Supplement 7 – Biological Assessment and Determination for Federally Listed Species for the Non-MA 3.63 Decision

Biological Assessment[1]

FOR

BLACK-TAILED PRAIRIE DOG MANAGEMENT IN NON-MANAGEMENT AREAS 3.63

on units of the

Nebraska National Forest:

Buffalo Gap and Fort Pierre National Grasslands, South Dakota
Oglala National Grassland, Nebraska

Prepared and reviewed by:

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Biological Determinations Made By:

_____________/s/ John Sidle_ ________________________June 23, 2008___
John Sidle, Fish and Wildlife Biologist **Date:**

[1] Meets the standards for Biological Assessment (50 CFR 402.12(f))

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1. Introduction

The purpose of this Biological Assessment (BA) is to determine the likely effects of black-tailed prairie dog (prairie dog) (*Cynomys ludovicianus*) management in the interior management zone (IMZ) on Nebraska National Forest (NNF) units (Buffalo Gap, Fort Pierre, and Oglala national grasslands) for federally listed species and proposed species under the Endangered Species Act (ESA). For South Dakota national grasslands, the BMZ has been defined on the Buffalo Gap National Grassland as less than one-half mile from private land and less than a quarter mile on the Fort Pierre National Grassland. On the Oglala National Grassland in Nebraska, the BMZ is less than one-half mile from private land.

Section 7 of the ESA requires federal agencies to use their authorities to carry out programs to conserve endangered and threatened species, and to insure that actions authorized, funded, or carried out by them are not likely to jeopardize the continued existence of listed or proposed species, or result in the destruction or adverse modification of their designated critical habitats. A BA must be prepared for federal actions that are "major construction activities" (defined under the National Environmental Policy Act (NEPA) as a project significantly affecting the quality of the human environment) to evaluate the potential effects of the proposal on listed or proposed species. This BA is being conducted in conjunction with an environmental impact statement (EIS) analyzing the situation. The contents of the BA are at the discretion of the federal agency, and will depend upon the nature of the federal action (50 CFR 402.12(f)).

2. Description of the Proposed Action

Purpose of and Need for Action

The 2005 *Record of Decision for Black-tailed Prairie Dog Conservation and Management on the Nebraska National Forest* ((USDA Forest Service 2005e) focused on the encroachment of prairie dog colonies from National Grasslands onto adjoining private or tribal agricultural lands, where ranchers and farmers are concerned about losses in agricultural production, costs of managing prairie dogs, effects on land values, and risks to health and safety. That effort dealt with the prairie dog colonies near the Forest boundaries in the BMZ and the impacts as colonies expanded onto non-Forest Service lands. The Forest Plan did not set acre objectives for prairie dog colonies outside the BMZs, and it limited rodenticide use to very specific situations.

The purpose of this proposed action is to determine the techniques and objectives for managing prairie dog colonies in the interior of the Oglala, Buffalo Gap, and Fort Pierre national grasslands (National Grasslands) in an adaptive fashion through the following:

- Setting objectives for desired acres of prairie dog colonies within the interior of the National Grasslands to move toward desired prairie dog acres, and to maintain or move toward desired vegetation cover, protect top soil, and prevent the establishment of noxious and invasive species.
- Managing black-tailed prairie dog habitat designated as a black-footed ferret management area (MA 3.63) in the 2002 Forest Plan to sustain populations of black-footed ferrets and associated species.

However, this proposed action addresses only non-MA 3.63 areas. This proposed action selects Alternative 1, for non-MA 3.63 areas only, in the FEIS. Current direction would continue in the two MA 3.63 areas, Conata Basin and Smithwick.

This BA tiers to and incorporates still valid information and analysis from the 2005 BMZ decision. The BA and other information are in the administrative record for that decision at the NNF Supervisor's Office in Chadron, Nebraska. For South Dakota national grasslands, the BMZ has been defined on the Buffalo Gap National Grassland as less than one-half mile from private land and less than a quarter mile on the Fort Pierre National Grassland. On the Oglala National Grassland in Nebraska, the BMZ is less than one-half mile from private land.

The following aspects of the proposed action are relevant to this BA:

Prairie Dog Management in Non-MA 3.63 Areas

Prairie dog acreage objectives would be established for non-MA 3.63 areas in all geographic areas (GA) (Table 1). For all but two GAs, a minimum and maximum range of acres would be set. In addition, desired vegetation conditions for prairie dog colonies would be described, along with a suite of tools that could be used to achieve those desired conditions.

Minimum Range of Acres: The minimum number of acres is1,000, based on the 2001 Forest Plan definition of a prairie dog colony complex. The 2001 Forest Plan defines a prairie dog colony complex as a group of at least 10 prairie dog colonies with nearest-neighbor inter-colony distances not exceeding 6 miles and with a total colony complex acreage of at least 1,000 acres. Two of the GAs, Fall River West and Wall North GA, currently are below the minimum prairie dog acreage requirement while the others are at or above 1,000 acres.

Maximum Range of Acres: The maximum range of prairie dog colony would be 3 percent of the gross national grassland acres in each GA. When the maximum range of prairie dog acres has been exceeded, rodenticide would be used to reduce acres. Specific colony locations may change based on other management objectives; for example, high vegetative structure for prairie grouse. During the range allotment management planning (RAMP) process, the District Ranger will use adaptive management to decide where the prairie dog colonies will occur, using existing colony locations as a starting point.

For Fall River Southeast and Wall Southwest GAs which contain MA 3.63 areas, prairie dog colony acreage objectives will be set at a later date through a separate proposed action.

Table 1. Range of prairie dog colony acres by geographic area.

Geographic Area	Current (2006) occupied acres in IMZ	Acres of prairie dog colonies	
		Minimum	Maximum
Oglala	1,125	1,000 [a]	2,800
Fall River Northeast	1,130	1,000	2,800
Fall River West	210	1,000	3,600
Fall River Southeast (excludes MA 3.63)	42	No acreage objective	
Wall North	454	1,000	2,100
Wall Southeast	1,414	1,000	2,900
Wall Southwest (excludes MA 3.63)	214	No acreage objective	
Fort Pierre	1,735	1,000 [a]	3,500

[a] No change from current Forest Plan direction

Desired Vegetation Condition: Plant communities identified in ROD Supplement 1, Table 6 would describe desired vegetation condition on prairie dog colonies. The desired condition would primarily be a blue grama plant community. Similarity Index[2] (SI) would be used to monitor the current condition of plant communities. The threshold for rodenticide use would be an SI of 25% of the Historic Climax Plant Community (HCPC) which generally equates to a blue grama community as described in Table 6, ROD Supplement 1.

- ♦ The District Ranger would use non-lethal methods before employing lethal methods to maintain the range of prairie dog acres and achieve desired vegetation conditions (see Supplement 1 – Implementation Plan).
- ♦ Prairie dogs would have priority over livestock for forage in allotments with prairie dog colonies. This may include annual removal of livestock from allotments with prairie dog colonies as a form of non lethal treatment.
- ♦ Livestock grazing would be managed to maintain prairie dog habitat to meet desired vegetation conditions and minimize the potential for soil loss. This management may include annual modifications to livestock grazing and other tools as described in ROD Supplement 1, Table 1. Long-term modifications to livestock grazing would be addressed in the range allotment management planning (RAMP) process.
- ♦ This proposed action would allow the use of rodenticide in the interior-colony management zone outside the MA 3.63 areas.
- ♦ Adaptive management as described in ROD Supplement 1 – Implementation Plan would be used. This includes the suite of management tools listed in Table 1 in that supplement. The District Ranger would be the decision-maker for the site-specific, on-the-ground actions. Monitoring would be used to determine if the thresholds (discussed below) that trigger action have been met. Cumulative effects of the actions would be considered and the actions would be modified, if needed. An integrated plan using non-lethal and lethal treatment methods will be developed. The integrated plan would include items to be monitored during the action. The plan would be specific to a colony. When the plan is implemented, we would monitor the results and use the findings to adjust future management actions.

There are two thresholds that could initiate use of rodenticide: when the maximum range of prairie dog colony acres is exceeded and when necessary to achieve a desired condition for vegetation on prairie dog colonies.

1. Maximum acreage limit exceeded (see ROD Supplement 1 – Implementation Plan):

- ♦ When prairie dog colony acres in a GA exceed the maximum, rodenticide use may occur on up to 1/3 of the maximum range of acres (i.e., if the aggregate acres exceed 3%, reduce to about 2%).
- ♦ Poisoning would usually occur for 1 to 3 years, until the District Ranger determines the prairie dog colony acres are at or below the maximum acreage. Colony reduction, due to exceeding acreage limits, may occur every year based on available funding. However, the District Ranger should avoid rodenticide use for more than three to five consecutive years. The intent is not to apply rodenticide annually.

[2] Similarity Index is a method to evaluate an ecological site. This method compares the present plant community on an ecological site to the desired vegetation that can exist on the site. The SI is expressed as the percentage of a vegetation plant community presently on the site to the desired vegetation plant community. The desired vegetation plant community must be identified as the reference plant community. (NRCS 2006).

1. **Maximum acreage limit exceeded cont.**
   - Acres that have been poisoned would not be used to calculate prairie dog acreage requirements until monitoring shows these areas have been recolonized.
   - Before, during and following poisoning to reduce prairie dog colony acres, livestock would be removed for a period of 1 to 3 years or until the District Ranger determines that desired prairie dog acreage requirements have been achieved.
2. **To achieve desired condition for vegetation:**
   - Before rodenticide use can occur, the minimum range of prairie dog colony acres for the GA must be achieved. Non-lethal methods can be used at any time (see Supplement 1).
   - Rodenticide would be used to reduce prairie dog densities within a colony. By reducing densities, we would reduce the amount of grass the prairie dogs are utilizing. This allows the vegetation to grow, making it possible to achieve desired vegetation condition. By poisoning some, but not all, of the prairie dogs (reducing density), we would maintain enough prairie dogs to ensure the colony still exists and can meet the needs of species associated with this habitat. In a colony in which prairie dog densities have been reduced but not eliminated, the treated acres would be used to calculate the minimum and maximum prairie dog colony acreage requirements for the GA.
   - If monitoring indicates that the existing condition of the plant community is below the desired condition and the SI is at or below 25% of HCPC, poisoning could occur as determined by the District Ranger (see Supplement 1).
   - Before, during and following poisoning to reduce acres, livestock will be removed for a period of 1 to 3 years or until the District Ranger determines that desired vegetation conditions are being met.

3. Area Affected

The proposed action only addresses non-MA 3.63 GAs. GAs are administrative units on the National Grasslands. Their administrative boundary encompasses federal land (national grasslands) and non-federal lands (mostly private). See Figures 1 and 2 for examples of GAs and depictions of IMZ, BMZ, and extent of prairie dog colonies; see maps of other GAs in Appendix F.

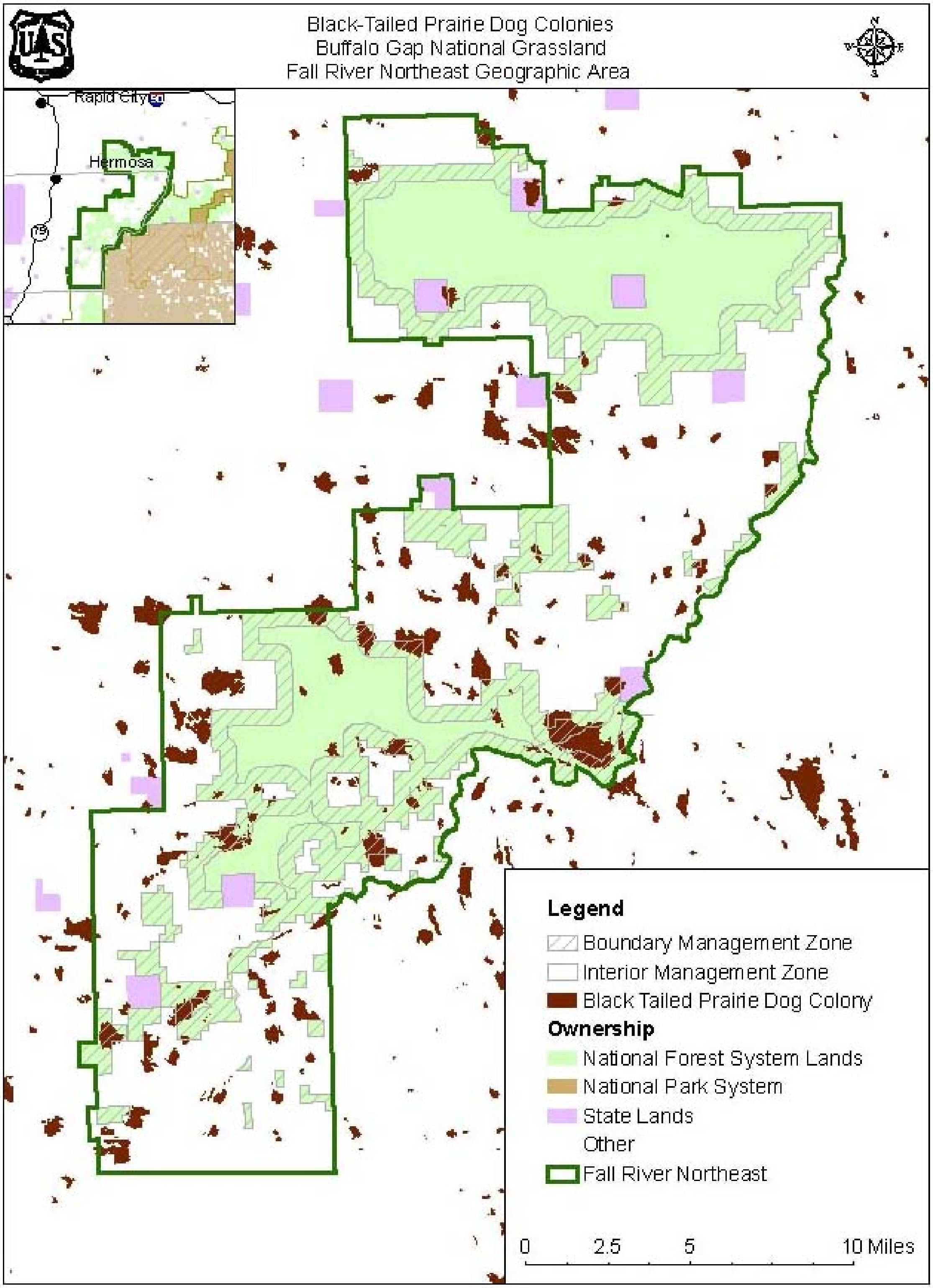


Figure 1. An example of a Geographic Area (GA) showing the extent of black-tailed prairie dog colonies on and in the vicinity of Buffalo Gap National Grassland (Fall River Northeast GA), South Dakota.

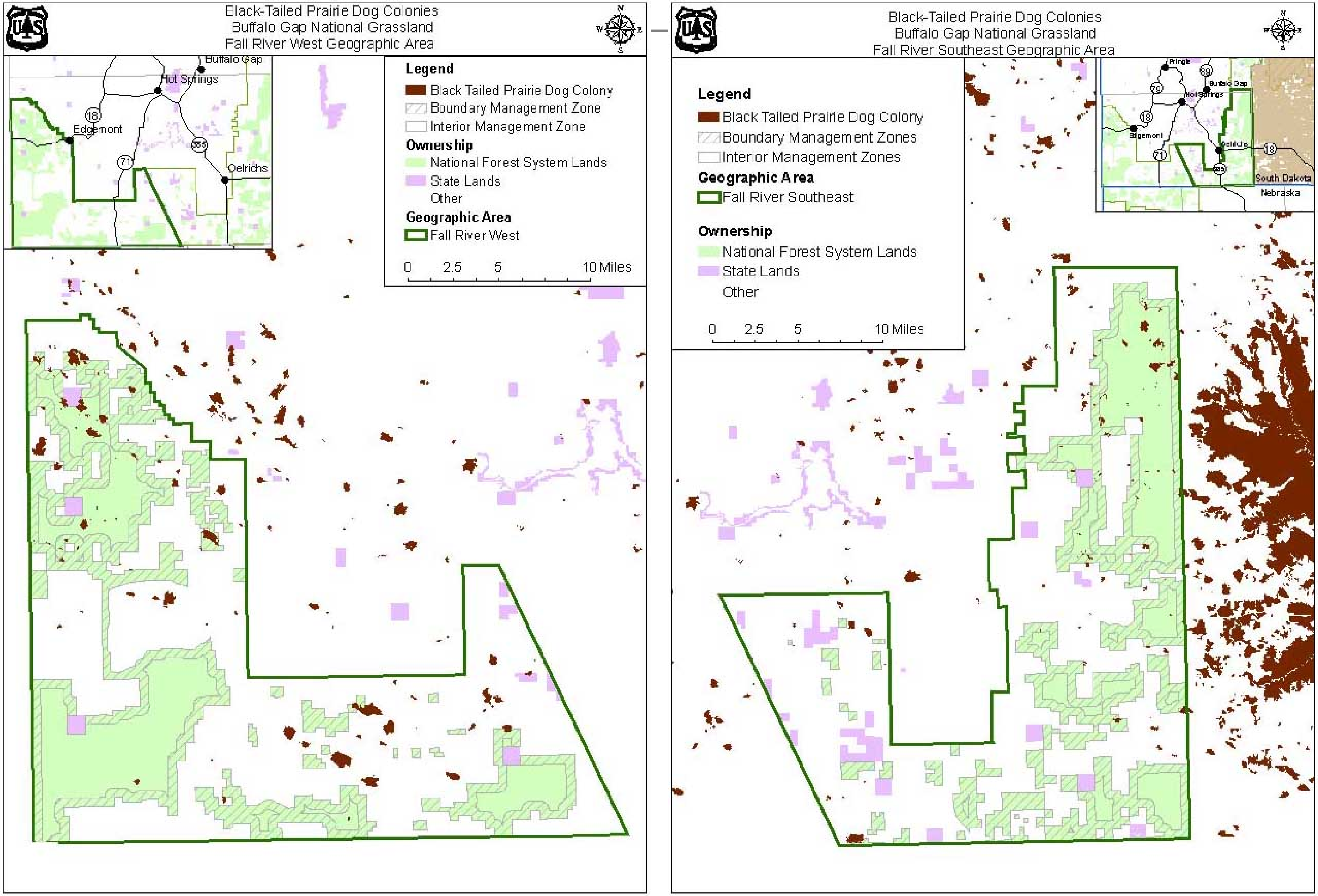


Figure 2. The extent of black-tailed prairie dog colonies on and in the vicinity of Fall River Southwest and Fall River Southeast GAs, Buffalo Gap National Grassland, South Dakota. The large prairie dog colonies on the Pine Ridge Reservation (far right) have been affected by plague but vast colony acreages remain suitable for black-footed ferret reintroduction.

Buffalo Gap National Grassland and Geographic Areas. The Buffalo Gap National Grassland (Buffalo Gap) is located in southwestern South Dakota and includes more than 589,000 acres of land that borders private, state, Indian reservation, and national park lands. The eastern half of this unit extends from near Kadoka to the Cheyenne River on the west, north to U.S. Highway 14, and south to the Pine Ridge Indian Reservation. The Wall Ranger District (WRD) at Wall, administers the eastern half. The WRD is divided into 3 GAs (Wall North, Wall Southeast, and Wall Southwest). Wall Southeast contains a 3,910-acre area designated as a Management Area 3.63 for black-footed ferret reintroduction. Wall Southwest contains Conata Basin, a 73,243-acre Management Area 3.63 for black-footed ferret reintroduction. Black-footed ferrets have been successfully reintroduced into this area. For clarity, the 3,910 and 73,243 acres are combined as the 77,155-acres Conata Basin Management Area 3.63. However, the focus of this BA is on the non-MA 3.63 GAs and the impacts that any further prairie dog control could have on the black-footed ferret.

The western half of Buffalo Gap extends from the Cheyenne River on the east to the Wyoming and Nebraska borders on the west and south, respectively, and is administered by the Fall River Ranger District (FRRD), Hot Springs. The FRRD is divided into 3 GAs (Fall River West, Fall River Southeast, and Fall River Northeast). Fall River Southeast contains Smithwick, a 25,307-acre MA 3.63 for black-footed ferret reintroduction. No black-footed ferrets have been reintroduced.

Fort Pierre National Grassland and Geographic Area. The Fort Pierre National Grassland (Fort Pierre) (116,053 acres) lies south of Pierre, South Dakota, north of Interstate 90, and west of the Lower Brule Indian Reservation. The Fort Pierre consists of mixed-grass vegetation on a rolling hill landscape just west of the Missouri River.

Oglala National Grassland and Geographic Area. The 94,484-acre Oglala National Grassland lies in Dawes and Sioux counties of northwestern Nebraska and contains mostly mixed-grass vegetation. Topography consists of rolling hills and badlands. The grassland is administered by the Pine Ridge Ranger District, Chadron, Nebraska.

Existing Condition

Prairie dog colonies occur throughout the GAs but are most numerous in the Wall Southwest GA, especially Conata Basin (Tables 1 and 2; Figure 3), an area dedicated to large complexes of prairie dog habitat for black-footed ferret recovery. There are currently only modest acreages of prairie dog colonies in the other GAs. Indeed, the number, density, and distribution of colonies in non-black-footed ferret areas on national grasslands in southwest South Dakota is similar to that found on private land in the same area. Maps of prairie dog colonies, potential prairie dog habitat, and buffer zones are in Appendix F. Please review these maps to understand the extent of prairie dog colonies and suitable prairie dog habitat.

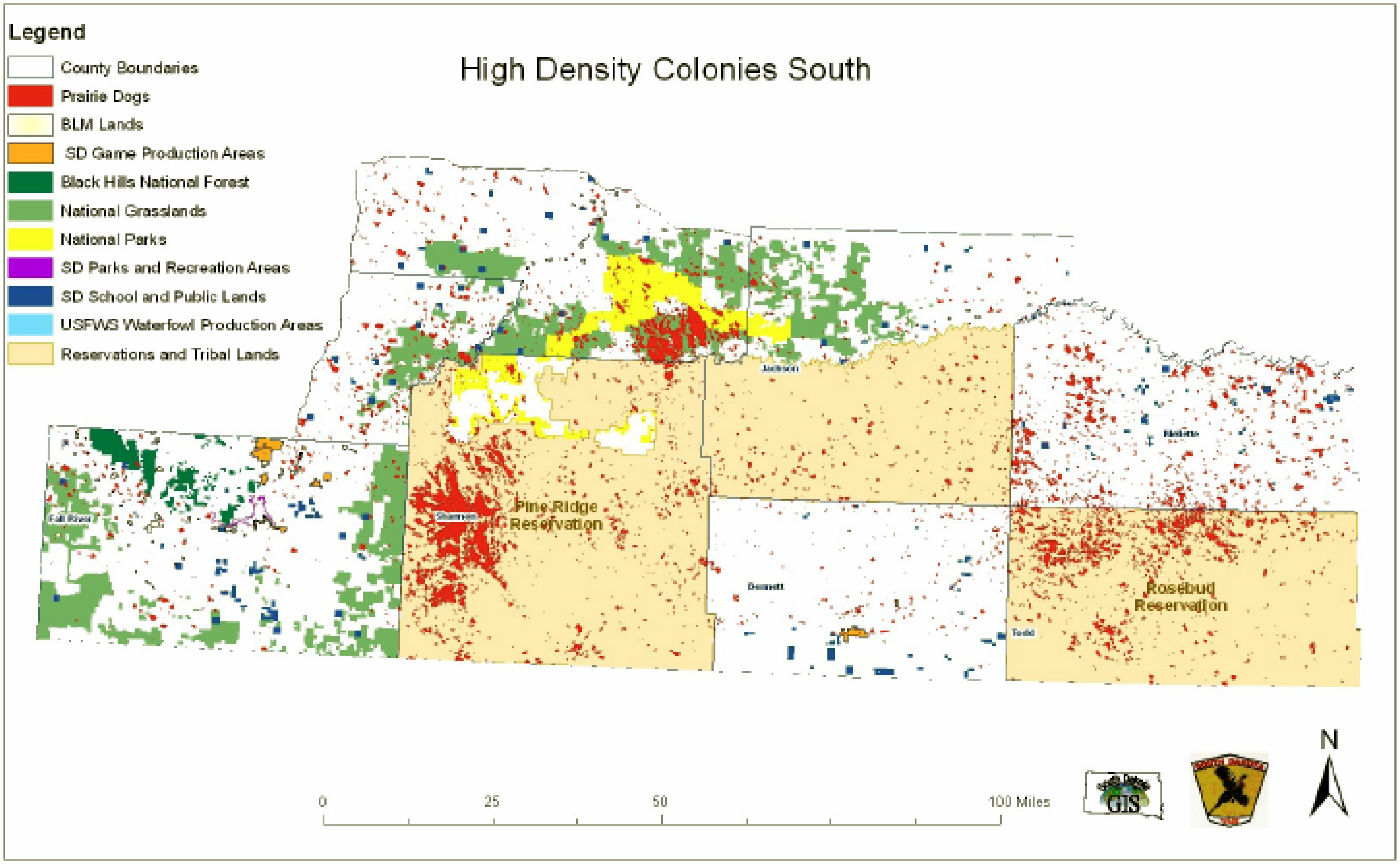


Figure 3. Distribution of black-tailed prairie dog colonies in southwestern South Dakota in 2006 (Kempema 2007). Most of the prairie dog colony acreage is located on reservations and tribal lands (extensive tribal lands in Mellette and Bennett counties are not depicted). The large red areas in the center of the map are colonies in Conata Basin, Buffalo Gap National Grassland.

Table 2. The extent of black-tailed prairie dog colonies in the non-MA 3.63 Geographic Areas during 2002 and 2006. Also displayed are the extents of the BMZ, IMZ, suitable habitat, and the proposed action's caps on prairie dog colonies (Source: Nebraska National Forest, Geographic Information System). There are no prairie dog colony acreage objectives for Wall Southwest and Fall River Southeast Geographic Areas.

Geographic and Management Areas	Total Non-NFS Acres in Geographic and Management Areas	2002 Prairie Dog Colony Acreage (% of non-NFS acres in GA)	2006 Prairie Dog Colony Acreage	Total NFS Acres in Geograp hic Area	Total Suitable NFS Acres for Prairie Dogs	Total Acres in BMZ	Total Acres Suitab le for Prairie Dogs in BMZ	Acres of Prairie Dog Colonie s Poison ed in BMZ, 2006	Total Acres in IMZ	Total Suitab le Acres (IMZ)	2002 Prairie Dog Colony Acreage (% of NFS acres in GA)	2006 Prairie Dog Colony Acreage (% of NFS acres in GA)
Oglala	121,274	NA[1]	NA	94,484	62,347 (66%)	64,902 (69%)	43,701	1,011	29,582	18,646	2,192 (2.3%)	1,125 (1.2%)
Fall River Northeast	119,265	5,008 (4%)	4294 (3.6%)	91,298	78,806 (86%)	51,334 (56%)	45,328	1,998	39,964	33,478	3,851 (4.2%)	1,130 (1.2%)
Fall River West	192,868	2,438 (1.2%)	2112 (1%)	119,951	116,434 (97%)	70,088 (58%)	68,014	780	49,863	48,420	1,358 (1.1%)	210 (0.17%)
Fall River Southeast	189,165	821 (0.4%)	722 (0.4%)	86,666	84,142 (97%)	61,515 (71%)	59,448	411	25,151	24,694	1,509 (1.7%)	42 (0.04%)
Smithwick MA 3.63	1	0	0	25,307	24,187 (95%)	7,658 (30%)	7,177	68	17,649	17,010	990 (4%)	503 (2%)
Wall North	76,450	426 (0.5%)	454 (0.6%)	69,437	63,894 (92%)	53,418 (77%)	49,093	940	16,019	14,801	397 (0.5%)	454 (0.6%)
Wall Southeast	86,107	975 (1%)	982 (1%)	90,840	79,017 (87%)	58,000 (64%)	51,132	1,370	32,840	27,885	1,312 (1.4%)	1,414 (1.5%)
Wall Southwest	57,810	1,231	1,701	28,580	15,125 (53%)	14,456 (50%)	8,432	279	14,124	6,693	186 (0.6%)	214 (0.7%)
Conata Basin MA 3.63	353	81	77	77,155	68,183 (88%)	25,149 (37%)	21,784	5,251	52,006	46,399	22,530 (29%)	26,484 (34%)
Fort Pierre	74,921	130 (0.17%)	163 (0.2%)	116,053	108,409 (93%)	50,639 (44%)	47,195	621	65,414	61,214	1,346 (1.1%)	1,735 (1.5%)
Total (Fall River Northeast through Fort Pierre)	918,214	11,110[2] (1.4%)	10,505[2](1.3 %)	799,771	700,544 (87%)	457,159	401,304	12,729	342,612	299,240	35,671 (4.4%)	33,311 (4.1%)

[1]No information is available on the extent of prairie dog colonies on the Oglala GA.

[2]Based upon total non-NFS acres (428,337) in Fall River Northeast, Fall River west, Wall North, Wall Southeast, and Fort Pierre.

4. Proposed Action (Alt. 1) and Alternatives Analyzed in the FEIS

The proposed action is to amend current management direction in the 2001 Forest Plan to: 1) specify the desired range of acres of prairie dog colonies on in non-MA 3.63 GAs on Buffalo Gap, Fort Pierre, and Oglala national grasslands; and 2) allow toxicants if the acreage exceeds the desired range and for multiple use objectives. The effects considered in this analysis are:

- Effects of setting minimum and maximum areas of prairie dog colonies for non-MA 3.63 GA.
- Effects of rodenticide application in the IMZ on black-footed ferrets and whooping cranes, the two species listed under the ESA that are known to occur or may occur in all or some of the non-MA 3.63 GAs.

This analysis assumes prairie dog colonies within the BMZ will be treated with rodenticide within the life of this project. For the purposes of this analysis, however, the BMZ will be considered to be free of prairie dogs.

The Alternatives

Below is a summary of each alternative. Refer to Chapter 2 of the FEIS for more details on each alternative. Table 3 displays the extent of prairie dog colonies under each alternative. The alternatives propose a range of prairie dog colony acres by GA. The “no action” alternative, Alternative 2, does not specify any specific range of acres, however, estimated acreages are provided based upon observed colony expansion rates. Alternative 4 only proposes a range of acres for the Conata Basin Black-footed Ferret Management Area 3.63. Alternatives 1, 3, and 4 also provide for use of rodenticide to reduce prairie dog density if a threshold based on Ecological Similarity Index or Desired Vegetation Condition is exceeded.

Alternative 1

This alternative employs adaptive management in emphasizing a mix of multiple uses while sustaining black-footed ferrets and associated species within Management Area 3.63 (MA 3.63). This alternative is based on a moderate objective for prairie dogs while incorporating adaptively applied active and passive management tools. Alternative 1 strives for a more balanced allocation between social/economic and biological issues while also sustaining black-footed ferrets. In the Conata Basin MA 3.63 where black-footed ferrets currently exist, this alternative prioritizes black-footed ferrets and the associated need for prairie dog colonies over other multiple uses. This alternative utilizes an Adaptive Response Protocol (See FEIS Appendix H) to help make implementation decisions at the site-specific level.

Outside of MA 3.63, maximum prairie dog colony acres are 3% of the total aggregate acres within each GA. The minimum acres center around an objective to establish one prairie dog colony complex on each GA that does not include 3.63 Black-footed Ferret Reintroduction Habitat. By definition, a prairie dog colony complex is a minimum of 1,000 acres of prairie dogs in 10 or more colonies with inter-colony distances not exceeding 6 miles. Higher acreages of active prairie dogs will be maintained in the 3.63 Black-footed Ferret Reintroduction Habitat.

Alternative 2

This alternative is the current prairie dog management as defined in the 2001 Forest Plan and 2005 amendment. The 2001 Forest Plan did not set specific acreage objectives (caps) for prairie dog colonies. The current management objective for prairie dogs located in the IMZ is to regulate and manage prairie dog populations through non-lethal methods and limited rodenticide use where human health and safety or infrastructure is threatened.

The 2001 Forest Plan's prairie dog expansion model estimated 24,400-39,800 acres of prairie dog colonies on the NNF by 2012. The 2005 Forest Plan amendment estimated 29,600-41,400 acres 2012. There are currently 33,310 acres of occupied prairie dog colonies. Observed annual growth rates on the NNF indicate an average expansion rate of 25 percent, the rate used in the current EIS to predict acres on the NNF in the next 10 years. This rate includes recent years when extended drought conditions have facilitated prairie dog colony expansion, although not necessarily prairie dog populations. The 2001 Forest Plan has allowed black-footed ferret habitat (prairie dog colonies) to increase consistent with the priority of 3.63 management areas.

Alternative 3

This alternative ensures that there is not a disproportionate share of prairie dog colony acres in any county containing federal lands. In South Dakota, this alternative only allows a maximum acreage of prairie dog colony acreage of 3% the total aggregate federal ownership in each county. Any minimum numbers are essentially set by the vegetative condition of each prairie dog colony based on a NRCS Ecological Site Similarity Index threshold (Natural Resource Conservation Service – USDA 2006). If the similarity index falls below 25%, the prairie dogs will be reduced to 10% of the active colony acreage. On the Oglala National Grassland, Nebraska, the range of acres of active prairie dog colonies is 100-900 acres.

Alternative 4

This alternative is derived from the South Dakota State Prairie Dog Plan (Cooper and Gabriel 2005). It calls for 8,000-12000 acres of prairie dog colonies in Conata Basin. The state plan did not specify colony acreage outside of Conata Basin. The plan set objectives at the state-wide level for tribal and non-tribal acreage and did not set specific acreage objectives for all federal lands included in this analysis.

Alternative 5

This alternative emphasizes prairie dogs and black-footed ferrets. In non-MA 3.63 areas, prairie dog colony acreage represents 10% of the total acres in the GA as a minimum and 20% as a maximum. In the 3.63 Black-footed Ferret Reintroduction Habitat in Conata Basin, the maximum acre objective is based on what is required to maintain 200 breeding adult ferrets (using average black-footed ferret home range data collected in Conata Basin and adjusted for unoccupied areas (Livieri 2007a, c), and includes a range of acres based on prairie dog densities. During drought, prairie dog colonies expand but there are fewer prairie dogs per acre. This low density of prairie dogs leads to larger home ranges of black-footed ferrets. During wet periods, prairie dog colonies exhibit higher densities of prairie dogs and black-footed ferret home ranges contract. The minimum acre objective for Conata Basin is based on what is required to maintain 120 breeding adult black-footed ferrets. The prairie dog colony acre objective for the Smithwick black-footed ferret area is based on what is required to maintain 50 breeding adult ferrets during wet and dry periods.

Table 3. Black-tailed prairie dog colony acreage under the alternatives for non-MA 3.63 areas.

Geographic Area	Current Acreage (2006)	Desired range of acres of prairie dog colonies				
		Alt 1[1]	Alt 2[2]	Alt 3[1]	Alt 4[3]	Alt 5[1]
Oglala	1,125	1,000-2,800	1,125-13,097	100-900	N/A	9,500-18,900
Fall River Northeast	1,130	1,000-2,700	1,130-13,155	2,700	N/A	9,100-18,300
Fall River West	210	1,000-3,600	210-2,445	3,600	N/A	12,000-24,000
Fall River Southeast	42	0	42-489	2,500	N/A	8,700-17,300
Wall North	454	1,000-2,100	454-5,285	2,100	N/A	6,900-13,900
Wall Southeast	1,414	1,000-2,700	1,414-16,461	2,700	N/A	9,100-18,200
Wall Southwest	214	0	214-2,491	830	N/A	2,600-5,100
Fort Pierre	1,735	1,000-3,500	1,735-20,198	3,470	N/A	11,600-23,200

[1]Desired minimum and maximum range of prairie dog colony acres.

[2]Range of acres is current acreage (2007) and projected acreage in ten years.

[3]This alternative does not contain a desired range of prairie dog colony acreage for non-MA 3.63 areas.

5. Endangered Species Considered in the Analysis

On April 5, 2007 a list of species to be evaluated was received from USFWS. Four species, the least tern, piping plover, Ute's Ladies' Tresses, and pallid sturgeon do not occur on any units of the Nebraska National Forest nor is there any suitable habitat that could be affected, and therefore these species are not analyzed further. Two federally-listed species are analyzed in detail in this report: black-footed ferret and whooping crane, which are known to occur or may be present on the Nebraska National Forest (Table 4).

Table 4. Species listed as endangered under the Endangered Species Act and located in the Project Area.

	Buffalo Gap National Grassland						Fort Pierre National Grassland	Oglala National Grassland
	Fall River West GA	Fall River SE GA	Fall River NE GA	Wall North GA	Wall SW GA.	Wall SE GA		
Black-footed ferret[1]	---	---	---	---	K	K	---	---
Whooping crane	P	P	P	P	P	P	P	P

K = Known occurrence; P = Possible but unconfirmed occurrence

[1]Non-essential experimental population (USFWS 1994)

The black-footed ferret MA 3.63 areas are not the subject of this BA, however, for context and clarity it is useful to briefly discuss theses areas. The Conata Basin/Badlands reintroduction area was designated as non-essential experimental population under Section 10(j) of the ESA (59 Federal Register 42682-42694; August 18, 1994) (Figure 4). A 10(j) black-footed ferret population is not afforded the same level of protection as a fully endangered species but is treated as a "proposed" species for the purposes of managing the reintroduction sites on National Forest System lands. On National Park Service lands, the species' status is considered threatened. The relaxed standards associated with a 10(j) designation are sometimes necessary to provide management flexibility while attempting to establish the population and also to sustain support for reintroduction efforts at the state and local level. A non-essential experimental population designation does not convey that the population is not important for the recovery of the species. To the contrary, Conata Basin/Badlands is foundational to black-footed ferret recovery and Section 10(j) populations are counted towards meeting recovery goals.

The reintroduction area (three units) in 1994 was about 42,000 acres. The experimental population area is about 1.2 million acres. In 1994, there were about 8,000 acres (much of the acres in Badlands National Park) of black-tailed prairie dog colonies in the three units. Other colonies occurred outside the units. The 1994 record of decision designated 206,300 acres of Buffalo Gap National Grassland outside the reintroduction area as dispersal habitat for black-footed ferrets that move outside the reintroduction area. USFWS et al. (1994) envisioned that black-footed ferrets would not simply remain within the three units illustrated above but rather would move to other colonies and that greater acreages of prairie dog colonies would be required. USFWS (1992; cited in USFWS et al. (1994) recommended that a site with 11,700 to 23,500 acres (or more) of active prairie dog colonies with an average prairie dog density of 5 prairie dogs per acre represents habitat for sustaining a population of 95 breeding black-footed ferrets.

The **Conata Basin and Smithwick MA 3.63** was established on Buffalo Gap National Grassland by the 2001 Forest Plan (Figure 5). The 3.63 Area encapsulates the 1994 reintroduction area and much of the dispersal habitat on Buffalo Gap into the 2001 Forest Plan. The theme or purpose of the area is uniquely black-footed ferret reintroduction habitat, that is providing prairie dog colonies to support a viable black-footed ferret population. Livestock grazing and other uses may occur in the 3.63 Area but fundamentally the emphasis is on habitat of the black-footed ferret. Specific acreages of prairie dog colonies were not enumerated in the 2001 Forest Plan because of uncertainties surrounding black-footed ferret habitat requirements and population size. The 2001 Forest Plan afforded flexibility in managing an endangered species.

Under the 2001 Forest Plan, "black-tailed prairie dog colony complexes are to be actively and intensively managed as reintroduction habitat for black-footed ferrets." Desired conditions are "large prairie dog colony complexes established and maintained as suitable habitat for black-footed ferret reintroductions. Land uses and resource management activities are conducted in a manner that is compatible with maintaining suitable black-footed ferret habitat. The Forest Service works with other agencies and organizations to pursue conservation agreements or easements with adjoining land jurisdictions to achieve black-footed ferret recovery objectives. Where landownership patterns are not conducive to effective and successful prairie dog and black-footed ferret management, landownership adjustments with willing landowners may also be used to help resolve management issues." The Forest Service "authorizes only those uses and activities that do not reduce the suitability of the area as black-footed ferret reintroduction habitat." All prairie dog colonies within this area "are managed as though they are occupied by black-footed ferrets." In addition, "Relocation of prairie dogs to establish new colonies and accelerate growth of prairie dog populations in selected areas may occur only after consultation with appropriate state and federal wildlife agencies. To help expand and maintain suitable black-footed ferret habitat, prairie dog shooting is prohibited. In 2005, the 2001 Forest Plan was amended and a boundary management zone (BMZ) was established within 0.5 miles of private and tribal lands where control of prairie dogs may occur. The BMZ effectively removed 25,149 acres (21,784 acres suitable for black-tailed prairie dogs) from the Conata Basin MA 3.63, assuming that all adjoining landowners would file valid complaints when prairie dogs expanded onto or approached their land. The BMZ effectively removed 7,658 acres

(7,177 acres suitable for black-tailed prairie dogs) from the Smithwick MA 3.63, again assuming that all adjoining landowners would not tolerate colonization by prairie dogs from the national grasslands.

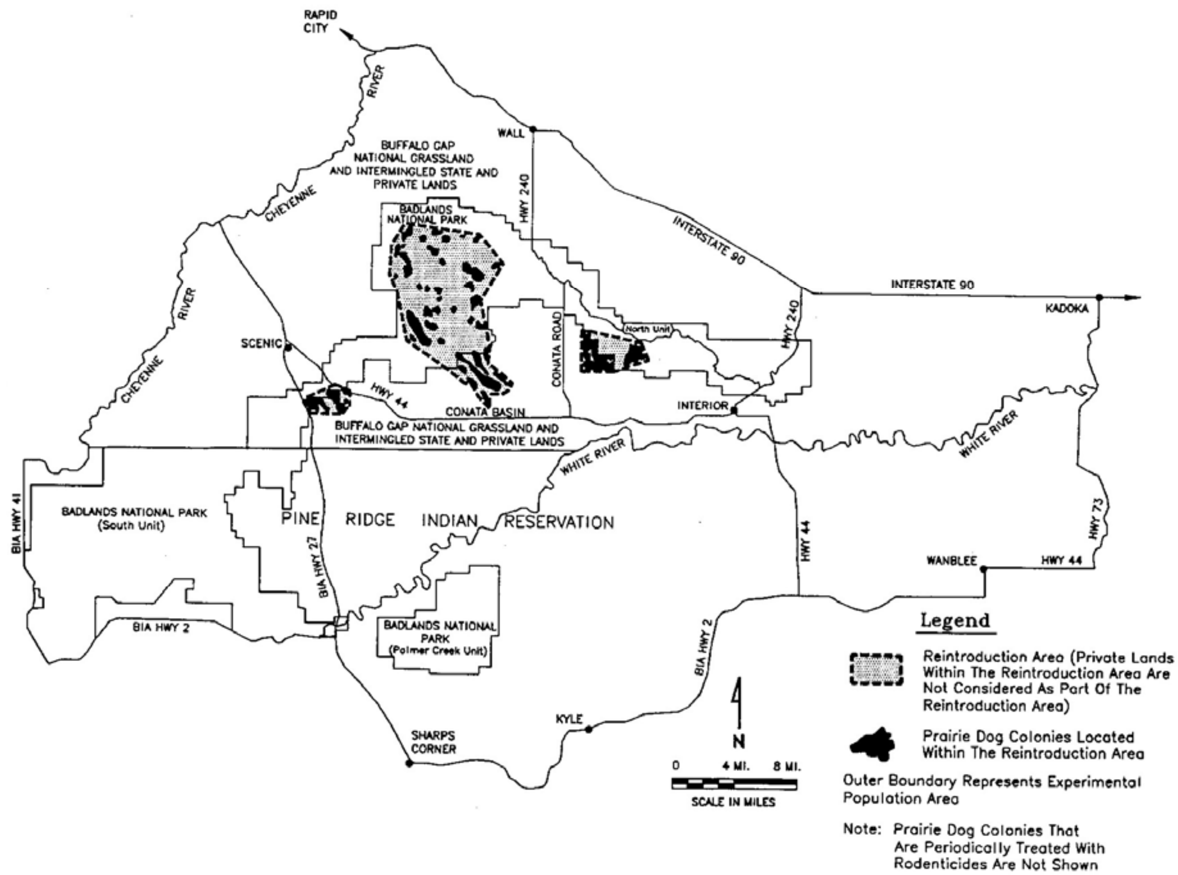
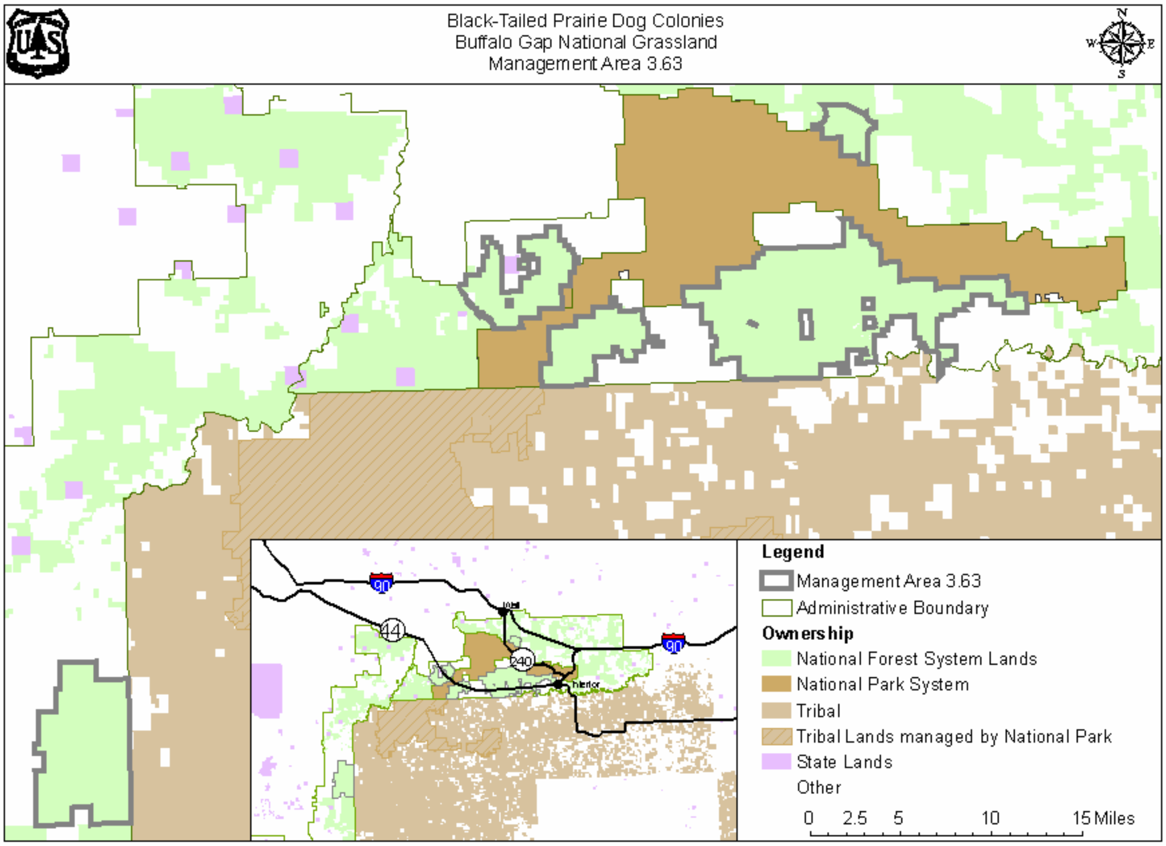


Figure 4. The Conata Basin/Badlands Black-footed Ferret Reintroduction Area and Experimental Population Area (outer boundary) established in 1994; the reintroduction area was selected by the U.S. Forest Service (31 May 1994 record of decision) and based upon USFWS et al. (1994).



Management Area 3.63	Total Acreage	Suitable	Unsuitable	BMZ Acreage	Suitable	Unsuitable	IMZ Acreage	Suitable	Unsuitable
Smithwick	25,307	24,187	1,120	7,658	6,696	481	17,649	17,010	639
Conata Basin	77,500	68,182	8,972	21,860	18,495	3,365	55,294	49,687	5,607

Figure 5. The **Conata Basin and Smithwick Management Areas 3.63** (outlined in grey above). Conata Basin is in the center and Smithwick is in the lower left corner. Suitable and unsuitable habitat (acres) for black-tailed prairie dogs in the Management Area 3.63 (black-footed ferret management areas) on Buffalo Gap National Grassland, including the size and suitability of the boundary management zone (BMZ) and interior management zone (IMZ). About 88% (68,182 acres) of Conata Basin 3.63 is suitable habitat for prairie dog colonies (black-footed ferret habitat). However, the 2005 BMZ decision changed suitable habitat for prairie dog colonies from 68,182 acres to 49,687 acres, a 27% reduction. The 2005 BMZ decision changed suitable habitat for prairie dogs in the Smithwick from 24,187 acres to 17,649 acres, a 27% reduction. There are currently about 26,000 acres of prairie dog colonies in Conata Basin 3.63, leaving another 23,687 acres for potential expansion or colonization as prairie dog colony extent shifts from current locations.

6. The Black-footed Ferret's (*Mustela nigripes*) Status, Ecology, and Prairie Dog Habitat

The black-footed ferret is in the Order Carnivora, Family Mustelidae, Genus *Mustela*, and Subgenus *Putorius* (Hillman and Clark 1980). The species is one of five *Mustela* in North America that include the ermine (*M. erminea*), long-tailed weasel (*M. frenata*), least weasel (*M. nivalis*), and American mink (*M. vison*) (Wilson and Ruff 1999). The black-footed ferret is the only ferret species native to the Americas.

Other ferret species in the genus include the Siberian polecat (*M. eversmanni*) and the European ferret (*M. putorius*). The black-footed ferret is most closely related to the Siberian polecat, from which ancestral black-footed ferrets arose (Anderson et al. 1986, Hillman and Clark 1980). The earliest fossil record of the black-footed ferret is from approximately 100,000 years ago (Anderson et al. 1986). The black-footed ferret was formally described in 1851 by J.J. Audubon and J. Bachman (Anderson et al. 1986, Clark 1986).

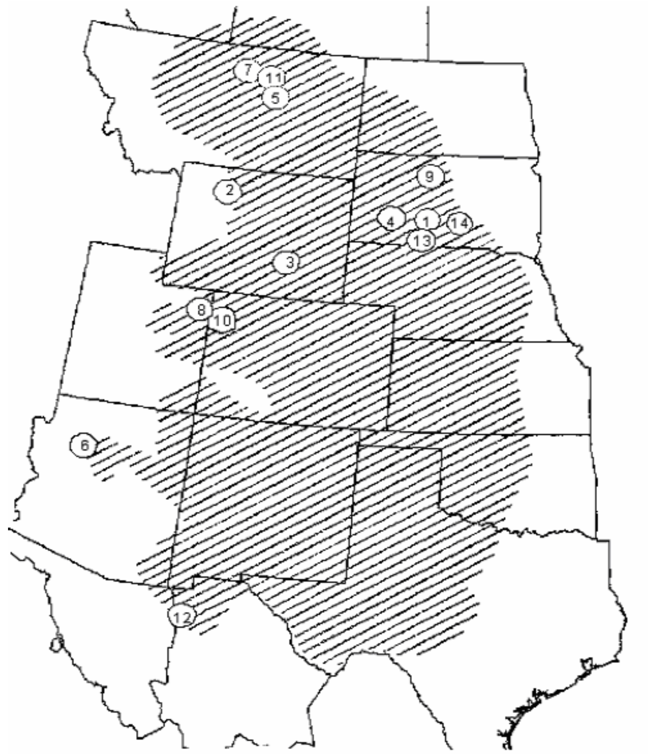


Figure 6. Probable historic range of black-footed ferrets as defined by composite ranges of black-tailed (*Cynomys ludovicianus*), white-tailed (*C. leucurus*) and Gunnison's prairie dogs (*C. gunnisoni*). Numbers 1 and 2 are the Mellette County, South Dakota and Meeteetse, Wyoming populations that no longer exist. Other numbers are re-introduction sites that are referenced in the table on the following page (USFWS 2006b).

The black-footed ferret is a medium-sized mustelid weighing 1.4-2.5 pounds and measuring 19-24 inches in total length. Upper body parts are yellowish buff, occasionally whitish; feet and tail tip are black; and a black "mask" occurs across the eyes (Anderson et al. 1986, Hillman and Clark 1980).

Distribution and Status

Our understanding of historic black-footed ferret distribution derives from the literature and museum specimens. Black-footed ferrets from Arizona, Colorado, Kansas, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, Utah, Wyoming, Alberta, and Saskatchewan have been collected since the late 1800s (Anderson et al. 1986). The black-footed ferret formerly occurred at colonies of three species of prairie dogs (Anderson et al. 1986) (Figure 6). Over 84 percent of black-footed ferrets occurred at black-tailed prairie dog colonies, the species with the largest range of any prairie dog species (Ernst et al. 2006).

The black-footed ferret was probably common, although its secretive habits (nocturnal and often underground) made it difficult to observe (Anderson et al. 1986, Clark 1989, Forrest et al. 1985). Given the historic extent of prairie dog colonies, Anderson et al. (1986) estimated that 500,000 to 1,000,000 black-footed ferrets once populated prairie dog colonies. For most of the twentieth century, however, the species was believed almost extinct due to the near eradication of prairie dogs, especially complexes of thousands of acres of prairie dog colonies. The first opportunity to study black-footed ferrets was during 1964-1974 at black-tailed prairie dog colonies in Mellette County, South Dakota. This remnant population was disappearing and removed black-footed ferrets died in captivity during captive breeding attempts. Black-footed ferrets were discovered in 1981 in white-tailed prairie dog colonies near Meeteetse, Wyoming (Clark et al. 1986, Miller et al. 1996). In 1985, sylvatic plague, a lethal disease to prairie dogs and black-footed ferrets, struck the prairie dogs at Meeteetse killing most prairie dogs.

Lethal canine distemper also was discovered in the Meeteetse black-footed ferrets. In 1986, the remaining eighteen Meteetse black-footed ferrets were removed to protect them from distemper and to start a captive breeding program (Miller et al. 1996). Seven of the black-footed ferrets were successfully bred in captivity (Garrelle et al. 2006, Hutchins et al. 1996). The extant population today, both captive and wild, descends from these seven "founder" animals. Several thousand black-footed ferrets have been produced in captivity (Conservation Breeding Specialist Group 2004). A goal of the breeding program is to retain as much genetic diversity as possible, although intensive searches throughout the black-footed ferret's range have not discovered any wild black-footed ferrets since the Meeteetse find. It is very unlikely that any undiscovered wild populations remain (Hanebury and Biggins 2006, Lockhart et al. 2006).

There are about 250 breeding adult black-footed ferrets in the wild. About 100 occur in Conata Basin. The number of breeding adults is the standard for measuring the status of black-footed ferret populations. The current wild population is well short of the objective to ensure the immediate survival of the species by establishing 1,500 breeding adults in 10 or more populations by 2010 (USFWS 1988). Since 1991, black-footed ferrets have been reintroduced into twelve sites including one site in Mexico. Two sites have failed to sustain a black-footed ferret population while other sites display varying results. The largest populations currently exist at Shirley Basin, Wyoming, Conata Basin, South Dakota and Cheyenne River Sioux Reservation, South Dakota. Wild animals from Conata Basin and Cheyenne River have been translocated to other reintroduction sites. Agencies and others tasked with black-footed ferret recovery desire large self-sustaining populations with the goal of eliminating or reducing the need for supplementation with captive-reared kits and thus the eventual elimination or reduction of the costly captive breeding program at the Black-footed ferret Conservation Center near Wellington, Colorado and participating zoos.

There are few successful black-footed ferret sites, that is, sites free of plague and containing large prairie dog colony acreages. In 2006, Wind Cave National Park, South Dakota and northwestern Kansas were selected in preliminary black-footed ferret allocations. These sites and Lower Brule Sioux Reservation are much smaller than previous reintroduction sites, but provide an opportunity for new sites east of the current plague line, cooperative efforts with new partners, and potential refugia in the event of increased plague activity.

More populations are needed to enhance overall species' viability and reduce the risk of extinction. In the past, the black-footed ferret had an enormous range in the center of North America and perhaps up to one million existed (Anderson et al. 1986). Fundamentally, most small animal populations face a particularly high risk of extinction in the modern world (Gaggiotti and Hanski 2004). This notion is as old as the writings of Charles Darwin and as recent as today (Holsinger 2000). The high extinction risk of small populations is not surprising because this is the expectation based on several mechanisms of extinction: demographic and environmental stochasticity, Allee effect, inbreeding depression, and so forth. As the different mechanisms tend to make populations ever smaller, they amplify the effect on each other and lead to extinctions (Gilpin and Soulé 1986).

Prairie Dog Habitat of the Black-footed Ferret

The exact acreage of prairie dog colonies that once existed is unknown and debate on the issue continues (Vermeire et al. 2004). Historical information on species is almost always lacking. Anderson et al. (1986) estimated a 90 percent decrease in occupied habitat for all species of prairie dogs. Recent estimates of prairie dog occupied habitat include 1,600,000 acres of black-tailed prairie dog occupied habitat (69 Federal Register 51217-51226, August 18, 2004; Manes 2006; Van Pelt 2007). The existence of an obligate carnivore, the black-footed ferret, suggests strongly that prairie dog colonies were once numerous and extensive. Moreover, using the USFWS (2004) current estimates for prairie dogs, the declining population trend is clear whether there were once 40,000,000 ha, 30,000,000 ha, 20,000,000 ha, or 10,000,000 ha of colonies. Respectively, these figures indicate declines of roughly 98%, 97%, 96%, or 92% (Miller et al. 2007).

The black-footed ferret is known to inhabit almost exclusively large complexes of prairie dog colonies of thousands of acres. Colonies provide the black-footed ferret with shelter and its only food source, prairie dogs. As prairie dog colonies and suitable habitat declined due to conversions from native prairie rangeland to cropland, poisoning and plague during the late 19th century and the first half of the twentieth century, black-footed ferret populations likewise declined (Biggins 2005, Cully 1993, Cully et al. 2006, Fagerstone and Biggins 1986, Lockhart et al. 2006). A typical landscape with prairie dogs in the Great Plains today contains widely scattered colonies of less than 50 acres each. Large complexes of thousands of acres of prairie dog colonies are uncommon and are found almost entirely on tribal and federal lands. Over 100 years ago, Merriam (1902) described a 25,000 square mile prairie dog colony in the north Texas short grass prairie. He also noted that colonies 20-30 miles long were common. Colonies of this magnitude no longer exist. Poisoning, plague, and land fragmentation confine black-footed ferret habitat to small areas. Grassland continues to be converted to cropland. Conversion of grassland that had no prior cropping history to cropland in South Dakota, for example, was 54,404 acres in 2005 and 47,167 acres in 2006 (U.S. Government Accountability Office 2007).

Black-footed ferret habitat, that is, the prairie dog colony, is a unique feature in the Great Plains. The colonies are easily visible on the ground, to aircraft, and even to orbiting, imaging satellites because they are fundamentally different from surrounding grassland. The U.S. Geological Survey's vegetation mapping program classifies prairie dog colonies as the "black-tailed prairie dog town grassland complex." This complex occurs widely throughout the Great Plains.

Visible features (conditions) at prairie dog colonies include numerous dome burrow mounds (up to 2.5 m in diameter) and crater mounds barren of vegetation, short-statured vegetation, and bare areas. Prairie dogs are diurnal and short vegetation, barren mounds, and bare areas greatly facilitate the detection of predators. In addition, prairie dogs feed on grasses and forbs. Prairie dogs are attracted to livestock and other ungulate grazing. Such grazing along with prairie dog herbivory helps establish and even expand prairie dog colonies by increasing the amount of short-statured vegetation and bare areas. Drought restricts plant growth leading to expansion of prairie dog colonies, more short-statured vegetation, and more bare areas than during times of normal precipitation. Prairie dog densities decrease because food resources decrease during drought leading to an increase in the home range sizes of black-footed ferrets and other carnivores.

Fundamentally, the clipping and foraging habits of prairie dogs create a unique habitat (unique conditions) of bare ground and short, sparse vegetation (Archer et al. 1987, Natural Resources Conservation Service 2003). Some species such as the mountain plover require prairie dog colonies containing from 40-60% bare ground (Knowles et al. 1982). Prairie dog colonies can contain from near 0% bare ground to 80% bare ground (Magle 2003) depending upon precipitation, grazing, and colony age. Vegetation species diversity and per cent bare ground changes under different levels of impacts such as grazing and drought (Whicker and Detling 1988). Plant biomass production and forage quality is positively correlated to precipitation. Black-footed ferrets occur even in large areas of bare ground in colonies (Travis Livieri, personal communication), however, the relationship between productivity of black-footed ferrets and plant biomass production and forage quality is not well understood.

Black-footed ferret habitat (prairie dog colonies) is located on a wide variety of soils, including clay, clay loam, silty loam and some sandy loam soils deposited following erosion from adjacent uplands, including badlands formations. Soils are deep, structured and not easily eroded. This type is found on level sites along drainages, in broad valleys, on gentle to moderately sloping hills, and flats on tables and buttes (Von Loh et al. 1999). Prairie dogs create extensive burrows in their towns. Large volumes of soil are moved, improving filtration, hastening the incorporation of organic matter, facilitating nutrient cycling, and increasing the spatial heterogeneity of vegetation, soils, and other ecosystem components (Whicker and Detling 1988).

Although several plant species are consistently found in black-footed ferret habitat, overall vegetation characteristics are highly variable depending upon size and age of the town and its position on the landscape. The vegetation in all colonies usually tends toward a prostrate growth form because of intensive grazing by prairie dogs and livestock. The overall pattern of vegetation appears in relatively concentric zones relating to the outward expansion of town boundaries over time. Vegetation cover varies from <25% to almost 100%.

Prairie dog colonies (black-footed ferret habitat) are located in open mixed grass or short grass prairie, and their activity has both direct and indirect effects on the vegetation. Prairie dogs keep the surrounding vegetation clipped close to the ground, presumably to improve their ability to detect stalking predators. This clipping gives the impression of a mowed lawn, or overgrazed rangeland. Prairie dogs repeatedly clip and graze plants, rarely allowing shoots to reach full size. Thus, canopy height within the colony is about 5-10 cm, compared to 20-50 cm in nearby, uncolonized grassland (Whicker and Detling 1988). Changes in plant species composition may begin as early as 2 or more years after colonization. Shortgrass species, such as blue grama (*Bouteloua gracilis)* and buffalo grass (*Buchloe dactyloides)*, and annual forbs, become abundant and replace mid-height or tall grasses. Continued heavy grazing may eventually result in complete dominance by a few species of forbs or dwarf shrubs (Whicker and Detling 1988). Grazing may even cause genetic shifts within species. The shorter, more prostrate, growth forms of western wheatgrass *(Pascopyrum smithii)*, for example, on prairie dog colonies have been shown to be more abundant than those away from colonies, suggesting that some genotypes within the species may tolerate grazing better than others (Jaramillo and Detling 1988, Whicker and Detling 1988).

Bison and livestock may be attracted to prairie dog colonies, and may preferentially graze them (Coppock et al. 1983, Coppock and Detling 1986, Day and Detling 1990). The forage on the colonies is more nutritious than off, with higher nitrogen content and younger shoots, apparently because animal waste products are deposited there. In turn, the presence of bison and livestock waste products further increases soil fertility and forage quality (Knight 1994).

Plant species diversity is increased by the small-scale disturbances caused by the digging of prairie dogs, and animal species diversity may also increase because of the habitat provided for the badger, rattlesnake, burrowing owl, black-footed ferret, and cottontail, in addition to the bison and pronghorn (Knight 1994). Prairie dog colonies can also move over time, expanding and contracting, and, as larger colonies can cover thousands of acres at a time (Augustine et al. In Press), the effect on the landscape is substantial. The plant community types on a prairie dog colony are roughly indicative of the extent of herbivore disturbance and reflect the cumulative impact of grazing intensity, grazing duration, activities of other animals, soil characteristics, and weather (Whicker and Detling 1988). Early stages of the colony may have a typical mixed grass or shortgrass prairie type. With continued grazing and age of the colony, the composition may shift to a mix of annual species and dwarf-shrubs. Species richness appears to be highest under moderate levels of disturbance, because grass species have not yet begun to disappear, but forb species begin to increase. In general, in the mixed grass prairie, prairie dog colonies reduce plant productivity and plant species richness by reducing cool-season perennial grasses and litter, and increasing bare ground (Johnson-Nistler et al. 2004).

There is a strong relationship between prairie dog colonies and ungulate grazing. Cattle-prairie dog interactions clearly show a synergistic relationship between cattle grazing and prairie dog habitat occupancy (Belak 2001). Osborn and Allen (1949) credited regenerating tall vegetation in a fallow pasture for the elimination of a small prairie dog colony located in tall-grass prairie. Snell and

Hlavachick (1980) found that elimination of cattle grazing during the growing season within and around a large colony in Kansas and the resulting vegetation growth was associated with a 90% decrease in the size of the colony. Knowles (1982), studying prairie dog distribution in eastern Montana, concluded that prairie dog distribution was mainly influenced by heavy livestock grazing pressure and other land disturbances created by humans. Uresk et al. (1982) found that the burrow densities within Conata Basin increased twice as fast in areas grazed by cattle vs. ungrazed areas. Cincotta (1985) reported that prairie dog colony expansion on the adjacent Badlands National Park was greater in heavily grazed areas and areas previously disturbed by homesteading activity. This was corroborated by Langer (1998) using a GIS analysis based on comparison of old homestead records with known prairie dog distributions. Cincotta et al. (1988) built a linear regression model to predict prairie dog establishment adjacent to existing colonies. They found that population density, visibility through vegetation, and the interaction of these two terms were significantly associated with colony expansion. These studies indicate that prairie dogs prefer areas with reduced vegetation density created by grazing pressure.

The role of livestock grazing in creating black-footed ferret habitat has been evident at the boundary of Buffalo gap National Grassland and Badlands National Park. Badlands National Park contains a comparatively small acreage of prairie dog colonies because much of the park is comprised of Badlands topography and because little ungulate grazing occurs in the park (Figure 7). For over 20 years prairie dog colonies on the National Grasslands in Conata Basin stopped at the fence line with the Park, although with severe drought some incursions of colonies into the Park have occurred. About 4,000 acres of colonies existed in Badlands during the 1994 reintroduction in Badlands. Colony acreage has increased from 5,629 to 7,867 during 2003-2006.

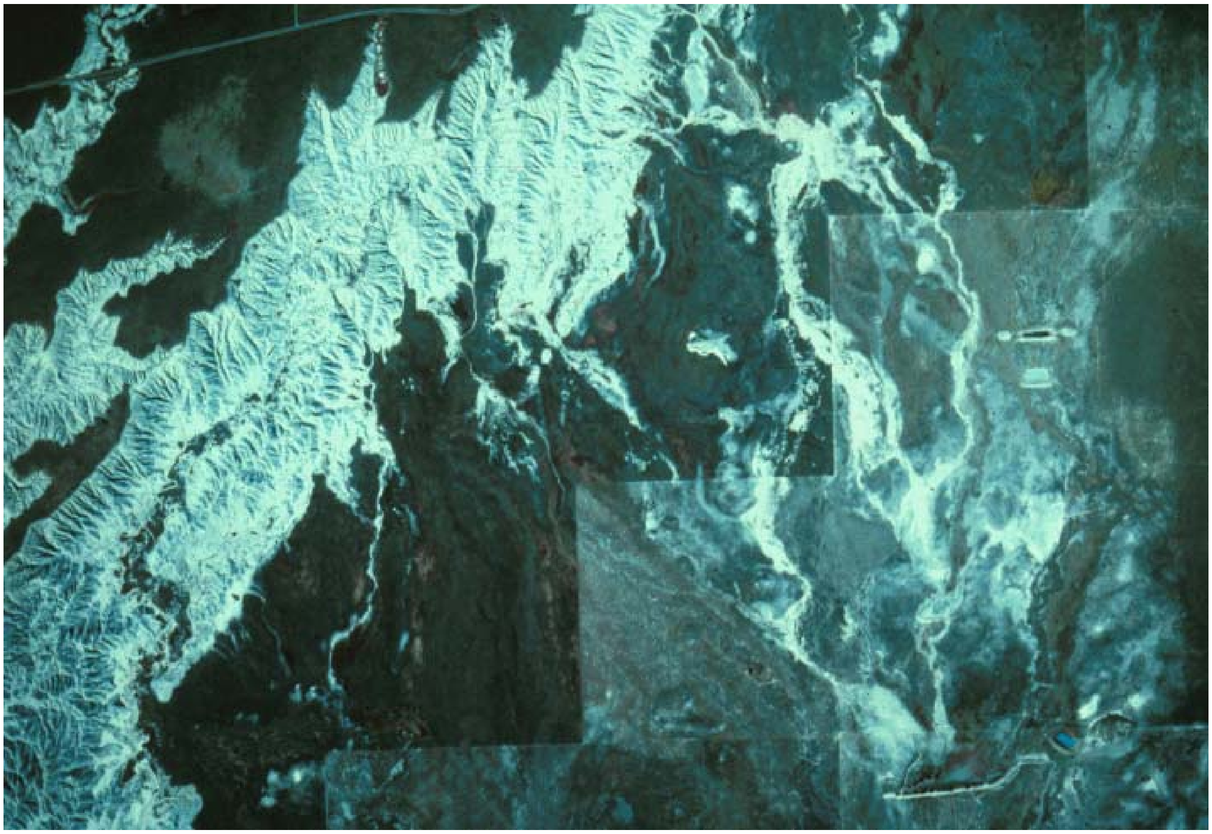


Figure 7. The boundary and fence line between Badlands National Park and Buffalo Gap National Grassland in part of Conata Basin during the early 1990s is illustrated by a different color tone. The stair-stepped lighter areas in the lower right are black-tailed prairie dog colonies on Buffalo Gap. The white areas, located mostly in the left section of the photograph, are Badlands topography in Badlands National Park. Extensive livestock grazing on Buffalo Gap fosters prairie dog colony development. No livestock grazing and a small bison herd in Badlands do not create the conditions for extensive prairie dog colonies required by black-footed ferrets. Buffalo Gap prairie dog colonies stop at the fence line. In recent drought years, there have been some prairie dog colony incursions into Badlands.

Black-footed ferret habitat can exhibit considerable antiquity. Carbon dating of mounds at Wind Cave National Park, South Dakota indicate that prairie dog colonies have existed there for about 400 - 800 years and other areas for several thousand years (White 1986, Carlson and White 1987), suggesting that despite periodic drought and varying levels of domestic and native ungulate grazing, black-footed ferret habitat persists in the same locations.

Prairie Dog as a Keystone Species in Creating Habitat for the Black-footed Ferret

Paine (1969) developed the keystone species concept when species composition and physical appearance of the ecosystem is greatly modified by the activities of a single native species high in the food web. Populations of such species are the "keystone of the community's structure, and the integrity of the community and its unaltered persistence through time are determined by their activities and abundances." The term keystone was borrowed from an old architectural word referring to the wedge-shaped stone at the highest point of an arch that locks the other stones in place and keeps the arch from collapsing (Mills 2007). The keystone concept can promote conservation not only for the prairie dog, but also for its grassland ecosystem (Kotliar 2000; Miller et al. 2000; Soulé et al. 2003). Soulé et al. (2005, 2007) labeled the prairie dog as a "strongly interacting species" in an ecosystem. They viewed as essential prairie dog population densities or levels that maintain interaction effectiveness rather than mere persistence at minimal numbers.

Miller et al. (2007) summarize the unique role played by prairie dogs. Like cattle, prairie dogs graze, but prairie dogs represent much more than just grazers (Kotliar et al. 2006). They also move soil (Detling and Whicker 1988, Detling 1998), influence nutrient cycling (Coppock et al. 1983a; Detling and Whicker 1988; Whicker and Detling 1988, 1993; Detling 1998), increase nitrogen content of soil and plants (Holland and Detling 1990, Detling 1998), change vegetation structure and community dynamics (Coppock et al. 1983a, Whicker and Detling 1988, Weltzin et al. 1997, Detling 1998, Fahnestock and Detling 2002), aerate the ground (Whicker and Detling 1988, Outwater 1996, Detling 1998), alter soil chemistry (Munn 1993), and deepen water penetration (Outwater 1996, Detling 1998). They provide a ready source of prey to many predators and burrows for shelter to other animals and insects (Goodrich and Buskirk 1998, Kotliar et al. 1999, Shipley and Reading 2006). This combination of effects gives the prairie dog its role as a highly interactive (keystone) species in the ecosystem, creating a matrix of different habitats that increases diversity across the grassland (Kotliar et al. 1999, 2006; Miller et al. 2000).

Kotliar et al. (2006) describe the prairie dog as a keystone species because the species has a unique, significant, disproportionately large impact on its ecosystem. The species' influence on grassland ecosystems varies with its abundance and certain keystone functions also vary with abundance. Even though small, isolated colonies of prairie dogs are better than no colonies at all in the Great Plains, they cannot support the full complement of species that naturally associate with prairie dogs (Kotliar 2000, Lomolino et al. 2003, Johnson and Collinge 2004). About 100 years ago, both large and small colonies occurred throughout the prairie dog's geographic range (Proctor et al. 2006). A similar combination of small and large colonies (e.g., Conata Basin) is probably a good mechanism for maintaining today's prairie dogs and their keystone functions (Lomolino et al. 2003; Trudeau et al. 2004). Lomolino and Smith (2003) found that while species richness per se was not necessarily higher in prairie dog colonies, they harbored significantly more rare and imperiled species than paired sites in the adjacent landscape.

Agricultural interests have dictated artificially small limits on prairie dog populations for more than 100 years (Schenbeck 1981, 1985; Miller et al. 1990; Lamb et al. 2006, Miller and Reading 2006). Indeed, few prairie dog populations today are sufficiently large to support viable populations of black-footed ferrets. A healthy grassland ecosystem includes areas with and without prairie dogs, allows for dispersal among colonies, and promotes colonization of new areas and recolonization of sites where prairie dogs lived in the recent or distant past. Because they currently inhabit only a tiny fraction of their original geographic range, more prairie dogs are pivotal for a healthy grassland ecosystem.

Regarding herbivory, redundancy (i.e., consumption of plants by several species rather than by a single species) is important for the persistence of ecosystems (Walker 1991; Ehrlich and Walker 1998). As redundancy decreases (e.g., following the drastic declines of American bison and prairie dogs from the grasslands of western North America), the vulnerability of an ecosystem increases.

In summary, the prairie dog is a keystone species because its effects on its ecosystem are unique, significant, and disproportionately large relative to its abundance (Kotliar et al. 2006):

- Prairie dogs influence the grassland ecosystem via three primary pathways: grazing, burrowing, and as prey. Numerous species use colony-sites for food and shelter. Black-footed ferrets, mountain plovers, burrowing owls, and at least 6 other species clearly depend on prairie dogs for survival and reproduction; at least 20 species opportunistically benefit at colony-sites; and at least 117 additional species have a natural history that suggests a benefit from associating with prairie dogs.
- Besides vertebrates, other types of organisms that associate with prairie dogs include numerous species of protozoans, arachnids, and insects, and at least four plant species.
- Burrowing by prairie dogs mixes subsoil and topsoil, redistributes nutrients and minerals, and promotes penetration and retention of moisture. The combination of burrowing, foraging, and clipping alters floral species composition and affects the concentration of nitrogen in the soil and the rate of nitrogen uptake by plants. Prairie dogs reduce vegetation biomass, but, especially at young colonies, they often enhance digestibility, protein content, and productivity of grasses and forbs.
- The prairie dog's influence on plant and animal communities is substantial and unique, disproportionately large relative to its abundance, and critical to the integrity of grassland ecosystems. The prairie dog is therefore a legitimate keystone species. Because some of its ecological functions are directly proportional to its abundance (e.g., nutrient cycling), the prairie dog is also a foundation species.
- Because it is a keystone and foundation species, conserving the prairie dog will help to save its grassland ecosystem. The concepts of keystone and foundation species thus are helpful for conservation.

Black-footed Ferret Use of Prairie Dog Colonies

Preliminary knowledge on how black-footed ferrets utilize prairie dog colonies has been gained from research in Conata Basin. Jachowski (2007) and Jachowski et al. (2008) examined resource selection by black-footed ferrets in relation to the spatial distribution of prairie dogs in Conata Basin and Montana (Figures 8 and 9). Although biologists have long mapped the boundaries of prairie dog colonies, the density of prairie dogs can vary considerably within a colony. Within prairie dog colonies, areas with high densities of active and inactive prairie dog burrows form patches and the distribution of these patches change in size, shape and connectivity over time, often a short amount of time (Jachowski 2007). The ability of an area to support a black-footed ferret population may be influenced by the size, availability, and density of high-density patches of prairie dogs (Biggins et al. 2006). Prairie dog distribution shifts likely in response to changes in vegetation species composition and productivity (Coppock et al. 1983, Detling and Whicker 1987). Prairie dog distribution moves to the perimeter of colonies but also back to the interior over time. Jachowski (2007) hypothesized:

> …the relationship between vegetative cover and prairie dog occupancy is likely a dynamic process, where activity areas of prairie dogs shift spatially within colonies over time to enable long-term occupancy of a defined area or burrow system. Thus the inactive portion of prairie dog colonies should not be viewed as low in habitat value over the long term because these sites might again become populated.

Jachowski (2007) stated:

> From a conservation perspective, our study supports the hypothesis that spatial distribution of patches of high prairie dog density is a major determinant of the ability of reintroduction sites to maintain ferret populations. Ferrets have relatively short life spans of 3-5 years (Forrest et al. 1988), experience a high rate of loss due to predation (Forrest et al. 1988, Biggins 2000), and have a low reproductive output relative to other mustelids (Forrest et al. 1985). These factors contribute to the difficulty of ensuring their recovery and underscore the importance of maintaining multiple breeding females at each recovery site. Our findings indicate that the ability of a site to support a greater number of female ferrets, and to achieve a self-sustaining ferret population, can be enhanced by management to create and maintain sufficiently large areas of high prairie dog density that are in close proximity to each other.

Black-footed ferrets compete for some space to some degree. Regardless of overlap, there is some competition and discussions continue of just how much spatial overlap exists and how to separate trespass from sharing, temporal overlap, and kinship effects. Mindful of the above uncertainty, black-footed ferret use of a colony, that is, its use of space, varies according to active prairie dog burrow densities (Figures 8 and 9). Lower prairie dog densities that are commonly associated with drought as well as disease, poisoning and possibly other unknown factors, lead to an expansion in the black-footed ferret's use of space. Conata Basin has experienced wet and drought years during the past 13 years. Home range estimates for female ferrets ranged from 51.2 – 162 acres during drought (Jachowski 2007). Male home range sizes were considerably larger, averaging 304 acres. Home range size increased as the mean prairie dog utilization distribution value within the home range decreased (Jachowski 2007).

Livieri (2007a, c) estimated the mean home range of female black-footed ferrets on one colony in Conata Basin at 79.3 acres during wet years (1998-2000) and 144.3 acres during a drought (2005), an 82% increase in home range size. Across Conata Basin the mean home range of 11 females was 193 acres and 351.2 acres for the wet and dry years, respectively. Black-footed ferrets are territorial but there is approximately 15% overlap of female home ranges and typically 21.1% of a colony may not be occupied by black-footed ferrets, a difference of 6% over home range overlap. Livieri (2007c) excluded home range overlap area and included unused areas of a colony. That is, it is too simplistic to restrict black-footed ferret spatial requirements to the specific acres of a home range. A 500-acre prairie dog colony containing three black-footed ferrets is not likely to use every acre of that colony but as indicated by Jachowski (2007) over the long and short term the black-footed ferrets will use most of the area. Males may overlap two female black-footed ferret home ranges. Therefore, and mindful of the pitfalls of using home range values, 125 breeding black-footed ferrets (95% population persistence) would require about 16,878 to 31,189 acres of prairie dog colonies during wet and dry years, respectively.

The findings on black-footed ferret home range between wet and dry years at Conata Basin are preliminary, but in general are consistent with patterns observed in many other species, where home ranges are not constant from year to year but typically become smaller when resources are plentiful. However, larger-than-average home ranges do not alone confirm that insufficient habitat quality or amount alone may be the driving factor (Bolen and Robinson 2003, Ewer 1973, MacDonald 1983). Other factors such as density of conspecifics, body size, competitors, predators and landforms can influence home range size. In essence, home range is an expression of the optimization process an animal uses to select habitat, a process that involves many factors (Morrison et al. 2006). Providing an area to allow a species to expand their home ranges to meet their resource needs under varying environmental conditions is fundamental to the long-term presence of the species and fundamental to reserve design (Temple and Cary 2002). The black-footed ferret can only achieve a viable population on substantial acreages of prairie dog habitat. If small areas of habitat were sufficient to sustain black-footed ferrets then one would expect to encounter black-footed ferrets throughout the Great Plains on remaining small patches of habitat, however, such encounters are non-existent.

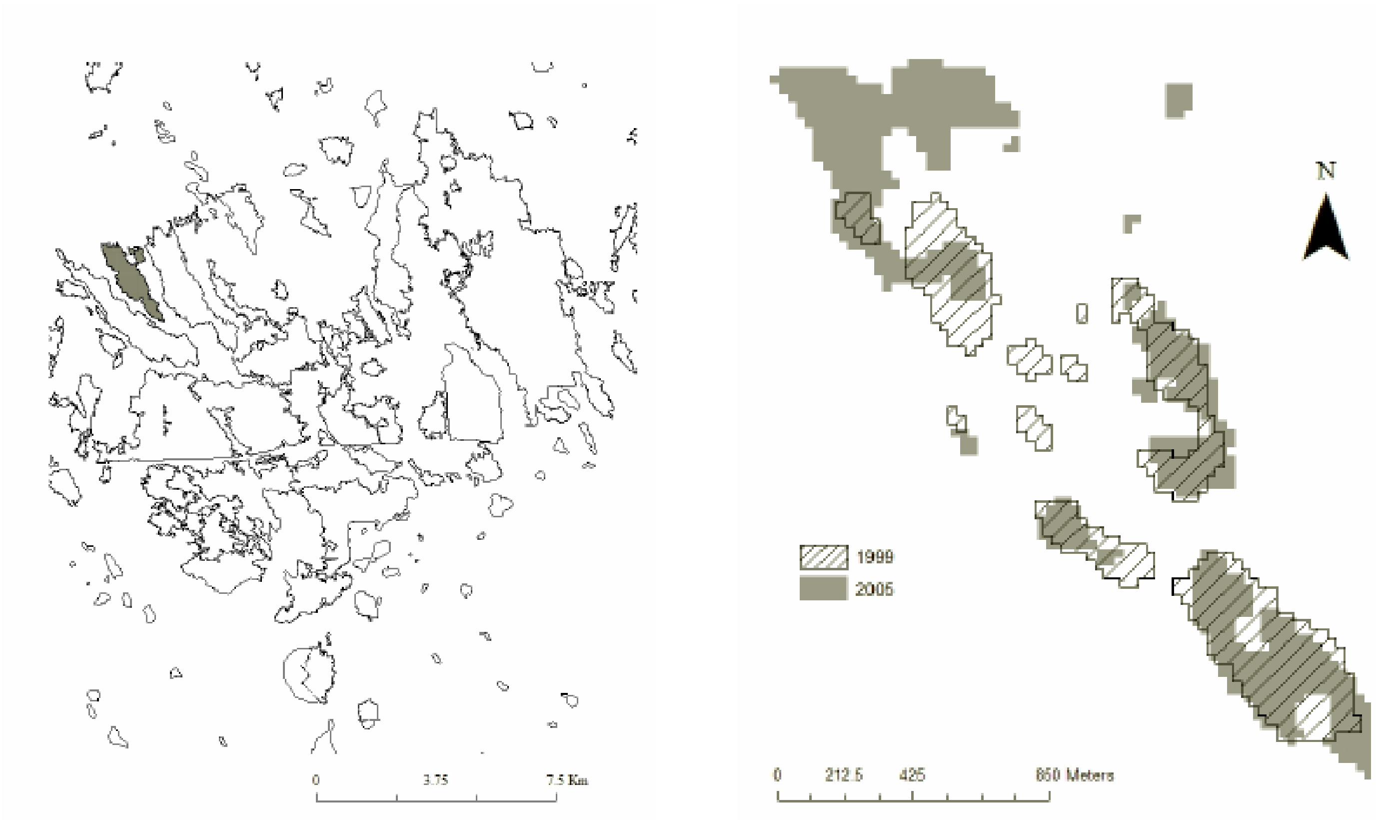


Figure 8. Perimeter map of black-tailed prairie dog colonies in Conata Basin (left). At right are the locations of areas of high densities of active burrows in 1999 and 2005 as illustrated by Jachowski (2007) who classified active burrow distributions into a five-level, ordered factor based upon the quantiles of the prairie dog burrow utilization distribution (Type 1 contained the lowest density patches of prairie dog burrows).

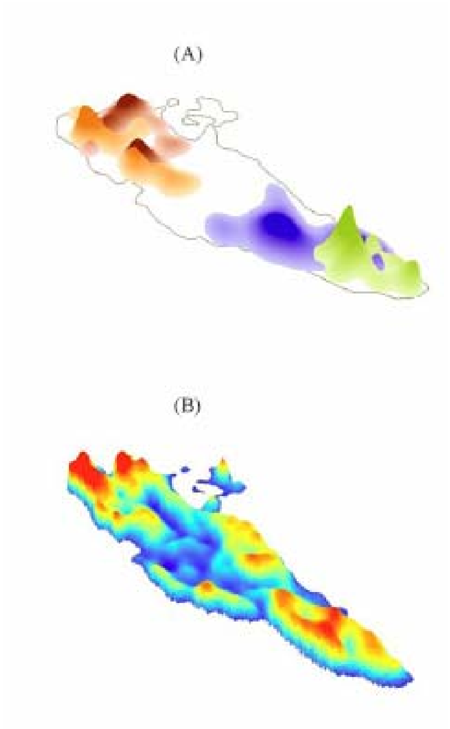


Figure 9. Three-dimensional representation (A) of four female black-footed ferret utilization distributions in 2006 at one large prairie dog colony in Conata Basin, 2006; and the prairie dog utilization (B) at the same colony. The yelow to red colors indicate high densities of active prairie dog burrows (Jachowski 2007). Blue shdes indicate low densities or no prairie dogs.

7. Black-footed Ferret ESA Status and Other Organizational Rankings

ESA Status	Conservation Status (http://www.natureserve.org)
Endangered	G1, N1; Nebraska – SH; South Dakota - S1

The black-footed ferret is the 11th rarest mammal in the world and was listed in 1967 as endangered under the Endangered Species Preservation Act of 1966, and in 1970 under the Endangered Species Conservation Act of 1969, forerunners to the ESA of 1973. Critical habitat has not been designated for the species. Nebraska and South Dakota list the species as endangered. The black-footed ferret is listed as extirpated by Canada and a recovery team and plan have been established (http://www.cosewic.gc.ca; http://www.speciesatrisk.gc.ca). Mexico has cooperated with the re-introduction of black-footed ferrets into northern Mexico. The U.S. Government is a state member of the International Union for the Conservation of Nature and Natural Resources (IUCN) which lists the black-footed ferret as extinct in the wild (IUCN 1996; http://www.iucn.org/themes/ssc/redlist2006/redlist2006.htm).

The Canada/Mexico/United States Trilateral Committee for Wildlife and Ecosystem Conservation and Management has identified the black-tailed prairie dog as a species of common conservation because of its role in the conservation of the black-footed ferret. The North American Agreement on Environmental Cooperation calls for action to encourage conservation of wildlife and wildlife habitat, and specifically, the protection of species in danger of extinction (http://www.cec.org). The black-footed ferret is listed on Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Appendix I lists species that are the most endangered among CITES-listed animals and plants. They are threatened with extinction and CITES prohibits international trade in specimens of these species except when the purpose of the import is not commercial, for instance for scientific research.

8. Recovery and Conservation Planning

Although the black-footed ferret has been listed for nearly 40 years, recovery is still problematic given severe habitat limitations and disease (Conservation Breeding Specialist Group 2004). Challenges facing black-footed ferret conservation include unknown influence of low genetic diversity; canine distemper hazard; direct effects of plague on prairie dog populations and on black-footed ferrets; and minimal suitable habitat for reintroduction (Seal et al. 1989, Roelle et al. 2006). Consequently, reintroductions at most black-footed ferret recovery sites have not succeeded in establishing self-sustaining populations (Figure 10).

Recovery plans developed under Section 4 of the ESA delineate actions which the best available science indicates are required to protect and recover listed species. They provide guidance to state and federal agencies and others. The goal of the black-footed ferret recovery plan is to recover the endangered black-footed ferret to the point where reclassification to threatened status, and eventually delisting, are possible. The recovery priority number for the black-footed ferret is 2 on a scale of 1-18, with 1 equaling the highest priority. This indicates that the black-footed ferret faces a high degree of threat. The ranking also reflects the black-footed ferret's taxonomic status as a full species.

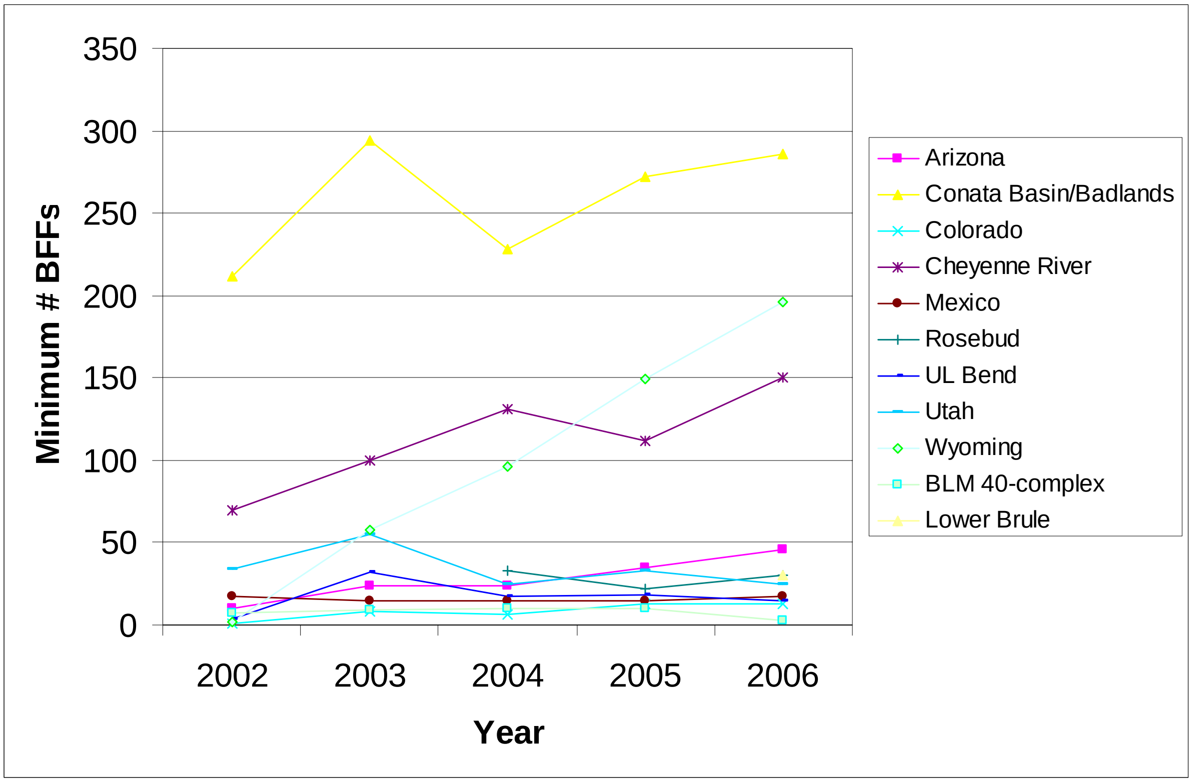


Figure 10. Success of black-footed ferret reintroduction sites through 2006.

To reclassify the black-footed ferret from endangered to threatened status, recovery criteria have been established in the 1988 recovery plan (USFWS 1988).

- Maintain a core breeding population of a minimum of 240 adults (90 males, 150 females)
- Establish a pre-breeding census population of 1,500 free-ranging black-footed ferret breeding adults in 10 or more populations with no fewer than 30 breeding adults in any population by 2010; and

- Encourage the widest possible distribution of reintroduced black-footed ferret populations.

USFWS recommends the following actions:

1. Maintain a captive black-footed ferret population of optimal size and structure to support genetic management and reintroduction efforts.
2. Reduce disease-related threats in wild populations of black-footed ferrets and associated species.
3. Ensure sufficient habitat to support a wide distribution of self-sustaining black-footed ferret populations.
4. Establish free-ranging populations of black-footed ferrets to meet reclassification and delisting goals.
5. Promote partner involvement and adaptive management through regular programmatic review and outreach.

The recovery plan is being revised and recovery of the black-footed ferret may require a pre-breeding census population of 3,000 free-ranging black-footed ferret breeding adults in 30 or more populations with no fewer than 30 breeding adults in any population and at least 10 populations with 100 or more breeding adults (Scott Larson, USFWS, personal communication).

Section 7(a) (1) of ESA requires all federal agencies to further the purposes of the ESA by carrying out programs for the conservation of endangered species.

The Forest Service, National Park Service, and their partners host the most successful black-footed ferret reintroduction efforts at Conata Basin/Badlands (Figure 10). Conata Basin has been a donor site for translocation of wild kits to other reintroduction projects on tribal lands in South Dakota, and in three other states.

The Forest Service has also identified two other potential black-footed ferret reintroduction sites on the Little Missouri National Grassland, North Dakota (Horse Creek) and on the Thunder Basin National Grassland, Wyoming (Cheyenne River). Implementation of reintroduction projects at these sites would improve recovery, but planning and implementation efforts are incomplete. Moreover, the Forest Service manages the widest extent of federal land ownership across Great Plains states east of the plague line which were historically occupied by black-footed ferrets and could establish recovery projects elsewhere in North Dakota, South Dakota, Colorado, Kansas, Oklahoma, Texas and New Mexico.

The Forest Service has the capability of more rapidly and effectively improving the number and distribution of wild black-footed ferret populations than any other federal agency, and more recovery attention is needed on all national grasslands with potential to support black-footed ferret populations (Mike Lockhart, USFWS, personal communication, 2007). Even with development of more recovery sites across national grasslands, the amount of habitat that would be needed to manage prairie dog and black-footed ferret populations would represent a small fraction of the 3.8 million acres of national grasslands.

In addition to agency efforts to identify black-footed ferret reintroduction sites, others have used a geographic information system (GIS) to identify areas with restoration potential within the former range of the black-tailed prairie dog, a species for which there are existing models of habitat suitability (Proctor, 1998, Proctor et al. 2006). Focal areas for black-footed ferrets have been identified, including Fort Pierre, Buffalo Gap (in addition to Conata Basin), and Oglala national grasslands (Figure 11).

Recently, the USFWS and the Forest Service met to discuss black-footed ferret recovery opportunities on national grasslands across the central plains. In a letter dated March 16, 2007, the USFWS stated:

> Previous Forest Service commitments to ferret recovery and it success at Conata Basin significantly advanced the overall ferret recovery. No other reintroduction effort has yet achieved the level of success of Conata Basin, and given current habitat extent and

presence of plague over much of the western prairie habitats, there are few sites that can realistically hope to match that success today. Moreover, Conata Basin is an essential donor source for wild born ferret kits and has helped initiate and/or bolster reintroduction efforts at three other sites in South Dakota, as well as recovery sites in three other States. The Forest Service's contribution to ferret recovery is enormous and deserving of recognition and appreciation of the Service and all of the other partners involved in ferret recovery

However, despite considerable recovery progress since the mid-1980s, the ferret remains a critically endangered species. Potential recovery sites across North America are limited. Perhaps no other agency or entity can contribute to more assured and rapid recovery of the ferret than the Forest Service. Ferret recovery cannot be achieved on National Grasslands alone, but likewise, the establishment of adequate numbers of ferret populations across the historical range of the species (a recovery plan objective) may not be possible without concerted support by the Forest Service and expansion of field recovery efforts across more of the Forest Service's vast western holdings. Even with more focused Forest Service management and development of additional sites for prairie wildlife, the amount of managed land actually required to meet these needs would represent a small percentage of the almost 4 million acres of National Grasslands.

Forest Service manages more lands distributed over plague-free, high-value black-tailed prairie dog habitat than any other State or Federal agency (i.e., in North and South Dakota). There may be excel1ent opportunities to expand reintroduction efforts into portions of other National Grasslands in Colorado, Kansas, Oklahoma, New Mexico, Texas, and Wyoming. I have enclosed a draft "recovery site" evaluation table (*see at end of ferret section*) currently being finalized by the Conservation Subcommittee of the Black-footed Ferret Recovery Implementation Team. That document is designed to identify existing and potential recovery areas; it shows that National Grasslands throughout the Plains States represent the greatest long-range potential to expand ferret recovery. We understand that many Forest Service sites are highly fragmented in Forest Service/private ownership and that plague is present at many as well. It may or may not be feasible in some cases to consolidate land ownership in a similar manner as was accomplished at Conata Basin. Still, the Service and other recovery partners are pursuing establishment of smaller "nursery" populations and development of plague management capabilities with a view that successful distribution of small sites in the near term may be crucial to spreading population extinction risk, while simu1taneously increasing numbers and distribution in the wild. Moreover, we are working on some innovative administrative procedures (via Endangered Species Act section 10(A)(1)(a) whereby we can implement experimental recovery actions in a more timely and cost effective manner (as opposed to requiring a costly and protracted 10(j) rulemaking process, while still ensuring the protections afforded by 10(j) on adjacent landowners). Our hope is that we can get more small populations started and maintained, while simultaneous efforts can be made to manage for expanding habitat base and consolidating land ownership.

It is important then that the Forest Service examine all possible opportunities to expand recovery efforts across grassland units. While habitats the size and quality of Conata Basin are certainly desirable, we understand that such habitat development is not possible for most units, and that actual development of suitable prairie dog habitats for ferrets may take considerable time to accomplish. Nevertheless, the planning for recovery sites/grassland unit should be initiated as soon as feasible. Wherever possible (especially on plague free units), small nursery populations of ferrets should be established on

> suitable complexes where 1,500 to 3,000 acres of prairie dogs occur and can be maintained and managed for ferret recovery.
>
> Finally, it is important to understand where the recovery program stands with respect to implementation and monitoring of ferret projects. Recovery partners are now trying to establish as many populations as possible as broadly as possible across the ferret's historical range. Funding for monitoring and research that was typically involved in earlier recovery efforts is largely unavailable today. Consequently, we are looking at more "hands-off" approaches to recovery that entail only basic monitoring requirements (e.g., one fall spotlight effort/year for the first 3 years, perhaps only every 3- 5 years thereafter). We know that the cost of implementing recovery actions is becoming a greater problem for partners and it has become more important from a recovery perspective to establish more and better distributed populations.

The Forest Service responded to its staff:

> To date, the most successful black-footed ferret reintroduction site is in Conata Basin on the Buffalo Gap National Grassland in South Dakota. A population of about 100 breeding adults has been established, and wild born kits from that site have even been available to supplement other recovery sites. As part of the Northern Great Plains Land Management Plan revision process, the Forest Service designated future black-footed ferret reintroduction sites at another area on Buffalo Gap, and on portions of the Little Missouri and Thunder Basin National Grasslands. These areas are envisioned to contain large acreages of black-tailed prairie dog colonies to support ferret populations.
>
> Additional reintroduction sites are needed to make better progress toward recovery objectives. Finding or even establishing large complexes of black-tailed prairie dog colonies is often problematic. Most black-tailed prairie dog colonies are small and scattered across the landscape. FWS is indicating that smaller complexes of black-tailed prairie dog colonies (1,500 to 3,000 acres) can play an increasingly important role in national recovery by supporting small nursery populations of black-footed ferrets. The enclosed letter from FWS provides the rationale for such nursery populations.
>
> FWS is also working on developing some innovative administrative procedures that may help to expedite reintroduction actions. Recognizing that funding for monitoring may be limited; FWS is also reducing expectations for post-release monitoring.
>
> Despite our important contributions to the national recovery program to this point, recovery of the black-footed ferret still remains tenuous at best. Opportunities likely remain for the Forest Service to continue to be a leader in the national recovery effort. Please join in the conversations and meetings as you can to better understand and discuss these opportunities in Region 2.

Limitations on recovery program efforts caused by declining budgets and redirected priorities over many areas are a critical concern. The lack of response of federal and state agencies to ESA Section 7(a) (1) responsibilities is a critical concern. The March, 2007 letter from the USFWS to the Forest Service not only highlights again the importance of Conata Basin but beckons the Forest Service to establish more black-footed ferret reintroduction sites on national grasslands. More detailed information on the status and recovery needs of black-footed ferret is presented by the U.S. Geological Survey (Roelle et al. 2006).

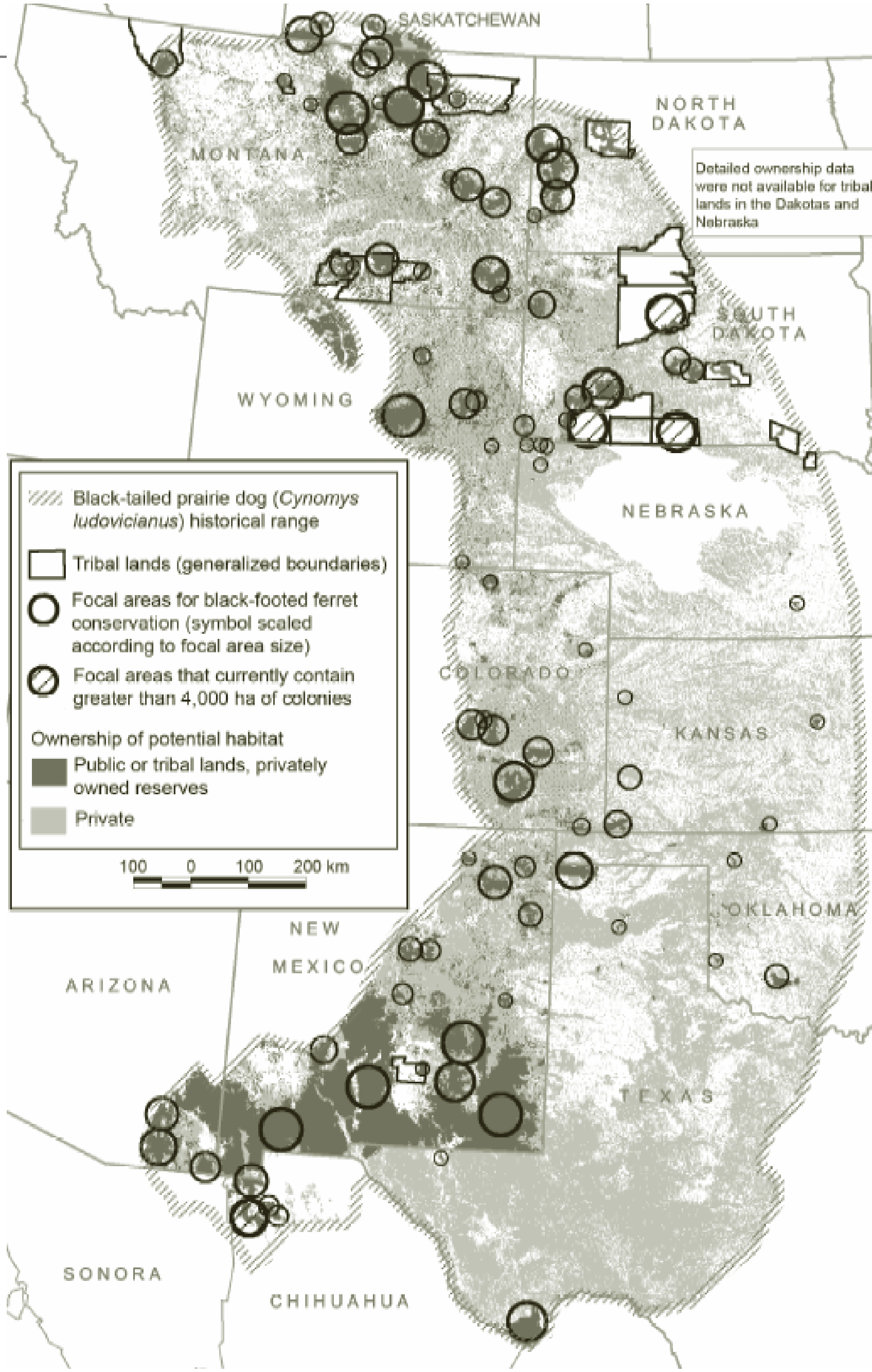


Figure 11. Focal areas for black-footed ferret conservation (Proctor et al. 2006b)

9. Analysis of Effects: Black-footed Ferret

This section analyzes the direct effects, indirect effects, and cumulative effects of the proposed action on the black-footed ferret. It describes and analyzes the effects of the action that would directly affect the species. For example, actions that would immediately remove or destroy habitat or displace animals are considered direct effects. Direct effects are effects occurring during implementation of an action.

Indirect effects are those that are caused by the action and are later in time (after the action is completed) but still reasonably certain to occur. Examples include changes to ecological systems, such as predator/prey relationships, long-term habitat changes, or anticipated changes in human activities, including changes in land use. The geographic extent of the above effects is the action area, defined as all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action.

The effects of the action must be evaluated in the context of cumulative effects. These are defined in the ESA as the effects of future state, tribal, local, or private activities that are reasonably certain to occur in the foreseeable future within the action area. NEPA requires disclosure of c*umulative impacts,* which may result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. The larger the extent of the project action area, the more extensive this aspect becomes. Once identified, the cumulative effects are evaluated with the direct and indirect effects of the action, to provide the context for the Services' jeopardy/adverse determination.

Direct Effects

Application of Rodenticide

Rodenticide is proposed in the IMZ under all of the action alternatives. Under current direction (the no action alternative, Alternative 2 in the 2008 FEIS), rodenticide use occurs in the BMZ per the 2005 forest plan amendment 2 and in limited circumstances in the IMZ regarding threats to public health and infrastructure. Prairie dog rodenticide (2 percent zinc phosphide bait) is highly effective in reducing prairie dog populations, the sole prey of the black-footed ferret. The direct effect of poisoning is the elimination of the prey and habitat currently used by the black-footed ferret and the elimination of habitat where black-footed ferrets can disperse to.

Poisoning of non-target species can occur but is minimized if the rodenticide is applied according to label specifications, time of year, and favorable weather. In Conata Basin, measurable reductions in non-target populations were observed for deer mice (*Peromyscus maniculatus*), ants (Hymenoptera), and darkling beetles (Coleoptera), but there was no measurable reduction in avian and other invertebrate populations (Apa et al.1991, Deisch et al. 1990, Uresk et al.1985a, Uresk et al.1985b, and Uresk et al.1986).

Zinc phosphide is a heavy, finely ground gray black powder that is practically insoluble in water. When exposed to moisture it decomposes slowly and releases phosphine gas. Phosphine generates rapidly when in contact with dilute acids in the stomach causing death. Animals that ingest lethal amounts of bait usually are asphyxiated within 3-5 hours (Timm 1983). Zinc phosphide is also a strong emetic (causes vomiting) which can determine how much zinc phosphide is required to kill the animal and whether or not an animal dies after ingesting the chemical (Schitoskey 1975).

Grain bait (oats) is treated with zinc phosphide for consumption by prairie dogs. Untreated grain (pre-bait) is typically applied to prairie dog colonies a few days prior to zinc phosphide treated bait to promote grain consumption. Prairie dogs usually will not eat the grain bait until early in the fall when their natural forage matures and dries (South Dakota Department of Agriculture et al. 1994). When proper procedures are followed, efficacy of zinc phosphide bait is typically 90 percent or higher (South Dakota Department of Agriculture et al. 1994).

Zinc phosphide is highly toxic to wild birds. It is also toxic to non-target mammals. Nearly sixty studies have been conducted on the toxicity of this rodenticide to wild animals. The most sensitive bird species which have been evaluated are geese (LD50 of 7.5 mg/kg for the white- fronted goose). Pheasants, morning doves, quail, mallard ducks and the horned lark are also very susceptible to zinc phosphide. Blackbirds are less sensitive (Extension Toxicology Network 1993). Seed-eating animals on national grasslands will be at risk from zinc phosphide treated oats. The whooping crane is granivorous.

Zinc phosphide breaks down rapidly in the digestive tract of affected animals, so predators and scavengers are generally not exposed to the compound. Species that were fed zinc phosphide-poisoned prey during laboratory studies and showed no negative physiological symptoms included Siberian polecats, mongooses, coyotes, kit foxes, mink, black vultures, bald eagles, golden eagle, and great-horned owls (USDA Animal Plant and Health Inspection Service 1994).

Zinc phosphide is not stored in the muscle or other tissue of poisoned animals and therefore there is no true secondary poisoning. However, zinc phosphide remains toxic for several days in the gut of dead rodents. Other animals can be poisoned if they consume enough of the gut content of rodents recently poisoned by zinc phosphide (Timm 1983), however, such poisoning is limited because most prairie dogs poisoned with zinc phosphide die in their burrows (Tietjen 1976).

There is only a small amount of deterioration of zinc phosphide baits due to the evolution of phosphide gas. Dry baits are considered toxic indefinitely. Lecithin-mineral oil, added to zinc phosphide to adhere to grain bait, offers protection against moisture, and therefore increases its stability. Under field conditions, zinc phosphide baits may remain toxic several months until eroded by weather, decomposition of the carrier, or removal by insects (Timm 1983). Translocation of phosphine gas has been demonstrated but it is rapidly converted to harmless phosphates (Timm 1983).

The 2001 Forest Plan prohibits the use of rodenticides (above-ground baits) outside October 1 to January 31 to reduce risks to migratory birds. To reduce risk to other wildlife, the LRMP does not allow burrow fumigants in prairie dog colonies. The act of applying rodenticide may also directly affect some species. Trucks are used to haul pre-bait and bait over two-track trails to the application site. Once at the site, all-terrain vehicles are operated on prairie dog colonies to allow people applying the oats to reach all prairie dog holes. The use of vehicles may directly impact some species.

Currently, black-footed ferrets occur only in the Conata Basin MA 3.63, with a 2008 observation of ferret snow tracks immediately adjacent to but outside of this area. Over time, some additional dispersal could occur within the vicinity of the reintroduction area. As explained above, no secondary poisoning of black-footed ferrets would be anticipated as a result of rodenticide application in non-MA 3.63 areas.

Minimum and Maximum Prairie Dog Colony Extent

A major aspect of the proposed action would be a minimum and maximum range of prairie dog colony acres to be allowed in each GA (Table 2). A consideration in the analysis of potential effects on the black-footed ferret is how setting a minimum of 1,000 acres of colonies and a maximum acreage of 3% of gross GA acreage (2,100 acres to 3,600 acres depending of the GA; Table 2), and setting a maximum inter-colony distance of 6 miles, will affect options for future black-footed ferret reintroductions on the six GAs. Will such a range of prairie dog colony acreage and inter-colony spatial standard going provide habitat for a viable population of black-footed ferrets?

One of the reasons for the near extinction of the black-footed ferret is the scant acreage of prairie dog colonies throughout the prairie dog's range in the Great Plains. If black-footed ferrets could survive in an area of low prairie dog colony acreage, the species would still occur in the Great Plains. In the Great Plains, prairie dog colonies typically are small and constitute a small extent of private rangeland. Examples of the low percentage of private land base in prairie dog colonies are displayed on the non-federal land within the GAs (Table 2; Figures 1 and 2). The percentage in prairie dog colony ranges from 0.17% on Fort Pierre GA non-federal land (much of that non-federal land is in cropland) to 4% on Fall River Northeast GA. The percentage of non-federal land in prairie dog colonies remained stable during 2002-2006 despite the drought (Table 2). Total acres fell from 8,977 to 8,005 acres (2.0 - 1.9%).

On federal land in the GAs, the percentage of land base in prairie dog colony ranged from 0.5 - 4.2% in 2002, depending on the GA, and from 0.17 - 1.5% in 2006 after BMZ poisoning (Table 2). Total prairie dog acreage on federal land fell from 8,264 to 6,068 acres (1.7 - 1.2%). Almost all of the current acreage is in the IMZ. The proposed action, Alternative 1, would establish a minimum of 1,000 acres (0.8 - 1.4% of federal land base, depending on the GA size) for black-footed ferret reintroduction. At this minimum acreage, the proposed action establishes a prairie dog colony extent slightly less than what exists on private land within the GAs. The minimum total of 6,000 acres for the six non-MA 3.63 GAs represents 1% of total federal land in the GAs, 1.2% of the total suitable prairie dog habitat, 2.5% of the total IMZ acreage, and 3% of the total suitable prairie dog habitat in the IMZ (Table 2).

Will the proposed action's maximum prairie dog colony acreage per GA (2,100 acres to 3,600 acres depending on the GA (Table 2)) of prairie dog colonies provide viability for a black-footed ferret population? The proposed action cites the recent reintroduction of black-footed ferrets at Wind Cave National Park for the proposed action's contention that the minimum and maximum range of acres of prairie dog colonies per GA will keep options open for black-footed reintroduction. The USFWS and others have long viewed large acreages of prairie dog colonies as essential for recovery of the species (Roelle et al. 2006). Prairie dog colony extent for black-footed ferrets has been a minimum of 10,000 acres, 5,000 acres, and now the USFWS will consider a reintroduction site if the site contains at least 1,500 – 3,000 acres of prairie dog colonies. This consideration by USFWS does not convey that 1,500 – 3,000 acres is all the acres a site needs for black-footed ferret reintroduction. Indeed, these small reintroduction sites are experiments to test whether a population of black-footed ferrets can be established at such acreages. The experiment may fail or the small sites such as Wind Cave and Smokey Valley ranch, Kansas may require periodic supplementation with captive-reared or wild born black-footed ferrets. The USFWS and others believe that it is crucial to attempt to establish and maintain as many black-footed ferret populations as possible in native habitats in order to achieve recovery of this species. The experiments at low prairie dog colony acreage will provide useful information but they are in another sense a sign of desperation because it is very difficult to find large extents of prairie dog colonies for black-footed ferret reintroduction.

The introduction of black-footed ferrets at Wind Cave is a test of the viability of using a reintroduction site with less than 5,000 acres of prairie dog colonies (National Park Service 2006). The black-tailed prairie dog management plan for Wind Cave sets the limits of prairie dog colonies within the park between 1,000 and 3,000 acres (3.6 - 11% of the park's land base or 12 – 35% of its 8,566 acres of suitable prairie dog habitat). The limits were established before a black-footed reintroduction was proposed.

> The primary goal of the project is to test and evaluate the viability of ferret populations in a small prairie dog complex (i.e., approximately 2,500 acres). The information obtained from this project will have significant implications to the ferret recovery program. The five-year goal of the proposed reintroduction is to establish a self-sustaining population of black-footed ferrets in the park. Specifically, the population would consist of at least

> 30 breeding females after five years. In the long-term (*i.e.*, continuing five years and longer after release), the goal would be to have a ferret population with size and distribution in a proportional relationship to the extent of prairie dog complexes in the park.

Again, it is unknown at this time if a complex of 1,000 – 3,000 acres will be able to support a self sustaining population of ferrets, therefore the park will be testing the viability of a site <5,000 acres (National Park Service 2006). Black-footed ferrets were reintroduced into Wind Cave in 2007 when the prairie dog colony acreage was 2,800 acres (greater than the acreage depicted in the Wind Cave map below). A similar reintroduction has recently occurred at the 16,800-acre Smokey Valley ranch in Kansas where there are about 2,600 acres of prairie dog colonies.

In light of the above, especially the misunderstanding about whether low acreages of prairie dog colonies constitute viability for the black-footed ferret, an understanding of prairie dog colony acreages, including the origin of minimum and maximum acre values, and black-footed ferret habitat requirements is therefore important. Such an examination is necessary to substantiate the BA's conclusions about black-footed ferret options under the proposed action.

The biological evaluation (BE) for the proposed action lists the sources for the origin of a minimum of 1,000 acres of prairie dog colonies per GA as the 2001 Forest Plan and the multi-state conservation plan for the black-tailed prairie dog (Luce 1999, 2003). The 2001 Forest Plan defines a prairie dog colony complex as:

> a group of at least 10 prairie dog colonies with nearest-neighbor inter-colony distances not exceeding 6 miles with a total colony complex acreage of at least 1,000 acres.

The 2001 Forest Plan is silent on minimum and maximum acres except for two GAs: Fort Pierre and Oglala, where it calls for at least one complex as defined above. At that time prairie dog colony acreage was low in those two GAs and the 2001 Forest Plan desired to encourage prairie dog colony expansion. The 1,000 acres was simply viewed as a target to achieve over the first few years of the 2001 Forest Plan. The ten colonies was taken from a general discussion on meta-populations by Hanski (1997) who suggested that for species in general an adequate successful network of small habitat fragments should have a minimum of 10-15 well-connected fragments. Hanski indicated that even this number may be insufficient if regional stochasticity is strong and local dynamics are strongly correlated. The six-mile maximum for inter-colony distance is taken from Knowles (1985) who published the farthest known dispersal distance for the black-tailed prairie dog.

The multi-state conservation plan for the black-tailed prairie dog calls for:

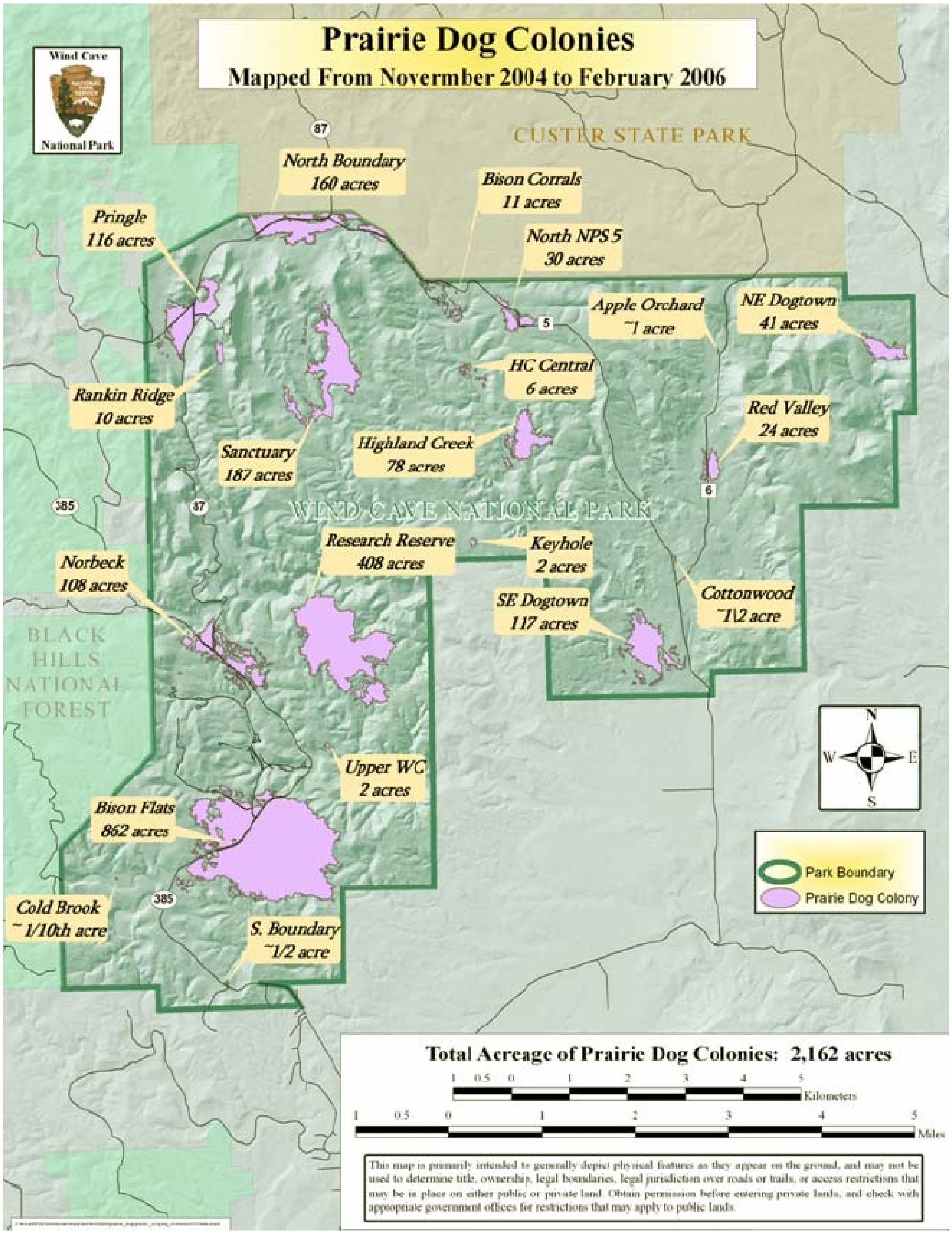
> an area greater than 1,000 acres of suitable prairie dog habitat, encompassing either an existing complex of occupied prairie dog colonies or an area where a complex of colonies can be created to sustain a viable population of prairie dogs for long-term management.

However, the multi-state conservation plan for the black-tailed prairie dog provides no substantiation for the 1,000 acres.

The 1,000 acres commonly appears in documents but there is no empirical basis for the figure even in the multi-state conservation plan. Moreover, there has never been any viability assessment to validate the accuracy of 1,000 acres colonies for viability of prairie dogs and associated species. Dr. Dean Biggins (USGS, personal communication, 2008) has been studying several prairie dog species for over 25 years and states clearly that there is no scientific basis for the 1,000 acre figure for prairie dog or black-footed ferret viability. The BE for this proposed action also recognizes the interface of legitimate social-political issues when grappling with prairie dog colony acres. Such issues arguably are significant when setting prairie dog colony acres for prairie dogs, black-footed ferrets, or grassland ecosystems.

The direct effect of establishing minimum and maximum acreages of prairie dog colonies does not preserve options for future black-footed ferret reintroductions. The proposed action is clear that current GAs with prairie dog colony acreage below 1,000 acres will be increased to 1,000 but is silent on any aggressive action to go beyond 1,000 acres. However, the desire to enhance options for black-footed ferret reintroductions into non-MA 3.63 is stated, suggesting that the maximum acreages will be pursued.

In addition to colony acreage triggers for prairie dog control in the IMZ, desired vegetation conditions in colonies must be met. If such conditions are not met, colonies can be poisoned to reduce prairie dog densities, or, if acreage exceeds the 3%, the acreage can be poisoned back to 2%. Such actions would negatively impact black-footed ferrets, however, the proposed adaptive response protocol is designed to give black-footed ferrets priority. For example, if a 50-acre prairie dog colony does not meet similarity index value and if black-footed ferrets were present, the prairie dogs would not be controlled out of deference to the black-footed ferrets. If the overall maximum acreage were exceeded, other arrangements would have to be made to translocate black-footed ferrets.



Distribution of prairie dog colonies at Wind Cave National Park in 2006. By 2007, the time of black-footed ferret reintroduction, the colony acreage had increased to 2,800 acres.

Table 5. The extent of prairie dog colonies under each alternative and potential black-footed ferret outcomes from establishing minimum and maximum acres of prairie dog colonies (black-footed ferret habitat) in non-3.63 Geographic Areas. Black-footed ferrets are not known to currently exist in the non-3.63 Geographic Areas, although three sets of snow tracks were observed in January, 2008 Wall Southeast.

Geographic Area	Total Acres in Geographic Area	Total Acres in IMZ	Total Suitable Acres (IMZ)	Current Prairie Dog Colony Acreage	Range of Prairie Dog Colonies by Alternative					Expected Black-footed Ferret Population[1]				
					ALT 1	ALT 2	ALT 3	ALT 4	ALT 5	ALT 1[2]	ALT 2[3]	ALT 3[4]	ALT 4[5]	ALT 5
Oglala	94,484	29,582	18,646	1,125	1,000 - 2,800	1,125 - 13,097	100 - 900	N/A	9,500 - 18,700	11	-	0	0	73
Fall River Northeast	91,298	39,964	33,478	1,130	1,000 - 2,800	1,130 - 13,155	0 - 2,700	N/A	9,100 - 18,300	11	-	0	0	68
Fall River West	119,951	49,863	48,420	210	1,000 - 3,600	210 - 2,445	0 - 3,600	N/A	12,000 - 24,000	11	-	0	0	95
Wall North	69,437	16,019	14,801	454	1,000 - 2,100	454 - 5,285	0 - 2,100	N/A	6,900 - 13,900	11	-	0	0	50
Wall Southeast	90,840	32,840	27,885	1,414	1,000 - 2,900	1,414 - 16,461	0 - 2,800	N/A	9,100 - 18,200	11	-	0	0	68
Fort Pierre	116,053	65,414	61,214	1,735	1,000 - 3,500	1,735 - 20,198	0 - 3,470	N/A	11,600 - 23,200	11	-	0	0	82

[1]Based upon the area requirements of black-footed ferrets (Table 7)

[2]Alternative 1 does not provide enough acres of prairie dog colonies to sustain a population of black-footed ferrets. The GAs areas may provide enough acres at the maximum range for a few black-footed ferrets. This population may have to be supplemented periodically with wild born or captive reared black-footed ferrets. However, the low end of one thousand acres is not adequate for even a nursery population of black-footed ferrets.

[3]Alternative 2 provides substantial maximum acreages that could sustain a black-footed ferret population in several geographic areas. However, the minimum acreage (the current 2006 acreage) is too low to support a population of black-footed ferrets. The problem in evaluating Alternative 2 ranges of prairie dog colony acres stems from their presentation in the FEIS. Alternative 2 is the current Forest Plan which allows prairie dog colony expansion and contraction to occur in the IMZ and does not specify colony acreages. The current plan also allows tools to expand colonies. The above range of acreage simply presents the current acreage and the expected acreage in ten years. In reality, Alternative 2 will support black-footed ferrets if the minimum acreages are adjusted upwards.

[4]Alternative 3 allows zero acres of prairie dog colonies and hence cannot support a population of black-footed ferrets.

[5]Alternative 4 provides no prairie dog colony acres in the non-MA 3.63

Indirect Effects

An indirect effect is the loss of habitat and ecosystem processes as a result of rodenticide use and reductions in prairie dog populations in black-footed ferret habitat. Prairie dogs cut tall vegetation creating the low structure grassland typical of black-footed ferret habitat. Permanently removing prairie dog populations could result in a shift of the vegetative community from a buffalo grass/blue grama sod to a western wheatgrass/green needlegrass community (depending on the soil type at the prairie dog colony). This in turn could alter habitat suitability for wildlife species. Many wildlife species prefer low structure grassland and bare ground created by prairie dogs. Soulé et al. (2005, 2007) labeled the prairie dog as a "strongly interacting species" in an ecosystem. They viewed as essential prairie dog population densities or levels that maintain interaction effectiveness rather than mere persistence at minimal numbers.

The BE and this BA also address the role of the prairie dog in the prairie ecosystem of the black-footed ferret. Both documents cite numerous sources for the role of the prairie dog as a keystone or highly interactive species, a species whose ecologically effective densities are far greater than densities required for mere population persistence. Ecologically effective densities influence large areas of grassland, thereby creating black-footed ferret habitat. Miller et al. (2007) summarize the unique role played by prairie dogs in black-footed ferret habitat. Like cattle, prairie dogs graze, but prairie dogs represent much more than just grazers (Kotliar et al. 2006). They also move soil (Detling and Whicker 1988, Detling 1998), influence nutrient cycling (Coppock et al. 1983a; Detling and Whicker 1988; Whicker and Detling 1988, 1993; Detling 1998), increase nitrogen content of soil and plants (Holland and Detling 1990, Detling 1998), change vegetation structure and community dynamics (Coppock et al. 1983a, Whicker and Detling 1988, Weltzin et al. 1997, Detling 1998, Fahnestock and Detling 2002), aerate the ground (Whicker and Detling 1988, Outwater 1996, Detling 1998), alter soil chemistry (Munn 1993), and deepen water penetration (Outwater 1996, Detling 1998). They provide a ready source of prey to many predators such as the black-footed ferret and burrows for shelter to other animals and insects, including the black-footed ferret (Goodrich and Buskirk 1998, Kotliar et al. 1999, Shipley and Reading 2006). This combination of effects gives the prairie dog its role as a highly interactive (keystone) species in the ecosystem, creating a matrix of different habitats that increases diversity across the grassland and sustains black-footed ferrets (Kotliar et al. 1999, 2006; Miller et al. 2000). (see Prairie Dog as a Keystone Species in Creating Habitat for the Black-footed Ferret and other Species.

The minimum and maximum prairie dog colony acreage caps would impose a steep limitation to the prairie dog's ecological role in a grassland ecosystem. Only 1.2% of the total suitable prairie dog habitat would be exposed to the ecological role of the prairie dog. In contrast, almost all of the non-MA 3.63 is annually exposed to the important ecological processes of grazing and browsing by domestic and native ungulates. The BE refers to strong regulatory mandates for viable populations and also references concerns that ecologically effective densities of highly interactive species like the prairie dog are not mandated (Soulé et al. 2005).

Cumulative Effects

Drought, rodenticide use, livestock grazing, plague, prairie dog shooting, and land use conversions, are reasonably foreseeable to occur in the project area.

Drought and Black-footed Ferret Habitat

Drought is significant in the natural history of black-footed ferret habitat. Periods of low precipitation can occur annually intermixed with normal and above normal precipitation periods. However, an extended period of low precipitation (drought) has occurred during the last 6 years, resulting in reduced plant productivity and expansion of prairie dog colonies, albeit, with low densities of prairie dogs. Drought also reduces prairie dog productivity. Climate history indicates that drought may persist into the future, however, periods of drought are normal. Alternatives that favor increasing prairie dog colony acreages during drought benefit the black-footed ferret because black-footed ferret home ranges must increase significantly during drought to compensate for reduced densities of prairie dogs. Alternatives that decrease prairie dog acreages during drought reduce food availability to black-footed ferrets.

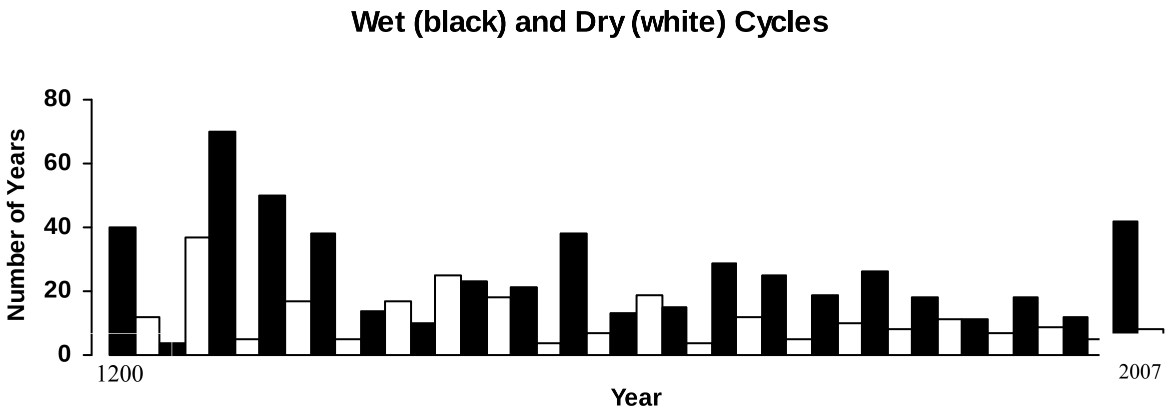


Figure 12. Tree ring data show repeated droughts of five years or longer in western Nebraska during 1200 - 2007 ((Source: University of Nebraska).

Drought is one of the stimulants for this FEIS. However, drought must be put into ecological and historical context. Drought promotes short-statured vegetation and prairie dog colonies can expand rapidly establishing large colonies with low densities of prairie dogs as plant food sources decline under drought. Drought has played a major role in the expansion of black-tailed prairie dog colonies on the NNF, including in Conata Basin, and throughout the Great Plains. However, droughts occur regularly and prairie dog colonies and black-footed ferret populations persist even continuously for hundreds or thousands of years in the same location despite drought or wet periods (White 1986, Carlson and White 1987). The 42-year wet cycle (1957-1999) was unusually long and it has been the period during which most living Americans have lived. Extended drought is a new experience for most people. But again, the phenomenon is normal during the past 800 years (Figure 12). What we see today in Conata Basin black-footed ferret habitat and elsewhere in regards to bare ground has been seen before on prairie dog colonies during drought as noted by Smith (1958):

> As the drought continued in 1956, some areas of the dog town were bare and other areas were fifteen per cent covered by vegetation whereas outside the dog town the vegetation covered twenty-five per cent of the ground. The pond dried up in June and was completely dry for eight months. In the autumn the cattle were taken off the area. Severe dust storms occurred; wind eroded areas around the pond and windmill. In December of 1956, and in January, February, and March of 1957, the prairie dogs dug for roots until parts of the dog town looked as though they had been cultivated. April and May brought ten inches of rain, which came in slow drizzles, soaking in with little or no runoff.

Annuals, especially peppergrass, began to green up the area and form a dense ground cover.

If the non-MA 3.63 areas are allowed to approach maximum prairie dog colony acres and a black-footed ferret nursery population is established, and if drought expands the colonies to beyond the maximum acreage, or if similarity index is violated, the proposed action's implementation plan would have to address the expanded home range needs of black-footed ferrets through translocation or some other tool. The adaptive response protocol appears to recognize this and addresses black-footed ferrets in MA and non-MA 3.63.

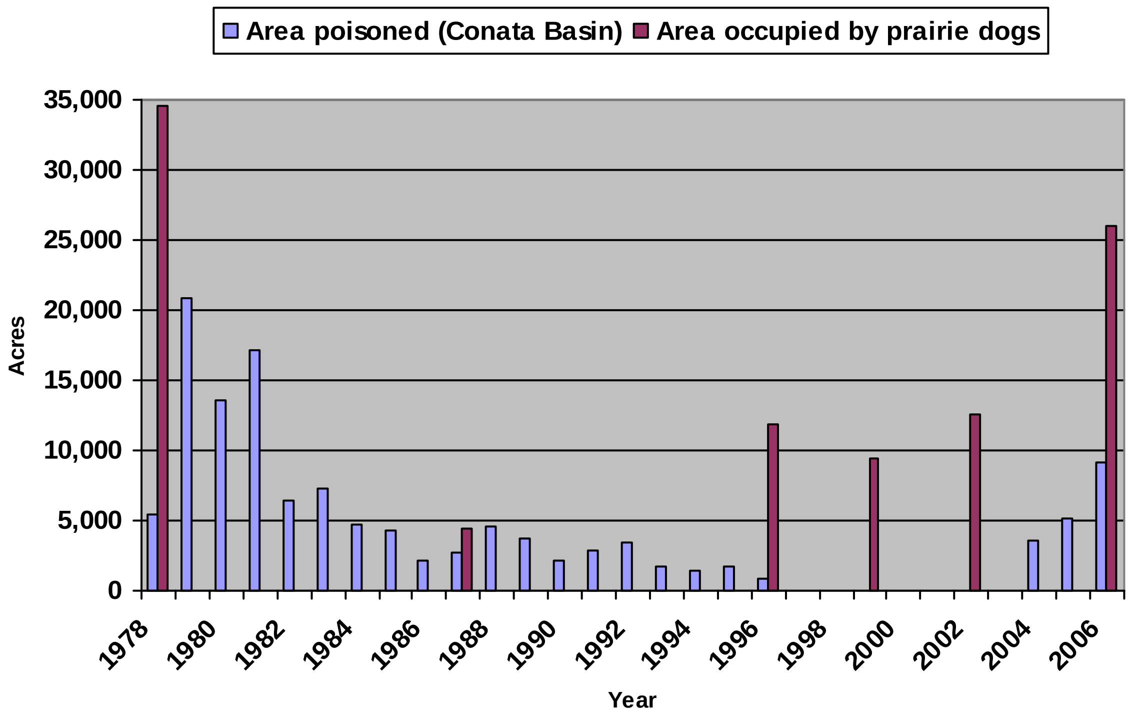


Figure 13. Extent of black-tailed prairie dog colonies and extent of poisoning in Conata Basin, Buffalo Gap National Grassland, South Dakota.

Poisoning of Black-footed Ferret Habitat

The cumulative effect of former and current poisoning prairie dog colonies in the Great Plains has been to eliminate almost all black-footed ferret habitat. Substantial acreages of prairie dog colonies occur on some federal lands and tribal lands where poverty and regulation curtail prairie dog poisoning (Figure 3). The century-old poisoning of black-footed ferret habitat persists because prairie dogs consume the grasses and forbs consumed by domestic livestock. Therefore, private landowners and agencies (Figure 13) have directed extensive programs to eliminate prairie dogs. The general dislike of black-footed ferret habitat persists today (Chace 1973, O'Meilia et al. 1982, Fox-Parrish 2002, Reading et al. 1999, 2002, 2005, McCain et al. 2002, Lamb et al. 2006, Detling et al. 2006, Miller and Reading 2006, Hoogland 2006). Although scientists have identified the prairie dog, the species upon which the black-footed ferret completely depends, as a keystone species, much of the rural public in the Great Plains views the prairie dog as a pest whether on private or federal land (Carr 1973, Lee and Henderson 1989, Reading and Kellert 1993, Kayser 1998, Zinn and Andelt 1999, Lamb et al. 2001, Sexton et al. 2001, Wyoming Agricultural Statistics Service 2001, Fox-Parrish 2002). A minority of ranchers favors the retention of small to medium-sized prairie dog colonies on federal lands (Carr 1973, Reading 1993).

Forrest and Luchsinger (2006) summarize the extent of destruction of black-footed ferret habitat since European settlement (Figure 14). By 1911, prairie dogs were gone from 2 million acres in Kansas. From 1903 through 1912, strychnine eliminated 91% of Colorado's prairie dogs. They state:

> South Dakota, for example, poisoned approximately 1.2 million hectares (3 million acres) of prairie dogs from 1915 to 1965. During the same period, Montana and Texas poisoned 3.4 and 3.8 million hectares (8.4 and 9.4 million acres), respectively. Arizona poisoned about *0.5* million hectares (1.2 million acres) from 1918 to 1922, and extirpated the prairie dog from the state by 1932 (Alexander 1932; Oakes 2000). Records for some states combined poisoning statistics for all species of prairie dogs, and occasionally with statistics for ground squirrels as well, so that data specifically for black-tailed prairie dogs are elusive. Wyoming, for example, reported only combined statistics for white-tailed and black-tailed prairie dogs through 1965.
>
> The total area across all states poisoned from 1915 to 1965 attributable exclusively to black-tailed prairie dogs was more than 12.1 million hectares (30 million acres) (Figure 5 below), and probably was more than 15 million hectares (37 million acres). The peak year was 1923, when poisoning affected 1.5 million hectares (3.7 million acres). Precise estimates for the cost of the war against prairie dogs are unavailable, but the cumulative cost over the years has been billions of dollars.
>
> By 1960, prairie dogs probably inhabited less than 5% of their geographic range of the early 1800s (Berryman and Johnson 1973; Miller et al. 1994). Survivors persevered on lands with low productivity, in areas with poor access, and on scattered public lands (Anderson et al. 1986; Oakes 2000). Most colonies inhabited less than 10 hectares (25 acres), and only a few complexes (i.e., groups of nearby colonies) inhabited more than 2,500 hectares (6,200 acres) (Linder et al. 1972; Chapter 12). Victims of their own success, poisoning programs started to wane. For the first time, federal agencies began to talk about "stabilizing" efforts to control prairie dogs (Berryman and Johnson 1973).

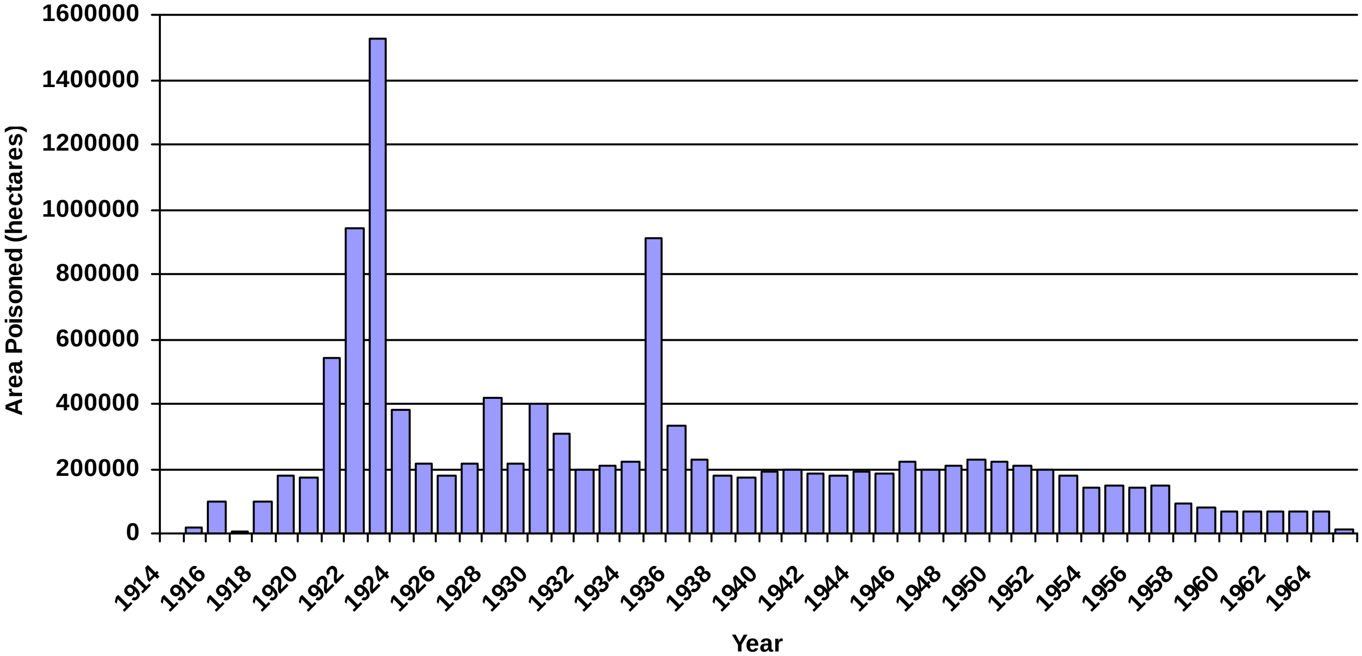


Figure 14. Area poisoned annually for elimination of black-tailed prairie dogs from 1915 to 1965 for all states except Wyoming, and including only the years 1918-1935 for New Mexico and 1921-1923 for Colorado (Forrest and Luchsinger 2006).

The magnitude of today's poisoning is low relative to poisoning over the past century simply because today's cumulative colony acreage is less than 5% of the former extent of colonies. There are fewer prairie dogs left to poison. Despite these trends regarding the magnitude of today's level of poisoning relative to levels of poisoning over the last 100 years, poisoning on federal, state, and private lands has increased since 2004 following the removal of the prairie dog from the list of candidate species for addition to the federal list of endangered and threatened species (Forrest and Luchsinger 2006). Continued drought conditions in much of the Great Plains have led to prairie dog colony expansion and coincided with additional poisoning activities compared to pre-drought.

An obvious cumulative effect arises from the reduction of prairie dog populations due to the current application of rodenticide in the BMZ on MA and non-MA 3.63 (Table 6). Although a suspension of prairie dog control on national grasslands occurred during 1999 to the fall of 2004, poisoning resumed in the BMZ in November, 2004. In addition, the state of South Dakota poisoned 32,055 acres in 2004, 14,725 in 2005, and 29,502 in 2006 (Smith 2007, Kempema 2007).

Since July 1, 2006 the South Dakota bait plant sold 274,500 lbs of oats treated with zinc phosphide (South Dakota State Department of Agriculture 2007). About 6 ounces of treated oats are typically applied per acre of prairie dog colony (Andelt 2006). Enough bait was sold to control 732,000 acres of prairie dogs between July 1, 2006 and the issue date of the winter newsletter of the South Dakota State Department of Agriculture. The state of South Dakota and U.S. Forest Service used only bait from the Pierre, South Dakota bait plant. All of the bait produced at the bait plant is not sold in the study area or even in the state of South Dakota. The South Dakota bait plant is also not the only source of zinc phosphide treated oats in the area. Nevertheless, a large number of prairie dogs have been controlled in 2006 and there is no indication that this trend will cease.

Given the poisoning of black-footed ferret habitat on private land, it is reasonable that federal lands play an important role in the establishment and management of suitable acreage of prairie dog colonies required for self-sustaining populations of black-footed ferrets (Sidle et al. 2006).

If black-footed ferrets disperse into non-MA 3.63 from Conata Basin or Badlands National Park, the Implementation Plan's Adaptive Response Protocol addresses black-footed ferrets first before carrying out poisoning or other management in response to too many prairie dog colony acres or an inadequate Similarity Index.

Table 6. A summary of prairie dog control conducted on the Nebraska National Forest by geographic area in the fall and winter of 2004, 2005, and 2006.

Geographic Area	Acres Poisoned		
	2004	2005	2006
Oglala	0	1,011	926
Fall River Northeast	2,106	1,998	2,844
Fall River West	768	780	372
Fall River Southeast	366	480	312
Wall North	60	497	940
Wall Southeast	237	950	1,370
Wall Southwest	3,196	2,184	5,530
Fort Pierre	0	211	621
Total	**6,733**	**8,110**	**12,905**

Prairie Dog Shooting

The possibility of accidental black-footed ferret mortality exists with prairie dog shooting (Joslin and Youmans 1999). Prairie dog shooting could accidentally kill a black-footed ferret, although the potential is probably small because the black-footed ferret is largely nocturnal. However, black-footed ferrets have been known to be aboveground during daylight hours, particularly early morning and late evening periods when prairie dog shooting may be occurring. Prairie dog colonies in non-MA 3.63 are not closed to shooting.

Prairie dog shooting is extensive in South Dakota and affects prairie dog populations. In 2000, 12,219 residents and 3,081 non-residents of South Dakota shot prairie dogs during over 100,000 recreational shooting days (Gigliotti 2000). Shooters killed 1.23 million prairie dogs on non-tribal lands with about 84% shot on private land. Prairie dog shooting occurs throughout the year with peak shooting in the summer.

Although small mammals such as lagomorphs and squirrels recover quickly from hunting via density-dependent vital rates, such recovery is not observed in the black-tailed prairie dog (Pauli and Buskirk 2007a). Because of their coloniality, prairie dogs possess certain life-history traits that predisposed them to be particularly susceptible to hunting associated disturbances, which had cascading effects on population-level processes (Pauli and Buskirk 2007a). Shooting of prairie dogs may significantly reduce prairie dog densities (Vosburg and Irby 1998) and indefinitely maintain reduced densities in colonies (Knowles 1987).

Prairie dogs show no evidence of density dependence in overwinter survival or next-year natality. Rather, shooting induces not only additive effects on survival but also leads to reproductive near-collapse the summer following shooting (Pauli and Buskirk 2007a). Surviving prairie dogs increase alert behaviors eightfold and reduce both aboveground activity and time spent foraging by 66%. Changes in behaviour lower the body condition of surviving adults by 35%. Survivors of shooting, especially juveniles, exhibited elevated stress levels; fecal corticosterone concentrations increased by 80% among juveniles. Pauli and Buskrik (2007a) discovered that overwinter survival rates did not increase in response to reduced prairie dog density. Pregnancy rates declined by 50% and reproductive output fell by 82%. Risk-disturbance overwhelmed any possible density-dependent effects of shooting in prairie dogs, which exhibited additive mortality in response to hunting, and reproductive failure 1 year after shooting. Risk-disturbance was the predominant mechanism whereby individuals and colonies were affected by hunting. The cumulative effect of shooting prairie dogs outside of Conata Basin/Badlands, where shooting is prohibited, is to lower the quality of the prairie dog colony habitat of black-footed ferrets and limit the effectiveness of black-footed ferret dispersal.

Federal lands are used extensively for prairie dog shooting with expanding lead alloy bullets that leave lead fragments in prairie dog carcasses posing a risk to scavengers (Pauli and Buskirk 2007). Their "results suggest that recreational shooting of prairie dogs contributes to the problem of lead intoxication in wildlife food chains that include prairie dogs. Indeed, some features of recreational shooting, including the killing of large numbers of animals, not removing carcasses from the field, and using expanding bullets, is in contrast to traditional forms of hunting and may present potentially dangerous amounts and particle sizes of metallic lead to scavengers and predators of prairie dogs. Recreational shooting of black-tailed prairie dogs occurs with minimal regulation, yet appears to provide a readily available source of lead to scavenging vertebrates. Few agencies regulate recreational shooting intensity and duration, and none currently regulate the type of ammunition that can be used. Managers should consider measures, such as using non-expanding or lead-free ammunition, to reduce the likelihood of lead poisoning in scavenging raptors and carnivores."

Another effect is secondary lead poisoning of non-target species caused by lead fragments left in the prairie dog carcasses after they have been shot by prairie dog shooters. In a study conducted in eastern Wyoming two types of bullets were tested to determine how much lead was present in the prairie dog carcasses after they had been shot: a soft point and a full metal jacket (both from .223 caliber rifles). Eighty-seven per cent of prairie dogs shot with soft point bullets contained bullet fragments compared to 7 percent of those shot with full metal jackets. Furthermore, the amount of lead found in prairie dog carcasses differed between the two bullet types; full metal jacket only averaged 19.8 mg of lead, while soft point averaged 225.2 mg of lead (Pauli and Buskirk 2007). Therefore, a scavenger, such as a black-footed ferret, that eats a prairie dog carcass could succumb to lead poisoning. Since black-footed ferrets are known to exist only on the federally administered Conata Basin/Badland complex area, impacts from secondary lead poisoning of ferrets are unlikely. The deposit of lead into the prairie dog colony environment lowers the quality of prairie dog colony habitat as dispersal habitat for black-footed ferrets. The cumulative effect is to heighten the importance of prairie dog colonies in Conata Basin/Badlands, where shooting is prohibited, as habitat for black-footed ferrets.

Unless the small acreages of prairie dog colonies in non-MA 3.63 are not closed to prairie dog shooting, their value to dispersing black-footed ferrets would likely be reduced. Their utility to harbor a nursery population of black-footed ferrets would also be reduced considerably.

Disease and Black-footed Ferret

Two diseases, canine distemper and sylvatic plague, have notably impacted both wild and captive-reared populations of black-footed ferrets. Sylvatic plague is the principal disease threat to the black-footed ferret. It is an exotic disease foreign to the evolutionary history of North American species and did not exist on this continent prior to 1900 (Gage and Kosoy 2006). It was first observed in prairie dogs in 1932 in Arizona (Cully 1993). Plague is caused by the bacterium, *Yersinia pestis*, which fleas acquire from biting infected animals and can then transmit to other animals via a flea bite. The disease can also be transmitted pneumonically among infected animals or via the consumption of contaminated food items (e.g., black-footed ferrets eating plague-killed prairie dogs) (Godbey et al. 2006).

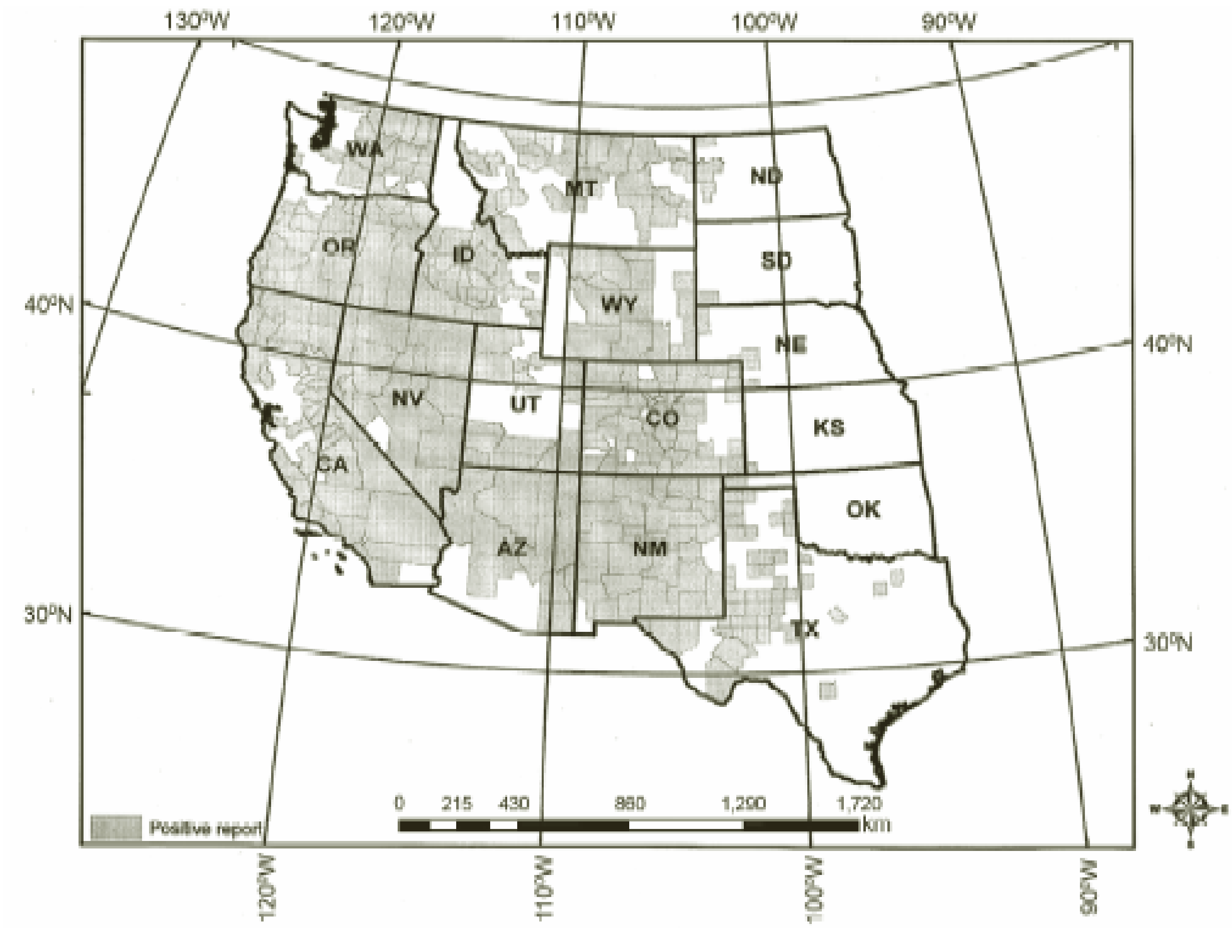


Figure 14. Counties with plague-positive mammals or fleas (1970-present) (Gage and Kosoy 2006). An imaginary plague line runs through the western Dakotas, Nebraska, Kansas, Oklahoma and Texas. The area east of that line is often referred to as plague-free and is the preferred area for black-footed ferret reintroductions.

Since the arrival of plague into North America 100 years ago, prairie dogs have not demonstrated evolved resistance to plague. The introduction of plague has subjected the black-footed ferret to a situation to which it is not evolutionarily adapted, thereby hastening extinction. The Siberian polecat, the black-footed ferret's closest relative, inhabits Asian steppe where plague is native. The polecat's reproductive strategy has to be more responsive to its varying environment and rodent prey. In contrast, the black-footed ferret appears relatively K-selected, that is, its litters are smaller than the polecat, an expected attribute for a specialist that evolved in the plague-free Great Plains inhabited by a stable prey species, the black-tailed prairie dog (Biggins 2000).

Prairie dogs are highly susceptible to sylvatic plague, a serious threat to the persistence of local prairie dog populations. Plague has been annihilating prairie dogs in the western two thirds of their geographic range since the 1940s and greatly reduced the success of black-footed ferret reintroductions. Plague is rare, almost totally absent among prairie dogs east of a line that approximates the 103rd meridian (Cully et al. 2006), near the Wyoming state line (Figure 14). Plague was confirmed in a prairie dog colony in western Custer County, South Dakota in September, 2004 near the Wyoming border, and less than 10 miles from the northern most boundary of the Fall River West Geographic Area. Plague positive prairie dogs were found on tribal lands in Shannon County in 2005, less than 10 miles from the eastern boundary of the Fall River Southeast Geographic Area. Prairie dog colonies may have been affected on the Fall River ranger District because few prairie dogs are observed at many colonies. To date all of the prairie dog colonies thought to be infected by plague have some live prairie dogs within them. The potential for plague to persist in prairie dog populations on the national grasslands and forests in the project area is unknown, but it is acknowledged that plague can have dramatic impacts on prairie dog populations and black-footed ferrets.

Plague can impact the black-footed ferret directly via infection and subsequent mortality and by destroying the black-footed ferret's prey base of prairie dogs. A plague epizootic quickly kills close to 100 percent of prairie dogs in a colony. Plague is also highly prevalent in prairie dog colonies in an enzootic state without any obvious epizootic (Hanson et al. 2007).

Recovery efforts for the black-footed ferret are hampered because both black-footed ferrets and prairie dogs are extremely susceptible to plague (Barnes 1993, Gage and Kosoy 2006). The higher densities and higher rates of social contact of black-tailed and Gunnison's prairie dogs particularly enhance the spread of plague (Cully 1993). The disease is present throughout the range of white-tailed and Gunnison's prairie dogs and is present in approximately the western two-thirds of the range of the black-tailed prairie dog (Figure 6; Barnes 1993, Lockhart et al. 2006). Plague appeared in South Dakota during 2005 and in Conata Basin in 2008.

Until 2005 – 2008, plague had been documented at or within 25 miles of all black-footed ferret reintroduction sites, except the 4 active sites in South Dakota (Conata Basin, Cheyenne River Sioux Reservation, Lower Brule Reservation and Rosebud Sioux Reservation) and the reintroduction site in northern Chihuahua, Mexico (USFWS 2006a). Conata Basin supports the largest black-footed ferret population and has provided a surplus of kits for translocation to other reintroduction areas (Lockhart et al. 2006). However, in 2005, plague struck prairie dogs approximately 25 miles south of Conata Basin. Recovery of prairie dog colonies is occurring. During the late summer and fall of 2005, approximately 3,500 pounds of the insecticide, deltamethrin, a synthetic pyrethroid, were applied to 7,000 acres of occupied prairie dog burrows in known black-footed ferret habitat in an effort to eliminate fleas, the most likely plague vector. Dusting continued in 2008.

On the Buffalo Gap National Grassland, plague is probably responsible for prairie dog die-offs in all three of the Geographic Areas (GA) located on the Fall River Ranger District (Fall River Southeast GA, Fall River Northeast GA, and Fall River West GA), however, no prairie dog carcasses have been collected for analysis. Few prairie dogs can be seen on some colonies in the above areas. On the Fall River Northeast GA, plague has probably occurred on two colonies (approximately 375 acres). On the Fall River Southeast GA, plague has probably occurred on 20 colonies (approximately 1,940 acres). On the Fall River West GA, plague has probably occurred on 5 colonies (approximately 500 acres). Plague may have occurred on additional colonies because only colonies that were not controlled in the past 3 years were examined. In 2008, plague has affected over 9,000 acres of colonies in Conata Basin MA 3.63. The epizootic continues.

In one instance, the black-footed ferret appears to have prospered despite the periodic presence of plague. In 1991, Shirley Basin, Wyoming was the first reintroduction site. Black-footed ferret releases were suspended there in 1994 due to plague and the small black-footed ferret population present was expected to be lost by the late 1990s. However, since 2002, the Shirley Basin black-footed ferret population has been growing rapidly (Lockhart et al. 2006, Grenier et al. 2007). This site is occupied by white-tailed prairie dogs. White-tailed prairie dog complexes are less densely populated than typical complexes of black-tailed or Gunnison's prairie dogs. Apparently, scattered populations of prairie dogs avoided contracting plague and were able to sustain a black-footed ferret population. Furthermore, outbreaks of plague appear to be associated with moisture and the Shirley Basin is one of the few areas in the white-tailed prairie dog range that has experienced prolonged dry conditions.

In summary, recent studies of plague underscore the negative impact of this disease on black-footed ferret recovery. Although the readily recognized epizootics of plague are indeed a hazard to black-footed ferret recovery (so far, one reintroduced population has failed due to epizootic plague), the chronic presence of cryptic levels of enzootic plague are equally ominous. Over a 12-year period, a population of black-footed ferrets was nearly extirpated when augmentation and plague management ceased at some study sites, but it was reestablished by additional releases and plague management; its future seems insecure without plague management. The South Dakota black-footed ferret reintroduction site at Conata Basin is now experiencing a plague epizootic. The extensive acres in Conata Basin may allow black-footed ferrets to survive the epizootic. Thus, while other black-footed ferret recovery sites, often with much smaller acreages of prairie dog colonies, have been lost due to plague, there is a highly disproportionate cumulative impact to the ferret recovery program of reducing the quality of the Conata Basin site by regulating the extent of prairie dog colonies (Dean Biggins, USGS Research Scientist, Science Consistency Review Report on Nebraska National Forest DEIS, 2007).

The cumulative effect of plague outside of South Dakota and the absence of plague throughout most of South Dakota heighten the importance of federal lands such as national grasslands for black-footed ferret sites. Enhancing options for black-footed ferret sites in the non-MA 3.63 through nursery or larger populations could potentially provide a relief valve for black-footed ferrets should plague spread in either MA-3.63 or non-MA 3.63.

10. Determination of Effect and Rationale for the Black-footed Ferret

The Determination

The biological determination for the black-footed ferret is "*no effect*" for non-MA 3.63 areas of Oglala, Fort Pierre, Fall River West, and Fall River Southeast. The biological determination for the black-footed ferret for non-MA 3.63 area of Wall North, Wall Southeast, and Wall Southwest is *"not likely to jeopardize the continued existence."* The biological determination for the black-footed ferret for non-MA 3.63 area of Fall River Northeast is *"may affect, not likely to adversely affect."*

Rationale

A finding of "no effect" is warranted for non-MA 3.63 areas of Oglala, Fort Pierre, Fall River West, and Fall River Southeast because black-footed ferrets do not occur there. Moreover, because of the GAs' distance from a known black-footed ferret population, black-footed ferrets are not likely to disperse to the aforementioned GAs.

Two sets of black-footed ferret snow tracks were recently observed by Forest Service staff in Wall Southeast suggesting dispersal from Conata Basin/Badlands. Because of the proximity of the non-MA 3.63 Wall North, Wall Southwest and Fall River Northeast GAs, dispersal to these GAs is possible within the span of the Forest Plan. A finding of "not likely to jeopardize the continued existence" is warranted for non-MA 3.63 areas of Wall North, Wall Southeast, and Wall Southwest. The determination for Fall River Northeast is "may affect, not likely to adversely affect" since it is outside the Section 10(j) designated area.

The proposed action would not change prairie dog management within MA 3.63 areas and is not expected to affect the existing population of black-footed ferrets at Conata Basin/Badlands. Therefore the previous analysis and ESA section 7 conferencing for Forest Plan amendment 2 remain valid.

Setting the minimum and maximum acreage of prairie dog colonies, along with the threshold for vegetation conditions, will reduce and constrain the available habitat that otherwise could be occupied in the future by black-footed ferrets outside of MA 3.63. The proposed action would provide fewer acres of habitat on the upper end of the range than were originally projected under the 2001 Forest Plan.

It is unlikely that a prairie dog colony of 1,000 acres could sustain black-footed ferrets over time without periodic augmentation or other intervention. Nevertheless, small "nursery" populations may be able to play some role in ferret recovery. Wind Cave black-footed ferret reintroduction on 2,800 acres of prairie dog colonies is an experiment to test whether small acreages of prairie dog colonies can sustain a small black-footed ferret population. The outcome may not be known for some years.

The effect of the proposed low acres of prairie dog colonies in non-MA 3.63 areas also reduces the prospects of successful black-footed ferret dispersal. The 1994 black-footed ferret reintroduction decision (USFWS et al. 1994) designated over 200,000 acres as dispersal habitat for black-footed ferrets, reasoning that black-footed ferrets would ultimately disperse from their point of re-introduction at Conata Basin/Badlands. The 2001 Forest Plan allowed prairie dog colonies to grow in non-MA 3.63 GAs, thereby allowing for future dispersal of black-footed ferrets from Conata Basin/Badlands. The proposed action's small prairie dog colony acreages greatly curtails or terminates successful black-footed ferret dispersal and confines black-footed ferrets to MA 3.63 areas.

11. Whooping Crane (*Grus americana*) Distribution and Status

Whooping cranes were nearly extinct (15 or 16 wintering birds) in 1941, but by 1995 there were 257 birds in captivity and in the wild (Lewis 1995). These large white cranes are rare migrants across Buffalo Gap and Fort Pierre National Grasslands (Peterson et al. 1991, Graupman et al. 1991, Austin and Richert 2001) (Figures 15 and 16). Whooping cranes that migrate across the Great Plains nest in Canada and winter on the Texas Gulf Coast. The U.S. Geological Survey (Austin and Richert 2001) undertook a comprehensive review of observational and site evaluation data of migrant whooping cranes in the United States for the period. 1943-1999. The following discussion is based upon the USGS evaluation.

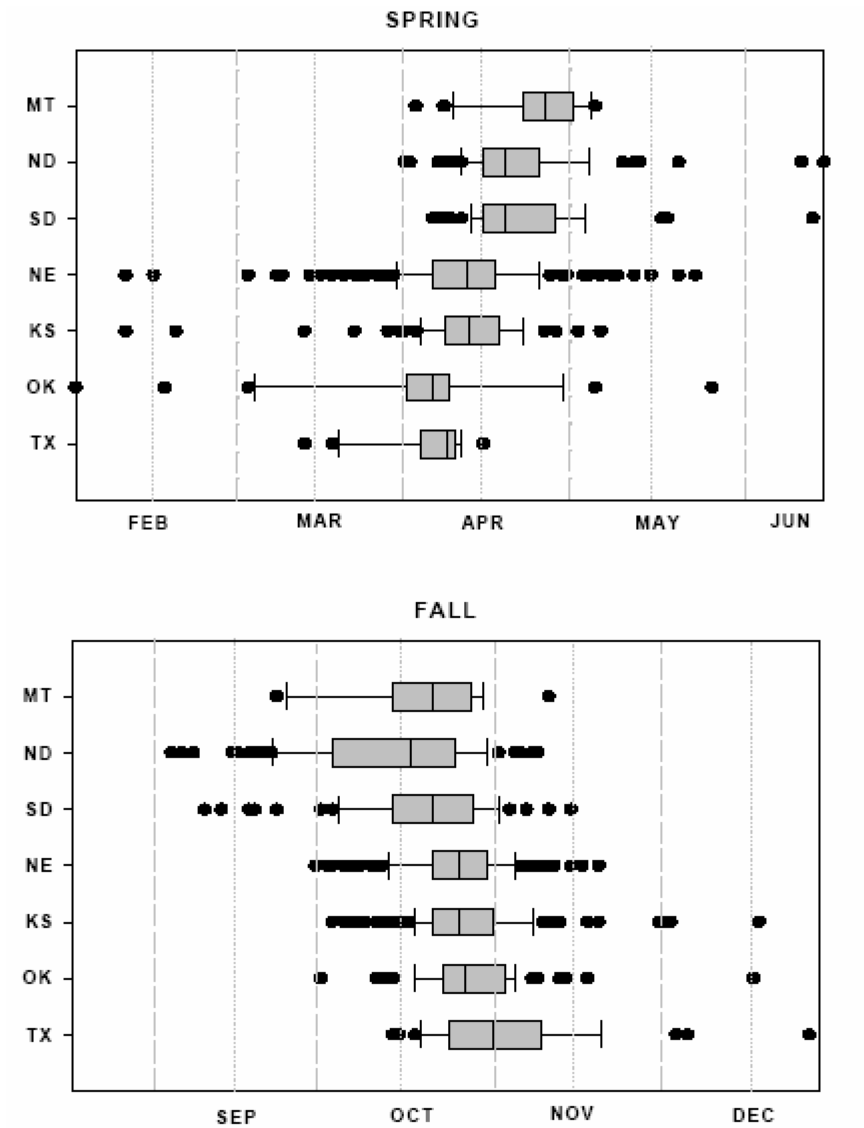


Figure 15. Dates of occurrence of whooping cranes in spring and fall, by state, 1943-1999. Box plots show median (vertical line box), 25th and 75th percentiles (box), 10th and 90th percentiles (bars) and outliers (dots) (Austin and Richert 2001).

Migration

Based on incidental observations, spring migration commences in mid- to late March and continues through mid-late May. Extreme dates include few observations in Oklahoma, Nebraska, and Kansas in February and early March, and in South and North Dakota in June. Some of these outliers were cranes that wintered in Oklahoma or summered in North Dakota. The peak of migration, as indicated by median dates of occurrence, was 8 April in Texas, 6 April in Oklahoma, 12 April in Kansas and Nebraska, 19 April in South and North Dakota, and 26 April in Montana. Few whooping cranes were observed in the United States after early May. The main periods of occurrence in each state over all years seem to be relatively short: the core 50% of the observations ranged from 6 days in Texas to 13 days in South Dakota. Fall migrants were first observed in North and South Dakota in early September; in Nebraska, Kansas, and Oklahoma in early October; and in Texas by mid-October. The peak of migration, as indicated by median dates, were 22 October in Montana, 18 October in North Dakota, 22 October in

South Dakota, 27 October in Nebraska, 27 October in Kansas, 28 October in Oklahoma, and 1 November in Texas.

Migration Habitat

Migrant whooping cranes use shallow water, including stock dams, as overnight roost sites (Ashton and Dowd 1991). Most wetlands used for roosting during migration were less than 10 acres in size and within 1 km of suitable feeding sites, croplands or wetlands (Lewis 1995). The birds are omnivorous and feed on plants, grain, and animals, including amphibians and invertebrates (Ashton and Dowd 1991).

Palustrine and riverine habitats in the central Great Plains provide roosting and foraging habitat to whooping cranes during spring and fall migration (Austin and Richert 2001). Characteristics of roost habitat have been examined in detail for the Platte River in Nebraska (Johnson 1982, Lingle et al. 1984, Faanes 1992, Faanes and Bowman 1992, Faanes et al. 1992), an area long recognized as a critical habitat for whooping cranes during migration. Although the Platte River is the best known spring stopover area for migrating whooping cranes, whooping cranes also use many other areas during spring and fall migration. Whooping cranes have been observed on various roosting and feeding areas throughout the migration path, which extends through North and South Dakota, Nebraska, Kansas, Oklahoma, and Texas. These areas play a key role in crane migration.

Austin and Richert (2001) evaluated the record of whooping crane sightings during migration. Palustrine wetlands accounted for >75% of records in all states except Nebraska; in that state, the proportions of observations occurring on palustrine and riverine systems were both high (56.0 and 39.6% of state records, respectively). Roost sites were most common on riverine systems only in Nebraska, primarily the Platte, Niobrara, and North and Middle Loup rivers. Most of the whooping cranes found on riverine roosts were single cranes or non-family groups, particularly on the Platte. Whooping cranes were most commonly observed on wetlands having seasonal and semipermanent water regimes. Cranes were observed on a wide range of wetland sizes in both spring and fall, with no apparent pattern relative to social groups. Cranes used portions of rivers that ranged in width from 27 to 457 m and averaged 267 + 87 (SD) m. Maximum depths of wetlands on which cranes were observed averaged 50.8 + 41.4 cm (20.0 + 16.3 inches), while specific sites within wetlands where cranes were observed feeding or roosting averaged 18.0 + 10.7 cm (7.1 + 4.2 inches). Most wetland shorelines were classified as having a slight slope (1 to <5% slope). In riverine systems, roosting cranes were more often observed on unvegetated sites than on vegetated sites, but palustrine roost sites had a broad range of emergent vegetation types.

Most feeding sites were upland crops, whereas dual-use sites were more often wetlands. On upland crop sites, 83% of grain stubble was wheat stubble, 75% of row-crop stubble was corn, and 80% of green crops was winter wheat. Habitats adjacent (<1.6 km [1 mi]) to roost sites were most frequently described as cropland (73.8%) and upland perennial cover (69.5%). Woodland habitat occurred adjacent to >70% of riverine roost sites but <8% of palustrine roost sites. More than two-thirds of sites where cranes were observed were <0.5 mi of human developments. Nearly half of the roost sites and two-thirds of feeding sites had unobstructed visibility of <0.25 mi). Private ownership accounted for >60% of all sites used by whooping cranes and >80% of feeding sites, which reflected the high use of crop fields.

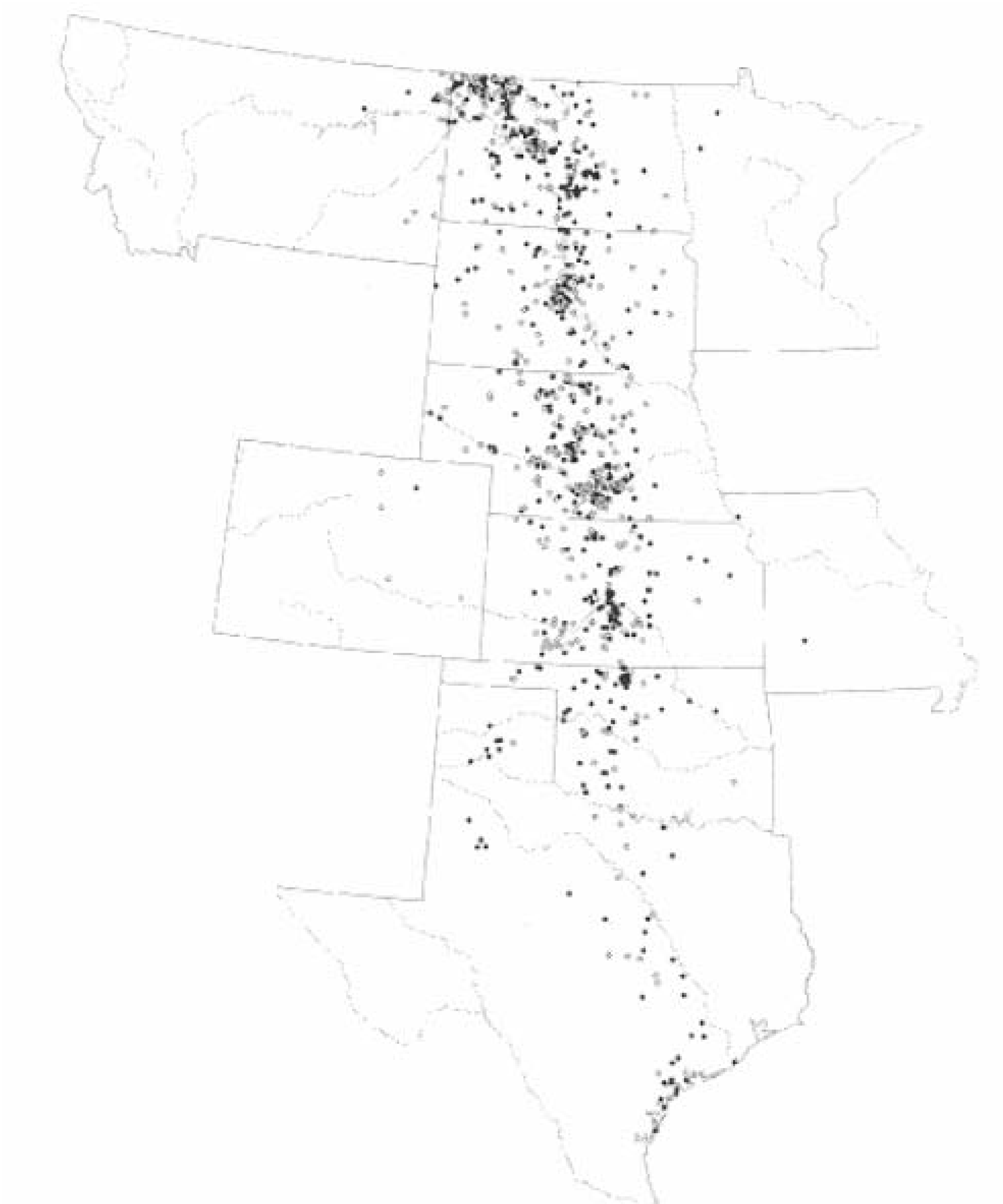


Figure 16. Whooping crane fall (●) and spring (°) sightings, 1943-1999 (Austin and Richert 2001)

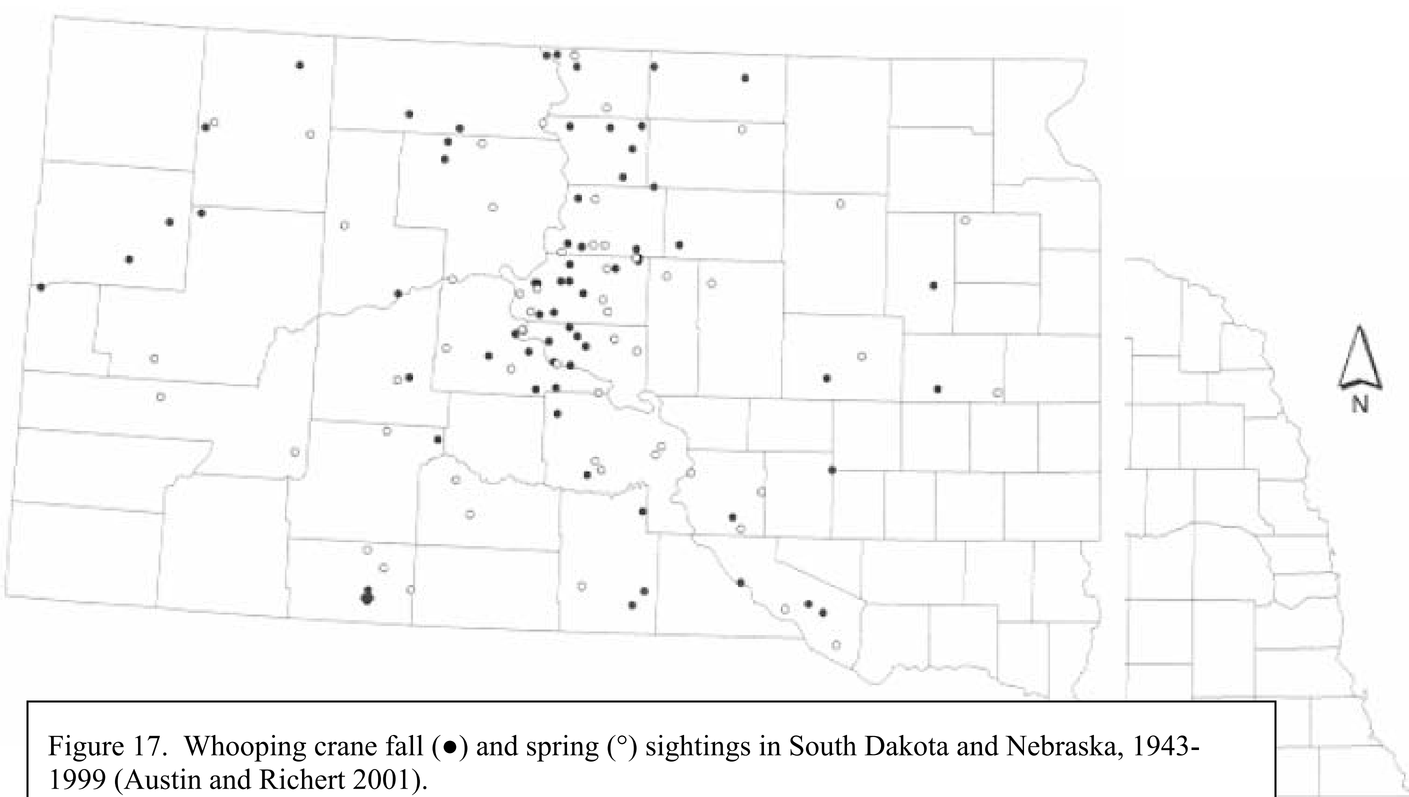
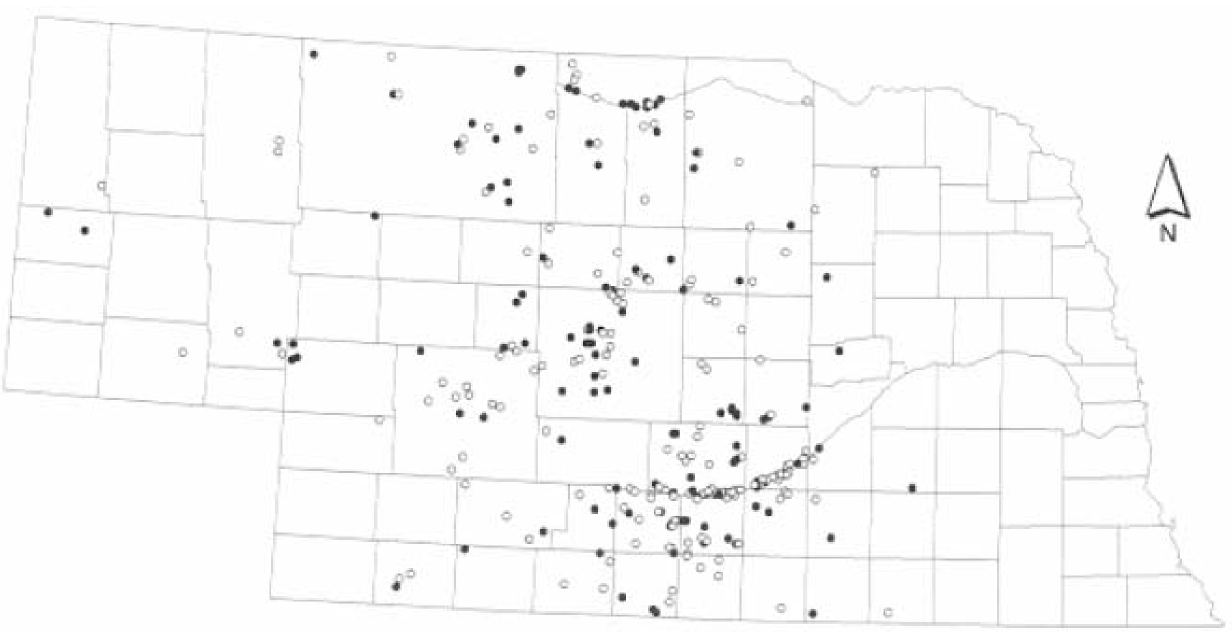


Figure 17. Whooping crane fall (●) and spring (°) sightings in South Dakota and Nebraska, 1943-1999 (Austin and Richert 2001).



Most sites where cranes were observed feeding were in upland crops whereas cranes observed at dual-use sites were more often in wetlands. Seasonally-flooded habitat was largely comprised of flooded pasture (47% of records) and seasonal wetlands (42% of records). Permanent wetlands were largely marshes (30–40%) and reservoirs (30–40%). Sixty percent of upland cover was described as pasture. For upland crops, wheat comprised 83% of small grain stubble, corn comprised about 75% of row-crop stubble, and winter wheat comprised 80% of green crops.

Most sites where cranes were observed feeding were upland crops, with lower occurrence of cranes seen in seasonally flooded habitats, permanent water, or upland perennial cover. No cranes were recorded feeding in woodland. Proportions of habitat types varied little between seasons. Although upland crops occurred in similar high proportions in descriptions of both feeding sites and adjacent habitat, cranes were less frequently observed in upland cover or on wetlands than occurred in adjacent habitat. In spring, cranes most frequently were observed feeding on row-crop stubble, with lesser use of small grain stubble and green crops; <10% of records were for standing small grain, standing row-crops and other. In fall, cranes were most frequently observed on green crops, small-grain stubble, and row-crop stubble. Cranes were infrequently observed in standing small grain, small-grain or row-crop stubble, or in other habitats such as CRP.

Habitats adjacent to roost sites (<1.6 km) most frequently were described as cropland (73.8%) and upland perennial cover (69.5%); permanent wetlands (36.2%) and upland cover (30.5%) were also common. Woodland habitat occurred adjacent to >70% of riverine roost sites but adjacent to <8% of palustrine roost sites. All riverine roosts also had adjacent upland cover, whereas only about half of palustrine roost sites had such adjacent cover; however, upland cropland was common. For both wetland systems, seasonal wetlands occurred more frequently in adjacent habitat for spring roost sites, probably reflecting their seasonal occurrence in the landscape, and permanent wetlands occurred more frequently adjacent to roost sites in fall. Upland cropland was more common in spring than in fall, but the large number of fall records from Cheyenne Bottoms, Quivira, and Salt Plains, where habitat adjacent to roosts is more likely to be non-cropland habitat than on private lands, may be a factor in these seasonal differences.

The most common habitats adjacent to feeding sites were cropland and upland perennial cover; permanent and seasonal wetlands and woodland were less common nearby. Occurrences of seasonal wetlands and upland cover in adjacent habitat were higher in spring than in fall. The higher occurrence of woodland in spring likely relates to greater occurrence of feeding observations in spring on river systems, all of which occurred in Nebraska. Adjacent croplands were most likely to be green crops (winter wheat, alfalfa, winter rye, barley) or row-crop stubble.

Whooping cranes appear similar to sandhill cranes in their frequent use of cropland for feeding particularly corn and wheat stubble (Howe 1987, Johns et al. 1997). However, data from dual use sites indicated that wetlands may provide important feeding areas for some whooping cranes. Howe (1987) did not distinguish between feeding-only and dual-use sites for radio-marked whooping cranes. He noted that the importance of cropland for feeding-only sites was likely higher than the 42% he reported because many feeding sites were actually categorized as roost sites. That is consistent with the frequent use of permanent or seasonally-flooded wetlands for dual-use sites in the USGS evaluation (Austin and Richert 2001).

12. Whooping Crane ESA Status and Other Organizational Rankings

ESA Status	Conservation Status[1]
ESA—Endangered	G1, N1N; Nebraska - S1; South Dakota - SNA

[1] Definitions - http://www.natureserve.org/explorer/nsranks.htm

Existing Conditions

In spring and fall, whooping cranes migrate through South Dakota between and conservation agencies monitor the migration. A contingency plan protects whooping cranes should they appear locally during fall migration.

Direct, Indirect, and Cumulative Effects

There is a remote possibility that whooping cranes could be exposed to rodenticide bait (oats) if they stopped on a project area during migration. Feeding patterns of the cranes, the low concentration of zinc phosphide in the bait, the small amount of bait applied per unit area, widely scattered bait, and the short exposure of bait contribute to low primary and secondary hazards to the birds (Tietjen 1976).

The actual process of applying rodenticide might also deter or scare cranes from the immediate area. Changes in the structure and composition of vegetation after prairie dog poisoning occurs would not affect cranes because they are only present on the ground briefly during migration.

Cumulative effects include mortality and injuries from prairie dog shooters, but this would be unusual. The whooping crane is a well known protected species and there are very stiff penalties for killing or injuring an endangered species. Gunfire and other hunter activities might scare birds locally, but these potential effects are considered insignificant and discountable. Other cumulative effects to whooping cranes include collisions with fences and power lines.

13. Determination of Effect and Rationale for the Whooping Crane

Entire Project Area

The biological determination for the whooping crane under the proposed action is: *"may affect, not likely to adversely affect."*

Rationale

Whooping cranes could ingest rodenticide bait in treated colonies. However, the likelihood of whooping cranes landing where rodenticide was recently applied is so remote that it is considered a "discountable effect." The contingency plan (USFWS 2000a) and consultation with the USFWS would reduce risks to cranes. If whooping cranes are sighted in an area where rodenticide is being applied, poisoning will stop until the cranes leave the area or are hazed out of the area. In addition, if rodenticide has been applied to an area where cranes have been seen, the area will be watched and any cranes appearing will be hazed to eliminate exposure to treated grain. The application of prairie dog rodenticide or sport shooting would not influence food availability for these migrants. Whooping cranes rarely use prairie dog colonies as habitat. Therefore, the range of prairie dog colony acres is not critical to the whooping crane.

Table 7. Summary of Determinations of Effects of Alternative 1 on black-footed ferret (BFF) and whooping crane (WHC) in the non-MA 3.63 Areas (Geographic Areas) of the Nebraska National Forest.

	Buffalo Gap National Grassland							
	Fall River West	Fall River Southeast (excludes MA 3.63)	Fall River Northeast	Wall North	Wall Southeast	Wall Southwest (excludes MA 3.63)	Oglala National Grassland	Fort Pierre National Grassland
BFF	NE	NE	MA-NLAA	NLJ	NLJ	NLJ	NE	NE
WHC	MA-NLAA	MA-NLAA	MA-NLAA	MA-NLAA	MA-NLAA	MA-NLAA	MA-NLAA	MA-NLAA

BFF = black-footed ferret

WHC = whooping crane

NE = No effect-- where no effect is expected.

MA-NLAA = May affect, not likely to adversely affect -- where effects are expected to be insignificant (immeasurable) or discountable (extremely unlikely to occur).

MA-LAA = May affect, likely to adversely affect -- where effects are expected to be adverse or detrimental.

NLJ = Not likely to jeopardize continued existence -- where effects are expected to be beneficial, insignificant (immeasurable), or discountable (extremely unlikely to occur).

LJ = Likely to jeopardize continued existence -- where effects are expected to reduce appreciably the reproduction, numbers, or distribution of the species

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