence in small remnant populations across much of its former range.

In 1961, after this major reduction in black-tailed prairie dog occupied habitat, the Predator and Rodent Control Branch of the Bureau of Sport Fisheries and Wildlife estimated the area occupied by black-tailed prairie dogs in the United States to be approximately 364,000 acres (147,000 hectares) (Bureau of Sport Fisheries and Wildlife 1961). These estimates were based on surveys conducted by district offices in response to concerns regarding declines in prairie dog numbers. The accuracy of these surveys likely varied between districts. The methodology used to arrive at these estimates was not available. However, this report does provide relative estimates of occupied habitat for each species of prairie dog in each State for this time period.

The Arizona Game and Fish Department asserts that (outside the State) the black-tailed prairie dog occurs in all portions of its historic range and that sufficient numbers of individuals remain to recolonize vacant habitat (Shroufe, Arizona Game and Fish Department, in litt. 1998). The AGFD refers to the Predator and Rodental Control Branch report (Bureau of Sport Fisheries and Wildlife 1961) which estimated black-tailed prairie dog occupied habitat across its historic range at 364,056 acres (147,330 hectares) (none in Arizona) and concludes that if this estimate is correct, then the species has increased 46 percent since 1961 to arrive at the current estimates provided in the petition.

Some increases in the amount of black-tailed prairie dog occupied habitat in some areas occurred subsequent to the Executive Order banning the use of the toxicant Compound 1080 in 1972. In 1998, Knowles estimated 677,000 acres (274,000 hectares) of occupied habitat for the species in the United States; however, Knowles also noted that these increases appear to have been limited by the use of toxicants such as zinc phosphide, the continuing spread of sylvatic plague, and other factors (Knowles 1998). Moreover, the majority of this increase (approximately 85 percent) occurred in areas (Montana, South Dakota, and Wyoming) where significant impacts due to disease had not yet occurred (Table 1).

Evaluations of estimates of black-tailed prairie dog occupied habitat in New Mexico have confounded some estimates of rangewide trends for the species. Some survey reports of prairie dogs in New Mexico have combined estimates of occupied habitat for black-tailed and

Gunnison's prairie dogs (both occur in New Mexico). Some confusion developed regarding estimates provided by the Biodiversity Legal Foundation et al. (1998), Mulhern and Knowles (1995), and U.S. Fish and Wildlife (1995). The following discussion addresses this issue. Hubbard and Schmitt (1983) adjusted figures from Bodenchuck (1981) and estimated 497,012 acres (201,220 hectares) of occupied habitat for both species of prairie dogs in New Mexico. Mulhern and Knowles (1995) and U.S. Fish and Wildlife (1995) also reported 497,012 acres (201,220 hectares) of occupied habitat. This acreage figure has been misinterpreted to represent recent (post 1980) acreage of black-tailed prairie dog occupied habitat in the State. This figure also has been included in some United States totals (Mulhern and Knowles 1995), which otherwise refer only to black-tailed prairie dogs. Therefore, the estimate from the National Wildlife Federation (1998) of a potential 30-60 percent reduction in occupied habitat and from Biodiversity Legal Foundation et al. (1998) of a potential 50 percent loss in black-tailed prairie dog occupied habitat during the past 3 years, based on a nationwide decrease from 1.35 million acres (547,000 hectares) (which includes both species for New Mexico) in 1995 (Mulhern and Knowles 1995) to less than 700,000 acres (280,000 hectares) (which includes only black-tailed prairie dogs for New Mexico) in 1998 (Knowles 1998), is incorrect. The Biodiversity Legal Foundation subsequently revised its estimate to acknowledge this inconsistency (Biodiversity Legal Foundation et al. in litt. 1998).

Survey efforts in some areas have noted significant declines in the amount of black-tailed prairie dog occupied habitat over the last few decades. The Forest Service has mapped all black-tailed prairie dog colonies within the Northern Great Plains National Grasslands and Forests. These 10 grasslands, covering approximately 3.7 million acres (1.5 million hectares), included a maximum of 86,220 acres (34,890 hectares) of black-tailed prairie dog occupied habitat, according to data collected from the 1970's to 1990's. In 1997, the Forest Service mapped 39,420 acres (15,965 hectares) of occupied habitat in the same areas, indicating a 54 percent decline (U.S. Forest Service 1998). Data provided by the Forest Service in 1999 (Sidle, U.S. Forest Service, in litt. 1999) confirmed losses in occupied habitat for the National Grasslands with a total decline of 58 percent from the 1970's to the present. Much of the recent decline noted by the Forest Service was due to prairie dog control programs. A few site specific areas where occupied habitat has recently increased on National Grasslands do not significantly affect this trend.

Lockhart (U.S. Fish and Wildlife Service, in litt. 1998) reported that the recovery program for the black-footed ferret has identified on an ongoing basis since the 1980's those large prairie dog complexes potentially useful for reintroduction of the ferret. Both black-tailed and other prairie dog species are considered. One necessary criteria for these sites is that they contain approximately 10,000 acres (4,000 hectares) of prairie dog occupied habitat. In the late 1980's, the Black-footed Ferret Interstate Coordinating Committee identified dozens of potential sites that may have qualified as suitable for ferret. However, by 1994 only 16 sites were identified and by 1998 this number was reduced to 10 sites (7 being black-tailed prairie dog sites).

Part of this decline in the number of known large prairie dog complexes was the extreme reduction in the amount of occupied habitat and individuals within a number of formerly large

black-tailed prairie dog complexes, i.e., Fort Belknap Reservation and southern Phillips County in north central Montana, the Northern Cheyenne Reservation in southeastern Montana, the Recluse site in northeastern Wyoming, Rocky Mountain Arsenal National Wildlife Refuge in central Colorado, Comanche National Grasslands in southeastern Colorado, and Cimarron County in the Oklahoma panhandle. Black-tailed prairie dog populations at these sites appear to have been reduced by as much as 90 percent within the last 10-15 years, largely in the western portion of the species' range, due to sylvatic plague, although limited recovery has been observed at some locales. These reductions in large complexes due to disease occurred across approximately a 1,000-mile (1,600-kilometer) reach of the species' range, which includes approximately 50 percent of its total range. This region has several similarities in habitat and range land characteristics as well as similar threats, in particular the presence of sylvatic plague (see Section 3.3.1). Populations in New Mexico and Texas also were reported to have been affected by sylvatic plague during this period.

In summary, significant recent population declines in many large black-tailed prairie dog complexes have occurred in the last few decades. These declines may be representative of the overall population dynamics of the species in many areas. However, populations in some other areas in the eastern portion of the species' range have increased marginally or remained generally constant during the same period (see Section 2.4.5.1 for discussions of individual States). A large scale perspective of these various trends is presented in Section 3.6.

2.4.5 Trends—Regional Differences in Occupied Habitat for the Species

Data from Knowles (1998) indicates that Arizona, New Mexico, Oklahoma, and Texas may have contained more than 50 percent of the historic black-tailed prairie dog occupied habitat in the United States, but currently account for less than 10 percent of the remaining occupied habitat. A similar comparison between more conservative historic estimates of occupied habitat in Table 2 and the Services' current estimates in Table 1 indicate similar trends (e.g., 40 percent of historic occupied habitat, 18 percent of current occupied habitat). The existence of large amounts of Federal and tribal lands in the more northerly portion of the species' range may account in part for the current larger regional prairie dog populations in these areas; land ownership in the southern range is disproportionately more private and may be more intensively managed in ways that do not support prairie dogs. Also, a longer history of disease (i.e., sylvatic plague) in the southwestern States may account in part for smaller regional black-tailed prairie dog populations. Conversely, South Dakota in the northern portion of the species' range has relatively large amounts of prairie grasslands in Federal and tribal ownership, is the only State where sylvatic plague is not known to have affected black-tailed prairie dog populations, has most of the remaining large black-tailed prairie dog complexes (four out of seven), and still has disproportionately more of its historic black-tailed prairie dog population than other States.

Approximately 66 percent, or 300 million acres (122 million hectares) of the black-tailed prairie dog range in the United States estimated in Table 2 is affected by sylvatic plague (Black-footed Ferret Recovery Foundation in litt. 1999). This area includes the western portions of the species' range. Additionally, another important factor which has affected the species is the conversion of

rangeland to cropland, especially in the eastern portion of the species' range. Conversion of native prairie to cropland has largely progressed across the species' range from east to west, with the more intensive agricultural use in the eastern portion of the species' range. The BFF Recovery Foundation (1999) used GIS to determine the amount of habitat (grass/shrub lands) currently available to the species. In the plague-free portion of the species' range (34 percent), less than 33 percent of the land is available to the species as non-cropland. Therefore, only approximately 10 percent of the black-tailed prairie dog range is both plague-free and currently suitable (i.e., not tilled) for the species. The majority of plague-free, suitable range occurs in South Dakota.

2.4.6 Distribution, Abundance, and Trends—Specific Areas

Eleven States and three Tribes provided comments regarding distribution, abundance and trends of the black-tailed prairie dog to the Service. These responses and other information regarding the historical and recent occurrence of the species are described below for each State, Tribe, and Country. This information also is presented in Table 1 where estimates from all available sources are summarized. Several eestimates of black-tailed prairie dog occupied habitat were available for each State. The dates, methodologies, and ultimately the reliability of these estimates varied. Generally, the Service estimate of current occupied habitat for each State is the most recently reported estimate with the most reliable methodology (Arizona, Montana, Nebraska, North Dakota, Oklahoma, South Dakota, Canada, and Mexico). For states where a range (Wyoming) or two reliable estimates were available (Kansas), we used the midpoint. For states where no recent estimate with adequate methodology was available (Colorado, New Mexico, and Texas), we extrapolated from older estimates. We rounded all Service estimates to the nearest 1,000 acres.

2.4.6.1 States.

ARIZONA

Distribution--Black-tailed prairie dog occupied habitat existed in southeastern Arizona prior to rodent control efforts (Hall and Kelson 1959). Specific reports by county vary as to the occurrence of the species. Information provided by Van Pelt (Arizona Game and Fish Department, in litt. 1998) noted the species in Cochise and Graham Counties. Information from Fagerstone and Ramey (1996) as delineated by the Black-footed Ferret Recovery Foundation (in litt. 1999) noted the species in Cochise and Santa Cruz Counties as well as portions of Pima, Graham, Pinal, and Greenlee Counties. The black-tailed prairie dog is extirpated at present in the State.

Abundance--Approximately 2 percent of black-tailed prairie dog occupied habitat in the United States may have existed in Arizona historically (Table 2), although a smaller estimate of 650,000 acres (263,000 hectares) also has been reported (Knowles 1998; Van Pelt, Arizona Game and Fish Department, in litt. 1998). This species largely disappeared in the State as early as 1932 (Alexander 1932), although a few small

colonies may have persisted until as recently as 1959-1960 (Cockrum 1960). The species is extirpated at present in Arizona.

Trends--Approximately 5 percent of the potential black-tailed prairie dog habitat in Arizona has been converted to cropland (Table 2). The Arizona Game and Fish Department believes that potential prairie dog habitat still exists in Arizona, but notes that this habitat type is "declining at an alarming rate." It also notes that "unquestionably, the black-tailed prairie dog has suffered well-documented, range-wide population declines that include extirpation from Arizona. In some parts of the currently occupied range, the surviving local (and typically fragmented) populations also face continued threats." The AGFD identified mesquite woodland invasion of grassland habitats as part of the reason for grassland habitat decline (see Section 3.1.3). It hypothesized that the reduction in grassland habitats "could be due to the accumulated effects of fire suppression, grazing practices and perhaps, the elimination of the black-tailed prairie dog" (Shroufe, Arizona Game and Fish Department, in litt. 1998).

Service Evaluation--The Service believes that intensive grazing in about 1900 may have encouraged the expansion of black-tailed prairie dog occupied habitat in Arizona, and that control efforts may have been the principal factor that subsequently suppressed populations. Shrub invasion also may have limited recovery. The species largely disappeared from the State prior to the documented occurrence of sylvatic plague in the State (Shroufe, Arizona Game and Fish Department, in litt. 1999). However, disease is an additional factor that could affect the future viability of previously occupied habitat for the black-tailed prairie dog in the State. Arizona is near the identified epicenter for outbreaks for this disease (Gage, Center for Disease Control, pers. comm. 1998). However, in Arizona, sylvatic plague may not occur at elevations below 4,500 feet (1,372 meters), where most of the species occurred historically (Shroufe, Arizona Game and Fish Department, in litt. 1999).

The Service does not agree with AGFD's comment that recolonization of formerly occupied habitat by the black-tailed prairie dog is assured across the species' range due to its perceived wide distribution and abundance. The extirpation of most historic populations (and burrow systems), vegetative community changes (e.g., brush invasion of grasslands), landscape changes (e.g., cropland conversion, urbanization), and the establishment of sylvatic plague in North America may limit any extensive reoccupation of its former range by the species. Additionally, most historic black-tailed prairie dog occupied habitat no longer exists and source populations for recolonization are often isolated.

COLORADO

Distribution--Historically, black-tailed prairie dogs occurred on suitable habitat throughout the eastern half of Colorado, east of the Rocky Mountain foothills (Hall and Kelson 1959, Torres 1973). Presently, the species appears to be scattered in remnant

populations throughout the same area. The Colorado Division of Wildlife believes that the species is widely distributed across short-grass prairie habitats in the eastern third of the State, quite common in the urban front-range area west of Interstate 25, and is expanding in some locales (Kahn, Colorado Division of Wildlife, in litt. 1998).

The Service estimates that approximately 96 percent of black-tailed prairie dog occupied habitat in Colorado occurs on private and State lands and 4 percent occurs on Federal lands.

Abundance--Approximately 7 percent of black-tailed prairie dog occupied habitat in the United States may have existed in Colorado historically (Table 2). Approximately 14 percent of occupied habitat in the United States currently exists in Colorado (Table 1). Statewide estimates of occupied habitat noted in Table 1 for Colorado range from 7 million acres (2.8 million hectares) historically to 44,000 acres (18,000 hectares) in 1998 (Knowles 1998). This reduction in occupied habitat is approximately 99 percent. A comparison between historic occupied habitat as estimated by Table 2 and the Service estimate of current occupied habitat (Table 1) indicates a similar trend.

Another historic estimate of black-tailed prairie dog occupied habitat in Colorado is 3 million acres (1.2 million hectares) in 1903 (Clark 1989). In 1961, the Predator and Rodent Control Branch report estimated 96,000 acres (39,000 hectares) of occupied habitat (Bureau of Sport Fisheries and Wildlife 1961). In 1979, it is estimated that there were 89,000 acres (36,000 hectares) of occupied habitat in the State (Van Pelt in prep.). A 1990 survey by the Colorado Department of Agriculture estimated 1.5 million acres (600,000 hectares) of prairie dog occupied habitat in Colorado (Colorado Department of Agriculture 1990). Approximately 973,000 acres (394,000 hectares) of this amount was black-tailed prairie dog habitat. A 1998 telephone survey canvassing Colorado agricultural extension or weed and pest agents (Black-footed Ferret Recovery Foundation in litt. 1998) estimated 326,000 acres (132,000 hectares) of black-tailed prairie dog occupied habitat. This survey noted marked differences in occupied habitat for the species in nearly all counties surveyed when compared to the CDA estimate. Other recent estimates of occupied habitat for the species report less than 100,000 acres (40,500 hectares) (Knowles 1995) and, most recently, 44,000 acres (18,000 hectares) (Knowles 1998). Knowles (1998) noted that his estimate was speculative and based on available mapping information.

Recent estimates of existing black-tailed prairie dog occupied habitat at specific locations include—1,320 acres (535 hectares) at Rocky Mountain Arsenal National Wildlife Refuge near Denver (Seery, U.S. Fish and Wildlife Service, pers. comm. 1999), 1,374 acres (556 hectares) at Comanche National Grasslands (0.31 percent of Federal lands within Comanche National Grasslands), and 731 acres (296 hectares) at Pawnee National Grasslands (0.38 percent of Federal lands within Pawnee National Grasslands) (Sidle, U.S. Forest Service, in litt. 1999).

The Service estimates that 93,000 acres (43,000 hectares) of black-tailed prairie dog occupied habitat occur in the State. This figure is based upon the sum of estimates for the Denver Metropolitan Area and for remaining potential black-tailed prairie dog habitat in the State. For the Denver Metropolitan Area, data provided by Skiba (Colorado Division of Wildlife, pers. comm. 1999) and modified by Seery (U.S. Fish and Wildlife Service, pers. comm. 1998) (see Trends below) were utilized. For the remaining potential habitat in the State, data provided by the BFF Recovery Foundation (in litt. 1999) regarding potential black-tailed prairie dog habitat in Colorado and a 0.5 percent occupancy rate based upon recent Forest Service data for the Pawnee National Grasslands Administrative Unit were utilized. An occupancy rate for the Pawnee National Grasslands Administrative Unit (3,951 acres/1,600 hectares of occupied habitat in the 755,200 acres/305,860 hectares administrative unit) was selected because it was the only non-urban area that contained both Federal and private holdings. This estimate is similar to estimates provided by Knowles (1995) and Van Pelt (in prep.) for Colorado.

Trends--Approximately 43 percent of the potential black-tailed prairie dog habitat in Colorado has been converted to cropland (Table 2). The CDOW shares the National Wildlife Federation's concern regarding the long term degradation of prairie ecosystems, specifically the loss of large (greater than 5,000-acre/2,000-hectare) colonies, but believes that large complexes are unlikely to occur in the State in the future (Kahn, Colorado Division of Wildlife, in litt.1998).

Recent declines have occurred on the Comanche National Grasslands in Colorado, where approximately 90 percent of the black-tailed prairie dog occupied habitat was lost between 1995 and 1998. These declines, from 4,500 acres (1,820 hectares) in 1994-1995 to 500 acres (200 hectares) in 1998, were likely due to sylvatic plague (Cully 1998). Recent surveys indicate recovery to 1,374 acres (556 hectares) of occupied habitat on the Comanche National Grasslands (Sidle, U.S. Forest Service, in litt. 1999). Long-term declines have been noted at the Rocky Mountain Arsenal National Wildlife Refuge due to recurring sylvatic plague outbreaks (U.S. Fish and Wildlife Service 1998) despite periodic limited recovery. Occupied habitat declined from approximately 4,500 acres (1,823 hectares) in 1988 to 1,320 acres (535 hectares) in 1999 with periodic increases and declines related to recurring plague events (Seery, U.S. Fish and Wildlife Service, pers. comm. 1999). In 1994, CDOW mapped 42,500 acres (17,200 hectares) of occupied habitat in the Denver Metropolitan Area (Skiba, Colorado Division of Wildlife, pers. comm. 1999); however, since then there has been approximately a 50 percent decline due largely to sylvatic plague and also urbanization (Seery, U.S. Fish and Wildlife Service, pers. comm. 1998) (Figure 1).

Service Evaluation--The Service believes that black-tailed prairie dog occupied habitat in Colorado has significantly declined from historic levels. There is a large disparity in recent Statewide estimates of remnant occupied habitat. However, the Service believes that trends at specific locations within the State (50 percent decline in Denver Metropolitan Area from 1994 to 1998, 70 percent decline at Rocky Mountain Arsenal

National Wildlife Refuge from 1988 to 1999, and a 90 percent decline at Comanche National Grasslands from 1995 to 1998), indicate that there has likely been a Statewide decline in recent years (despite periodic limited recovery) and that these declines may continue. These declines have largely been attributed to sylvatic plague.

KANSAS

Distribution--Historically, black-tailed prairie dogs occurred on suitable habitat throughout the western two-thirds of Kansas, west of approximately the 97th meridian (Hall and Kelson 1959, Smith 1958). Presently, the species appears to be scattered throughout generally the same area, except that the eastern limit of the range appears to have shifted westward approximately 30-50 miles (50-80 kilometers) in recent years (Vanderhoof and Robel 1992). The greatest amount of occupied habitat exists in the western third of the State (Vanderhoof et al. 1994).

The Service estimates that approximately 97 percent of black-tailed prairie dog occupied habitat in Kansas occurs on private and State lands and 3 percent occurs on Federal lands.

Abundance--Approximately 10 percent of black-tailed prairie dog occupied habitat in the United States may have existed in Kansas historically (Table 2). Approximately 6 percent of occupied habitat in the United States currently exists in Kansas (Table 1). Statewide estimates of occupied habitat noted in Table 1 for Kansas range from 2.5 million acres (1 million hectares) historically to 36,000 acres (15,000 hectares) in 1998 (Knowles 1998). This reduction in occupied habitat is approximately 99 percent. A comparison between historic occupied habitat as estimated by Table 2 and the Service estimate of current occupied habitat (Table 1) indicates a similar trend.

In 1957, black-tailed prairie dog occupied habitat in the State was estimated at 57,000 acres (23,000 hectares) (Smith 1958). The Bureau of Sport Fisheries and Wildlife (1961) estimated that the species occupied 50,000 acres (20,000 hectares) of habitat. In 1972, the species was reported to occupy approximately 36,000 acres (15,000 hectares) of habitat in the State (Henderson and Little 1973). A 1992 survey of western counties in Kansas (Vanderhoof and Robel 1992) estimated 47,000 acres (19,000 hectares) of black-tailed prairie dog occupied habitat. The BFF Recovery Foundation phone survey estimated that 147,000 acres (60,000 hectares) of species occupied habitat were present in Kansas (Black-footed Ferret Recovery Foundation in litt. 1998). Knowles (1998) estimated that there were approximately 36,000 acres (15,000 hectares) of occupied habitat in the State.

The only available recent estimate for black-tailed prairie dog occupied habitat at a specific location is 1,287 acres (521 hectares) on the Cimarron National Grassland (1.19 percent of Federal lands within Cimarron National Grassland) in the southwest corner of the State (Sidle, U.S. Forest Service, in litt. 1999).

The Service estimates 42,000 acres (17,000 hectares) of black-tailed prairie dog occupied habitat exist Statewide. This figure represents the mid-point between estimates of Vanderhoof and Robel (1992) and Knowles (1998) for Kansas and acknowledges recent declines reported by Powell (1992) and Sidle (U.S. Forest Service, pers. comm. 1998).

Trends--Approximately 74 percent of the potential black-tailed prairie dog habitat in Kansas has been converted to cropland (Table 2). The Kansas Department of Wildlife and Parks notes that the amount of black-tailed prairie dog occupied habitat has been greatly reduced from historic accounts. However, it believes that the remnant population has been relatively stable for the last 10-15 years (Williams, Kansas Department of Wildlife and Parks, in litt. 1998). This stability may be due, in part, to the fact that sylvatic plague in black-tailed prairie dogs does not appear to be widespread in the State; although Cully (U.S. Geological Survey, Biological Resources Division, pers. comm. 1998) has verified a sylvatic plague epizootic in black-tailed prairie dogs in Kansas on the Cimarron National Grasslands, where colonies infected in 1996 became inactive by late 1997. He believes that this sylvatic plague epizootic still affects prairie dog populations in this area.

Powell (1992), using high resolution aerial photographs, compared black-tailed prairie dog town numbers and total black-tailed prairie dog occupied habitat for three Kansas Counties in 1990 with a 1986 survey done by Lee and Henderson (1989) which used similar methodology. A comparison of Meade, Gray, and Hamilton Counties indicated that a 50 percent average reduction in the number of colonies and a 17 percent average reduction in occupied habitat occurred from 1986 to 1990.

The Forest Service documented recent declines of 25 percent in black-tailed prairie dog occupied habitat from 1988 to 1998 on the Cimarron National Grasslands in Kansas (Sidle, U.S. Forest Service, pers. comm. 1998). This decline has been related to the recent verification of sylvatic plague in the State (Cully, U.S. Geological Survey, Biological Resources Division, pers. comm. 1998).

Service Evaluation--The Service believes that black-tailed prairie dog occupied habitat in Kansas has declined significantly from historic estimates, but has likely been stable to slightly declining in recent years (Figure 2). The most recent Statewide survey is from 1992 (Vanderhoof and Robel 1992). However, in 1996 sylvatic plague was documented in Kansas on the Cimarron National Grasslands (Cully, U.S. Geological Survey, Biological Resources Division, pers. comm. 1998). Therefore, occupied habitat may decline if sylvatic plague impacts continue and/or spread to other areas of the State.

MONTANA

Distribution--Historically, black-tailed prairie dogs occurred on suitable habitat in the eastern two-thirds of Montana, east of the 110th meridian (Flath and Clark 1986), with the exception of the northeastern corner of the State (Hall and Kelson 1959). Known

concentrations currently exist in southern Phillips County, Fort Belknap Reservation, Custer County, Charles M. Russell National Wildlife Refuge, and the Crow Reservation.

The Service estimates that approximately 43 percent of black-tailed prairie dog occupied habitat in Montana occurs on private and State lands, 29 percent on Federal lands, and 28 percent occurs on tribal lands (Montana Department of Fish, Wildlife, and Parks in prep.).

Abundance--Approximately 14 percent of black-tailed prairie dog occupied habitat in the United States may have existed in Montana historically (Table 2). Approximately 10 percent of occupied habitat in the United States currently exists in Montana (Table 1). Statewide estimates of occupied habitat noted in Table 1 for Montana range from 6 million acres (2.4 million hectares) historically (Knowles 1998) to 28,286 acres (11,456 hectares) in 1961 (Bureau of Sport Fisheries and Wildlife 1961). The most recent estimate of occupied habitat is 66,420 acres (26,900 hectares) (Montana Department of Fish, Wildlife and Parks 1998). This reduction in habitat from historic estimates to the present is approximately 99 percent. A comparison between historic occupied habitat as estimated by Table 2 and the Service estimate of current occupied habitat (Table 1) indicates a similar trend.

The Montana Department of Fish, Wildlife and Parks believes that the historic information regarding size and extent of prairie dog colonies in Montana (and elsewhere) is anecdotal or the product of extrapolations from archived descriptions and disputes this estimate of loss (Graham, Montana Department of Fish, Wildlife, and Parks, in litt. 1998). Flath and Clark (1986) estimated that black-tailed prairie dogs historically occupied a minimum of 1.47 million acres (596,000 hectares) in the eastern two-thirds of Montana. This estimate was based on railroad surveys conducted from 1908 to 1914 throughout nearly one-half of the species' range in Montana. The authors estimated that a greater than 90 percent reduction in occupied habitat occurred between 1914 and 1986. Flath and Clark (1986) also reported 125,000 acres (51,000 hectares) of black-tailed prairie dog occupied habitat Statewide in 1986. Campbell (1989) estimated more than 100,000 acres (40,500 hectares) of occupied habitat Statewide. MDFWP (1998) reported approximately 66,420 acres (26,900 hectares) of black-tailed prairie dog occupied habitat in the State based upon an effort which included—revisiting sites previously recorded by Campbell (1989), additional field surveys, agency interviews, and collecting survey information from BIA and Bureau of Land Management (BLM). Knowles (1998) also reported a similar estimate of 65,000 acres (26,000 hectares) in the State from the same data set. The MDFWP believes that the techniques used to obtain this information resulted in an accurate minimum estimate for the State (Graham, Montana Department of Fish, Wildlife, and Parks, in litt. 1998).

Comments received from one individual disagreed with the findings of MDFWP (1998) regarding occupied habitat in the State (Moore, pers. comm. 1999). Moore concluded, based on ancillary information gathered during big game aerial surveys he had conducted

for MDFWP in portions of two counties in the State, that black-tailed prairie dog occupied habitat could be as much as four times that estimated by MDFWP. However, comparisons of ground based GIS data sets with this information indicate that Moore's estimates were approximately 50 percent higher than actual acreage amounts (Black-footed Ferret Recovery Foundation, pers. comm. 1999; Matchett, U.S. Fish and Wildlife Service, pers. comm. 1999). Moore also reported more colonies than identified by MDFWP, but the Service was unable to evaluate this information due to data limitations and time constraints. Moore did not discuss if an effort was made during aerial surveys to differentiate between active and inactive colonies. Additionally, comments provided by Moore indicated that some of the colonies noted as black-tailed prairie dog occupied habitat may have been occupied only by ground squirrels. The Service believes that Moore's inference of potentially 266,000 acres (108,000 hectares) of black-tailed prairie dog occupied habitat in Montana (based on extrapolating the Montana estimate × 4) is likely inflated given the relatively thorough effort expended by Flath and Clark (1986), Clark (1989), and MDFWP (1998), as well as the trend information (see below) for all available discrete, relatively large sites in Montana where black-tailed prairie dog occupied habitat declined similarly from 1986 to 1998.

Recent estimates of existing black-tailed prairie dog occupied habitat at specific locations include 14,230 acres (5,763 hectares) at Fort Belknap Reservation (Kaiser, Bureau of Indian Affairs, pers. comm. 1999); 11,042 acres (4,472 hectares) in Phillips County; 5,961 acres (2,414 hectares) in Custer County; 5,147 acres (2,085 hectares) at the Charles M. Russell National Wildlife Refuge; and 3,911 acres (1,584 hectares) at the Crow Reservation (Montana Department of Fish, Wildlife, and Parks 1998). More recent preliminary surveys on the Crow Reservation indicate that approximately 10,000 acres (4,050 hectares) of occupied habitat may exist here (Graham, Montana Department of Fish, Wildlife, and Parks, in litt. 1999).

The Service believes that 65,000 acres (26,000 hectares) of black-tailed prairie dog occupied habitat is a reasonable Statewide estimate.

Trends--Approximately 30 percent of the potential black-tailed prairie dog habitat in Montana has been converted to cropland (Table 2). Following a major reduction in occupied habitat from approximately 1900 to 1961, black-tailed prairie dog populations in the State apparently increased between 1961 and 1986 and then experienced significant declines due to sylvatic plague. MDFWP (1998) noted that black-tailed prairie dog occupied habitat declined by approximately 50 percent from the estimates of the late 1980's, largely due to sylvatic plague. In southern Phillips County occupied habitat declined from 26,123 acres (10,580 hectares) in 1988 to 13,372 acres (5,416 hectares) in 1998, following plague epizootics (Matchett, U.S. Fish and Wildlife Service, pers. comm. 1999). Occupied habitat on Fort Belknap Reservation declined from approximately 24,000 acres (9,700 hectares) in 1990 to approximately 11,000 acres (4,500 hectares) in 1996 and recovered slightly to 13,475 acres (5,457 hectares) in 1998. A subsequent sylvatic plague outbreak was reported in September, 1999 (Hanebury, U.S.

Fish and Wildlife Service, pers. comm. 1999). Occupied habitat on the Northern Cheyenne Reservation declined from 10,758 acres (4,357 hectares) in 1992 to approximately 650 acres (263 hectares) in 1994 and recovered slightly to 980 acres (400 hectares) in 1998 (Montana Department of Fish, Wildlife, and Parks 1998, Montana Department of Fish, Wildlife, and Parks in prep.) (Figure 1).

MDFWP states that "in the absence of active management actions, prairie dogs could disappear from marginal habitats at the western extent of their range in Montana. However, this would not threaten the species with extinction so long as the primary prairie dog complexes in Montana are maintained" (Graham, Montana Department of Fish, Wildlife, and Parks, in litt. 1998).

Service Evaluation--The Service believes that there have been significant declines from historic estimates of black-tailed prairie dog occupied habitat in Montana. Current accurate minimum estimates for black-tailed prairie dog occupied habitat are available. Recently, black-tailed prairie dog complexes in Montana have been significantly impacted by sylvatic plague and may continue to decline, although some site-specific increases have occurred. However, Young (University of Arizona, pers. comm. 1998) believes that black-tailed prairie dog populations at Northern Cheyenne Reservation will not recover to pre-plague levels. Matchett (U.S. Fish and Wildlife Service, pers. comm. 1999) stated that he was unaware of any relatively large black-tailed prairie dog complex in the northern Great Plains that had recovered to its former population levels after initial and subsequent plague epizootics.

NEBRASKA

Distribution--Historically, black-tailed prairie dogs occurred on suitable habitat throughout most of Nebraska west of the 97th meridian (Hall and Kelson 1959, Knowles 1995). The Sandhills in the north-central portion of the State include approximately 15 million acres (6 million hectares) which provide only limited suitable habitat (Black-footed Ferret Recovery Foundation in litt. 1999). Presently, the species appears to be scattered throughout the same area, but at much reduced numbers, especially east of the 99th meridian. Populations are known to occur in the western panhandle, southwest of the Platte River, and in central Nebraska.

The Service estimates that approximately 98 percent of black-tailed prairie dog occupied habitat in Nebraska occurs on private and State lands and 2 percent occurs on Federal lands.

Abundance--Approximately 11 percent of black-tailed prairie dog occupied habitat in the United States may have existed in Nebraska historically (Table 2). Approximately 9 percent of occupied habitat in the United States currently exists in Nebraska (Table 1). Statewide estimates of occupied habitat noted in Table 1 for Nebraska range from 6 million acres (2.4 million hectares) historically (Knowles 1998) to 30,000 acres

(12,000 hectares) in 1961 (Bureau of Sport Fisheries and Wildlife 1961). The most recent estimate of occupied habitat is 60,000 acres (24,000 hectares) (Knowles 1998). This reduction in occupied habitat from historic times to the present is approximately 99 percent. A comparison between historic occupied habitat as estimated by Table 2 and the Service estimate of current occupied habitat (Table 1) indicates a similar trend.

In 1971, an estimated 15,000 acres (6,000 hectares) of black-tailed prairie dog occupied habitat remained in the State (Lock 1973). The BFF Recovery Foundation phone survey estimated 80,000 acres (32,000 hectares) of black-tailed prairie dog occupied habitat in the State (Black-footed Ferret Recovery Foundation in litt. 1998). Other current estimates indicate approximately 60,000 acres (24,000 hectares) of occupied habitat in Nebraska (Knowles 1998). The Nebraska Game and Parks Commission estimates 60,000-80,000 acres (24,000-32,000 hectares) of occupied habitat exist in the State (Amack, Nebraska Game and Parks Commission, in litt. 1998). It believes that these population levels are stable. An additional estimate of occupied habitat in 1999 is anticipated from aerial surveys recently conducted by the Forest Service (Sidle, U.S. Forest Service, pers. comm. 1999).

The only estimates of black-tailed prairie dog occupied habitat at specific locations are 741 acres (300 hectares) at Oglala National Grasslands (0.78 percent of Federal lands within Oglala National Grasslands) and 69 acres (28 hectares) at Bessey National Grasslands (0.07 percent of Federal lands within Bessey National Grasslands) (Sidle, U.S. Forest Service, in litt. 1999).

The Service believes that 60,000 acres (24,000 hectares) of black-tailed prairie dog occupied habitat is a reasonable Statewide estimate for Nebraska.

Trends--Approximately 57 percent of the potential black-tailed prairie dog habitat in Nebraska has been converted to cropland (Table 2). Following significant historic declines in occupied habitat and some limited recovery, the amount of occupied habitat in recent years appears fairly stable (Figure 2).

Service Evaluation--The Service believes black-tailed prairie dog occupied habitat in Nebraska has been significantly reduced from historic estimates and likely has been stable to slightly declining in recent years (Figure 2). This stability may be due, in part, to the fact that sylvatic plague does not appear to be widespread in the State, although it has been documented in the northwestern portion of the panhandle where it has impacted some black-tailed prairie dog populations (Virchow et al. 1992).

NEW MEXICO

Distribution--Historically, black-tailed prairie dogs occurred on suitable habitat throughout the southern and eastern two-thirds of the State (Bailey 1932, Hall and Kelson 1959). Hubbard and Schmitt (1983) estimated that the overall range of the species had

been reduced by one-fourth in New Mexico by 1983, particularly in the southern portion of the State. Large complexes documented historically, as in Animas Valley in 1908 (Bailey 1932), no longer exist, although a limited, experimental reintroduction effort has been undertaken there (Spangle, U.S. Fish and Wildlife Service, pers. comm. 1999). Presently, the species appears to exist in remnant populations in scattered locations, generally east of the Pecos River (Findley et al. 1975). Recent studies by Sager (1996) and Paternoster (1997) report that the black-tailed prairie dog is limited in its occurrence in New Mexico. The New Mexico Department of Game and Fish believes that in these areas of the State where inventories have been conducted black-tailed prairie dogs "occupy only small areas, consist of small populations and represent isolated colonies" (Maracchini, New Mexico Department of Game and Fish, in litt. 1998).

The Service estimates that approximately 98 percent of black-tailed prairie dog occupied habitat in New Mexico occurs on private and State lands and 2 percent occurs on Federal lands.

Abundance--Approximately 11 percent of black-tailed prairie dog occupied habitat in the United States may have existed in New Mexico historically (Table 2). Approximately 6 percent of occupied habitat in the United States currently exists in New Mexico (Table 1). Statewide estimates of occupied habitat noted in Table 1 for New Mexico range from over 6.64 million acres (2.69 million hectares) historically (Bailey 1932) to 15,000 acres (6,000 hectares) in 1998 (Knowles 1998). This reduction in occupied habitat is greater than 99 percent. A comparison between historic occupied habitat as estimated by Table 2 and the Service estimate of current occupied habitat (Table 1) indicates a similar trend.

The Bureau of Sport Fisheries and Wildlife (1961) estimated that 17,330 acres (7,000 hectares) of black-tailed prairie dog occupied habitat existed in New Mexico in 1961. Bodenchuck (1981) conducted limited surveys in New Mexico which reported approximately 42,000 acres (17,000 hectares) of black-tailed prairie dog occupied habitat. He also estimated that the black-tailed species represented 27.5 percent of the reported total for all species of prairie dogs in the State. He projected (based upon the percentage of responses returned) total occupied habitat for all prairie dog species in the State to be 497,000 acres (201,000 hectares). If the percentage of 27.5 percent black-tailed prairie dogs also is projected, total black-tailed prairie dog occupied habitat for the State was approximately 137,000 acres (55,000 hectares) in 1981. The Service recognizes that nonrespondent follow-up surveys were not conducted and that this projection may be inflated due to bias. In 1998, the BFF Recovery Foundation phone survey estimated 112,000 acres (45,000 hectares) of black-tailed prairie dog occupied habitat in the State (Black-footed Ferret Recovery Foundation in litt. 1998). However, the BFF Recovery Foundation included seven counties in their survey which Bodenchuck

(1981) classified as within the range of the Gunnison's prairie dog. If acreage estimates for these counties are deleted, approximately 107,000 acres (43,000 hectares) of black-tailed prairie dog occupied habitat would be its revised estimate for New Mexico.

Some survey reports of prairie dogs in New Mexico have combined black-tailed and Gunnison's prairie dogs (both occur in New Mexico). The lumping of these species has confounded evaluation of various reports. Some confusion exists regarding estimates provided by the Biodiversity Legal Foundation et al. (1998), Mulhern and Knowles (1995), and U.S. Fish and Wildlife (1995). Hubbard and Schmitt (1983) adjusted figures from Bodenchuck (1981) and estimated 497,012 acres (201,220 hectares) of occupied habitat for both species of prairie dogs in New Mexico. Mulhern and Knowles (1995) and U.S. Fish and Wildlife (1995) also reported 497,012 acres (201,220 hectares) of occupied habitat. This acreage figure includes occupied habitat for both Gunnison's and black-tailed prairie dog.

Recent estimates of existing black-tailed prairie dog occupied habitat at specific locations include 613 acres (248 hectares) at Kiowa National Grasslands (0.45 percent of Federal lands within Kiowa National Grasslands) (Sidle, U.S. Forest Service, in litt. 1999), 1,870 acres (757 hectares) in Roosevelt County and 1,304 acres (528 hectares) in Curry County (Paternoster 1997).

Sager (1996) surveyed 4 northeastern counties and found 1,191 individual black-tailed prairie dogs at 64 sites. Paternoster (1997) surveyed 2 counties in east central New Mexico and counted 77 black-tailed prairie dog colonies totaling 3,174 acres (1,285 hectares). Many colonies were small in size and had a very low density of animals. Sager (1996) and Paternoster (1997) do not provide any Statewide estimates of occupied habitat; however, they do provide detailed regional population estimates. The NMDA believes, based upon their own survey efforts, that Knowles (1998) and Paternoster (1997) underestimated black-tailed prairie dog occupied habitat in New Mexico (DuBois, New Mexico Department of Agriculture, in litt. 1999).

The Service estimates that 39,000 acres (16,000 hectares) of black-tailed prairie dog occupied habitat occur in New Mexico. This estimate is based upon data provided by Paternoster (1997) for Roosevelt and Curry Counties; data provided by Sager (1996) and Sidle (U.S. Forest Service, in litt. 1999) for Colfax, Harding, Mora, and Union Counties; and for all other counties—(1) total county acreage, (2) species presence or absence by county as determined by Bodenchuck (1981), and (3) mean species occupancy rate by county as determined by Hubbard and Schmitt (1983).

Trends--Approximately 6 percent of the potential black-tailed prairie dog habitat in New Mexico has been converted to cropland (Table 2). Sylvatic plague also has likely caused declines in the State, most recently in the northeastern portion (Sager 1996). The States' Draft Conservation Agreement notes that "there are no data available that would suggest populations in New Mexico are stable and/or improving" (Van Pelt in prep.).

Service Evaluation--The Service believes that black-tailed prairie dog occupied habitat in New Mexico has experienced significant historic declines. Following restrictions on toxicant use in 1972, increases in occupied habitat appear to have occurred (Table 1). However, the Service believes that declines in occupied habitat have occurred in recent years.

NORTH DAKOTA

Distribution--Historically, black-tailed prairie dogs occurred on suitable habitat in the southwestern third of North Dakota, west of the Missouri River (Hall and Kelson 1959). Many large colonies of black-tailed prairie dogs were present in North Dakota west of the Missouri River in the early 1900's (Bailey 1926). Presently, the species appears to be scattered throughout the same area with remnant populations on or near the Little Missouri National Grassland, Theodore Roosevelt National Park, and Standing Rock Reservation.

The Service estimates that approximately 44 percent of black-tailed prairie dog occupied habitat in North Dakota occurs on private and State lands, 40 percent on tribal lands, and 16 percent on Federal lands.

Abundance--Approximately 3 percent of black-tailed prairie dog occupied habitat in the United States may have existed in North Dakota historically (Table 2). Approximately 4 percent of occupied habitat in the United States currently exists in North Dakota (Table 1). Statewide estimates of occupied habitat noted in Table 1 for North Dakota range from 2 million acres (810,000 hectares) historically (Knowles 1998) to approximately 7,000 acres (2800 hectares) as a conservative estimate in 1973 (Grondahl 1973). The most recent estimate of occupied habitat is the Forest Service's preliminary estimate of approximately 25,000 acres (10,000 hectares) (Sidle, U.S. Forest Service, pers. comm. 1999). The reduction in occupied habitat from historic times to present is approximately 99 percent. A comparison between historic occupied habitat as estimated by Table 2 and the Service estimate of current occupied habitat (Table 1) indicates a similar trend.

In 1961, 19,750 acres (8,000 hectares) of black-tailed prairie dog occupied habitat were estimated to occur in the State (Bureau of Sport Fisheries and Wildlife 1961). Grondahl (1973) reported 6,770 acres (2,740 hectares) of occupied habitat in 245 colonies; however, he noted that he "made a limited effort to locate prairie dog towns" and acreage was not determined for several colonies. Stockrahm (1979) estimated occupied habitat to

be approximately 10,000 acres (4,000 hectares). The North Dakota Game and Fish Department conducted prairie dog surveys during 1980-1991 and counted 383 black-tailed prairie dog colonies in 11 counties totaling 20,464 acres (8,290 hectares) (North Dakota Game and Fish Department undated). Colony size ranged from 1 to 600 acres (0.41 to 243 hectares). A majority of the colonies (72 percent) were 50 acres (20 hectares) or less in size. Knowles (1998) estimated 20,444 acres (8,280 hectares) of occupied habitat for the species. The 1998 BFF Recovery Foundation telephone survey reported 15,160 acres (6,140 hectares) of black-tailed prairie dog occupied habitat in seven North Dakota counties; six counties within the species' range did not respond (Black-footed Ferret Recovery Foundation in litt. 1998). Aerial surveys conducted in the State in 1999 as part of an ongoing work effort by the Forest Service provided a preliminary estimate of 25,000 acres (10,000 hectares) of occupied habitat in North Dakota (Sidle, U.S. Forest Service, pers. comm. 1999). McKenna (North Dakota Game and Fish Department, in litt. 1999) cites 30,000 acres (12,000 hectares) of occupied habitat in the State.

The only recent estimate of existing occupied habitat at a specific location is 2,862 acres (1,158 hectares) at Little Missouri National Grasslands (0.28 percent of Federal lands within Little Missouri National Grasslands) (Sidle, U.S. Forest Service, in litt. 1999).

The Service believes that 25,000 acres (10,000 hectares) of black-tailed prairie dog occupied habitat (Sidle, U.S. Forest Service, pers. comm. 1999) is a reasonable Statewide estimate.

Trends--Approximately 53 percent of the potential black-tailed prairie dog habitat in North Dakota has been converted to cropland (Table 2). Historic declines in occupied habitat in the State were documented by Bishop and Culbertson (1976). They examined aerial photographs of western North Dakota from 1939 to1972 to evaluate the impact of control programs and land use practices on black-tailed prairie dog colonies on part of the Little Missouri National Grasslands. Colonies were measured for three periods during the 33-year span and showed an 89 percent decline in the number of colonies, and a 93 percent decline in the amount of occupied habitat. The NGFD believes that black-tailed prairie dog occupied habitat in the State increased from 10,000 acres (4,000 hectares) in the mid 1970's to 30,000 acres (12,000 hectares) in 1999 (McKenna, North Dakota Game and Fish Department, in litt. 1999).

Service Evaluation--The Service believes that black-tailed prairie dog occupied habitat in North Dakota has experienced significant declines from historic estimates, but has likely been fairly stable to increasing in recent years (Figure 2). The amount of occupied habitat in North Dakota is relatively small compared to other States in the northern Great Plains.

OKLAHOMA

Distribution--Historically, black-tailed prairie dogs occurred on suitable habitat throughout approximately the western two-thirds of Oklahoma west of the 97th meridian (Hall and Kelson 1959). Presently, the species is largely limited to the panhandle (Shaw et al. 1993, Tyler 1968, Wuerthner 1997), although other scattered remnant populations occur in the western half of the State outside of the panhandle (Shackford et al. 1990).

The Service estimates that approximately 90 percent of black-tailed prairie dog occupied habitat in Oklahoma occurs on private lands (Duffy, Oklahoma Department of Wildlife Conservation, in litt. 1998).

Abundance--Approximately 6 percent of black-tailed prairie dog occupied habitat in the United States may have existed in Oklahoma historically (Table 2). Approximately 1 percent of occupied habitat in the United States currently exists in Oklahoma (Table 1). Statewide estimates of occupied habitat noted in Table 1 for Oklahoma range from 950,000 acres (385,000 hectares) historically (Knowles 1998) to less than 8,600 acres (3,500 hectares) in 1998 (Lomolino, University of Oklahoma, in litt. 1999). This reduction in occupied habitat is approximately 99 percent. A comparison between historic occupied habitat as estimated by Table 2 and the Service estimate of current occupied habitat (Table 1) indicates a similar trend.

In 1961, approximately 15,000 acres (6,080 hectares) of black-tailed prairie dog occupied habitat were estimated to occur in Oklahoma (Bureau of Sport Fisheries and Wildlife 1961). Statewide surveys completed in 1966-1967 reported 9,522 acres (3,856 hectares) of occupied habitat (Tyler 1968). Lewis and Hassien (1973) estimated that 15,000 acres (6,080 hectares) of occupied habitat were present in 1973. Surveys in 1986-1989 reported approximately 18,000 acres (7,300 hectares) of occupied habitat (Shackford et al. 1990). The Oklahoma Department of Wildlife Conservation concurs with the estimate by Shackford et al. (1990) of 18,000 acres (7,300 hectares) of black-tailed prairie dog occupied habitat in the State (Duffy, Oklahoma Department of Wildlife Conservation, in litt. 1998). In 1990, Shaw et al. (1993) surveyed lands in the Oklahoma panhandle and estimated occupied habitat acreage at levels very similar to those in 1986-1989. However, in 1991-1992, these authors noted that several large complexes in Cimarron County experienced abrupt declines, presumably due to sylvatic plague (Figure 1). The 1998 BFF Recovery Foundation survey reported 70,000 acres (28,000 hectares) of black-tailed prairie dog occupied habitat in the State (Black-footed Ferret Recovery Foundation in litt. 1998), although one county estimate was 50,000 acres (20,000 hectares). Knowles (1998) estimated that less than 9,500 acres (3,850 hectares) remained in Oklahoma. Field surveys conducted by the University of Oklahoma as part of an ongoing study have found less than 8,600 acres (3,500 hectares) of occupied habitat in Oklahoma (Lomolino, University of Oklahoma, in litt.).

The only recent estimate of existing occupied habitat at a specific location is

approximately 1,975 acres (800 hectares) for Cimarron County, the largest amount of occupied habitat for any Oklahoma county (Lomolino, University of Oklahoma, in litt. 1999).

The Service believes that approximately 9,000 acres (3,600 hectares) of black-tailed prairie dog occupied habitat (Lomolino, University of Oklahoma, in litt. 1999) is a reasonable Statewide estimate.

Trends--Approximately 69 percent of the potential black-tailed prairie dog habitat in Oklahoma has been converted to cropland (Table 2).

Recent occupied habitat trends have been well documented in Cimarron County, where most black-tailed prairie dog populations in Oklahoma occur (Figure 1). In 1967, occupied habitat was estimated to be 1,837 acres (744 hectares) (Tyler 1968). By 1972, occupied habitat increased to 5,500 acres (2,228 hectares) (Lewis and Hassien 1973); and by 1989, occupied habitat increased to 10,406 acres (4,214 hectares) (Shackford et al. 1990). In 1991, occupied habitat declined to 2,370 acres (960 hectares); and in 1992, very little occupied habitat was found (Shaw 1993). This decline was presumed due to sylvatic plague. In 1999, occupied habitat recovered somewhat to 1,975 acres (800 hectares) (Lomolino, University of Oklahoma, in litt. 1999). East of the State's panhandle, occupied habitat has experienced a steady decline since the 1960's (Shackford et al. 1990).

The ODWC believes that precise historic data is not available in Oklahoma, and, therefore, range reduction for the species cannot be documented. The ODWC believes that the species is broadly distributed across the State's grasslands (90 percent on private land) and that numbers appear stable in the State; however, this contradicts ongoing work by Lomolino (University of Oklahoma, in litt. 1999) who reported less than 8,600 acres (3,500 hectares) for a Statewide total. In 1998, the ODWC documented additional prairie dog towns in the State, but did not report the amount of occupied habitat (Duffy, Oklahoma Department of Wildlife Conservation, in litt. 1999).

Service Evaluation--The Service believes that there have been significant declines from historic estimates of black-tailed prairie dog occupied habitat in Oklahoma. The panhandle has experienced significant declines in the past 10 years, with limited recovery. These declines were likely due to sylvatic plague. The remainder of occupied habitat in the State has experienced a slow, steady decline since the 1960's. Overall, Oklahoma has less occupied habitat than any other State. Populations appear to have been reduced by 50 percent in the last 10 years.

SOUTH DAKOTA

Distribution--Historically, black-tailed prairie dogs were found throughout all but the eastern one-fourth of the State (Hall and Kelson 1959, Linder et al. 1972). Presently the species appears to be scattered throughout the same area, with the majority of occupied habitat on tribal or Federal lands west of the Missouri River and small scattered populations elsewhere. Known concentrations exist at Buffalo Gap National Grassland, Cheyenne River Sioux Tribe Reservation, Pine Ridge Reservation, and Rosebud Sioux Tribe Reservation.

The Service estimates that approximately 73 percent of black-tailed prairie dog occupied habitat in South Dakota occurs on tribal lands, 17 percent occurs on private (frequently adjoining tribal lands) and State lands, and 10 percent occurs on Federal lands.

Abundance--Approximately 8 percent of black-tailed prairie dog occupied habitat in the United States may have existed in South Dakota historically (Table 2). Approximately 22 percent of occupied habitat in the United States currently exists in South Dakota (Table 1). South Dakota has a significant portion of the remaining black-tailed prairie dog occupied habitat in the United States. Statewide estimates of occupied habitat noted in Table 1 for South Dakota range from greater than 1,757,000 acres (712,000 hectares) historically, following the initiation of intensive control efforts in 1918 (Linder et al. 1972), to 33,000 acres (13,000 hectares) in 1961 (Bureau of Sport Fisheries and Wildlife 1961). The most recent estimate of occupied habitat in the State is a preliminary estimate of 147,000 acres (60,000 hectares) (Sidle, U.S. Forest Service, pers. comm. 1999). This reduction in occupied habitat from historic times to the present is approximately 92 percent. A comparison between historic occupied habitat as estimated by Table 2 and the Service estimate of current occupied habitat (Table 1) indicates a similar trend.

In 1967, data based on aerial surveys and reports from South Dakota Department of Game, Fish and Parks indicated that about 37,000 acres (15,000 hectares) of black-tailed prairie dog occupied habitat existed in the State (Henderson et al. 1974). Rose (1973) estimated 60,000 acres (24,000 hectares) of occupied habitat in 1968. Tschetter (1988) noted 700,000 acres (284,000 hectares) of occupied habitat existed in 1980, but that this amount decreased to 184,000 acres (75,000 hectares) in 1987. He also noted that 76 percent of occupied habitat for the species occurred on tribal lands. Several sources estimated approximately 245,000 acres (99,000 hectares) of occupied habitat in the mid 1990's (Knowles 1995, Knowles 1998, Mulhern and Knowles 1995). A 1998 phone survey estimated 175,000 acres (71,000 hectares) (Black-footed Ferret Recovery Foundation in litt. 1998). The SDGFP estimated 231,000 acres (94,000 hectares) of occupied habitat were present in 1996, based on a questionnaire/mail survey (South Dakota Department of Game, Fish, and Parks 1996). Aerial surveys completed in 1999 by the Forest Service provided a preliminary estimate of 147,000 acres (60,000 hectares) of black-tailed prairie dog occupied habitat in South Dakota (Sidle, U.S. Forest Service, pers. comm. 1999).

Recent estimates of existing occupied habitat at specific locations include approximately 45,000 acres (18,000 hectares) on Rosebud Sioux Tribal lands and an additional 25,000 acres (10,000 hectares) on adjoining lands (Finnegan et al., Rosebud Sioux Tribe, in litt. 1998), 44,000 acres (18,000 hectares) on the Cheyenne River Sioux Tribal and adjoining lands (Bourland and Dupris, Cheyenne River Sioux Tribe, in litt. 1998), 20,000-30,000 acres (8,000-12,000 hectares) on Pine Ridge Tribal lands (Yellowhair, Pine Ridge Sioux Tribe, pers. comm. 1999), and 13,270 acres (5,370 hectares) at Buffalo Gap National Grasslands (2.22 percent of Federal lands within Buffalo Gap National Grasslands) and 1,589 acres (643 hectares) at Grand River National Grasslands (1.03 percent of Federal lands within Grand River National Grasslands) (Sidle, U.S. Forest Service, in litt. 1999). The Crow Creek Sioux Tribe estimates that "60 active grounds" of black-tailed prairie dogs exist on their tribal lands (Miller, Crow Creek Sioux Tribe, in litt. 1998).

The Service believes that 147,000 acres (60,000 hectares) of black-tailed prairie dog occupied habitat (Sidle, U.S. Forest Service, pers. comm. 1999) is a reasonable Statewide estimate.

Trends--Approximately 43 percent of the potential black-tailed prairie dog habitat in South Dakota has been converted to cropland (Table 2). Black-tailed prairie dog occupied habitat in South Dakota has experienced significant declines from historic estimates. There appeared to be declines in occupied habitat until 1961, then recovery until the 1980's when occupied habitat again declined. Reductions in occupied habitat in South Dakota appear to be primarily in response to control efforts, as well as some loss in available habitat due to cropland development. Sylvatic plague has not been documented in black-tailed prairie dogs in the State.

Service Evaluation--The Service believes that there have been significant declines from historic estimates of black-tailed prairie dog occupied habitat in South Dakota, with notable recovery from 1961 to 1980. Thereafter, extensive control efforts at Pine Ridge Reservation, on Forest Service managed lands, and elsewhere in the 1980's resulted in a significant decline in occupied habitat (Figure 1). Subsequently, occupied habitat has remained fairly stable (Figure 2). South Dakota appears to have more black-tailed prairie dog occupied habitat than any other State with most populations occurring on tribal land. Additionally, more unoccupied but available habitat appears to remain in South Dakota than in other States.

TEXAS

Distribution--Historically, black-tailed prairie dogs occurred on suitable habitat throughout the northwestern one-third of Texas (Bailey 1905, Hall and Kelson 1959). Presently, the species occurs largely in the western portion of the northern panhandle, with Dallam and Deaf Smith Counties having the greatest amount of occupied habitat (Lair and Mecham 1991). Some scattered remnant populations exist in the Trans-Pecos Region of western Texas.

The Service estimates that approximately 99 percent of black-tailed prairie dog occupied habitat in Texas occurs on private and State lands and 1 percent occurs on Federal lands.

Abundance--Approximately 21 percent of black-tailed prairie dog occupied habitat in the United States may have existed in Texas historically (Table 2). Approximately 11 percent of occupied habitat in the United States currently exists in Texas (Table 1). Statewide estimates of occupied habitat noted in Table 1 for Texas range from 58 million acres (23 million hectares) historically (Bailey 1905) to 23,000 acres (9,000 hectares) at present (Knowles 1998). This reduction in occupied habitat is greater than 99 percent. A comparison between historic occupied habitat as estimated by Table 2 and the Service estimate of current occupied habitat (Table 1) indicates a similar trend.

In 1961, black-tailed prairie dog occupied habitat in Texas was estimated at 26,000 acres (11,000 hectares) (Bureau of Sport Fisheries and Wildlife 1961). In 1965, Cottam and Caroline (1965) estimated more than 12,900 acres (5,200 hectares) of occupied habitat were present in the State.

In 1977, approximately 90,000 acres (36,000 hectares) of habitat were estimated to exist in Texas, largely in the northern panhandle region (Cheatheam 1977). In this study, most colonies were located from aerial photographs of 108 counties; other colonies were located through individual contacts. The author noted that on-site inspection of 229 colonies (approximately 20 percent of the 1,144 colonies located by aerial photographs) found 45 colonies totaling 6,550 acres (2,650 hectares) that were inactive, that 13 colonies had decreased by a total of 1,685 acres (682 hectares), and that 30 colonies had increased by a total of 4,524 acres (1,831 hectares). These changes equate to a net loss of 3,709 acres (1,501 hectares) in the 229 colonies. If the 229 colonies receiving an on-site inspection were typical of all colonies located from aerial photographs, occupied habitat was actually 24 percent, or 18,545 acres (7,505 hectares), less in the area surveyed by aerial photographs. Accordingly, the total occupied habitat would have been approximately 71,479 acres (28,927 hectares).

In 1991, Lair and Mecham (1991) inventoried black-tailed prairie dog towns greater than 100 acres (40 hectares) for the purpose of locating black-footed ferret habitat within Texas. Consequently, not all towns in the State were included. Twenty-nine counties in the Texas panhandle were examined. County to county comparisons with Cheatheam

(1977) were not possible. Approximately 68,000 acres (28,000 hectares) of occupied habitat were reported. The Texas Parks and Wildlife Department believes that the two studies, Cheatheam (1977) and Lair and Mecham (1991), are not comparable because the latter estimate covered a smaller area and reported minimum estimates (Sansom, Texas Parks and Wildlife Department, in litt. 1998).

The BFF Recovery Foundation's 1998 telephone survey estimated 227,000 acres (92,000 hectares) of occupied habitat for the species (Black-footed Ferret Recovery Foundation in litt. 1998), although one county estimate was 100,000 acres (40,000 hectares). Knowles (1998) estimated 23,000 acres (9,000 hectares) of occupied habitat in Texas.

The only recent estimate of existing occupied habitat at a specific location is 966 acres (391 hectares) in Rita Blanca National Grasslands (1.04 percent of Federal lands within Rita Blanca National Grasslands) (Sidle, U.S. Forest Service, in litt. 1999).

The Service believes that 71,000 acres (29,000 hectares) of black-tailed prairie dog occupied habitat, modified from Cheatheam (1977), is a reasonable Statewide estimate.

Trends--Approximately 28 percent of the potential black-tailed prairie dog habitat in Texas has been converted to cropland (Table 2). Additionally, sylvatic plague has impacted the species in the State (Sager 1996). The TPWD agrees that "the numbers and habitat of the species have been radically reduced in Texas." However, it does not agree with the current estimate of 23,000 acres (9,000 hectares) occupied habitat from Knowles (1998) (Sansom, Texas Parks and Wildlife Department, in litt. 1998).

Service Evaluation--The Service believes that there have been significant declines from historic estimates of black-tailed prairie dog occupied habitat in Texas. However, based upon the limited amount of information available, the Service believes that following the restrictions on toxicants use in 1972, occupied habitat increased. The Service also believes that populations may have remained fairly stable since the late 1970's.

WYOMING

Distribution--Historically, black-tailed prairie dogs occurred on suitable habitat throughout the eastern half of Wyoming, east of the Rocky Mountain foothills (Clark 1973, Hall and Kelson 1959) below approximately 5,500 feet (1,676 meters) elevation (Van Pelt in prep.). Presently, remnant populations appear to be scattered throughout the same area, with known concentrations on and near Thunder Basin National Grassland in the northeastern portion of the State.

The Service estimates that approximately 86 percent of black-tailed prairie dog occupied habitat in Wyoming occurs on private and State lands and 14 percent occurs on Federal lands.

Abundance--Approximately 7 percent of black-tailed prairie dog occupied habitat in the United States may have existed in Wyoming historically (Table 2). Approximately 18 percent of occupied habitat in the United States currently exists in Wyoming (Table 1). Statewide estimates of occupied habitat noted in Table 1 for Wyoming range from 16 million acres (6.5 million hectares) historically (Knowles 1998) to 49,000 acres (20,000 hectares) in 1961 (Bureau of Sport Fisheries and Wildlife 1961). The most recent estimate is 70,000-180,000 acres (28,000-73,000 hectares) in 1998 (Knowles 1998). This reduction in occupied habitat from historical times to the present is approximately 99 percent. A comparison between historic occupied habitat as estimated by Table 2 and the Service estimate of current occupied habitat (Table 1) indicates a similar trend.

In 1971, Clark (1973) estimated approximately 133,000 acres (54,000 hectares) of black-tailed prairie dog occupied habitat in Wyoming. Following field mapping in 1987, the Wyoming Game and Fish Department estimated 131,000-204,000 acres (53,000-83,000 hectares) of occupied habitat in the State (Oakleaf et al. 1996). The BFF Recovery Foundation phone survey estimated 535,000 acres (217,000 hectares) of occupied habitat for both species of prairie dogs in Wyoming (Black-footed Ferret Recovery Foundation in litt. 1998). Based upon species breakdowns by county presented by Clark (1973), approximately 422,000 acres (171,000 hectares) of black-tailed prairie dog habitat were noted by BFF Recovery Foundation. The Wyoming Department of Agriculture requested that officials from county Weed and Pest Districts in Wyoming provide estimates of the number of acres occupied by black-tailed prairie dog within their counties (Micheli, Wyoming Department of Agriculture, in litt. 1999). A total of 362,000 acres (147,000 hectares) were estimated to be occupied by black-tailed prairie dogs in the State. The WDA states that these estimates are conservative, realistic, and based on firsthand observations by local officials who have spent years inspecting their counties for weeds and pests. The WDA estimates over 100 million black-tailed prairie dogs exist in the State, based upon an estimate of 30 prairie dog holes per acre and 10 dogs per hole (Micheli, Wyoming Department of Agriculture, in litt. 1998, 1999). This estimate equates to a density of 300 black-tailed prairie dogs per acre (741 per hectare) which far exceeds density estimates in available literature references (Fagerstone and Ramey 1996, Hoogland 1995, King 1955, Koford 1958, Miller 1996).

The only recent estimate of existing occupied habitat at a specific location is 18,239 acres (7,381 hectares) at Thunder Basin National Grasslands (3.26 percent of Federal lands within Thunder Basin National Grasslands) (Sidle, U.S. Forest Service, in litt. 1999), which, in the absence of sylvatic plague, has experienced increases in recent years.

The Service estimates 125,000 acres (51,000 hectares) of black-tailed prairie dog

occupied habitat exist in Wyoming. This figure represents a 25 percent decline from the mid-point of the 1987 WGFD estimate of 131,000-204,000 acres (53,000-83,000 hectares). This projected decline during the last 12 years for Wyoming is less than the Statewide decline of 50 percent for the adjacent State of Montana during the last 12 years, where sylvatic plague impacts have been more apparent than in Wyoming. Lockhart (U.S. Fish and Wildlife Service, in litt. 1998) and Jennings (U.S. Fish and Wildlife Service, pers. comm. 1999) note sylvatic plague impacts in black-tailed prairie dog complexes throughout the State. However, at least one large complex, Thunder Basin National Grassland, has not been impacted by sylvatic plague and has experienced significant increases in occupied habitat (High Country News, 1999).

Trends--Approximately 12 percent of the potential black-tailed prairie dog habitat in Wyoming has been converted to cropland (Table 2). In regard to black-tailed prairie dog populations, the WGFD "believes there has been a significant decline in Wyoming since the turn of the century" and believes "the potential exists for continued declines." The WGFD also notes that many of these populations are "small, disjunct, and isolated" (Wichers, Wyoming Game and Fish Department, in litt. 1998).

Service Evaluation--The Service believes that there have been significant declines from historic estimates of black-tailed prairie dog occupied habitat in Wyoming. Increases in occupied habitat occurred following restrictions in toxicant use in 1972; however, the Service believes that recent declines are likely to continue, largely due to impacts from sylvatic plague.

2.4.6.2 Canada.

Distribution--Historically, black-tailed prairie dogs occurred on suitable habitat in southernmost Saskatchewan (Hall and Kelson 1959). Presently the species is found in a small area along the Frenchman River Valley in extreme southern Saskatchewan. Many of these colonies are in Canada's Grasslands National Park (Laing 1986).

Abundance--Canada represents a very small percentage (approximately 0.3 percent) of the rangewide population (Table 1). Millson (1976) noted that in 1970 there were 15 colonies in this area totaling 1,244 acres (503 hectares); and in 1975, he mapped 16 colonies totaling 1,885 acres (763 hectares). Laing (1986) later mapped 14 colonies totaling 1,691 acres (685 hectares). Knowles (1998) estimated that there are 1,500-2,000 acres (600-800 hectares) of black-tailed prairie dog occupied habitat in Canada. Surveys conducted between 1993 and 1996 found 25 colonies totaling 2,318 acres (938 hectares), with 13 colonies totaling 1,353 acres (548 hectares) located within Canada's Grasslands National Park holdings (Fargey, Grasslands National Park, pers. comm. 1998). Colonies ranged from 3.9 acres (1.57 hectares) to 328 acres (132.9 hectares). There are no other known colonies in Canada.

Trends--Black-tailed prairie dog occupied habitat in Canada has always been limited, but

appears to have remained fairly constant.

Service Evaluation--The Service believes that black-tailed prairie dog occupied habitat in Canada is approximately 2,000 acres (800 hectares) and, in the absence of sylvatic plague, will likely remain stable.

2.4.6.3 Mexico.

Distribution--Historically, black-tailed prairie dogs occurred on suitable habitat throughout the northern portion of the Mexican States of Chihuahua and Sonora (Hall and Kelson 1959). Presently, most individuals appear to be limited to a small region in northern Chihuahua.

Abundance--Historically, black-tailed prairie dog occupied habitat in Mexico was estimated at 1,384,000 acres (560,000 hectares) (Mearns 1907 as cited in Ceballos et al. 1993). Ceballos et al. (1993) mapped 136,000 acres (55,000 hectares) of occupied habitat in Chihuahua, Mexico, in 1988. Included in this estimate was one colony within the Janos-Nuevo Casas Grandes Complex which totaled 86,360 acres (34,949 hectares). List et al. (1997) reported the total amount of occupied habitat in Mexico as 90,000 acres (36,000 hectares) in 1996. The Janos-Nuevo Casas Grandes Complex is currently the largest black-tailed prairie dog complex in North America and contains approximately 12 percent of all occupied habitat rangewide (Table 1). This complex is the only significant black-tailed prairie dog population remaining in Mexico (Ceballos et al. 1993).

The Service believes that 90,000 acres (36,000 hectares) from List et al. (1997) is a reasonable current estimate of black-tailed prairie dog occupied habitat in Mexico.

Trends--From 1988 to 1996, the geographic range of the species in Mexico contracted 79 percent and the amount of occupied habitat decreased by 34 percent (List et al. 1997). Ceballos et al. (1993) and List et al. (1997) noted historic and recent declines at the Janos-Nuevo Casas Grandes Complex. Colony fragmentation has occurred in black-tailed prairie dog colonies previously surveyed, reducing the size of towns and increasing their isolation. The average town size reduced from 6,323 acres (2,559 hectares) in 1988 to 418 acres (169 hectares) in 1996 (List et al. 1997). He indicated that reduction was due to increased cropland conversion, control, and drought.

These same factors have impacted the Mexican prairie dog, a peripheral isolate of the black-tailed prairie dog, which is currently classified as endangered (Trevino-Villarreal and Grant 1998). The Mexican prairie dog occurs principally in the State of Nuevo Leon approximately 600 miles (1,000 kilometers) southeast of the black-tailed prairie dog complex in Chihuahua, Mexico. Habitat destruction has been considered one of the most important factors in the recent decline of the Mexican prairie dog, which currently inhabits 118,000 acres (48,000 hectares). The black-tailed prairie dog currently occupies

approximately 90,000 acres (36,000 hectares) in Mexico. These two species appear to be declining for similar reasons.

Service Evaluation--The Service believes that black-tailed prairie dog occupied habitat in Mexico has declined significantly from historic estimates and that this decline continues (Figure 1). This decline appears to be due primarily to cropland conversion.

3. FACTORS AFFECTING THE SPECIES

Section 4(a)(1) of the Act and regulations (50 CFR, Part 424), promulgated to implement listing provisions of the Act, set forth the procedures for adding species to the Federal endangered and threatened species list. Listing decisions may consider any one or any combination of the five factors listed in section 4(a)(1). All of these factors act both alone and in concert to affect the status of the black-tailed prairie dog.

Three major impacts have had a substantial influence on black-tailed prairie dog populations. Although they have overlapped in different time periods, their principal influences occurred as described hereafter. The first major impact on the species was the initial conversion of prairie grasslands to cropland in the eastern portion of its range from approximately the 1880's through the 1920's. The conversion of native prairie to cropland likely reduced black-tailed prairie dog occupied habitat in the United States from about 80 million acres (32 million hectares) to about 50 million acres (20 million hectares) or less. This estimate of prairie conversion is extrapolated from Laycock's (1987) estimate of 104 million acres (42 million hectares) converted from 1880-1899, assuming that 20 percent of this was black-tailed prairie dog occupied habitat (Whicker and Detling 1988) and that the rate of decline in the next 20 years was 50 percent of that in the preceding 20 years. The second major impact on the species was large-scale control efforts conducted from approximately 1918 to approximately 1972 in efforts to reduce competition between prairie dogs and domestic livestock. Large scale, repeated control efforts likely reduced black-tailed prairie dog occupied habitat in the United States from about 50 million acres (20 million hectares) to approximately 400,000 acres (162,000 hectares) by 1961 (Bureau of Sport Fisheries and Wildlife 1961). Some limited recovery and subsequent declines have since occurred in these remnant populations. The third major impact on the species was the inadvertent introduction of an exotic disease, sylvatic plague, from the Old World into North American ecosystems around 1900, with the first recorded impacts on the black-tailed prairie dog in 1946. The influence of sylvatic plague on black-tailed prairie dog populations is recent in a historical sense, and especially in a biological sense. Its influence may have been masked by other factors, but it has had significant depressant effects on remnant populations in the last 10-15 years. These three factors, as well as other additional factors impacting the species, are discussed below.

3.1 THE PRESENT OR THREATENED DESTRUCTION, MODIFICATION, OR CURTAILMENT OF THE SPECIES' HABITAT OR RANGE

Significant destruction, modification, and curtailment of black-tailed prairie dog habitat and

range have occurred. The aftermath of some of these influences is apparent, e.g., intensively farmed croplands, while other influences such as habitat deterioration are not as obvious. The indirect effects of previous habitat modifications may have less apparent but significant influences on black-tailed prairie dog populations.

3.1.1 Habitat Loss Due to Cropland Development

The eastern portion of the historic range of the black-tailed prairie dog includes a large portion of the most productive cropland in the United States. Between 1880 and 1899, 104 million acres (42 million hectares) on the Great Plains were converted to crop production (Laycock 1987). Conversion of native prairie continued throughout the early 1900's until the dust bowl of the 1930's, when the conversion of submarginal land and drought conditions caused severe land degradation. Some of these lands were subsequently returned to grasslands with native species and are presently managed by the Forest Service as National Grasslands. Native grasslands in the North American mid-continent have been much reduced. In the United States, approximately 33 percent of the historic range of the black-tailed prairie dog and 37 percent of the suitable habitat within its range has been converted to cropland uses at present (Black-footed Ferret Recovery Foundation, in litt. 1999, Table 2). This fundamental land use change resulted in significant destruction of black-tailed prairie dog habitat, mostly in the eastern portions of the species' range where adequate precipitation favored farming. Cropland conversion was so thorough as to curtail the range of the species in the eastern part of some midwestern States where conversion to cropland has been essentially complete.

The present threat of large-scale destruction of black-tailed prairie dog habitat through cropland conversion is much less than in the early days of agricultural development in the Great Plains, except perhaps in Mexico. For example, in Nebraska, rangeland continues to be converted to cropland and other uses, but at a slower pace than previously (Amack, Nebraska Game and Parks Commission, in litt. 1998). This difference is due to the fact that land with the highest potential for traditional farming uses was converted many years ago.

Cropland conversion of black-tailed prairie dog occupied habitat continues today, but it is unknown how much is converted annually. Improved dryland farming techniques have been responsible for additional cropland conversion in the western Great Plains in recent years. Conversion of rangelands and prairie habitat to cropland occurs in some areas due to continuing improvements in intensive agricultural techniques, e.g., dryland wheat farming in Montana (Knowles et al. 1996, Lessica 1995) and irrigated croplands in Mexico (List et al. 1997). List et al. (1997) reported that occupied black-tailed prairie dog habitat in Mexico declined by 34 percent between 1988 and 1996, in part due to rangeland conversion due to farming. A primary cause of reduction of prairie dog habitat in Kansas is conversion of short grass prairie to cropland or other uses (Williams, Kansas Department of Fish and Wildlife, in litt. 1998).

Prairie conversion to cropland in the western portion of South Dakota has been facilitated, in part, by the development of genetically-altered soybeans that can be cultivated on lands previously suitable only as rangeland. The use of recombinant genetic techniques to develop

drought-resistant crop strains may further curtail the habitat of the black-tailed prairie dog if additional or existing varieties become more widely used (Hogan, U.S. Fish and Wildlife Service pers. comm. 1998). Hexem and Krupa (1987) identified 57.7 million acres (23 million hectares) of unplowed land in the western Great Plains with high to medium potential for cropland conversion by the year 2000. If a major portion of these lands was converted to cropland, it would result in a significant reduction in native prairie and would likely adversely affect the black-tailed prairie dog.

Some comment letters noted that the Conservation Reserve Program (CRP) has slowed the trend of rangeland conversion to farming. However, Stutzman (1989) reported that in five counties in north-central Montana, 56,000 acres (23,000 hectares) of native prairie were converted to cropland between 1987 and 1989, despite the CRP. Lesica (1995) noted that in the past 10 years there has been a small decline in the amount of cropland in Montana, due mainly to the CRP. However, the author also believes that the CRP has encouraged the loss of native prairie in Montana. The CRP allowed operators to break up native prairie and put it into crops at the same time that they have enrolled cropland in CRP. More land was put back into grass than was broken, but less than 6 percent of CRP land in Montana was planted to native species. Knowles et al. (1996) noted in Montana that *Agropyron cristatum* (crested wheatgrass) was the most common species planted on lands enrolled in the CRP, with a resultant loss in grassland biodiversity. Grass species established on most CRP lands would not likely be conducive for occupancy by black-tailed prairie dogs.

Some degree of prairie conversion to cropland is likely to continue (Soil Conservation Service 1989). Farming activities are expanding throughout the western Great Plains and will likely affect some remaining black-tailed prairie dog populations, although the magnitude of potential losses to the species' habitat is unknown. Paternoster (1997) noted that most prairie dog colonies surveyed in New Mexico were bordered by agricultural lands that appeared to restrict colony expansion. Small isolated colonies surrounded by agriculture also were typical in Nebraska in aerial surveys in 1996 and 1997 (Sidle, U.S. Forest Service, pers. comm. 1998).

The Service believes that impacts on the species due to habitat loss via cropland conversion are a moderate threat to the species at present. In particular, black-tailed prairie dog occupied habitat in Mexico may continue to decline due to a more rapid rate of habitat conversion than is occurring in other portions of the species' range.

3.1.2 Habitat Loss Due to Urban Development

One example of the present and threatened destruction of black-tailed prairie dog occupied habitat due to urban development near large cities is apparent along the Front Range of Colorado near Denver. In the early 1990's, 42,500 acres (17,200 hectares) of occupied habitat were mapped in the Denver/Boulder/Fort Collins metropolitan area (Skiba, Colorado Division of Wildlife, pers. comm. 1999). However, since the initial mapping effort, Knowles (1998) estimated that occupied habitat in this area has declined by approximately 8,000 acres due to urbanization. Several local organizations are actively acquiring and conserving black-tailed prairie dog habitat in response to wildlife conservation concerns of the local populace (The Denver Post 1998).

Although some black-tailed prairie dog occupied habitat has been lost due to urban development along the Front Range, an evaluation of the specific impact due to this factor is difficult because sylvatic plague also has significantly affected populations in this area in recent years (Weber, Colorado Division of Wildlife, pers. comm. 1998). Seery (U.S. Fish and Wildlife Service, pers. comm. 1998) estimates that occupied habitat mapped in the early 1990's in north central Colorado has been reduced by 50 percent due to various factors including urban development, but primarily due to sylvatic plague.

One type of area conducive to black-tailed prairie dog use in Colorado lies at the interface between urban areas and active croplands. The species persists precariously in heavily developed areas and is often persecuted via control in agricultural areas; however it prospers temporarily at the edge formed between these two land uses where speculative opportunities for additional development exist, but no active use occurs. Generally, urban development might not be considered a potential major influence on the species, since the species' range is very large and since there are few large cities within its range. However, it has been noted that black-tailed prairie dogs are common in the urban front-range area west of Interstate 25 in Colorado (Kahn, Colorado Division of Wildlife, in litt. 1998). Interstate 25 is the major north-south transportation corridor and the focus of continuing rapid development in the State. In 1994, Colorado reported 42,500 acres (17,200 hectares) of occupied habitat (Skiba, Colorado Division of Wildlife, pers. comm. 1999) along the front range that could be affected by urbanization via habitat loss, fragmentation, dispersal limitations, etc. This portion of occupied habitat in Colorado appears to be a significant percentage of occupied habitat present in the State. Moreover, the most densely populated area of the species' range in Colorado appears to be in areas with this type of land use. Most rangeland areas in Colorado have present occupancy rates of 0.32-0.5 percent (Sidle, U.S. Forest Service, in litt. 1999), while the front-range metropolitan area has occupancy rates of 1.6-3.1 percent (Seery, U.S. Fish and Wildlife Service, pers. comm. 1998; Skiba, Colorado Division of Wildlife, pers. comm. 1999). Urbanization also represents a locally significant loss of black-tailed prairie dog habitat in metropolitan areas near Wichita, Kansas and Helena, Montana (Knowles 1995).

The impact of urban development elsewhere in the species' range is unknown. The influence of urban development on black-tailed prairie dog populations is likely cumulative with other factors; it may have a significant direct effect in a local area through the effects of habitat destruction and fragmentation.

The Service believes that overall impacts on the species due to habitat loss from urban development are a low threat at present.

3.1.3 Habitat Loss Due to Changes in Vegetative Communities

Habitat modification and loss due to the absence of black-tailed prairie dogs can be anticipated in the prairie ecosystem where populations have been extirpated or significantly reduced in number. Weltzin et al. (1997) determined that black-tailed prairie dogs, and the herbivores and granivores associated with their colonies, probably maintained grassland and savanna historically by preventing woody species such as mesquite from establishing or attaining dominance. List et al. (1997) reported that control of black-tailed prairie dogs in Mexico resulted in the invasion of mesquite shrubs that rendered the landscape unsuitable for reoccupation by the species; moreover, fire suppression would likely maintain this situation. Davis (1974) also noted that the removal of the species from some sites in Texas resulted in the invasion of brush. Arizona stated that grassland (prairie dog) habitat is "declining at an alarming rate" in Arizona (Shroufe, Arizona Game and Fish Department, in litt. 1998). It noted a 35 percent reduction in grassland habitat along the San Pedro River to mesquite woodland invasion that could be due to the cumulative effects of fire suppression, grazing practices and perhaps the elimination of the black-tailed prairie dog.

The fragmented nature of remaining prairie dog colonies, barriers to immigration and emigration, and the lack of fire and native ungulate herds that historically denuded the landscape and provided opportunities for prairie dog colonies to expand (Miller et al. 1994) accentuate habitat loss due to vegetative succession. The reduction of grazing pressure to achieve higher stands of grass around black-tailed prairie dog colonies is a management tool for restricting the expansion of colonies (Snell and Hlavachick 1980, Snell 1985, Uresk et al. 1981). It would appear that these types of land use changes can have an impact on black-tailed prairie dog occupancy as well. The degree to which this type of grassland change and other landscape alterations affect black-tailed prairie dog populations across their range is unknown. Nevertheless, these subtle habitat changes may be a major factor in the utilization of habitat or recolonization of former habitat by the species.

The Service believes that impacts on the species due to habitat loss from changes in vegetative communities are a moderate threat at present.

3.1.4 Habitat Loss Due to Structural Deterioration of Burrows

Physical habitat changes may limit population recovery where control, sylvatic plague, or other factors have removed black-tailed prairie dogs. Once the species no longer inhabits an area, the deterioration of its burrows may preclude recolonization, especially where light grazing pressure or mesic conditions do not favor the expansion of colonies. Prairie dog burrows can be used and maintained by many generations of animals, depending on burrow longevity due to local soil type. Once underground burrows collapse due to the effects of weathering and age, the species is less likely to reoccupy them and reestablish itself in an area. The collective effort of several generations in developing a burrow complex is not easily duplicated by a pioneering individual from another colony. Black-tailed prairie dogs seldom disperse further than 3 miles (5 kilometers) and generally migrate to another colony or the perimeter of their natal colony rather than establish a new colony (Garrett and Franklin 1988, Hoogland 1995). This phenomenon was evident at the Rocky Mountain Arsenal National Wildlife Refuge in Colorado where reintroduced black-tailed prairie dogs reestablished themselves quickly where intact burrows constructed by previous prairie dog populations (extirpated by sylvatic plague) had not deteriorated. However, prairie dogs established themselves slowly and with much less success where burrows had deteriorated (Seery, U.S. Fish and Wildlife Service, pers. comm. 1998).

The Service believes that impacts on the species due to habitat loss from burrow deterioration are a moderate threat at present.

3.1.5 Habitat Fragmentation and Its Indirect Exacerbating Influence on the Effects of Other Factors

The grassland biome in North America has suffered among the most extensive fragmentation and transformation of any biome on the continent (Groombridge 1992). More fragmented, more isolated, and less connected populations usually have higher extinction rates (Clark 1989, Gilpin and Soule 1986, MacArthur and Wilson 1967, Shaffer 1981, Wilcove et al. 1986, Wilcox and Murphy 1985). List et al. (1997) suggested that fragmented black-tailed prairie dog colonies in Mexico were prone to extirpation.

Across their range, many black-tailed prairie dog colonies are small and spatially isolated from other colonies (Miller et al. 1996). The BFF Recovery Foundation (1999) analyzed the most recent GIS data for black-tailed prairie dog colonies in Montana and found that 33 percent of the colonies were 10 acres (4 hectares) or less in size and 84 percent were less than 100 acres (40 hectares) or less in size. However, BFF Recovery Foundation also noted spatially associated colonies with sufficient interaction to maintain some biological relationships. This situation might not exist in areas where more cropland conversion or urban development have occurred and created barriers to movement.

Vanderhoof and Robel (1992) reported that although prairie dog colonies in Kansas increased in number by 28 percent between 1972 and 1991, the total occupied habitat declined by 19 percent. This suggests that formerly large single colonies had been broken up into numerous smaller colonies as a result of habitat fragmentation. Reports from Kansas (Powell 1992), Nebraska (U.S. Forest Service 1998), New Mexico (Sager 1996, Paternoster 1997), North Dakota (North Dakota Game and Fish Department, undated), Oklahoma (Duffy, Oklahoma Department of Wildlife Conservation, in litt. 1998), Wyoming (Wichers, Wyoming Game and Fish Department, in litt. 1998), and Mexico (List et al. 1997) confirm a trend toward smaller, more isolated colonies.

Miller et al. (1996) described existing prairie dog populations as small, disjunct, and geographically isolated. He further described the discontinuous nature of remaining populations as widely separated islands where habitat fragmentation has resulted in an increased likelihood of extinction for individual colonies due to genetic inbreeding and random demographic events. Dispersal movements that previously offset these adverse effects have been limited by barriers created by human development that preclude immigration or emigration. Fragmentation and extirpation of small, isolated colonies will result in the loss of additional genotypes, as occurred with the complete extirpation of the species in portions of the eastern and southwestern areas of its historic range. Lost genetic diversity will inherently be detrimental to the species.

Fragmentation of habitat threatens black-tailed prairie dog populations by—(1) reducing the number and size of colonies which increases the likelihood of colony extinction through disease, genetic inbreeding, random demographic events, or natural environmental catastrophes; (2) widespread dispersion of colonies which limits or prevents ready repopulation by immigration; and (3) fostering habitat alterations between islands of remaining habitat which can present barriers to immigration of individuals that would otherwise repopulate extirpated colonies. If these isolated populations or metapopulations are extirpated for whatever reason in a highly fragmented landscape, then recolonization may not be possible given the limited migration reported by Garrett and Franklin (1988) and Hoogland (1995). The precise means by which these inter-related phenomena are affecting black-tailed prairie dog populations is unknown.

Gilpin (University of California at San Diego, pers. comm. 1999) suggests that various threats may interact to accelerate decline in black-tailed prairie dog populations. He also suggests that the current ecological situation for the species is quite different than what it was during the species' evolutionary history. He believes that selection pressures have changed radically, and that populations may become no longer suited to their natural ecology. He notes that most populations are genetically isolated and subject to genetic erosion due to drift. He also notes that a sylvatic plague frequency of more than once per decade may be lethal to an isolated population.

The Service believes that impacts on the species due to habitat fragmentation are a moderate threat at present.

3.1.6 Overall Threat of Present or Threatened Destruction, Modification, or Curtailment of the Species' Habitat or Range

Overall, the Service believes that this factor is a moderate threat to the species at present.

3.2 OVERUTILIZATION FOR COMMERCIAL, RECREATIONAL, SCIENTIFIC, OR EDUCATIONAL PURPOSES

3.2.1 Commercial Interest in the Species as a Pet

Herron (Texas Parks and Wildlife Department, pers. comm. 1999) and others have reported that black-tailed prairie dogs are removed from the wild for sale as pets. Herron was aware of three commercial operators who collectively removed approximately 5,000 individuals from the Texas panhandle and other States annually in recent years, although these efforts may have declined this past year. One animal export company in Texas noted that over the past 4 years their company has bought and sold approximately 20,000 black-tailed prairie dogs, largely from the same locations in western and northwestern Texas (Shaw, Texas Animal Export, in litt. 1999). Texas has initiated a requirement for reports from these parties. Miscellaneous reports indicate that this practice occurs elsewhere in the species' range, but the extent of removal of individuals from the wild for use as pets is unknown.

The Service believes that impacts on the species due to the removal of individuals from the wild for use as pets is not a threat at present because of the small number of animals involved.

3.2.2 Recreational Shooting of Species

One factor impacting black-tailed prairie dog populations in some local areas is recreational (sport or varmint) shooting. At present, the Service does not believe that this factor is responsible for significant rangewide declines in the species' population; however, it may be important locally. The popularity of that type of shooting has increased appreciably in recent years. However, the number of shooters in a given complex can fluctuate substantially from year to year. High-powered rifles with high-quality scopes enable the modern varmint shooter to be accurate at distances of up to 400 yards (366 meters) or greater, and many animals may be shot by an individual shooter each day (Kayser 1998). Many States do not require hunting licenses and have no bag limits or seasonal restrictions for taking prairie dogs. Additionally, the practice of leaving carcasses in the field when shooting prairie dogs complicates the potential of enforcing bag limits.

Knowles (1988) reported that shooting on two black-tailed prairie dog colonies removed 69 percent of the adults. He thought that the reduction of prairie dog populations below a certain threshold number might have a further negative consequence because fewer prairie dogs were available to watch for predators and keep the vegetation clipped around burrows to improve detection of predators. Vosburgh (1996) reported that intensive shooting can have a statistically significant impact on the density of local black-tailed prairie dog colonies. He observed that

during the summer species density declined 33 percent on colonies with shooting and 15 percent on colonies without shooting. Prairie dogs also spent more time in alert postures and less time foraging on colonies where shooting occurred.

Extensive shooting, especially of pregnant females or females nursing young, could significantly reduce annual recruitment and change the ultimate population dynamics of a colony. In recent years, shooters have removed thousands of black-tailed prairie dogs annually from colonies on Forest Service National Grasslands in South Dakota and Wyoming. Thousands of shooter days (one individual shooting for a period of 1 day equals one shooter day) are focused on small areas in these situations. In one instance, the Forest Service District Ranger for the Conata Basin area of the Buffalo Gap National Grasslands in South Dakota estimated that shooters removed most of the young-of-the-year with 6,500 shooter days occurring on 9,000 acres (3,600 hectares), mostly in June and July, 1998 (Perry, U.S. Forest Service pers. comm. 1998). These projections were derived from local prairie dog density data and numbers of kills reported by shooters. Gross estimates of the number of modern shooters of prairie dogs and their potential take, based on reports from the field, suggest that hundreds of thousands of black-tailed prairie dogs are probably shot across their range annually.

Large, healthy populations appear to be able to withstand considerable removal by shooting and remain viable (Bourland and Dupris, Cheyenne River Sioux Tribe, in litt. 1998, Finnegan et al., Rosebud Sioux Tribe, in litt. 1998). Accordingly, the shooting of hundreds of thousands of individuals across the extensive range of the black-tailed prairie dog where millions of individuals occur, will not likely adversely impact the overall population of a species where each female can produce an average of four young annually. Conversely, small local populations already depressed by disease and other adverse influences may suffer shooting impacts as additive losses. Shooting impacts also may contribute to population fragmentation and preclude or delay recovery of colonies reduced by other factors such as sylvatic plague.

The Service believes that impacts on the species due to recreational shooting are a low threat at present.

3.2.3 Overall Threat of Overutilization for Commercial, Recreational, Scientific or Educational Purposes

Overall, the Service believes that the impact on the species due to commercial interest in the species as a pet is not a threat at present; and that the impact due to recreational shooting is a low threat at present.

3.3 DISEASE OR PREDATION

3.3.1 Disease

The Service believes that sylvatic plague is likely the most important factor in recent reductions of many black-tailed prairie dog populations throughout a significant portion of the range of the species. Approximately 66 percent of the species' range has been affected by plague (Black-footed Ferret Recovery Foundation in litt. 1999).

3.3.1.1 Etiology.

Sylvatic plague is a disease caused by the bacterium *Yersinia pestis*, which fleas acquire from biting infected rodents and other species and then transmit via a bite. The disease also can be transmitted directly between animals. The term "sylvatic" refers to the occurrence of the disease in the wild. It also may be referred to in its bubonic, pneumonic, or septicemic forms, depending on the affected portion of the organism in which it is observed (Berkow 1982). Hereinafter, the use of the term "plague" will be inclusive of all forms of the disease in wild animals.

Cully (1989) summarized plague reports in 76 species of 5 mammalian orders in the United States, although it is primarily a rodent disease. It can seriously affect humans, although it responds well to modern treatment (Center for Disease Control 1997). Rodent species vary in their susceptibility to plague. Some species may act as hosts or carriers of the disease or infected fleas and show little or no symptoms. Conversely, black-tailed and Gunnison's prairie dog populations demonstrate nearly 100 percent mortality when exposed to plague (Barnes 1993, Cully 1993) and cannot be considered carriers.

Plague is an exotic disease foreign to the evolutionary history of North American species (Gage, Center for Disease Control, pers. comm. 1999). Black-tailed prairie dogs show neither effective antibodies nor immunity to the disease. Death occurs quickly in prairie dogs exposed to plague; notable symptoms often do not develop prior to death (Cully 1993). Some rodents may act as enzootic hosts or reservoirs, maintaining the disease at a static level of intensity where plague recurs (focal areas or foci), and acting as carriers (Barnes 1993, Cully 1993). If other rodent species, e.g., prairie dogs, inhabit the same area, the enzootic species may transfer plague to them, causing an outbreak that can spread to nonfocal areas and result in an epizootic. Because epizootic hosts, such as black-tailed prairie dogs, suffer nearly 100 percent mortality, epizootics are often short-lived.

3.3.1.2 Extent of Plague.

Plague was first observed in wild rodents in North America near San Francisco, California, in 1908 (Eskey and Haas 1940). It spread eastward across the continent following its introduction and still appears to be expanding its range, although not as rapidly as in its early years. Human plague cases of wild rodent-flea origin were first documented in California in 1908 (Eskey and Haas 1940), Oregon in 1934, Utah in 1936, Nevada in 1937, Idaho in 1940, New Mexico in 1949, Arizona in 1950, Colorado in 1957, Wyoming in 1978, Washington in 1984, and Montana in 1987 (Barnes 1993). Plague was first observed in Gunnison's prairie dogs in northwestern Arizona in 1932, in eastern Arizona in 1937, and in New Mexico in 1938. It was first recorded in Utah prairie dogs in Utah and white-tailed prairie dogs in Wyoming in 1936 (Eskey and Haas 1940). In 1945, following control efforts in South Park, Colorado, plague epizootics were noted in Gunnison's prairie dogs. By 1949, only 5 percent of the original 915,000 acres (371,000 hectares) of occupied Gunnison's habitat remained. Approximately 67 percent of the acres lost was attributed to plague (Ecke and Johnson 1952).

The first reported incidence of plague in black-tailed prairie dogs noted in published literature occurred in Texas in 1946 (Miles et al. 1952). Plague also was detected in fleas collected from black-tailed prairie dogs in Montana in the 1940's (Gage, Center for Disease Control, pers. comm. 1999). Although no reports of any effects on the species are available from this time period. The lack of such reports may be due to the occurrence of few black-tailed prairie dogs at this time due to intensive control efforts. However, by the mid to late 1990's, black-tailed prairie dog colonies in Montana were reduced by approximately 50 percent from the late 1980's, largely due to plague (Montana Dept. Fish, Wildlife & Parks 1998). Large complexes in south Phillips County, including the Charles M. Russell National Wildlife Refuge, and at Fort Belknap and Northern Cheyenne Reservations were among the areas impacted.

Plague has been in the United States for less than 100 years, allowing very little time for any resistance to evolve in native wildlife. It has been observed in black-tailed prairie dogs for approximately 50 years. The introduction of the disease to this continent around 1900 has contributed to the overall decline of the black-tailed prairie dog (Barnes 1993, Cully 1993). The eastward movement of plague in prairie dog populations underscores the possibility that South Dakota (the last largely plague-free State within the range of the black-tailed prairie dog) may experience outbreaks in the future (Gage, Center for Disease Control, pers. comm. 1999). Although the disease has not been documented in black-tailed prairie dog colonies in South Dakota, the Center for Disease Control (1997) has reported plague in the species in Wyoming and North Dakota counties contiguous with the South Dakota border. Additionally, in 1992, a report of plague titre in coyote (*Canis latrans*) and badger (*Taxidea taxus*) blood was reported from Sioux County, Nebraska (adjoining South Dakota) near a black-tailed prairie dog colony (Schenbeck, U.S. Forest Service, pers. comm. 1999a). The prairie dog population in this colony

declined to near zero during the summer of 1992, and the cause was believed to be due to plague (Virchow et al. 1992). Additionally, in 1995, a badger, coyote, and red fox (*Vulpes vulpes*) were collected in southwestern South Dakota with plague titres in their blood, indicating exposure to the disease (Center for Disease Control 1997).

Currently plague is widespread throughout 66 percent of the historic range of the black-tailed prairie dog (except in most of South Dakota and portions of Kansas, Nebraska, North Dakota, and Oklahoma) (see Section 3.6.2) and is carried by many rodent species (Barnes 1982). It is likely no coincidence that four of the largest seven remaining black-tailed prairie dog complexes are in South Dakota. Black-tailed prairie dog complexes throughout much of the species' range have been or likely will be challenged by plague repeatedly, especially if it becomes more persistent in the ecosystem. Populations have been reduced more in Arizona and New Mexico near the southwest plague focus identified by Barnes (1982) than in other portions of the species' range (Table 1). Plague data from 1971 to1980 reconfirmed the geographic range of plague activity in the United States as described by Eskey and Haas (1940) and extended records of its occurrence in various species from the 101st to as far east as the 97th meridian in Texas (Barnes 1982). It is possible that plague epizootics create a "ripple effect" with major epizootics occurring in the western portion of the black-tailed prairie dog range, smaller epizootics occurring further east, and positive titres detected in some mobile species still further east (Gage, Center for Disease Control, pers. comm. 1999). Gage believes that black-tailed prairie dog populations are subject to plague wherever they are located; he has stated that there may be some areas less vulnerable to infection than others, but that there are no entirely safe areas.

3.3.1.3 Effects of Epizootics on Populations.

Given the communicability and lethality of plague, an epizootic may affect an entire colony in a similar manner as a pathogen may affect an individual animal. An entire black-tailed prairie dog colony may disappear just as an individual black-tailed prairie dog would die from a plague infection. The BFF Recovery Foundation (1999) suggested that, with regard to plague, the vulnerability of black-tailed prairie dog populations can be, in part, evaluated based upon species' dispersal distance and the distances between complexes. For example, in Montana, if black-tailed prairie dog colonies within 3 miles (5 kilometers) of each other are grouped into a complex, there are 57 complexes of 100 acres (40 hectares) or larger in size, representing approximately 95 percent of the black-tailed prairie dog occupied habitat in the State. Each of these complexes is vulnerable to significant reductions due to plague. Accordingly, across the range of the species there may be only a few hundred complexes which include most black-tailed prairie dog populations. These large complexes, while resistant to the normal repressive factors affecting small isolated populations, e.g., genetic suppression, stochastic events, etc., are nevertheless, quite vulnerable to plague due to their interconnectedness.

Data from the Rocky Mountain Arsenal National Wildlife Refuge illustrates that plague

can significantly depress black-tailed prairie dog populations (Seery and Matiatos, in prep., U.S. Fish and Wildlife Service 1998). The refuge encompassed a 4,800-acre (1,940-hectare) black-tailed prairie dog complex in 1988. Although efforts were made to control plague (e.g., periodic dusting of burrows with the insecticide Permethrin) and no control or other major adverse artificial factors affected the population, several outbreaks have decimated the complex, reducing the amount of occupied habitat by 99 percent on two occasions. Moreover, subsequent population recovery has been only approximately 50 percent of the previous population peak for the two periods of recovery (Seery, U.X. Fish and Wildlife Service, pers. comm. 1998). The number of individuals was reduced to less than 1 percent of their previous numbers on one occasion. Although the periodic translocation of approximately 12,000 prairie dogs from off-site onto the refuge between 1989 and 1998 boosted populations subsequent to plague-induced declines, a trend analysis predicts that even with intensive management and no additional adverse factors, black-tailed prairie dog populations on the Rocky Mountain Arsenal National Wildlife Refuge may be extirpated subsequent to additional anticipated epizootics.

Plague, once established in an area, becomes persistent and periodically erupts, with the potential to extirpate local black-tailed prairie dog populations. After several epizootics, black-tailed prairie dogs at the Rocky Mountain Arsenal National Wildlife Refuge (probably the most studied site for plague on a large population of this species) have neared extirpation. This phenomenon may be occurring at other formerly large black-tailed prairie dog complexes across much of the western portion of the species' range, such as at Northern Cheyenne Reservation in southeastern Montana. A plague epizootic on the Reservation started in 1991 and continued through 1996 (Young 1997), removing 97 percent of the black-tailed prairie dog population (Fourstar, Bureau of Indian Affairs, pers. comm. 1998). Subsequently, the population increased from a low of 378 acres (153 hectares) of occupied habitat to 963 acres (390 hectares). However, Young (University of Arizona, pers. comm. 1998) does not believe that this complex will recover to its former status.

Biggins (U.S. Geological Survey, Biological Resources Division, pers. comm. 1998) reports long-term, plague-related declines for white-tailed prairie dogs near Meeteetse, Wyoming, where periodic limited recoveries appear to be less robust than for black-tailed prairie dogs. Although white-tailed prairie dog populations in Shirley Basin, Wyoming, have been significantly reduced by plague, their subsequent recovery has been somewhat more robust than at Meeteetse (Wichers, Wyoming Game and Fish Department, in litt. 1999). The Service believes that plague is likely affecting many prairie dog populations across the western United States in a similar manner. The effects of plague on prairie dogs may be exacerbated in smaller, isolated colonies where populations are not buffered by large numbers (where some individuals may escape infection by chance) and where recovery may be hampered by limited immigration from other colonies.

Plague outbreaks will probably recur where they have previously occurred. Epizootics in prairie dogs may be sporadic and localized in small colonies, but in large interconnected

colonies may affect large areas. Small isolated colonies may not recover. If they do recover, it usually requires approximately 4-5 years to regenerate and then they again become receptive to a plague epizootic (Barnes 1982, Barnes 1993). However, this observation is based on the relatively short history of the disease on the continent and the fact that larger colonies are more likely to be noticed than smaller ones. In New Mexico, Cully et al. (1997) observed that population growth rate increased in a colony of Gunnison's prairie dogs following a plague epizootic and anticipated that the population would recover in 6-7 years. However, a second epizootic was experienced 4 years after the first. Consequently, 12 years following the initial epizootic, the population was still a small percentage of its original level.

The Service believes that impacts on the species due to disease (plague) are a moderate threat at present. Plague has significantly reduced several large complexes and has contributed to the extirpation of many small complexes. However, it does not affect all populations simultaneously. Consequently, some recovery may occur, largely via unaffected adjacent populations, before its reoccurrence.

3.3.2 Predation

The Service believes that predation is not likely a major factor affecting overall black-tailed prairie dog populations, but it may be important locally or contribute to the effects of other factors. The species is an important prey animal and experiences significant demands on its population. Animals that prey on prairie dogs include the badger, black-footed ferret, bobcat (*Lynx rufus*), coyote, gray fox (*Urocyon cinereoargenteus*), grizzly bear (*Ursus americanus*), long-tailed weasel (*Mustela frenata*), mountain lion (*Felis concolor*), red fox, swift fox, bullsnake (*Pituophis melanoleucus*), rattlesnake (*Crotalus sp.*), ferruginous hawk, golden eagle (*Aquila chrysaetos*), prairie falcon (*Falco mexicanus*), red-tailed hawk (*Buteo jamaicensis*), several other species of hawks, and humans (Hoogland 1995). Little information is available to quantify the impact of these predators on prairie dogs.

There is no evidence to indicate that predation has an adverse impact on the viability of black-tailed prairie dog populations rangewide. Although it is conceivable that unusual or intense levels of predation could have some effect, it would likely be localized and of short duration, such as during periods of raptor migration. For example, approximately 200 ferruginous hawks were observed in a single day on the Rocky Mountain Arsenal National Wildlife Refuge in 1989, when the black-tailed prairie dog complex on this site was the largest colony along the Front Range of Colorado (Lockhart, U.S. Fish and Wildlife Service, pers. comm. 1998). This situation involved a high density of raptors preying on a small area of black-tailed prairie dog occupied habitat. However, no long-term effects on prey species were observed, despite the fact that black-tailed prairie dogs formed the major component of the prey

base for wintering raptors at the Rocky Mountain Arsenal National Wildlife Refuge (Seery and Matiatos in prep.). Cully (1986) reported that raptor densities increased sevenfold during autumn migrations in the Moreno Valley of New Mexico where Gunnison's prairie dogs occurred.

The Service believes that impacts on the species due to predation are not a threat at present.

3.3.3 Overall Threat of Disease or Predation

Overall, the Service believes that impacts on the species due to disease (plague) are a moderate threat at present, but that impacts due to predation are not a threat at present.

3.4 THE INADEQUACY OF EXISTING REGULATORY MECHANISMS

Many States, Tribes, and Federal Agencies recognize the historic decline and ecological significance of the black-tailed prairie dog, but few use available regulatory mechanisms to conserve the species. At least one government entity in most States promotes their reduction. However, some limited regulatory mechanisms exist for conservation of the species. Additionally, State and Federal agencies do not differentiate between black-tailed prairie dogs and other species of prairie dogs occurring within the current range of the black-tailed prairie dog (e.g., Colorado, Montana, New Mexico, and Wyoming). The Service believes that inadequate regulatory mechanisms are a contributing factor affecting overall black-tailed prairie dog populations.

3.4.1 States

Mulhern and Knowles (1995) reported that all States within the historic range of the black-tailed prairie dog classify the species as a pest for agricultural purposes and either allow or require their eradication. They noted that in Colorado, Kansas, South Dakota, and Wyoming, Statewide or local mandatory controls are in effect; and in Montana, New Mexico, Nebraska, North Dakota, Oklahoma, and Texas, control is not mandatory, but assistance may be provided to landowners. State wildlife agencies in many States classify black-tailed prairie dogs by categories such as "non-game" and permit licensed or unlicensed shooting with no limitations on take or season. A review of the species in seven States within the central and northern Great Plains by Knowles (1995) reported that all of these States except North Dakota have laws that require eradication under various circumstances. Nebraska repealed regulatory directives mandating control of the species in 1995. In the 10 States where the black-tailed prairie dog currently exists, only Colorado currently has restrictions on shooting (Knowles 1998). However, this restriction pertains only to contest hunts. In Arizona, where the species has been extirpated, the hunting season was closed on black-tailed prairie dogs in 1999 (Shroufe, Arizona Game and Fish Department, in litt. 1999).

ARIZONA--The Arizona Game and Fish Department classifies all prairie dogs native to the State, black-tailed and Gunnison's, as nongame mammals. In 1999, the hunting season for black-tailed prairie dogs was closed (Shroufe, Arizona Game and Fish Department, in litt. 1999). Arizona does not require the eradication of prairie dogs for agricultural purposes or promote recreational shooting of prairie dogs (Shroufe, Arizona Game and Fish Department, in litt. 1998). The black-tailed prairie dog is listed as endangered on the Arizona "Threatened Native Wildlife" list (Arizona Game and Fish Department 1988). This list is being modified into a State list of "Wildlife of Special Concern" and AGFD has proposed the black-tailed prairie dog for inclusion on the new list (Van Pelt, Arizona Game and Fish Department, pers. comm. 1998).

COLORADO--The Colorado Division of Wildlife requires a resident or non-resident hunting license for prairie dog shooting unless the animals are on a person's own land. The season is year-round, with no bag or possession limit. However, for hunt contests, no participant may take more than five prairie dogs during the contest. In 1999, the Colorado State Legislature passed a bill prohibiting the translocation of prairie dogs and other species without the consent of the county's commissioners (Van Pelt in prep.). This bill limits prairie dog conservation efforts in the State (Boucher, pers. comm. 1999). A number of environmental groups have asked the CDOW to include the black-tailed prairie dog on their List of Special Concern (Kahn, Colorado Division of Wildlife, in litt. 1998), but this has not occurred. The Petitioner notes that Colorado agriculture control statutes classify prairie dogs as "destructive rodent pests," authorizing counties to destroy them, as an abatement of a public nuisance, without limitations (National Wildlife Federation 1998).

KANSAS--The State of Kansas considers black-tailed prairie dogs as agricultural pests and mandates control if an adjoining landowner files a complaint (Knowles 1995). In recent years, some counties have invoked "Home Rule" to take over authority for prairie dog control from the townships and impose mandatory control requirements on landowners. The landowner is given the opportunity to control prairie dogs on his land and if he fails to do so it is done by the county at the landowner's expense (Van Pelt in prep.). The Kansas Department of Wildlife and Parks reports that the shooting of prairie dogs in Kansas is not unrestricted since a resident or nonresident hunting license is required and established methods of take are listed (Williams, Kansas Department of Wildlife and Parks, in litt. 1998). The Petitioner notes that Kansas considers the black-tailed prairie dog as both a pest and as wildlife, and recreational shooting of prairie dogs is unrestricted and may occur year-round (National Wildlife Federation 1998).

MONTANA--The Montana Department of Fish, Wildlife and Parks requires no license to shoot prairie dogs and no limits on take or season exist. The MDFWP protects prairie dogs on two State parks as important features of those parks (Graham, Montana Department of Fish, Wildlife and Parks, in litt. 1998). The MDFWP identifies the black-tailed prairie dog as a State "species of special concern" (Flath 1998). As a partner in black-footed ferret recovery efforts, MDFWP helped to develop "Montana Prairie Dog Guidelines" to monitor and conserve prairie dog ecosystems Statewide. These guidelines include management goals and voluntary restrictions on recreational shooting in southern Phillips County, the location of the largest complex in Montana and part of one of the seven largest colonies throughout the species' range. However, the agency

has been unsuccessful in its attempts to classify the black-tailed prairie dog as a "nongame species in need of special management." This classification, if implemented, would allow the formulation of management guidelines and regulations. A species conservation plan for the black and white-tailed prairie dogs in Montana also is being developed (Montana Department of Fish, Wildlife, and Parks in prep.).

The Montana Department of Agriculture classifies prairie dogs as "rodents" and "vertebrate pests." The MDA assists landowners in control of prairie dogs if requested, but it is not mandated (Sullins, Montana Department of Agriculture, pers. comm. 1999).

NEBRASKA--The black-tailed prairie dog is currently considered an unprotected nongame species in Nebraska and can be taken in any manner, without restrictions on shooting or control activities. Permits are not required for residents; nonresidents must have a small-game hunting permit. A statute requiring extermination of prairie dogs on private and State-owned lands was repealed in 1995 (Van Pelt in prep.). The Nebraska Game and Parks Commission recognizes prairie dog shooting as an acceptable recreational activity, but suggests that shooting be avoided at times when prairie dogs have dependent young in the burrows and that shooters take responsible measures to avoid disturbance of other wildlife species that use prairie dog colonies (Amack, Nebraska Game and Parks Commission, in litt. 1998).

NEW MEXICO--The New Mexico Department of Game and Fish requires a license to shoot prairie dogs, but there are no bag limits or restrictions (Knowles 1998). The Petitioner reports that New Mexico considers the prairie dog as a "rodent pest" and mandates that landowners destroy prairie dogs on notice (National Wildlife Federation 1998).

NORTH DAKOTA--The black-tailed prairie dog is classified as a nongame wildlife species by the North Dakota Game and Fish Department. A resident is not required to purchase a hunting license to shoot prairie dogs, however nonresidents are required to purchase one. There are no bag limits or seasons set for prairie dogs. The State of North Dakota considers the black-tailed prairie dog as a pest. The State Legislative Assembly passed a resolution urging the Service not to list the species (North Dakota Legislative Assembly in litt. 1999). The North Dakota Department of Agriculture and the county weed boards have regulatory authority over control efforts (Van Pelt in prep.). A guidebook is available to aid prairie dog shooters in finding colonies (North Dakota Game and Fish Department undated). The Petitioner states that North Dakota considers black-tailed prairie dogs "gophers" and "pests" and authorizes extermination on private lands (National Wildlife Federation 1998).

OKLAHOMA--The Oklahoma Department of Wildlife Conservation classifies the black-tailed prairie dog as a Category II Mammal Species of Special Concern. ODWC placed a moratorium on control of prairie dogs in January 1972 and canceled it in February 1973 (Lewis and Hassien 1973). Prairie dog eradication is no longer mandatory in Oklahoma, but is assisted by some State agencies and local governments. Although control and recreational shooting of the species can occur on private land, the ODWC does not promote either activity (Duffy, Oklahoma Department of Wildlife Conservation, in litt. 1998). A license for recreational shooting is

required by residents and nonresidents. Prairie dogs may be killed by rifle, shotguns, handguns, and bows and arrows. A permit is required from ODWC prior to any control. Prairie dogs cannot be reduced in any county to fewer than 1,000 individuals and control is not permitted on public lands (Van Pelt in prep.).

SOUTH DAKOTA--The South Dakota Game and Fish Department classifies the black-tailed prairie dog as a predator/varmint and requires a resident or nonresident license to shoot prairie dogs in the State; however, there are no seasons or bag limits. The South Dakota Weed and Pest Control Statute designates the species as a Statewide declared pest. Therefore the existence of prairie dogs constitutes an infestation, giving the State authority to enter private land and exterminate the animals. Once a county declares an infestation, landowners are responsible for the costs to control prairie dogs on their land whether they want control or not (Van Pelt in prep.).

TEXAS--The Texas Parks and Wildlife Department designates the black-tailed prairie dog as a nongame species and is prohibited by State statutes from listing them as a State endangered species. A license is required to hunt prairie dogs, but there is no season or bag limit. In 1999 a new regulation was established which requires a nongame collection or dealer's permit to possess more than 10 prairie dogs or to sell any number of prairie dogs (Van Pelt in prep.). This law does not regulate the killing of prairie dogs for recreational, agricultural, or nuisance purposes (Sansom, Texas Parks and Wildlife Department, in litt. 1998). The Texas Health and Safety Code authorizes counties to control prairie dogs and gives the Texas Department of Agriculture responsibility for providing information regarding control to requesting counties (Van Pelt in prep.).

WYOMING--The black-tailed prairie dog is a nongame wildlife species in Wyoming and is listed as a Species of Special Concern by the Wyoming Game and Fish Department. No license is required to hunt prairie dogs, and there is no season, bag limit, or restriction on method of take (Van Pelt in prep.). The WGFD supports development of seasons and bag limits for the black-tailed prairie dog (Wichers, Wyoming Game and Fish Department, in litt. 1998). The Wyoming Department of Agriculture lists the species as a pest. The Wyoming Weed and Pest Control Act of 1973 authorizes counties to enter private property to control prairie dogs if damage has been documented to neighboring landowners (Knowles 1995). The Wyoming State Legislature passed a resolution urging the Service not to list the species (Wyoming State Legislature in litt. 1999).

3.4.2 Tribes

Mulhern and Knowles (1995) estimated that 30 percent of black-tailed prairie dog colonies occur on tribal lands. Four of the seven remaining large complexes of 10,000 acres or more (Cheyenne River Sioux Tribe, Fort Belknap, Pine Ridge, and Rosebud Sioux Tribe) occur on tribal lands. Two Tribes (Cheyenne River Sioux Tribe in South Dakota and Fort Belknap in Montana) have prairie dog management plans in place (Knowles 1995). The Cheyenne River Sioux Tribe drafted a prairie ecosystem management plan in 1992 that prohibits control on 44,100 acres (17,860 hectares) of black-tailed prairie dog occupied habitat. The Fort Belknap Reservation is

an active Black-footed Ferret Reintroduction Area and manages its black-tailed prairie dogs; it has curtailed its former extensive prairie dog shooting program. No extensive control of prairie dogs has occurred on Cheyenne River Sioux Tribe, Fort Belknap, or Rosebud Sioux Tribe (in South Dakota) lands in recent years due to concerns related to the conservation of black-footed ferrets. However, there are active recreational shooting programs on these and other tribal lands. The Oklahoma Department of Wildlife Conservation states that tribal management programs for the species can not be considered more sophisticated or positive "because the money generated from recreational shooting goes to a tribal wildlife program rather than a state or federal wildlife program" (Duffy, Oklahoma Department of Wildlife Conservation, in litt. 1998).

The following Tribes provided specific information regarding management status of the species on their lands:

CHEYENNE RIVER SIOUX TRIBE (in South Dakota).

The Cheyenne River Sioux Tribe does not classify the prairie dog as a pest and does not require or encourage their eradication. The Tribe reported that black-tailed prairie dog seasons are year-round and without limits on Cheyenne River lands. However, shooting is not unregulated because the Tribe's Game, Fish, and Parks Program issues all prairie dog hunters a license and stamp. Prairie dog hunters are required to complete harvest report cards that document the amount and locations of harvest. The Tribe indicated that if prairie dog populations decline below management goals, its Game, Fish, and Parks Program will restrict season lengths and/or number of hunting permits (Bourland and Dupris, Cheyenne River Sioux Tribe, in litt. 1998; Dikeman et al., Cheyenne River Sioux Tribe, in litt. 1999).

CROW CREEK SIOUX TRIBE (in South Dakota).

The Crow Creek Sioux Tribe indicated approximately "60 active grounds" exist on the Reservation. Recreational shooting is allowed and "appears to have no effect on their numbers." Chemical control is not allowed and the black-tailed prairie dog is reported as abundant (Miller, Crow Creek Sioux Tribe, in litt. 1998).

ROSEBUD SIOUX TRIBE (in South Dakota).

The Rosebud Sioux Tribe Department of Natural Resources established a licensing system for black-tailed prairie dogs in 1989. In 1998, a new license structure was implemented in an attempt to reduce the number of shooters (Finnegan et al., Rosebud Sioux Tribe, in litt. 1998). License sales were reduced by approximately 50 percent from approximately 4,000 licenses in 1997 to 2,000 licenses in 1998 (Finnegan, Rosebud Sioux Tribe, pers. comm. 1999).

3.4.3 Federal

Knowles (1995) reviewed Federal regulatory management policies as they relate to the black-tailed prairie dog. Significant black-tailed prairie dog occupied habitat is found on public lands managed by the BIA, BLM, the Service, the Forest Service, and the NPS. The APHIS and the Environmental Protection Agency (EPA) do not manage public lands; however, they impact the species through their regulatory authorities.

BUREAU OF INDIAN AFFAIRS.

The BIA has a trust responsibility to oversee management of tribal lands. The BIA's involvement in prairie dog control efforts has been principally through management of funding for prairie dog control programs on tribal lands. The BIA is authorized to make rules and regulations concerning range protection. In the northern Great Plains, from 1978 through 1992, BIA funding was responsible for the control of more prairie dog habitat than any other Federal Agency in the country (Roemer and Forrest 1996). Following control efforts at Pine Ridge Reservation in South Dakota in the early 1980's (described in Section 3.5.2), additional control of large black-tailed prairie dog populations was proposed in the mid-1990's via BIA-sponsored control programs on Fort Belknap, Cheyenne River Sioux Tribe, and Rosebud Sioux Tribe Reservations. These control efforts were halted due to concerns for black-footed ferret reintroduction which precluded Federal funding of these efforts. Limited control still occurs on these Reservations with non-Federal funds.

BUREAU OF LAND MANAGEMENT.

The BLM manages prairie dogs to meet multiple-use resource objectives including production of livestock forage and preventing prairie dogs from spreading to adjacent State or private lands. Although control is no longer actively conducted by the BLM, it still allows control to occur by other agencies on its lands and it still allows significant levels of unregulated sport shooting (Knowles 1995). In a memorandum dated June 23, 1999 and expiring September 30, 2000, the BLM instructed all of its State Directors within the range of the black-tailed prairie dog to "ensure that all actions authorized, funded or carried out by their respective field offices do not contribute to the need to list this species" (Colby, Bureau of Land Management, in litt. 1999). The Western Association of Fish and Wildlife Agencies (Greer, Western Association of Fish and Wildlife Agencies, in litt. 1999) supports this moratorium. The BLM also anticipates implementing a mandatory restriction on prairie dog hunting in portions of south Phillips County, Montana, due to the lack of success of current voluntary closures in the area (64 FR 56213).

FISH AND WILDLIFE SERVICE.

The Service manages over 500 National Wildlife Refuges and their satellites, but only about 15 refuges, satellites, or Waterfowl Production Areas have black-tailed prairie dogs. Only two refuges have any significant amount of occupied habitat. On the Charles M. Russell and UL Bend National Wildlife Refuges in Montana, 5,150 acres (2,090 hectares) of black-tailed prairie dogs are managed. Burrows have been treated with insecticide in an attempt to reduce fleas and disease transmission, and prairie dogs are moved to recolonize vacant or low density towns (Matchett 1997). This area is managed to enhance its value as a black-footed ferret reintroduction site. The Rocky Mountain Arsenal National Wildlife Refuge in Colorado, which manages black-tailed prairie dogs to support and enrich a diversity of wildlife, is attempting to recover its populations subsequent to repeated plague epizootics (U.S. Fish and Wildlife Service 1998).

Shooting of prairie dogs is currently prohibited on all refuges and satellites. Limited control has occurred on a few wildlife refuges, primarily as a measure to prevent their spread onto adjacent private lands. Minimal control around office buildings and campgrounds has been reported on one refuge. Some control has occurred as a "Good Neighbor Policy" on one refuge in South Dakota. During the current status review period for the black-tailed prairie dog, all control efforts regarding the species have been suspended on Service lands (Clark, U.S. Fish and Wildlife Service, in litt. 1999).

U.S. FOREST SERVICE.

The Forest Service manages approximately 3,700,000 acres (1,500,000 hectares) of National Grasslands, which support approximately 42,460 acres (17,200 hectares) of black-tailed prairie dog occupied habitat, approximately 1.1 percent of the National Grasslands (Sidle, U.S. Forest Service, in litt. 1999). For example, at Thunder Basin National Grasslands in Wyoming, the 1995 long term management objective (10-15 years) was to retain approximately 4,000 acres (1,600 hectares) of occupied habitat out of 16,500 acres (6,700 hectares) of then existing occupied habitat within 572,000 total acres (232,000 hectares) (U.S. Forest Service 1995b). Presently, the Forest Service estimates that at Thunder Basin approximately 18,000 acres (7,000 hectares) of occupied habitat exist out of 478,000 acres (193,000 hectares) of potential prairie dog habitat (Sidle, U.S. Forest Service, in litt. 1999). Buffalo Gap National Grasslands in South Dakota contains approximately 597,000 acres (242,000 hectares). Approximately 455,000 acres (184,000 hectares) are considered potential prairie dog habitat; and 13,270 acres (5,370 hectares) of occupied habitat currently exist; or 3 percent of potential prairie dog habitat is currently occupied (Sidle, U.S. Forest Service, in litt. 1999).

On other National Grasslands lower management objectives exist. In Kansas, the Cimarron National Grasslands Prairie Dog Management Plan specifies the maintenance of 12-25 black-tailed prairie dog colonies on 500-1,200 acres (200-500 hectares) out of 108,177 acres (43,812 hectares); and in Colorado, the Comanche National Grassland Prairie Dog Management Plan specifies that 30-65 colonies of 2,000-4,000 acres (800-1,600 hectares) be maintained on 418,963 acres (169,680 hectares) (U.S. Forest Service 1995a).

In response to a request from the National Wildlife Federation and the positive 90-day finding, the Forest Service issued a moratorium on control of black-tailed prairie dogs during the current status review period on all lands administered by the Forest Service. The Western Association of Fish and Wildlife Agencies (Greer, Western Association of Fish and Wildlife Agencies, in litt. 1999) supports this moratorium. The Forest Service also noted their intention to manage for larger prairie dog populations via new planning efforts subject to completion and approval (Manning, U.S. Forest Service, in litt. 1999).

NATIONAL PARK SERVICE.

The NPS is involved with prairie dog control programs through integrated pest management guidelines. During 1982-1992, four national parks in the northern Great Plains were involved in prairie dog control, including Badlands National Park, South Dakota, with 5,423 acres (2,196 hectares) controlled; Wind Cave National Park, South Dakota, with 1,922 acres (778 hectares) controlled; Theodore Roosevelt National Park, North Dakota (trace amounts controlled); and Devils Tower National Monument, Wyoming (trace amounts controlled) (Roemer and Forrest 1996). In a memorandum dated January 14, 1999, the NPS instructed Superintendents of National Parks within the Midwest Region where prairie dogs occur (Badlands, Fort Larned, Scotts Bluff, Theodore Roosevelt, and Wind Cave units) to suspend further treatment of prairie dog colonies (with few exceptions) until a final determination is made on their status (Schenk, National Park Service, in litt. 1999). No information was available regarding NPS lands in the southern portion of the black-tailed prairie dog's range.

ANIMAL AND PLANT HEALTH INSPECTION SERVICE.

The APHIS-Wildlife Services (APHIS-WS) (formerly Animal Damage Control) influences prairie dog control programs through its involvement in the field, its grant-in-aid program to States, its technical assistance to other State, tribal, and Federal agencies, and private landowners, and its distribution of prairie dog toxicants. For example, APHIS-WS offered its assistance in black-tailed prairie dog control via commercial radio announcements in the Texas panhandle in August, 1999 (Harmon, U.S. Fish and Wildlife Service, pers. comm. 1999). Roemer (1997) reported that during 1990-1994, APHIS-WS was involved in control of 101,660 acres (41,140 hectares) of prairie dogs. They also were involved in programs in the early 1980's at the Pine Ridge Indian Reservation (Oglala Sioux Tribe) in South Dakota that controlled 458,600 acres (185,700 hectares) of black-tailed prairie dogs from 1980 to

1984 (Roemer and Forrest 1996). The APHIS Denver Wildlife Research Center also has directed and conducted research related to the efficiency of prairie dog and other rodent control.

ENVIRONMENTAL PROTECTION AGENCY.

The EPA deals indirectly with prairie dog control through pesticide labeling programs including restrictions to protect wildlife. Presently, labeling does not restrict prairie dog control, but does address concerns for the endangered black-footed ferret.

3.4.4 Canada

In Canada, the black-tailed prairie dog is designated as vulnerable by the Committee on the Status of Endangered Wildlife in Canada. Control is prohibited and only private landowners are permitted to shoot prairie dogs (Fargey, Grasslands National Park, pers. comm. 1998).

3.4.5 Mexico

The black-tailed prairie dog is listed as threatened by the Lista de las Especies Amerzadas, the official threatened and endangered species list of the Mexican Government (SEMARNAP 1994). List et al. (1997) reported that in Mexico, laws exist to stop control, but are often not enforced, and extensive control occurs. There are no protected areas for the black-tailed prairie dog in Mexico (Ceballos et al. 1993).

3.4.6 Overall Threat of Inadequacy of Existing Regulatory Mechanisms

The Service believes that impacts on the species due to inadequate regulatory mechanisms are a moderate threat at present.

3.5 OTHER NATURAL OR MANMADE FACTORS AFFECTING THE SPECIES' CONTINUED EXISTENCE

3.5.1 Rodent Control

Control programs conducted in response to concerns related to potential forage competition with domestic livestock have significantly reduced black-tailed prairie dog populations. This species of prairie dog is believed to have been particularly impacted because its tendency toward larger and more densely populated colonies, when compared with other species of prairie dogs, creates more conflicts with landowners (Clark 1973, Fagerstone and Ramey 1996, Roemer and Forrest 1996). The Service believes that control efforts have been an important influence limiting black-tailed prairie dog populations, especially large-scale, well-organized efforts conducted early in the century. Current control efforts are limited compared to historic efforts, but impact a significant portion of black-tailed prairie dog occupied habitat annually.

3.5.1.1 Rodent Control Efforts Prior to 1972.

Control efforts resulted in extirpation of the black-tailed prairie dog in Arizona (Alexander 1932). Similar control efforts in Texas resulted in the persistence of only remnant populations in areas where historically, the largest known populations of the species once occurred (Bureau of Sport Fisheries and Wildlife 1961, Cheatheam 1977, Cottam and Caroline 1965).

A well-documented control effort has occurred over most of the range of the black-tailed prairie dog (Anderson et al. 1986, Bell 1921, Cain et al. 1972, Forrest and Proctor in prep., Hanson 1993, Hubbard and Schmitt 1983, Lantz 1903, Lewis and Hassien 1973, Linder et al. 1972, Merriam 1902, Roemer and Forrest 1996, Shriver 1965). It is important to note that prairie dog control occurred repeatedly in most areas and figures cited for acreage controlled may include retreatment of the same areas in subsequent years. Therefore, annual acreage estimates of lands treated do not always equate to total loss of habitat. However, control (usually in conjunction with other factors) has led to the complete loss of occupied habitat in many areas. Organized prairie dog control gained momentum from 1916 to 1920 when prairie dogs were controlled on tens of millions of acres of western rangeland (Bell 1921). Federal programs were responsible for much of this effort, which was initiated by congressional appropriations to the Bureau of Biological Survey in 1915 (Cain et al. 1972).

From 1937 to 1968, 30,447,355 acres (12,331,178 hectares) of prairie dog occupied habitat were controlled (Cain et al. 1972), less than what was controlled during the much shorter period from 1916 to 1920 described by Bell (1921). Of the lands controlled from 1937 to 1968, 75 percent was treated by 1950, with an average of more than 1.6 million acres (650,000 hectares) treated annually. From 1951 to1968, the average amount of prairie dog occupied habitat controlled annually dropped to approximately 430,000 acres (174,000 hectares) per year. In the 1960's, several States reached their lowest estimates of black-tailed prairie dog occupied habitat (Table 1). According to Cain et al. (1972), in the late 1960's, the public became interested in Federal animal control programs, including prairie dog control, and this interest resulted in increased attention to ecological considerations. Several toxicants previously used for pest or predator control were banned. In 1972, Compound 1080, which was used extensively in prairie dog control efforts, was banned by Presidential Executive Order II 11643 for use on Federal lands, in Federal programs, or on private lands (Barko 1997). Although prairie dog control continued via other toxicants, it was at a reduced rate.

3.5.1.2 Recent Rodent Control Efforts.

The most extensive control efforts in recent years have been conducted in the Northern Great Plains (U.S. Forest Service 1998). Roemer and Forrest (1996) summarized recent Federal and State control efforts on approximately 1,045,524 acres (423,437 hectares) in South Dakota, Montana, and Wyoming. From 1978 to 1992, an average of 69,701 acres

(28,229 hectares) were treated annually in these three States. These estimates did not include estimates for private control or control involving indirect State or Federal assistance. Forrest and Proctor (in prep.) estimated that in recent years private land control and control conducted at the local level probably affected "tens of thousands" of acres of black-tailed prairie dog occupied habitat on an annual basis.

The BIA administered the last large-scale control effort for black-tailed prairie dogs on the Pine Ridge Reservation in South Dakota in the early 1980's. This effort resulted in the eradication of most prairie dogs on approximately 458,618 acres (185,740 hectares) from 1980 to 1984. From 1985 to 1986, 240,000 acres (97,000 hectares) were retreated (Roemer and Forrest 1996). In 1987, after these efforts, 57,281 acres (23,199 hectares) remained (Tschetter 1988). Additional control continued. Current estimates of occupied habitat range from 20,000 to 30,000 acres (8,000 to 12,000 hectares) (Yellowhair, Pine Ridge Sioux Tribe, pers. comm. 1999). Following control efforts on Pine Ridge, three additional extensive control efforts targeted for the Cheyenne River Sioux Tribe and Rosebud Sioux Tribe Reservations in South Dakota and Fort Belknap Reservation in Montana were halted due to concerns regarding the lack of available black-footed ferret reintroduction sites.

The amount of control of black-tailed prairie dogs on lands managed by the Forest Service has declined. For example, on Thunder Basin National Grassland, from 1988 to 1992, an average of 3,900 acres (1,600 hectares) was controlled annually; and from 1993 to 1997, an average of 1,190 acres (480 hectares) was controlled annually. As another example, on Buffalo Gap National Grassland, from 1988 to 1992, an average of 3,880 acres (1,570 hectares) was controlled annually; and from 1993 to 1997, an average of 1,750 acres (709 hectares) was controlled annually (Sidle, U.S. Forest Service, in litt. 1999). As noted in Section 3.4.3, the Forest Service has issued a moratorium on control of black-tailed prairie dogs during the current status review period on all Forest Service lands (Manning, U.S. Forest Service, in litt. 1999).

The APHIS-WS is a participant in control of prairie dogs. Forrest and Proctor (in prep.) reported that from 1990 to 1996, APHIS-WS sold, used, or was involved in the distribution of a total of 266,976 gas cartridges, 3,532,499 tablets of aluminum phosphide fumigants, and 169,161 pounds of zinc phosphide-treated bait, primarily for control of prairie dogs. From 1990 to 1994, 101,660 acres (41,170 hectares) were treated by APHIS-WS, with 94 percent of this total on private land. Control efforts at the State and local level on private lands are largely undocumented. The Pocatello Supply Depot sold 244,880 pounds of zinc phosphide bait from 1988 to 1992, enough to control 128,500 acres (52,040 hectares) of prairie dog occupied habitat annually. The APHIS-WS used an average of 24,166 pounds yearly during this same period. Therefore, the authors concluded that approximately half of Pocatello's output is distributed to others. If so, private control may occur on about 60,000 acres per year.

Depending on which figures are used, it appears that 10-20 percent of current black-tailed

prairie dog occupied habitat may be controlled annually by Federal, State, local, and private entities. Without the additive adverse effects of other impacts, black-tailed prairie dog populations can recover to an appreciable degree from control efforts in some areas. For example (but perhaps as an exception given the uniqueness of the State as a site free of plague), the acreage occupied by black-tailed prairie dogs in South Dakota was reduced to approximately 60,000 acres (24,000 hectares) in 1968 (Rose 1973), but recovered to approximately 700,000 acres (280,000 hectares) by 1980 (Tschetter 1988), prior to initiation of control efforts at Pine Ridge Reservation. The Service is unaware of any similar level of increase in this or other populations within the past 20 years, although Thunder Basin National Grasslands has experienced similar **rates** of increase. Following control efforts, South Dakota was estimated to contain 184,000 acres (74,500 hectares) of occupied habitat (Tschetter 1988). Nevertheless, control efforts in some specific areas, balanced between agricultural and wildlife conservation interests, can likely be accommodated, given the resiliency of the black-tailed prairie dog. However, given the disproportionate amount of black-tailed prairie dog occupied habitat on tribal lands, just four control efforts could reduce the total amount of black-tailed prairie dog occupied habitat in the United States by approximately 22 percent. These four Reservations have either had recent large scale control efforts which significantly reduced occupied habitat or have had recent plans for such programs.

In September 1999, the Petitioner requested the Service to readdress this issue based on reports of increased control efforts (Graber, National Wildlife Federation, in litt. 1999). The Service has limited information that indicates some increased efforts have occurred, but has not reached any conclusions at this time.

3.5.2 Synergistic Effects

An important manmade factor affecting many black-tailed prairie dog populations is the likely simultaneous operation of all the factors described previously. The Service believes that many factors (alone, in combination with each other, and synergistically) have influenced and continue to influence black-tailed prairie dog populations. Evaluations of these influences will require more effort than that involved in this finding.

3.5.3 Overall Threat of Other Natural or Manmade Factors Affecting the Species' Continued Existence

The Service believes that impacts on the species due to other natural or manmade factors are a moderate threat at present.

3.6 VULNERABILITY OF THE SPECIES IN PERSPECTIVE

3.6.1 Vulnerability of Complexes

Historically, large black-tailed prairie dog populations coped successfully with various depressant factors, except plague, on a different scale; populations were large and robust while threats were few with only temporal effects. Presently, most populations are significantly reduced and must cope with many persistent influences that depress populations, both temporally and permanently. There has been a general long-term rangewide decline as well as some recent areawide declines in black-tailed prairie dog populations. Although some populations where plague was absent increased appreciably 20-30 years ago from historic lows following the restrictions on the use of Compound 1080 in 1972, only a few increases have been observed in isolated locations across the species' range over the last 10-15 years. Conversely, several large black-tailed prairie dog complexes have been markedly reduced during this period—south Phillips County, Fort Belknap Reservation and Northern Cheyenne Reservation, Montana; Rocky Mountain Arsenal National Wildlife Refuge and Comanche National Grasslands, Colorado; Cimarron County, Oklahoma; and Janos Nuevo Casas Grandes, Mexico (Figure 1).

It might be assumed that the persistence of the black-tailed prairie dog as a species is secure because it is relatively abundant in absolute numbers when compared with many other species with smaller populations that are not thought to be vulnerable. Many wildlife species in North America that have experienced significant population declines remain viable, e.g., various game species such as the pronghorn (*Antilocapra americana*). However, the black-tailed prairie dog is a highly social species that for the most part responds to major factors causing population reductions (e.g., plague and control) as a colony rather than on an individual basis. Additionally, inadequate regulatory mechanisms are in place for the black-tailed prairie dog as compared to game species. Therefore, populations may not be as viable as their absolute numbers might suggest.

A significant portion of existing black-tailed prairie dog occupied habitat rangewide occurs in a few large complexes. Using current estimates of occupied habitat for the species and information about the size of the seven large remaining prairie dog complexes from the Service's black-footed ferret recovery program, it may be determined that 36 percent of the remaining occupied habitat for the species in North America occurs in seven complexes larger than 10,000 acres (4,000 hectares). These complexes include—Buffalo Gap National Grassland, Conata Basin, South Dakota (approximately 15,000 acres/6,000 hectares); Cheyenne River Sioux Tribe Reservation, South Dakota (approximately 45,000 acres/18,000 hectares); Fort Belknap Reservation, Montana (approximately 15,000 acres/6,000 hectares); Janos Nuevo Casas Grandes, Mexico (approximately 90,000 acres/36,000 hectares); Pine Ridge Reservation, South Dakota (approximately 20,000 acres/8,000 hectares); Rosebud Sioux Tribe Reservation, South Dakota (approximately 70,000 acres/28,000 hectares); and Thunder Basin National Grassland, Wyoming (approximately 20,000 acres/8,000 hectares). The potential vulnerability of these complexes to control efforts or plague is notable.

Other than disease and control efforts, larger colonies are likely more resistant to various depressant factors, but smaller colonies may be threatened by factors affecting isolated remnant populations, e.g., stochastic events and inbreeding, in addition to the major factors that continue to suppress most prairie dog colonies, e.g., plague, control, and habitat loss. Smaller colonies may not be relied on for the long-term viability of the species since their continued persistence may be questionable (Clark 1989, Gilpin and Soule 1986, MacArthur and Wilson 1967, Shaffer 1981, Wilcove et al. 1986, Wilcox and Murphy 1985).

There are few black-tailed prairie dog colonies that are large enough to successfully cope with various threats over the long term and these are particularly susceptible to control efforts and plague epizootics. The Service believes that depressant factors (especially plague and control) continue to cause local extirpations that could lead to the species becoming vulnerable in a significant portion of its range without management intervention. Paramount among these factors is the existence of an exotic disease in the species' environment. Approximately 66 percent of the black-tailed prairie dog range has been affected by plague (see Section 3.6.2). Bright (1998) reviewed the influences of various exotic species on native flora and fauna; he concluded that plague has crippled surviving prairie dog populations. This disease is a recurring depressant influence on black-tailed prairie dog populations throughout a significant portion of their range. Only in South Dakota and parts of other States in the eastern portion of the species' range is it absent at present. If plague establishes itself in these areas (Kansas, Nebraska, North Dakota, South Dakota), it could have an even more significant negative effect on the overall status of the species.

Plague appears to have advanced from the western portion of the black-tailed prairie dog range eastward. This implies that the eastern portions of the species' range provide a more secure habitat; however, habitat conversion has occurred throughout the species' range, in a generally east to west progression. If unsuitable lands (e.g., urban areas, cultivated lands, forested areas, etc.) and lands impacted by plague are not considered, approximately 10 percent of the black-tailed prairie dog's historic range is suitable habitat, with South Dakota providing the bulk of plague-free suitable habitat (Black-footed Ferret Recovery Foundation in litt. 1999).

Extant populations of black-tailed prairie dogs may or may not be large enough to be resilient to ongoing or future environmental challenges and related potential declines. Quammen (1996) provided examples of species that appeared to be abundant, but suddenly became very rare. For example, he reported that the passenger pigeon (*Ectopistes migratorius*) numbered in the billions around 1810 and in the low millions by the 1880's, yet was extinct in the wild by 1900. Habitat destruction and over-harvesting depressed passenger pigeon numbers to a few million, a level too low for a highly social and colonial species to function (Halliday 1980). The black-tailed prairie dog numbered in the billions around 1900, exists as a few million at present, and appears to be declining in a significant portion of its range. The advantages of sociality in the past (e.g., breeding, feeding, predator defense) may no longer offset its modern disadvantages (e.g., vulnerability to disease and control).

Although there are an apparent large number of individual black-tailed prairie dogs (even after

large historic declines in the amount of occupied habitat), the black-tailed prairie dog, as a colonial species occurring in isolated groups, may be as vulnerable as species on islands when confronted by environmental challenges (MacArthur and Wilson 1967). The vulnerability of species on islands to threats from which they cannot escape is compounded by the limitations on recruitment caused by isolation. This situation may be similar for isolated black-tailed prairie dog colonies impacted by habitat barriers, habitat modification, disease, and other adverse impacts. The species may have difficulty in coping with these challenges without the advantage of its historic abundance and its wide distribution. The appropriate time for successful management intervention to stabilize a colonial species such as the black-tailed prairie dog may be earlier than for some other species.

Accordingly, the vulnerability of the black-tailed prairie dog as a species to population reductions may be related less to its absolute numbers across its range than to the number of colonies in which it exists, their size, their geospatial relationship, existing barriers to immigration and emigration, and ultimately the number and nature of the direct threats to the species, both alone and in concert.

3.6.2 Area Evaluations

The stability of any portion of a species' population is specific to its locality and the time at which its viability is evaluated. The Service has identified eight areas within the range of the black-tailed prairie dog which appear to have different sets of circumstances affecting the persistence of local remnant populations of the species (Figure 3). These evaluations, including the respective area estimates for historic range, utilize habitat analysis provided by the BFF Recovery Foundation (1999).

Percentage estimates noted for current occupied habitat in Areas 4, 7, and 8 utilize Service estimates presented in Table 1, column 10. All North Dakota and South Dakota black-tailed prairie dog occupied habitat is assumed to occur in Area 8, and all Nebraska and Kansas black-tailed prairie dog occupied habitat is assumed to occur in Area 7. All black-tailed prairie dog occupied habitat in Oklahoma is assumed to occur in Area 4. These allocations are generally correct.

- Area 1 encompasses that portion of the historic black-tailed prairie dog range in Arizona. This area represents approximately 2 percent of the total historic range. The species is reported to be extirpated in this area, with no remaining black-tailed prairie dog occupied habitat. Extirpation is believed to have been due largely to early control efforts prior to the occurrence of plague in the area. Accordingly, the species (i.e., any proposed reintroductions) may be considered very vulnerable in this area at present.

- Area 2 encompasses that portion of the historic black-tailed prairie dog range in parts of Kansas, Nebraska, Oklahoma, and Texas east of the 98th meridian. This area represents approximately 8 percent of the total historic range. The species is extirpated to nearly extirpated in this area, with little or no remaining black-tailed prairie dog occupied habitat, largely due to extensive changes in land use resulting in habitat loss. Accordingly, the species may be considered very vulnerable in this area at present.

- Area 3 encompasses that portion of the historic black-tailed prairie dog range in parts of New Mexico and Texas, west of the Pecos River. This area represents approximately 12 percent of the total historic range. Only very small remnant populations persist in this area, with very little remaining black-tailed prairie dog occupied habitat, largely due to impacts from control efforts and plague. Accordingly, the species may be considered very vulnerable in this area at present.

- Area 4 encompasses that portion of the historic black-tailed prairie dog range in parts of Colorado, Montana, Nebraska, North Dakota, New Mexico, Oklahoma, Texas, and Wyoming, bounded on the southwest by the Pecos River, on the south, west, and north by the limit of the species' range, and on the east by the easternmost records of plague occurrence. This area represents approximately 50 percent of the total historic range and contains approximately 60 percent of the current black-tailed prairie dog occupied habitat in the United States. Populations have been reduced in this area largely due to plague, control efforts, and land use changes resulting in habitat loss. Recent significant population declines due to plague have occurred throughout much of this area (Thunder Basin National Grasslands in Wyoming is the only known relatively large complex in Area 4 not yet impacted by plague). Accordingly, the species may be considered vulnerable in this area at present.

- Area 5 encompasses that portion of the historic black-tailed prairie dog range in Mexico. This area represents approximately 4 percent of the total historic range and contains approximately 12 percent of current black-tailed prairie dog occupied habitat rangewide. Populations have been reduced in this area largely due to land use changes resulting in habitat loss and control efforts. Accordingly, the black-tailed prairie dog may be considered vulnerable in this area at present.

- Area 6 encompasses that portion of the historic black-tailed prairie dog range in parts of Kansas, Nebraska, Oklahoma, and South Dakota, bounded on the east by the 98th meridian, on the north by the limit of the species' range, on the west by the 99th meridian, and on the south by Texas. This area represents approximately 8 percent of the total historic range. Remnant, scattered populations occur in this area, with very little black-tailed prairie dog occupied habitat, largely due to extensive changes in land use resulting in habitat loss. Accordingly, the species may be considered vulnerable in this area at present.

- Area 7 encompasses that portion of the historic black-tailed prairie dog range in parts of Kansas, Nebraska, and Oklahoma, bounded on the east by the 99th meridian, on the north by South Dakota, and on the west and south by the easternmost records of plague occurrence. This area represents approximately 9 percent of the total historic range and contains approximately 15 percent of the current black-tailed prairie dog occupied habitat in the United States. Populations in this area are fragmented, largely due to changes in land use resulting in habitat loss and control efforts. Populations are much reduced, but persistent and relatively stable. Accordingly, the species may be considered vulnerable in this area, but not within the foreseeable future unless plague becomes more widespread.

- Area 8 encompasses that portion of the historic black-tailed prairie dog range in parts of North Dakota and South Dakota, bounded on the north by the limits of the species' range, on the east by the 99th meridian, on the south by Nebraska, and on the west by the easternmost records of plague occurrence. This area represents approximately 7 percent of the total historic range and contains approximately 25 percent of the current black-tailed prairie dog occupied habitat in the United States. Most populations in this area occur in a few relatively large complexes and appear to be resilient. Accordingly, the species is not considered vulnerable in this area, although its clumped distribution could be problematic if plague occurs in the area or if a relatively few well-organized control programs were initiated (as have occurred as recently as 1984 or have been proposed as recently as 1994).

4. FINDING

4.1 CONCLUSION/FINDING

The Act requires the Service to make a finding regarding the potential listing of any species based solely on the best scientific and commercial information available. After a review of the petition and supplemental information, the pertinent literature and other scientific data, and statements submitted by States, Tribes, Federal Agencies and other entities, the Service believes that sufficient information is currently available to support a determination that listing the black-tailed prairie dog as threatened is warranted.

A listing of the black-tailed prairie dog as threatened is warranted because of the number and variety of threats adversely affecting the status of the species, both alone and in concert. A significant recent decline in black-tailed prairie dog occupied habitat has been due to several factors, the most influential of which is the widespread occurrence of plague, an exotic and completely lethal disease to the species. In concert with plague, the loss of suitable habitat and inadequate regulatory mechanisms have adversely affected remnant fragmented populations. The available information indicates that the species is likely to become endangered throughout all or a significant portion of its range in the foreseeable future, i.e., meets the definition of a threatened species.

A major decline in historic black-tailed prairie dog occupied habitat has occurred (perhaps as much as 99 percent at present). Sixty percent of the species' remnant occupied habitat is vulnerable or very vulnerable to the effects of habitat loss or modification, disease, inadequate regulatory mechanisms, and other factors in an area covering 84 percent of the historic range (Areas 1-6, Figure 3).

Approximately 30 percent of areas along the periphery of the historic range no longer supports any appreciable number of black-tailed prairie dogs (Areas 1, 2, 3, and 6; Figure 3). Approximately 37 percent of the suitable habitat within the species' historic range in the United States has been fundamentally modified via conversion to cropland and is not available for use by the species (Table 2). Additionally, habitat in approximately 66 percent of the historic range of the species has been degraded by the occurrence of plague. These estimates are not additive inasmuch as several factors can affect any given portion of the range.

Notably, while black-tailed prairie dog population levels have remained relatively stable in parts of the eastern portion of the species' range over the last 10-15 years, the best available information indicates they have declined in the western portion where plague occurs (Figure 4). Trends may be more indicative of population impacts than the absolute magnitude of declines, if rates of increase in some areas after the 1972 toxicant ban are contrasted with rates of **decline** after plague reports increased in the 1980's and 1990's. The shifting trends in extant black-tailed prairie dog occupied habitat from one of remarkable increases from approximately 1972 to 1980 (although not approaching historic levels) to marked declines from approximately 1980 to 1999 suggests the presence of a significant widespread depressant influence such as disease in many areas. Other factors also have limited population growth across the range as well, particularly in South Dakota where control efforts at Pine Ridge in the early 1980's resulted in a significant decrease in occupied habitat (Figure 5).

Recent, widely-separated, site-specific declines in 50 percent of the black-tailed prairie dog historic range where 60 percent of current rangewide populations occur (Area 4) appear to be indicative of a general population decline similar to that observed across the State of Montana from 1986 to 1998 (Montana Department of Fish, Wildlife and Parks 1998). In Montana, approximately 50 percent of all black-tailed prairie dog occupied habitat was lost, largely due to plague, from 1986 to 1998. Plague has incrementally extended its range and impacts on black-tailed prairie dogs since it was first reported in the literature in 1946. It may continue to expand into the eastern portions of the species' range (Areas 7 and 8) in the immediate future. This likelihood is evidenced by recent reports of plague exposure to predator species in previously unaffected portions of the range. A similar decline can be expected for populations in Mexico (Area 5), 12 percent of current rangewide populations, where habitat loss due to cropland conversion is occurring. Assuming this pattern of decline persists across Areas 4 and 5, and plague manifests itself in Areas 7 and 8 (Figure 3) over the next 30 years, then existing black-tailed prairie dog occupied habitat could decline to as low as approximately 10 percent of current estimates for remnant populations. At present, occupied habitat has decreased over the

past century by two orders of magnitude (from approximately 100 million acres to less than 1 million acres). In 30 years, occupied habitat could decrease by another order of magnitude to approximately 0.1 percent of historic estimates.

4.2 LISTING PRIORITY NUMBER FOR THE SPECIES

At present Region 6 has 26 proposed and candidate species and/or subspecies to address in addition to consideration of the required listing action pursuant to this 12-month finding. Service policy (48 FR 43098) requires the assignment of a listing priority number (LPN) to all candidate species that are warranted for listing. This listing priority system was developed to ensure that the Service has a rational system for allocating limited resources in a way that ensures that the species in greatest need of protection are the first to receive such protection. A smaller LPN reflects a need for greater protection than a larger LPN. The LPN is based on the magnitude and immediacy of threats and the species' taxonomic uniqueness with a value range from 1 to 12 (Table 3).

The Service has provided guidance on evaluating the magnitude and immediacy of threats (48 FR 43104). The first criterion to consider is the magnitude of threats. Species facing the greatest threats to their continued existence should receive the highest consideration for listing based on the highest magnitude of threat. The second criterion to consider is the immediacy of threats. Species facing actual, identifiable threats should be given priority over potential threats. In assigning a species to a priority category regarding immediacy, the Service should consider the known occurrence or lack of documented detrimental trade or harvest, habitat modification, significantly detrimental disease or predation, and other present or potential threats. The third criterion to consider assigns priority to species that represent highly distinctive or isolated gene pools.

The Service has evaluated the magnitude and immediacy of threats to the black-tailed prairie dog as discussed in this finding. The following is a summary of these evaluations. The black-tailed prairie dog is considered a species under the third criterion mentioned above (Table 3).

- The Present or Threatened Destruction, Modification, or Curtailment of the Species' Habitat or Range.

  Habitat loss and fragmentation are considered a threat of moderate magnitude. The species has lost 99 percent of its historic occupied habitat, much of it through cropland conversion, largely in the eastern portion of the species' range. However a considerable amount of potential unoccupied habitat remains, especially in the western portion of the species' range. This unoccupied habitat could be utilized if other factors such as control efforts and disease were not present or carefully managed via adequate regulatory mechanisms.

This threat is considered imminent because habitat loss continues at present through cropland conversion, urbanization, change in vegetative communities, etc. Suitable habitat can be unavailable or degraded due to fragmentation, isolation, and/or the presence of disease in reservoir species.

- Overutilization for Commercial, Recreational, Scientific, or Educational Purposes.

  Overutilization via commercial use of the species as a pet is not considered a threat, given the apparent low number of individuals utilized.

  Overutilization via recreational shooting is considered a threat of low magnitude. Local populations may be impacted by shooting; however, significant rangewide population declines due to this factor are not likely.

  This threat is considered imminent because it is ongoing.

- Disease or Predation.

  Disease is considered a threat of moderate magnitude because it is not affecting all populations at once and since some recovery may occur, largely via unaffected adjacent populations, before its reoccurrence. Plague has impacted the species and its conspecifics throughout a significant portion of their ranges. Plague first occurred in Gunnison's prairie dogs in Arizona in the 1930's and in Colorado in the 1940's. Plague first occurred in black-tailed prairie dogs in Texas and Montana in the 1940's, and could spread eastward to the remainder of the black-tailed prairie dog range. Black-tailed prairie dogs suffer nearly 100 percent mortality when exposed to plague. An epizootic may affect an entire complex as if it were an individual animal affected by a pathogen. The spread of plague eastward in black-tailed prairie dog populations underscores the likelihood that unaffected areas may experience outbreaks. Plague is a new phenomenon in North American ecosystems. Its impacts may be as dramatic as those caused by other non-native invasive species.

  This threat is considered imminent because it is ongoing.

  Predation is not considered a threat.

- Inadequacy of Existing Regulatory Mechanisms.

  Existing regulatory mechanisms are inadequate and considered a threat of moderate magnitude. All States within the current range of the black-tailed prairie dog classify the species as a pest for agricultural purposes and either allow or require its eradication. Few regulatory mechanisms exist to aid in conserving the species.

This threat is considered imminent because it is ongoing. State wildlife agencies and other interested parties are developing a draft conservation plan for the species. While we believe that this is a good beginning in addressing the conservation needs of the black-tailed prairie dog, this document lacks commitments to specific immediate actions that would affect the status of the species. However, implementation of specific actions developed under this Strategy could have a positive impact on the species' status in the future.

- Other Natural or Manmade Factors Affecting its Continued Existence.

  Control programs conducted largely in response to concerns related to potential forage competition with domestic livestock are considered a threat of moderate magnitude. Control programs have had significant impacts on population levels in the past. Control efforts resulted in extirpation of the black-tailed prairie dog from Arizona and significant reductions in populations in other States. Current control efforts may impact 10-20 percent of the species' overall population annually.

  This threat is considered imminent because it is ongoing. Control efforts in some areas could likely be accommodated if adequate regulatory mechanisms were in place which balanced agricultural and wildlife conservation interests.

- Synergistic Effects.

  The synergistic effects of various factors adversely influencing black-tailed prairie dog populations are largely unknown. Nevertheless, these influences are considered a moderate threat because of known exacerbating influences such as isolation of scattered populations.

  This threat is considered imminent because it is ongoing.

The Service has concluded that the overall magnitude of threats to the black-tailed prairie dog throughout its range is moderate and the overall immediacy of these threats is imminent. The black-tailed prairie dog is considered a species pursuant to its genetic status. Pursuant to the Service's Listing Priority Policy, a species for which threats are determined to be moderate and imminent is assigned a LPN of 8 (Table 3).

Under the Service's Listing Priority Guidance for Fiscal Year 2000 (99 FR 57114) the Service prioritizes among the various listing activities. Highest priority is given to emergency listings, next priority to processing final decisions on already proposed listings, next priority is given to candidate species, and the lowest priority to responding to petitions. Region 6 currently has four species proposed as endangered or threatened including lynx (*Lynx canadensis*), *Yermo xanthocephalus* (desert yellowhead), mountain plover (*Charadrius montanus*), and *Gaura neomexicana* ssp. *coloradensis* (Colorado butterfly plant). Proposed rules for two other plant species, which were previously candidate species, have been developed and submitted for review. Critical habitat designation for species already listed also may become a higher priority if court action requires us to develop designations. Region 6 is currently under a court order to

if court action requires us to develop designations. Region 6 is currently under a court order to designate critical habitat for the Virgin River chub (*Gila robusta seminuda*), and is involved in settlement of a court case which will result in designation of critical habitat for the piping plover (*Charadrius melodus*).

Region 6 currently has 9 candidate species or subspecies that have lower LPN's, and, therefore, are in more immediate need of protection (Table 4). There are currently three species or subspecies with a LPN of 8. Those species or subspecies with lower LPN's include the sicklefin chub (*Macrhybopsis meeki*), sturgeon chub (*Macrhybopsis gelida*), fat-whorled pond snail (*Stagnicola bonnevillensis*), *Astragalus tortipes* (Sleeping-Ute milk-vetch), boreal toad (*Bufo boreas boreas*), Arkansas darter (*Etheostoma cragini*), *Penstemon grahamii* (Graham beardtongue), *Penstemon debilis* (parachute beardtongue), and *Penstemon scariosus* var. *albifluvis* (White River beardtongue). Other species or subspecies with the same LPN are swift fox (*Vulpes velox*), *Castilleja aquariensis* (Aquarius Indian paintbrush), and *Astragalus equisolensis* (Horseshoe milk-vetch).

The Service believes that sufficient information is currently available to support a decision that listing the black-tailed prairie dog as threatened is warranted, but that a proposed rule at this time is precluded by work on other higher priority species. The Service will re-evaluate the status of the species 1 year after publication of this finding in the Federal Register.

Approval: Jamie Rappaport Clark Date: FEB - 1 2000

Disapproval: _____ Date: _____

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Table 1. Summary of Estimates of Black-tailed Prairie Dog Occupied Habitat in Various Areas for Selected Dates (estimates in thousands of acres)

State or Country	Historic	BSFW (1961)[1]	Other Recent	Mulhern & Knowles (1995)	Knowles (1995)	BFFRF Survey[2] (1998)	States 1998[3]	Knowles (1998)	USFWS (1999)[4]
Arizona	650 (AGF&P)	0	0	0	0		0	0	0
Colorado	3,000 (Clark 1989) 7,000 (Knowles 1998)	96	89 in 1979 (Van Pelt in prep.)		<100	326	973 in 1990 (CO Dept Ag)	44	93
Kansas	2,000 (Lantz 1903) 2,500 (Knowles 1998)	50	57 (Smith 1958) 36 (Henderson & Little 1973) 47 (Vanderhoof & Robel 1992)	47	47	147		36	42
Montana	1,471 (Flath & Clark 1986) 6,000 (Knowles 1998)	28	125 (Flath & Clark 1986) >100 (Campbell 1989)	88	88		66 (MT FW&P)	65	65
Nebraska	6,000 (Knowles 1998)	30	15 in 1971 (Lock 1973)	60	60	80	60-80 (NE G&P)	60	60
New Mexico	>6,640 (Bailey 1932)	17	137 (Bodenchuck 1981)	497[5]		107		15	39
North Dakota	2,000 (Knowles 1998)	20	>7 (Grondahl 1973) 10 (Stockrahm 1979) 25 in 1999 (Sidle pers. comm.)	21	20	15	30 (ND G&F)	20	25
Oklahoma	950 (Knowles 1998)	15	10 (Tyler 1968) 15 (Lewis & Hassien 1973) 18 (Shackford et al. 1990) 8.6 in 1999 (Lomolino in litt.)	10		70	18 (OK Dept WC)	<9.5	9
South Dakota	1,757 (Linder et al. 1972)	33	37 in 1967 (Henderson et al 1974) 60 in 1968 (Rose 1973) 700 in 1980 (Tschetter 1988) 184 in 1987 (Tschetter 1988) 147 in 1999 (Sidle pers. comm.)	247	245	175	231 in 1996 (SD GF&P)	245	147
Texas	58,000 (Bailey 1905)	26	>13 (Cottam & Caroline 1965) 90 (Cheatheam 1977) >68 (Lair & Mecham 1991)	30		227		23	71
Wyoming	16,000 (Knowles 1998)	49	133 in 1971 (Clark 1973)	204	131-204	422	131-204 in1987(WYG&F) 362 (WY Dept Ag)	70-180	125
United States	**111,000 (Knowles 1998)**	**364**		**1,359**		**1,686**		**677**	**676**

State or Country	Historic	BSFW (1961)[1]	Other Recent	Mulhern & Knowles (1995)	Knowles (1995)	BFFRF Survey[2] (1998)	States 1998[3]	Knowles (1998)	USFWS (1999)[4]
Canada	1.5-2 (Knowles 1998)		1.9 (Millson 1976) 1.6 (Laing 1986) 2.3 (Fargey pers. comm. 1998)					2	2
Mexico	1,384 (Ceballos et al. 1993)		136 (Ceballos et al. 1993)					90	90
N. America	**104,000 (Anderson et al. 1986)[5]** **99,000-247,000 (Miller et al. 1996)[5]** **384,000 (Seton 1953)**							**769**	**768**

[1] Bureau of Sport Fisheries and Wildlife (1961).
[2] Black-footed Ferret Recovery Foundation phone survey, September 1998.
[3] State Agency responses to 1998 petition and 90-day finding.
[4] Fish and Wildlife Service's best estimate of current occupied habitat (1999).
[5] Includes all prairie dog species present.

Table 2. Geographical Information System Estimation of Potential Black-tailed Prairie Dog Occupied Habitat (in acres).

State	Total Range	Croplands Within Range	Grass/Shrub Within Range	Potential Habitat	20 Percent of Potential Habitat*
Arizona	8,516,730	345,862	6,635,691	6,981,553	1,396,311
Colorado	33,151,600	11,601,300	15,621,810	27,223,110	5,444,622
Kansas	38,136,400	27,839,336	9,676,833	37,516,169	7,503,234
Montana	66,140,400	15,841,388	37,496,108	53,337,496	10,667,499
Nebraska	46,719,300	25,578,936	19,526,548	45,105,484	9,021,097
New Mexico	53,838,600	2,536,731	42,213,264	44,749,995	8,949,999
North Dakota	11,357,400	5,808,501	5,194,639	11,003,140	2,200,628
Oklahoma	24,849,900	15,953,241	7,170,891	23,124,132	4,624,826
South Dakota	35,036,500	13,921,928	18,131,964	32,053,892	6,410,778
Texas	93,048,100	23,558,038	59,957,784	83,515,822	16,703,164
Wyoming	37,354,300	3,477,034	25,452,430	28,929,464	5,785,893
Total	**448,149,230**	**146,462,295**	**247,077,962**	**393,540,257**	**78,708,051**

* It has been estimated that historically, approximately 20 percent of all potential habitat was inhabited by the species at any given time (Whicker and Detling 1988).

Table 3. Listing Priority Guidance for the U.S. Fish and Wildlife Service (48 FR 43098).

Magnitude of Threat	**Immediacy of Threat**	**Taxonomy**	**LPN**
High	Imminent	Monotypic genus	1
		Species	2
		Subspecies/population	3
	Non-imminent	Monotypic genus	4
		Species	5
		Subspecies/population	6
Moderate to Low	Imminent	Monotypic genus	7
		Species	8
		Subspecies/population	9
	Non-imminent	Monotypic genus	10
		Species	11
		Subspecies/population	12

Table 4. Region 6 Listing Priorities as of November 1999.

SPECIES	LEAD OFFICE	STATUS	LISTING PRIORITY
Proposed Species			
Colorado Butterfly Plant	Cheyenne, WY	Proposed (T) March 24, 1998	
Desert Yellowhead	Cheyenne, WY	Proposed (T) December, 22, 1998	
Lynx	Helena, MT	Proposed (T) July, 8, 1998	6-month extension to January 2000
Mountain Plover	Grand Junction, CO	Proposed (T) February 16, 1999	
Pending Proposed Rule			
2 plant species		Previous Candidates	Proposed rule submitted to WO
Court Orders			
Virgin River Chub Critical Habitat	Salt Lake, UT	Court-ordered designation due January 20, 2000	
Piping Plover Critical Habitat	Pierre, SD	*In settlement negotiations	
Candidate Species			
Sicklefin Chub	Bismarck, ND	Candidate (petitioned)	2
Sturgeon Chub	Bismarck, ND	Candidate (petitioned)	2
Fat-whorled (Bonneville) Pond Snail	Salt Lake, UT	Candidate	2
Sleeping-Ute Milk-Vetch	Lakewood, CO	Candidate	2
Boreal Toad (Southern Rocky Mtn population)	Grand Junction, CO	Candidate (warranted but precluded)	3
Arkansas Darter	Manhattan, KS	Candidate	5
Graham Beardtongue	Lakewood, CO	Candidate	5
Parachute Beardtongue	Lakewood, CO	Candidate	5
White River Beardtongue	Salt Lake, UT	Candidate	6
Swift Fox	Pierre, SD	Candidate (warranted but precluded)	8
Aquarius Indian Paintbrush	Salt Lake, UT	Candidate	8
Horseshoe Milk-Vetch	Salt Lake, UT	Candidate	8

* Action pending. Settlement could require completion of critical habitat for this species in a timeframe which would preclude completion of other listing actions.

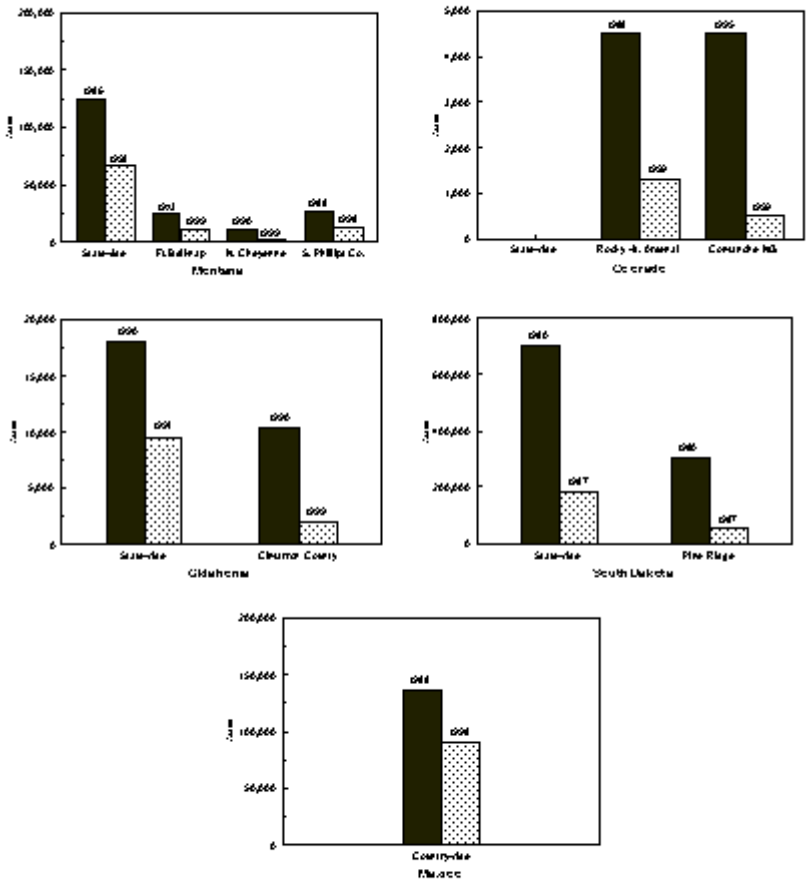

Figure 1. Recent declining trends in black-tailed prairie dog occupied habitat.

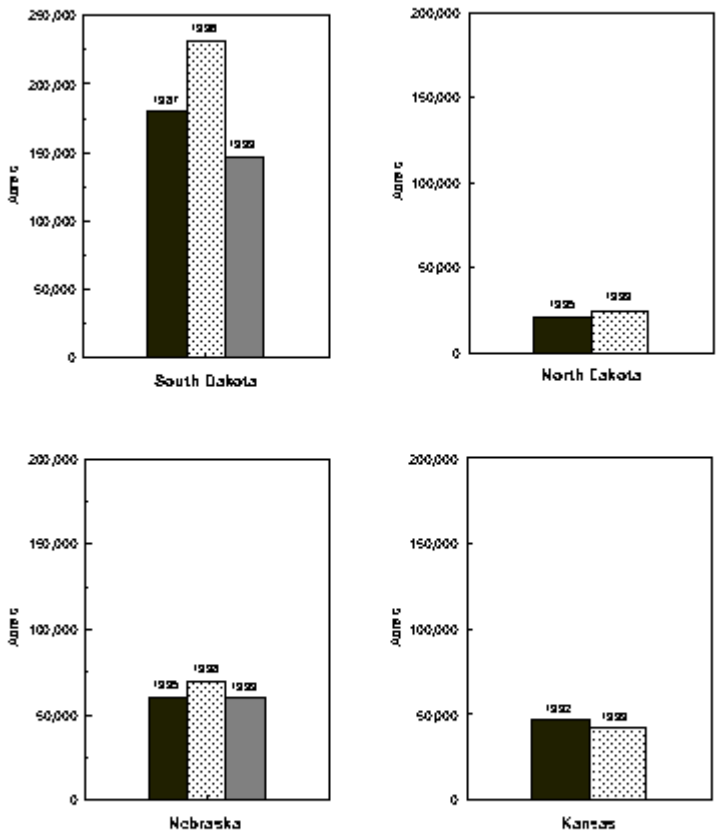

Figure 2. Recent stable trends in black-tailed prairie dog occupied habitat.

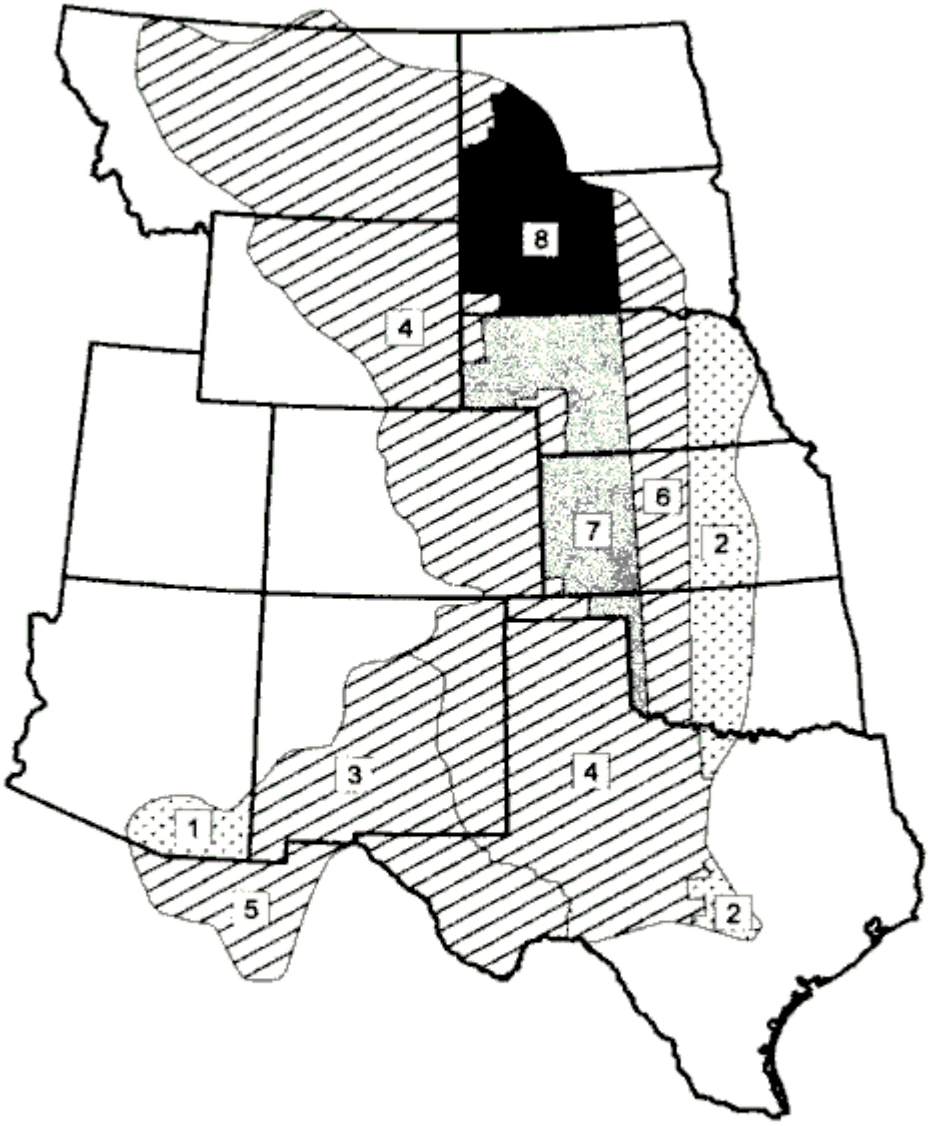

Figure 3 Areas within the range of the black-tailed prairie dog with similar

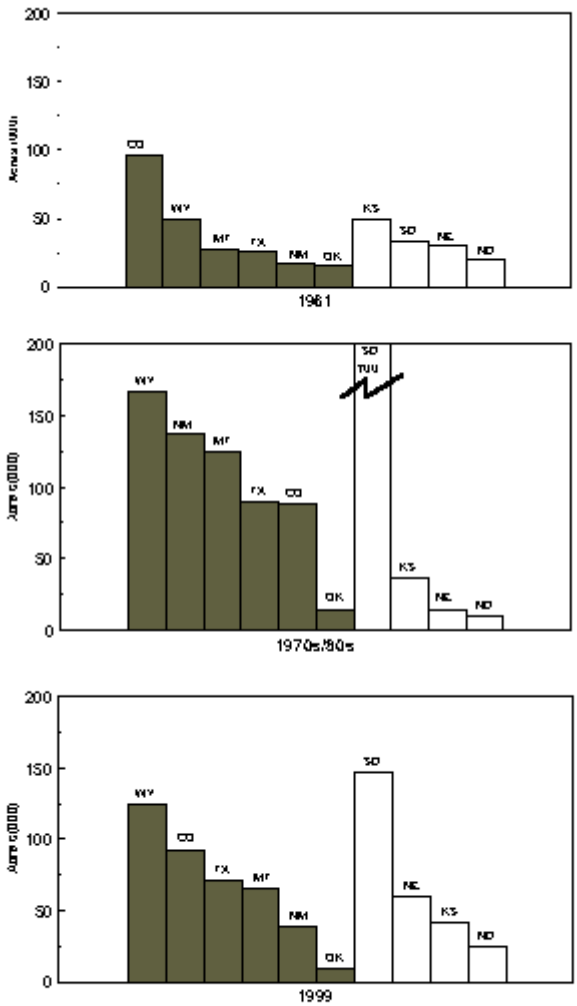

Figure 4. Estimates of black-tailed prairie dog occupied habitat for states impacted by plague (dark) and not impacted by plague (light).

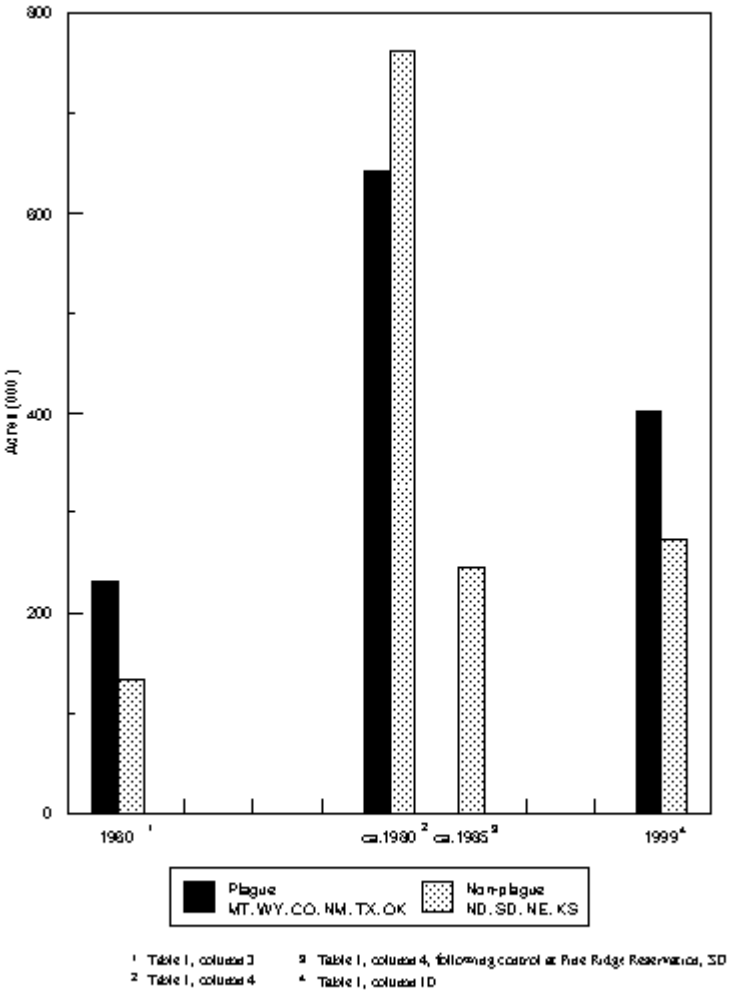

Figure 5. Trends in black-tailed prairie dog occupied habitat for areas impacted and not impacted by plague.