DRAFT

BLACK-TAILED PRAIRIE DOG

CONSERVATION ASSESSMENT AND MANAGEMENT STRATEGY

for the

THUNDER BASIN NATIONAL GRASSLAND

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EXECUTIVE SUMMARY

The black-tailed prairie dog (*Cynomys ludovicianus)* is designated as a sensitive species by the Regional Forester in Region 2 of the US Forest Service and as a management indicator species on the Thunder Basin National Grassland. It is one of the most controversial animals on the Northern Great Plains. There is widespread concern over its population viability and has been petitioned for listing as a threatened species under the Endangered Species Act in 1999 and 2007. There is also concern over the prairie dog's potential impact on public health, infrastructure, and the local agricultural economy.

Management of the Thunder Basin National Grassland is guided by the Thunder Basin National Grassland *Land and Resource Management Plan* (hereafter "LRMP").

INTRODUCTION

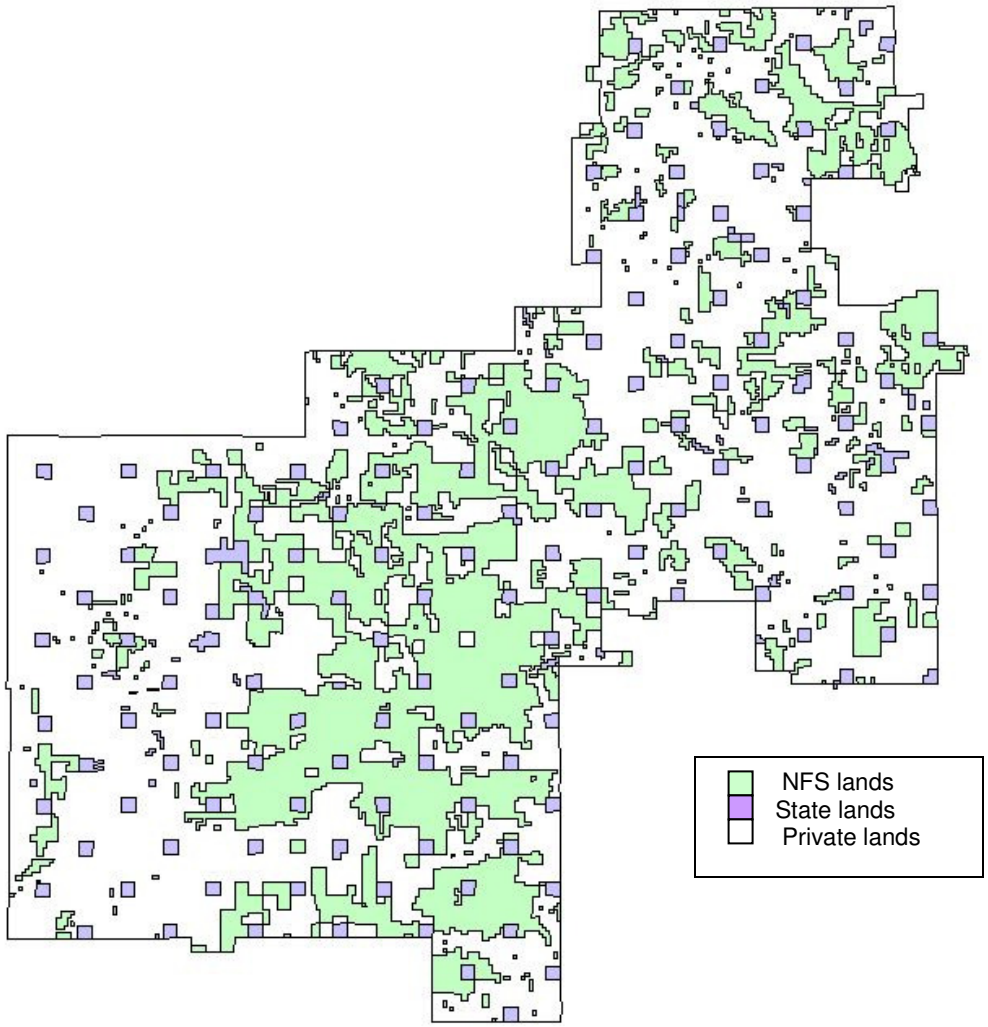
A. Area Covered by this Document

This document is specific to the Thunder Basin National Grassland (TBNG) on the Douglas Ranger District in northeastern Wyoming.

The TBNG encompasses the 553,000-acres in Campbell, Converse, Crook, Niobrara, and Weston counties, Wyoming; (Figure 1); and is dominated by mixed-grass prairie of the wheatgrass-needlegrass association.

The land ownership pattern across the TBNG is characterized by intermingled private lands and grazing allotments typically have mixed ownership. The private landowner retains all property rights, including the right to control prairie dogs or post the land against trespass.

Figure 1: The Thunder Basin National Grassland.



B. Purpose of this Document

The purpose of this *Black-tailed Prairie Dog Conservation Assessment and Strategy* is to provide overall guidance for prairie dog management at a landscape scale. It outlines management strategies for maintaining and increasing black-tailed prairie dogs (*Cynomys ludovicianus*) on the TBNG. Its goal is to provide for the long term viability of this species and those associated with prairie dog colonies. It is designed to provide adequate amounts and distributions of occupied prairie dog colonies to support the reintroduction of the federally listed endangered black-footed ferret. It provides information on the use of available tools to facilitate prairie dog colony expansion into currently unoccupied habitat and to address unwanted colonization on to adjacent private lands.

Note that most conservation assessments and strategies contain an extensive overview of the treated species' ecology and biology. The Interdisciplinary Team (IDT) has omitted such information here, as it is readily available elsewhere.

This document summarizes relevant information and determines biological, geographic, and administrative priorities. It is not a "decision document." Any on-the-ground actions would first have to be approved through the National Environmental Policy Act (NEPA) process.

C. Reason for Conservation Concern

Although estimates vary, black-tailed prairie dogs have declined greatly since 1900 (Knowles et al. 2002, U.S. Fish and Wildlife Service 2000).

In 1998, the National Wildlife Federation, Predator Conservation Alliance, Biodiversity Legal Foundation, and Jon Sharps petitioned the U.S. Fish and Wildlife Service (USFWS) to list the black-tailed prairie dog under the Endangered Species Act. The U.S. Fish and Wildlife Service (2000) determined that the black-tailed prairie dog warranted being listed, but was precluded from that listing due to the need to deal with even more imperiled species. The species was therefore placed on the "candidate list". Since this determination was made in 2000, the U.S. Fish and Wildlife Service has conducted annual reviews of the prairie dog's status and distribution. In 2004, the U.S. Fish and Wildlife Service removed the black-tailed prairie dog from the candidate list. In August, 2007 US Fish and Wildlife Service received another petition for listing of the black-tailed prairie dog (Forest Guardians et al, 2007). It is currently undergoing a status review by the USFWS to determine whether or not to list it as threatened under the Endangered Species Act.

There continues to be widespread concern for the viability of species associated with black-tailed prairie dogs. Chief among these are the black-footed ferret (*Mustela nigripes*) and the burrowing owl (*Athene cunicularia*). The black-footed ferret is totally dependent on prairie dogs for food and shelter. It has been listed as "endangered" since the enactment of the Endangered Species Act, and is considered the rarest mammal in the United States.

The burrowing owl is closely associated with colonial burrowing animals, particularly prairie dogs. Burrowing owls have sharply declined in recent decades. The most dramatic declines

have been noted in the Northern Great Plains. The burrowing owl is now listed as endangered in Canada and is currently listed as a Forest Service Region 2 Sensitive Species.

D. Other Prairie Dog Management Efforts

In 1998, the state governments of Arizona, Colorado, Kansas, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, and Wyoming formed the "Interstate Black-tailed Prairie Dog Conservation Team". The team's goal was to prevent the black-tailed prairie dog from being listed under the Endangered Species Act. The Interstate Conservation Team published a range-wide Black-tailed Prairie Dog Conservation Assessment and Strategy in 1999, and a Multi-state Conservation Plan in 2004. As part of the team's efforts, all of the individual states involved, including Wyoming, agreed to develop state-specific management plans.

The Thunder Basin Grassland Prairie Ecosystem Association (TBGPEA) has been actively developing a Prairie Dog Strategy in collaboration with the USDA Forest Service, US Fish and Wildlife Service, and the Wyoming Game and Fish Department. Some of the components of this strategy are incorporated in this comprehensive Thunder Basin National Grassland strategy where appropriate. Because a large majority of past and current colonies of prairie dogs are within the TBGPEA landscape, this collaborative effort is the basis for the TBNG strategy.

METHODS

A. Interdisciplinary Team (IDT) and Peer Review

During the development of the strategy the IDT regularly coordinated our efforts with prairie dog experts from the Nebraska National Forest, Dakota Prairies Grassland, Wyoming Game and Fish Department, and U.S. Fish and Wildlife Service. As part of this coordination, the IDT asked these agencies as well as the USDA Wildlife Services to comment on a draft of this document in September 2005. Responses were received from: The Thunder Basin, Inyan Kara and Spring Creek Grazing Associations and they were kept informed of our progress at regular intervals. The TBGPEA has been involved in this process through concurrent development of their prairie dog management strategy which is considered in the development of this strategy.

B. Review of Grassland Plan Direction

The IDT reviewed the 2001 Land and Resource Management Plan (LRMP) for the TBNG. The LRMP provides the direction for management of the Thunder Basin National Grassland. That direction is given in the form of goals, objectives, standards, and guidelines. The LRMP direction related to prairie dogs is summarized in Table 1.

Table 1: TBNG LRMP direction considered particularly relevant to the management of black-tailed prairie dogs.

PAGE #	DIRECTION
1-2	1. As scientific information becomes available, jointly develop with the US Fish and Wildlife Service and other agencies conservation and recovery strategies for plant and animal species, listed as threatened or endangered under the Endangered Species Act, and implement established conservation or recovery strategies over the life of the Plan.
1-3	2. Within 15 years, demonstrate positive trends in population viability, habitat availability, habitat quality, population distribution throughout the species range within the planning area, and other factors affecting threatened, endangered, sensitive species and MIS.
1-3	3. Develop and implement conservation strategies for Forest Service sensitive species, as technical information becomes available
1-3	4. Within 15 years, conserve populations of species at risk and rare communities by demonstrating positive trends in habitat availability and quality, or any other applicable factors affecting species at risk.
1-3	5. Identify rare plant and animal communities, inventory them, and develop associated management strategies to conserve them. Support the development and implementation of State and Regional Conservation Plans as they apply to the grassland or forest units.
1-3	6. Within 10 years, provide sufficient habitat for Management Indicator Species to reduce adverse impacts on populations during droughts.
1-3	7. Establish scientifically credible monitoring programs, develop survey methods, and initiate baseline and trend surveys for populations, habitats and/or ecological conditions to contribute to viability of threatened and endangered species, species at risk, and MIS.
1-14	18. In prairie dog colonies known or thought to be occupied by black-footed ferrets, limit oil and gas development to one location per 80 acres to help maintain suitable ferret habitat. **Standard**
1-15	19. To help provide suitable habitat for black-footed ferrets and their young during the breeding and whelping seasons, prohibit the following activities within prairie dog colonies, or those portions of larger colonies, occupied or thought to be occupied by black-footed ferrets from March 1 through August 31: • Construction (e.g., roads, water impoundments, oil and gas facilities), • Reclamation, • Gravel mining operations, • Drilling of water wells, oil and gas drilling. **Standard**
1-15	20. To help provide suitable habitat for black-footed ferrets and their young during

PAGE #	DIRECTION
	the breeding and whelping seasons, do not authorize the following activities within prairie dog colonies, or those portions of larger colonies, occupied or thought to be occupied by black-footed ferrets from March 1 through August 31: • Construction (e.g., pipelines, utilities, fencing), • Seismic exploration, • Permitted recreation events involving large groups of people. **Guideline**
1-15	21. Any net loss of suitable black-footed ferret habitat as a result of prairie dog poisoning or development of new facilities within colonies must be replaced with suitable ferret habitat. This is based on the amount of suitable habitat available when the poisoning or development is proposed to occur. **Standard**
1-15	22. For routine maintenance, access to oil and gas facilities in prairie dog colonies occupied or thought to be occupied by black-footed ferrets should be limited to daylight hours. This does not apply to emergency repairs. **Guideline**
1-15	25. To help maintain suitable nesting habitat for mountain plover, prohibit development of new facilities within 0.25 miles of known mountain plover nests or nesting areas. This does not apply to pipelines, fences and underground utilities. **Standard**
1-15	26. To help maintain occupied nesting and brooding habitat on black-tailed prairie dog colonies, new oil and gas development will be limited to one well per 80 acres within occupied habitat. Cumulatively, structure and facility development will not occur on more than 2 percent of the occupied mountain plover nesting habitat in each prairie dog colony. **Standard**
1-16	27. Any net loss of suitable and occupied mountain plover habitat as a result of prairie dog poisoning or development of new facilities within prairie dog colonies will be replaced within the year by concurrent expansion of suitable plover habitat or in some cases, by enhanced management and protection of occupied plover habitat elsewhere on or near the national grassland. The amount of habitat loss is based on the amount of suitable and occupied habitat available prior to prairie dog dispersal in the year of the poisoning or development. **Guideline**
1-16	28. To help reduce disturbances and risks to nesting mountain plover, prohibit the following activities in plover nesting areas or within 0.25 miles of plover nests from March 15 through July 31: • Construction (e.g., roads, water impoundments, oil and gas facilities), • Reclamation, • Seismic exploration, • Gravel mining operations, • Oil and gas drilling, • Drilling of water wells, • Prescribed burning. **Standard**
1-16	29. To help reduce disturbances and risks to nesting mountain plover, do not

PAGE #	DIRECTION
	authorize the following activities in plover nesting areas or within 0.25 miles of plover nests from March 15 through July 31: • Construction (e.g., pipelines, utilities, fencing), • Workover operations for maintenance of oil and gas wells, • Permitted recreation events involving large groups of people, • Grasshopper spraying, • Prairie dog shooting (in consultation with state wildlife agencies and U.S. Fish and Wildlife Service). **Guideline**
1-16	30. To help reduce risks to mountain plover, access to oil and gas facilities in occupied mountain plover habitat for routine maintenance should be limited to once per 24 hour period and occur between 9 am and 5 pm. Duration of maintenance activities should not extend beyond 1 hour when possible. This does not apply to travel for emergency repairs. **Guideline**
1-16	31. To help reduce risks to mountain plovers from traffic, limit vehicle speeds in occupied mountain plover habitat to 25 mph on resource roads and 35 mph on local roads. **Standard**
1-16	32. Vegetation management projects in suitable mountain plover habitat will be designed to maintain or improve mountain plover habitat. **Standard**
1-16	33. To avoid attracting avian predators, new structures and facilities in occupied mountain plover habitat will be designed with low profiles and/or perch-inhibitors. This does not apply to structures and facilities less than 4 feet in height or those not expected to be used as hunting perches by raptors. **Guideline**
1-17	34. Use the following criteria at the project level to help determine where to use prescribed burning and high livestock grazing intensities (Appendix I) to provide low grassland structure and enhanced mountain plover nesting and brooding habitat: • Proximity to existing mountain plover nesting areas, • Proximity to prairie dog colonies, • Presence of expansive and flat grassland areas. **Guideline**
1-19	61. Do not spray grasshoppers within 0.25 mile of known burrowing owl nests. **Standard**
1-19	62. To optimize habitat for burrowing owls, manage for active prairie dog colonies that are larger than 80 acres. **Guideline**
1-19	63. Coordinate and consult with the appropriate wildlife management agencies and local landowners to prohibit prairie dog shooting in areas where significant risks have been identified for other wildlife species or where shooting is preventing or slowing a desired prairie dog population expansion. Restrictions shall be year-long or seasonal, and dates of seasonal restrictions shall vary depending on the species at risk. **Standard**

PAGE #	DIRECTION
1-20	64. Prohibit activities that would alter water flow regimes and flood prairie dog burrows. **Standard**
1-20	65. Evaluate prairie dog management 3 years after management plan approval. Evaluate prairie dog management again when the total acres of active prairie dog colonies expand to 35,000 acres (approximately 7%) of suitable habitat on the Thunder Basin National Grassland. **Standard**
1-20	66. To reduce risks and habitat loss for prairie dogs and other wildlife species closely associated with prairie dog colonies, align new roads outside prairie dog colonies. If it's necessary to place a new road in a prairie dog colony, minimize the amount of road within the colony to the extent that soil, drainage, topographical and other physical factors will allow. **Guideline**
1-23 (as modified in Record of Decision)	1. Restrict the use of rodenticides (grain baits) for reducing prairie dog populations to the following situations. • Public health and safety risks occur in the immediate area, • Damage to private and public facilities, such as cemeteries and residences. **Standard**
1-23	2. Consult state-wide prairie dog conservation strategies for additional guidance on the appropriate response to complaints of unwanted prairie dog colonization on adjoining agricultural lands (private, state, and tribal lands). **Guideline**
1-23	3. Reduce conflicts with adjacent landowners over prairie dog management through an active landownership adjustment program. **Guideline.**
1-23	44. From January 1 through September 30, don't use rodenticides (above-ground baits) to reduce prairie dog populations. This is necessary to reduce risks to migratory birds. To reduce risk to other wildlife, don't use burrow fumigants in prairie dog colonies. **Standard**
1-27	3. Consider the following when opportunities to acquire lands occur (Reference 36 CFR 254): • Lands with important or unique resources, such as water frontage, wetlands, flood plains and associated riparian ecosystems, cave resources, essential big-game winter range, threatened or endangered species habitat and habitats needed for recovery, Forest Service sensitive species habitat, important paleontological or geologic sites, important historical, heritage resources or traditional cultural properties, outstanding scenic values, or critical ecosystems when these resources are threatened by change of use, or when management may be enhanced by public ownership. • Lands that include prairie dog colonies or that present opportunities to allow expansion of colonies that already exist on nearby National Forest System lands are a high priority. • Important botanical, wildlife and fishery management areas. This includes

PAGE #	DIRECTION
	lands supporting rare plant communities. Lands with important value for outdoor recreation purposes. **Guideline.**
2-5 Broken Hills GA, 2-12 Cellars Rosecrans GA	1. Maintain an increasing trend of black-tailed prairie dog populations across the geographic area over the next 10 to 15 years. **Objective**
2-5 Broken Hills GA, 2-12 Cellars Rosecrans GA	2. Maintain and expand the current distribution of black-tailed prairie dogs across the geographic area over the next 10 to15 years. **Objective**
2-5 Broken Hills GA, 2-12 Cellars Rosecrans GA	3. Improve the Management Area of prairie dog colonies (10 or more colonies with distances between nearest colonies not exceeding 6 miles) in the central part of the Broken Hills GA and the Southwestern part of the Cellars Rosecrans GA over the next 10 to 15 years. This area has been designated as MA 3.63. **Objective**
2-5 Broken Hills GA, 2-12 Cellars Rosecrans GA	4. To help increase prairie dog populations and habitat for associated species, allow and encourage expansion of the prairie dog colony Management Area (10 or more colonies with a total colony acreage of at least 1,000 acres and intercolony distances of less than 6 miles) in the central portion of this geographic area over the next 10 to 15 years. Colonies protected by conservation agreements or easements on adjoining land jurisdictions, including private, may be considered part of a Management Area. **Objective**
2-7 Broken Hills GA, 2-14 Cellars Rosecrans GA	1. Emphasize an active landownership adjustment program adjacent to the Management Area, throughout the geographic area in an attempt to reduce private land conflicts over prairie dog management and to enhance long-term management opportunities for expanding prairie dog populations in this area. Landownership adjustments may need to be completed in some locations before implementation of some actions to accelerate prairie dog population growth. **Guideline**
2-7 Broken Hills GA	2. A range of 23,616 to 31,488 acres of low structure grasslands is prescribed for this geographic area. Much of this acreage should be located in the northeast portion of the geographic area in areas adjoining existing colonies and where prairie dog colonies are known to have occurred in the recent past. This will accelerate expansion of existing colonies and re-establishment of past colonies that are not along private land boundaries. **Guideline**
2-14 Cellars Rosecrans GA	2. A range of 36,324 to 42,378 acres of low structure grasslands is prescribed for this geographic area. Much of this acreage should be located in the northeast portion of the geographic area in areas adjoining existing colonies and where prairie dog colonies are known to have occurred in the recent past. This will

PAGE #	DIRECTION
	accelerate expansion of existing colonies and re-establishment of past colonies that are not along private land boundaries. **Guideline**
3-9 (SIA MA)	***2.1b - Cheyenne River Zoological SIA***: This 5,980-acre site provides for approximately 3,000 acres of prairie dog Management Area, including occupied mountain plover habitat and potential black-footed ferret habitat. Management emphasis is on protecting and enhancing habitat conditions. **Additional Direction:** • Coordinate and consult with the appropriate state wildlife agency to prohibit prairie dog shooting and fur harvest within the SIA. **Standard** • Restrict motorized travel to locations and time periods when it would not reduce the optimum habitat effectiveness of the area. **Standard** • Allow oil and gas leasing; however, prohibit ground-disturbing oil and gas activities if they may have adverse effects on black-footed ferret reintroduction objectives. **Standard**. • Prohibit locatable mineral operating plans that would reduce effectiveness of the habitats emphasized. **Standard** • Prohibit new special-use facilities except for valid existing rights. **Guideline** • Manage livestock grazing and stocking rates to achieve the most rapid development of mature cottonwood willow riparian area while promoting best habitat conditions for mountain plover breeding, nesting, and brood rearing. **Standard**
3-16 (3.63 BFF MA)	**General** 1. Authorize only those uses and activities that do not reduce the suitability of the area as black-footed ferret reintroduction habitat. **Standard** 2. Manage all prairie dog colonies within this Management Area as though they were occupied by black-footed ferrets, and apply all Standards and Guidelines as though black-footed ferrets occupy all colonies. **Standard**
3-16 (3.63 BFF MA)	**Mineral and Energy Resources** 1. Oil and gas stipulations for black-footed ferrets (Appendix D) apply to all prairie dog colonies within this management area. **Standard**
3-16 (3.63 BFF MA)	**Livestock Grazing** 1. Prior to the U.S. Fish and Wildlife Service authorizing a black-footed ferret release, the Forest Service will coordinate and consult with the U.S. Fish and Wildlife Service, the state wildlife agency and other agencies that conduct, authorize or fund predator control to help ensure that predator control activities on the national grassland to reduce livestock losses do not pose significant risks to black-footed ferrets. **Standard**
3-16 (3.63 BFF MA)	**Fish and Wildlife** 1. Use of rodenticides in a colony to reduce prairie dog populations may occur only after consultation and concurrence of the U.S. Fish and Wildlife Service. The

PAGE #	DIRECTION
	conditions when prairie dog poisoning may be authorized are presented in Chapter 1. **Standard** 2. 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. **Standard**
3-16 (3.63 BFF MA)	**Recreation** 1. To help expand and maintain suitable black-footed ferret habitat, coordinate and consult with the state wildlife agency to prohibit prairie dog shooting within black-footed ferret reintroduction habitat. **Standard**
ROD (pg 40)	If a statewide conservation plan is approved for Wyoming and allows for poisoning along private land buffers for some colonies or complexes, a future plan amendment may be needed to incorporate this direction.

C. Issue Identification

To identify the primary issues facing prairie dog conservation on the TBNG, the IDT discussed past complaints of prairie dog expansion; reviewed the latest drafts of the Wyoming Prairie Dog Management Plans; and reviewed the LRMP's Final Environmental Impact Statement (FEIS) and its supporting documents.

D. Determination of Suitable Habitat for Black-tailed Prairie Dogs

The IDT relied on the prairie dog habitat suitability model used in the LRMP's FEIS (p. 3-264). Suitable habitat is based on slope (less than 30% slope), soils and vegetation (see FEIS pp. B-31, B-32, and B-34 for a list of "suitable" vegetation types). In classifying prairie dog habitat suitability, a site was classified as preferred habitat only if all four variables (vegetation, soil, slope, and water) were rated as preferred. If one variable was rated suitable but marginal, the entire site was rated marginal. If one variable was rated unsuitable, the entire site was rated unsuitable.

Forest and wetland vegetation types were considered unsuitable for prairie dogs. Grassland vegetation types including those with minor shrub components were considered preferred habitat. Since black-tailed prairie dogs also occur in shrublands and modify shrublands by removing shrubs in and around their colonies, shrublands were considered suitable but marginal habitat.

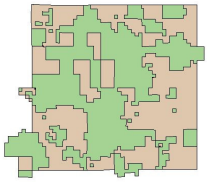
Slopes with suitable soils and vegetation that were less than 10% slope were considered preferred habitat. Slopes ranging from 10 to 30%were classified as suitable but marginal habitat. Areas with average slopes exceeding 30% were identified as unsuitable.

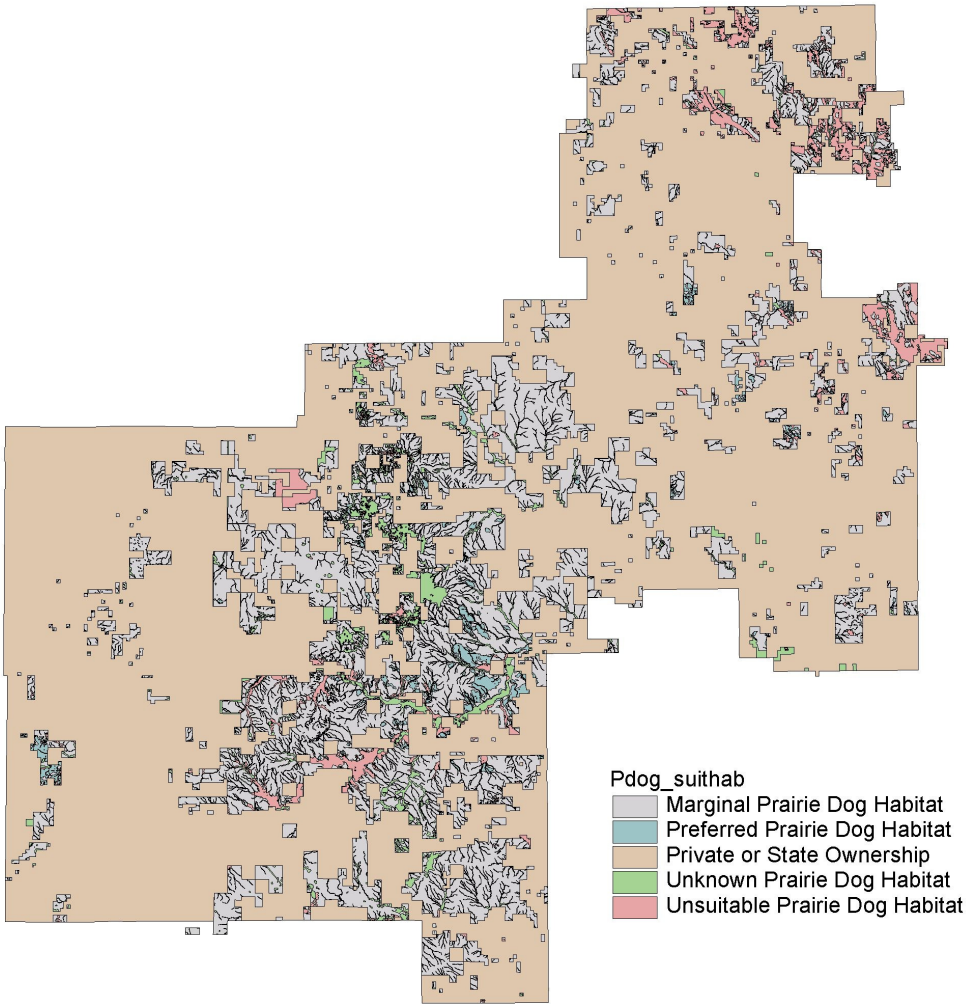
All water and wetlands were classified as unsuitable for prairie dog colonization. Areas with shallow water tables were also classified as unsuitable.

The Thunder Basin analysis used vegetation classified from the USDA Forest Service Pueblo Integrated Resource Inventory (IRI) Center. Each type was classified for prairie dog suitability.

This model classified 405,000 acres (92%) of Thunder Basin as potentially suitable habitat for prairie dog colonization.

Figure 2: Suitable Habitat on Thunder Basin National Grassland – USFS





E. Determination of Colony Size

Active colonies were mapped between May and August using a hand-held Trimble GPS unit. Active colonies are determined by the presence of fresh prairie dog scat, active digging near and/or on burrows, and clipped vegetation near burrows. Mapping was mostly confined to USFS lands, but in some cases colonies that straddled USFS lands and private lands were mapped if they were within grazing permit allotments.

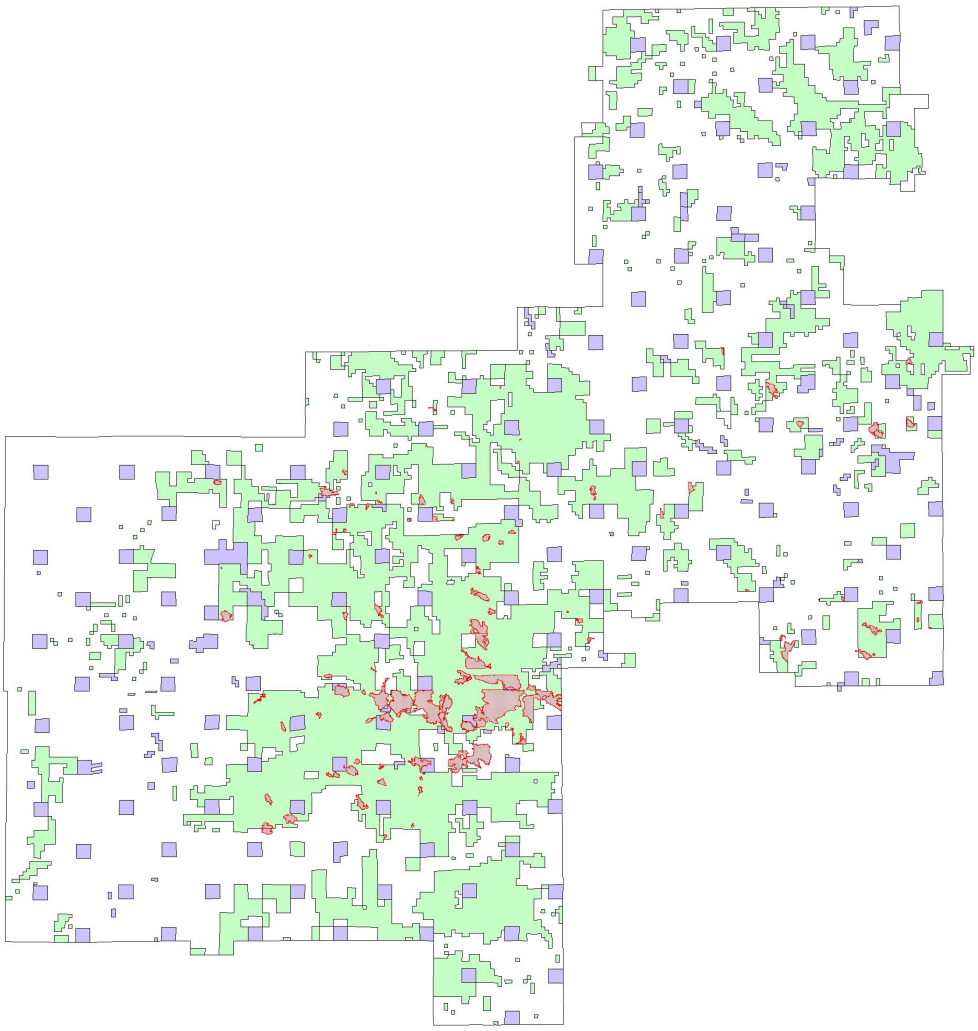
F. Estimation of Expansion Potential

The highest acreage of active colonies on Thunder Basin National Grassland was 21,456 acres in 2001. This figure is considered the expansion potential on Thunder Basin. The following table shows the estimated total acres of active colonies from 1996 – 2007

Estimated Total Acres of Prairie Dog Colonies

1996-1997	16,589
2001	21,456
2002	4,324
2003	5,629
2004	9,550
2005	14,217
2006	6,500
2007	3,243
2008	4,000

Figure 4. Expansion Potential based on 2001 mapping.



G. Determination of Black-footed Ferret Family Rating

The Black-footed Ferret Family rating is a method that evaluates prairie dog colonies for potential black-footed ferret habit. This prairie dog evaluation system is based on the number of active burrows per hectare in active prairie dog colonies. Prairie dog colonies must be accurately mapped on 1:24,000 maps as the first step. Transects are then laid out in the longest direction of the town on the map within each prairie dog colony. Transects are numbered on the map and in the accompanying field notebook - for each prairie dog colony. Transects are 200 meters apart and can be split and wrapped around if the edge of the prairie dog colony is reached before the transect is completed. Complete coverage of each prairie dog colony is the goal.

Prairie dog data is collected by walking the plotted 1000M x 3M transect pushing a measuring wheel with a 3 meter bar attached to it with strings hanging down to delineate the outside of the transect. A compass is used to orient transects, north-south, and transect line is maintained while walking by sighting on a distant object or feature. A hand tally is carried in each hand - one tally for active burrows and one tally for total burrows. Data collected for each prairie dog colony includes only total burrows and active burrows. A burrow is considered "in" the transect if more than 1/2 of the burrow is inside of the transect.

An active burrow is defined as one which, has fresh (current year) prairie dog scat within one meter of the center of the burrow opening. If multiple burrows are present, the rule still applies - each burrow with fresh prairie dog scat within one meter of the center of the opening is considered active. Current year prairie dog scat is brown or green, has moisture in it, and does not break up easily. Scat from previous years (such as may be on a mound whose burrow has been excavated) is very light in color, appears weathered, and crumbles easily. Prairie dog scat is 1/2 inch or more in length and 1/4 to 3/8 inch in diameter while ground squirrel scat is about 1/2 half of that size.

Fresh digging (in the absence of fresh scat) is NOT an indication of an active burrow under the assumptions in the Model. Prairie dog burrows are 3-4 inches in diameter, ground squirrels about 2 inches in diameter. Occasionally, prairie dog or ground squirrel burrows are reamed out by a badger; this does not preclude prairie dog use. These burrows are about 6-8 inches in diameter. If fresh prairie dog scat is present on a badger reamed burrow it counts as an active prairie dog burrow.

Prairie dog densities are determined from a Prairie Dog Habitat Evaluation Model. It is run off of a simple spreadsheet and requires only the size of the prairie dog colony, and numbered transects with total burrows and active burrows per transect.

H. Assessment of Management Tool Effectiveness

To assess the likely effectiveness of various management tools, the IDT reviewed agency records and reports, reviewed scientific peer-reviewed literature, and interviewed prairie dog management experts. (See Table 3).

MANAGEMENT ISSUES

A. Prairie Dog Conservation

Prairie dog conservation on the Thunder Basin National Grassland includes:

i. Maintaining a Stable Prairie Dog Population

Prairie dogs are important to the prairie ecosystem. They provide habitat, and serve as a food source to many species that inhabit the prairie. Some of these species, such as the burrowing owl, are considered sensitive in Region 2. They are also the key species to the survival of black-footed ferrets, the most endangered mammal in North America. Maintaining and monitoring stable to increasing black-tailed prairie dog populations is essential in managing for other sensitive species that rely on them for habitat and/or food, and for the re-introduction and recovery of black-footed ferrets on Thunder Basin National Grassland.

ii. Maintaining Habitat for Associated Species

In the Great Plains, burrowing owls are strongly associated with colonial, burrowing mammals, particularly the black-tailed prairie dog. Surveys in eastern Colorado identified 423 burrowing owl locations within short- and mixed-grass prairie, 80% of which were located within black-tailed prairie dog colonies (Lantz, 2005). On the Thunder Basin National Grassland, few burrowing owl nest burrows have been found away from prairie dog colonies.

Both systematic and incidental burrowing owl surveys have been conducted on the Thunder Basin National Grassland. In 1998, prairie dog colonies on 17 National Grasslands were surveyed for burrowing owl. The percentage of occupied colonies varied from 75% occupied on the Grand River to 16% (11 of 68 colonies) on the Thunder Basin.

In 2005, Lantz surveyed 73 prairie dog colonies on Thunder Basin private and Forest Service land and found 39 inactive colonies and 34 active colonies. Fifty-seven colonies surveyed were occupied by burrowing owls. Of the occupied nests, 81% were within active prairie dog colonies, and 19% of nests were within inactive prairie dog colonies. In both 2003 and 2004 Lantz identified 136 active burrowing owl nest burrows.

Mountain plover nesting normally occurs in short vegetation types or areas routinely kept short. While they will nest in playas, roads, and recent burn areas, much of this available literature indicates that a significant portion of the summer habitat is associated with prairie dogs. On Thunder Basin National Grassland, over half of the known nests have been found in black-tailed prairie dog colonies (Plumb, 2004).

iii. Contributing to Black-footed Ferret Recovery

The black-footed ferret (*Mustela nigripes*) is considered the most endangered mammal in North America, and the United States Forest Service is committed to helping recover this species on National Forest land. The 1988 National Black-Footed Ferret Recovery plan establishes a goal

of a pre-breeding population of 1,500 black-footed ferrets in 10 or more populations with no fewer than 30 breeding adults in any population. The Land and Resource Management Plan for the Thunder Basin National Grassland allocated 53,830 acres as a black-footed ferret reintroduction area (MA 3.63), but reintroduction has been delayed by a 2001 plague epizootic. The black-tailed prairie dog population on TBNG dropped 77 percent. Prairie dog colonies on the TBNG continue to be affected by sylvatic plague; and though there have been years of substantial population increase since 2001, the effects of this disease continue to cycle through many of the TBNG colonies. Predicting future prairie dog populations is difficult, but the FS will continue to manage black-tailed prairie dogs on TBNG, and vigorously pursue reintroduction of black-footed ferrets. Thunder Basin National Grassland is expected to support black-footed ferret recovery within fifteen years of the approval of the current LRMP.

iv. Meeting LRMP Objectives

Grassland Wide

1. As scientific information becomes available, jointly develop with the US Fish and Wildlife Service and other agencies conservation and recovery strategies for plant and animal species, listed as threatened or endangered under the Endangered Species Act, and implement established conservation or recovery strategies over the life of the Plan.

2. Within 15 years, demonstrate positive trends in population viability, habitat availability, habitat quality, population distribution throughout the species range within the planning area, and other factors affecting threatened, endangered, sensitive species and MIS.

3. Develop and implement conservation strategies for Forest Service sensitive species, as technical information becomes available.

4. Within 15 years, conserve populations of species at risk and rare communities by demonstrating positive trends in habitat availability and quality, or any other applicable factors affecting species at risk.

5. Identify rare plant and animal communities, inventory them, and develop associated management strategies to conserve them. Support the development and implementation of State and Regional Conservation Plans as they apply to the grassland or forest units.

Broken Hills and Cellars Rosecrans Geographic Areas

1. Maintain an increasing trend of black-tailed prairie dog populations across the geographic area over the next 10 to 15 years. **Objective**

2. Maintain and expand the current distribution of black-tailed prairie dogs across the geographic area over the next 10 to15 years. **Objective**

3. Improve the Management Area of prairie dog colonies (10 or more colonies with distances between nearest colonies not exceeding 6 miles) in the central part of the Broken Hills GA and the Southwestern part of the Cellars Rosecrans GA over the next 10 to 15 years. This area has been designated as MA 3.63. **Objective**

4. To help increase prairie dog populations and habitat for associated species, allow and encourage expansion of the prairie dog colony Management Area (10 or more colonies with a total colony acreage of at least 1,000 acres and intercolony distances of less than 6 miles) in the central portion of this geographic area over the next 10 to 15 years. Colonies protected by conservation agreements or easements on adjoining land jurisdictions, including private, may be considered part of a Management Area. **Objective**

B. Unwanted Prairie Dog Expansion

Management issues regarding unwanted prairie dog expansion on the Thunder Basin National Grassland can be summarized as follows:

1. Minimizing the Threat to Public Health

Prairie dogs are most commonly identified as a risk to public health due to the prairie dogs' susceptibility to sylvatic plague. The concern is that fleas from infected prairie dogs might vector the disease to humans. The risk of such transmittal, however, is very low because humans rarely handle infected prairie dogs directly, and because the fleas that inhabit prairie dogs are highly host-specific (Barnes 1982), and therefore will not bite humans. Humans are at greater risk from the more host-generalist fleas that inhabit ground squirrels, mice, cats, and dogs. There are no known, documented cases of sylvatic plague in humans on or near the Thunder Basin National Grassland.

An ancillary public health concern regarding prairie dogs is the attraction of rattlesnakes. The prairie rattlesnake (*Crotalus viridis viridis*) uses prairie dog colonies for both foraging and denning. Prairie dog colonies that function as hibernacula may attract scores of snakes. It is unclear, however, what effect prairie dog colonies have on local rattlesnake populations (i.e. if the prairie dog colony was not there, would there still be as many rattlesnakes?).

2. Minimizing the Damage to Public and Private Facilities

Prairie dog burrowing can damage facilities such as cemeteries, drainage ditches, and dams. Prairie dogs and their burrows can also reduce the utility of places such as picnic areas, campgrounds, and cemeteries.

3. Minimizing the Change in Vegetative Condition

Prairie dogs change both the amount and type of vegetation found on their colonies (Agnew et al. 1986, Archer et al. 1987). The extent of this change is affected by soil and precipitation factors, as well as by the presence or absence of other herbivores, particularly bison (*Bison bison*) or livestock. The time period involved is also important, with older (> 7 to 10 years old) colonies showing greater changes in vegetative conditions (Archer et al. 1987, Cincotta et al. 1989). Agnew et al. (1986) found that prairie dogs grazing in southwestern South Dakota decreased: mulch cover, maximum vegetation height, and plant species richness; and favored buffalo grass over western wheatgrass and blue grama. Archer et al. (1987) found that the greatest changes in litter amount and extent of bare soil occurred in the first 2 years of colony habitation. On the

Thunder Basin National Grassland, the most common changes in vegetative condition is a shift from a mid-grass community dominated by western wheatgrass/blue grama or crested wheatgrass/blue grama to a community dominated by blue grama alone (Dan Svingen, pers. obs). The percentage of bare ground typically increases with long-term prairie dog occupancy (ibid).

4. Minimizing the Expansion onto Adjacent Private Land

Near the Thunder Basin National Grassland, private landowners rarely desire prairie dogs on their properties. Reasons vary by individual landowner, but include all of the concerns listed above, as well as aesthetic reasons. Some landowners see prairie dog colonies as unattractive "wasteland" and believe the presence of prairie dogs to be an indictment of their land management.

CONSERVATION ASSESSMENTS AND STRATEGIES

For the purposes of this document, the IDT has defined a "**conservation assessment**" as a review of the biological, administrative, and social factors that affect prairie dog management on the Thunder Basin National Grassland.

The IDT has defined a "**conservation strategy**" as a summation of proposed activities that would enhance prairie dog conservation and management on the TBNG. In many cases, implementation of proposed activities would require National Environmental Policy Act review (i.e. it would require completion of a document such as an "Environmental Assessment" or "Environmental Impact Statement").

A. Past and Current Conditions

Since the 2001 plague epizootic, prairie dog populations on TBNG are increasing slowly. There has been in increase in total active area in 2002 and 2003 of 29%, and 69% in 2004 (Figures 5-13).

Figure 5: Population Trend Graph 1-Thunder Basin NG

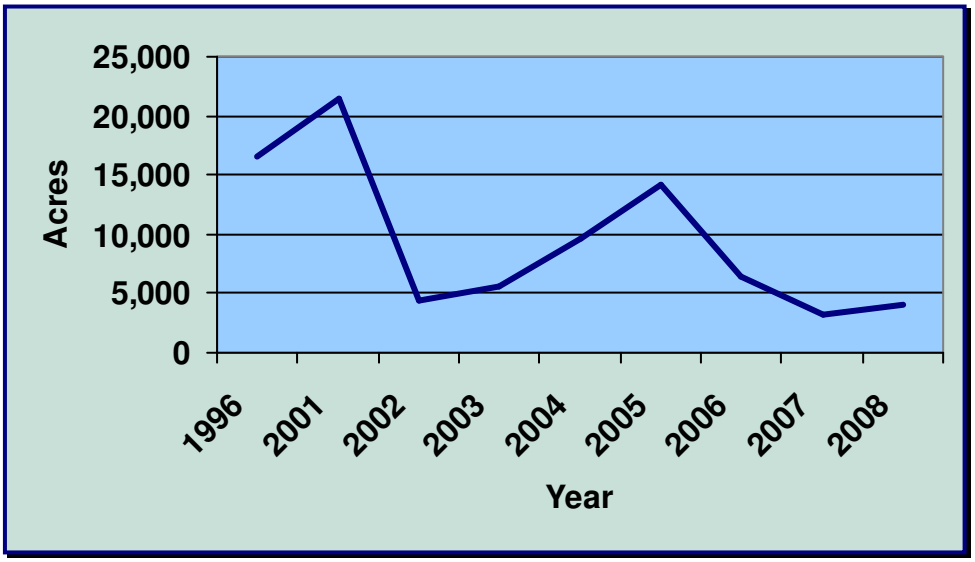


Figure 6: Population Trend Graph 2

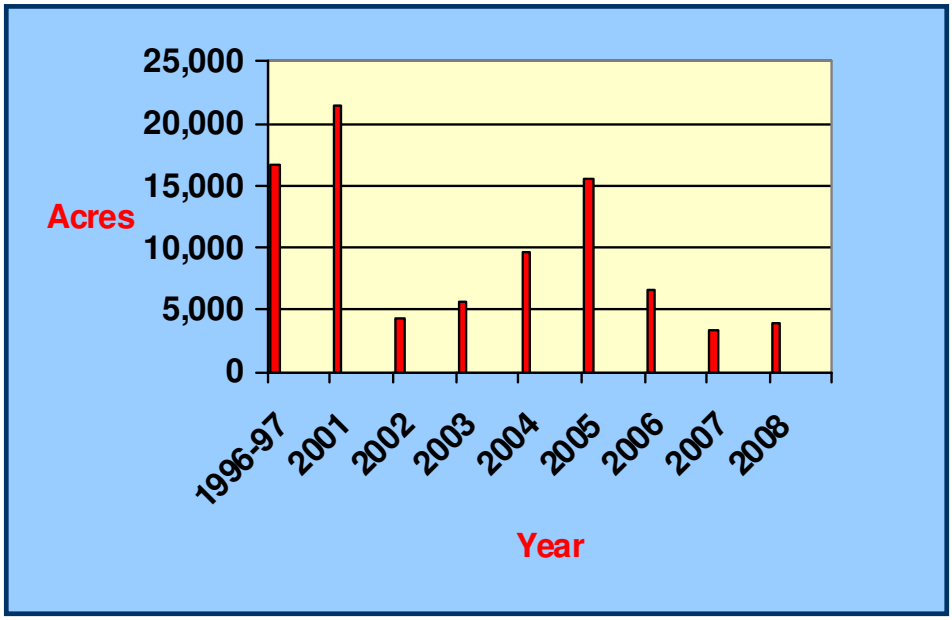
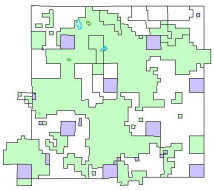


Figure 7. Population Trend Map



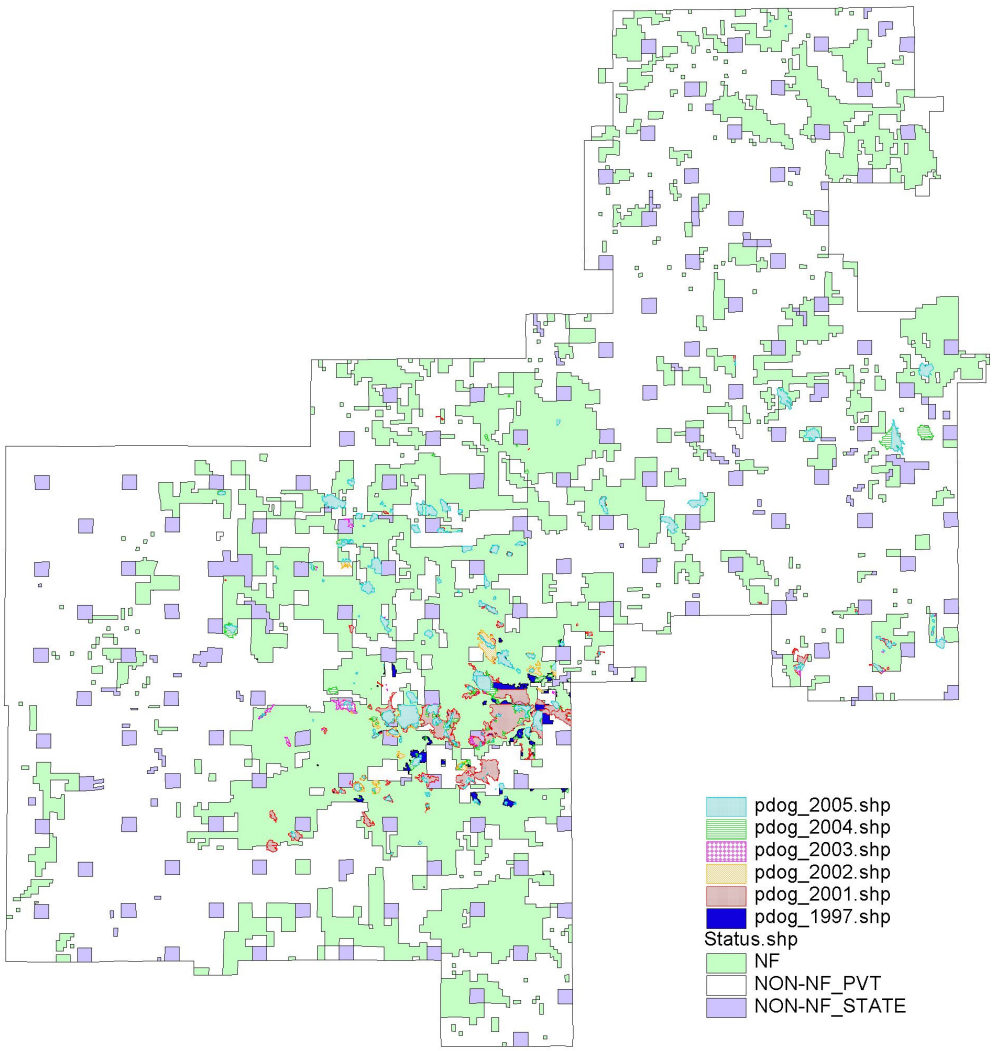


Figure 8. 1997 Prairie Dog Colonies

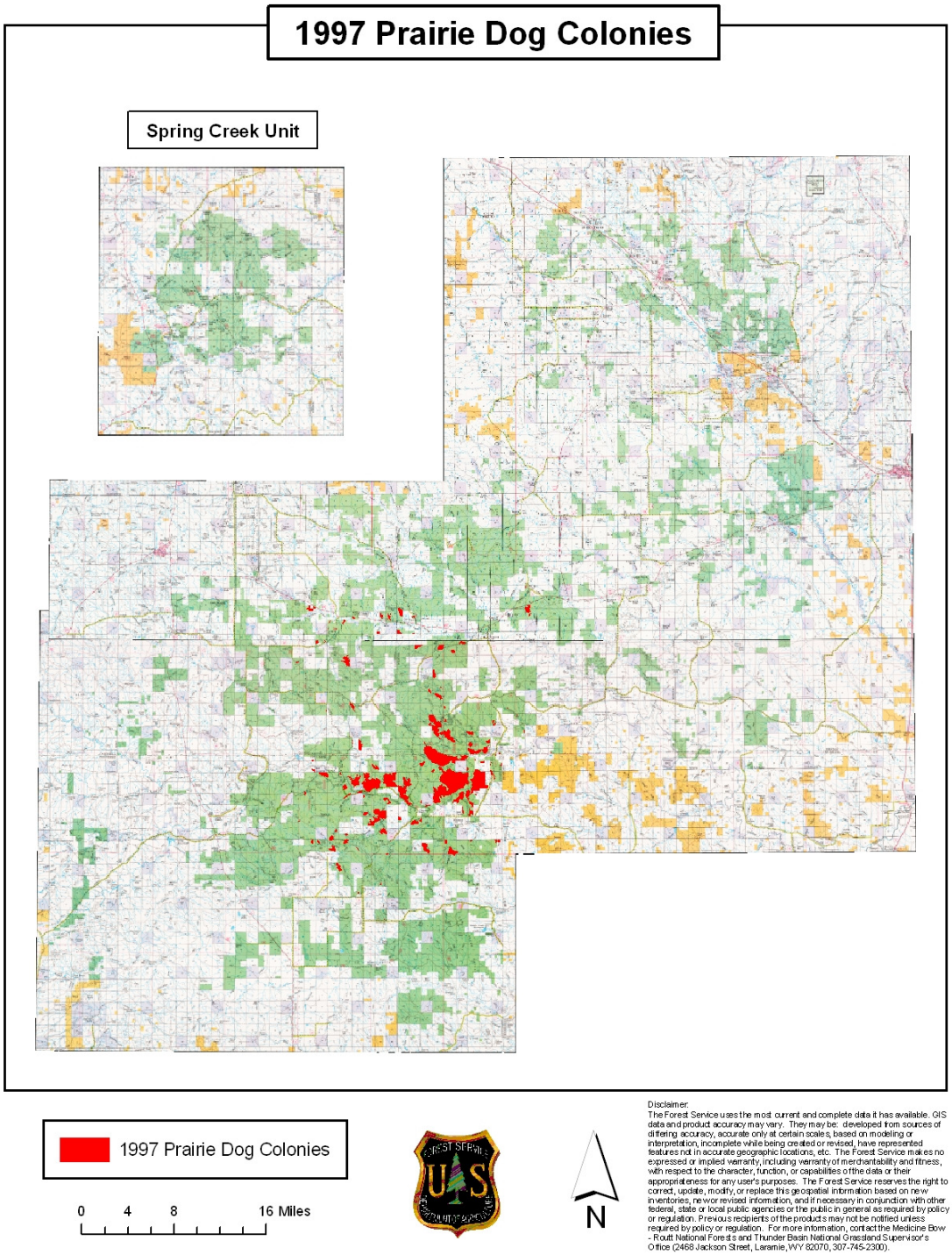
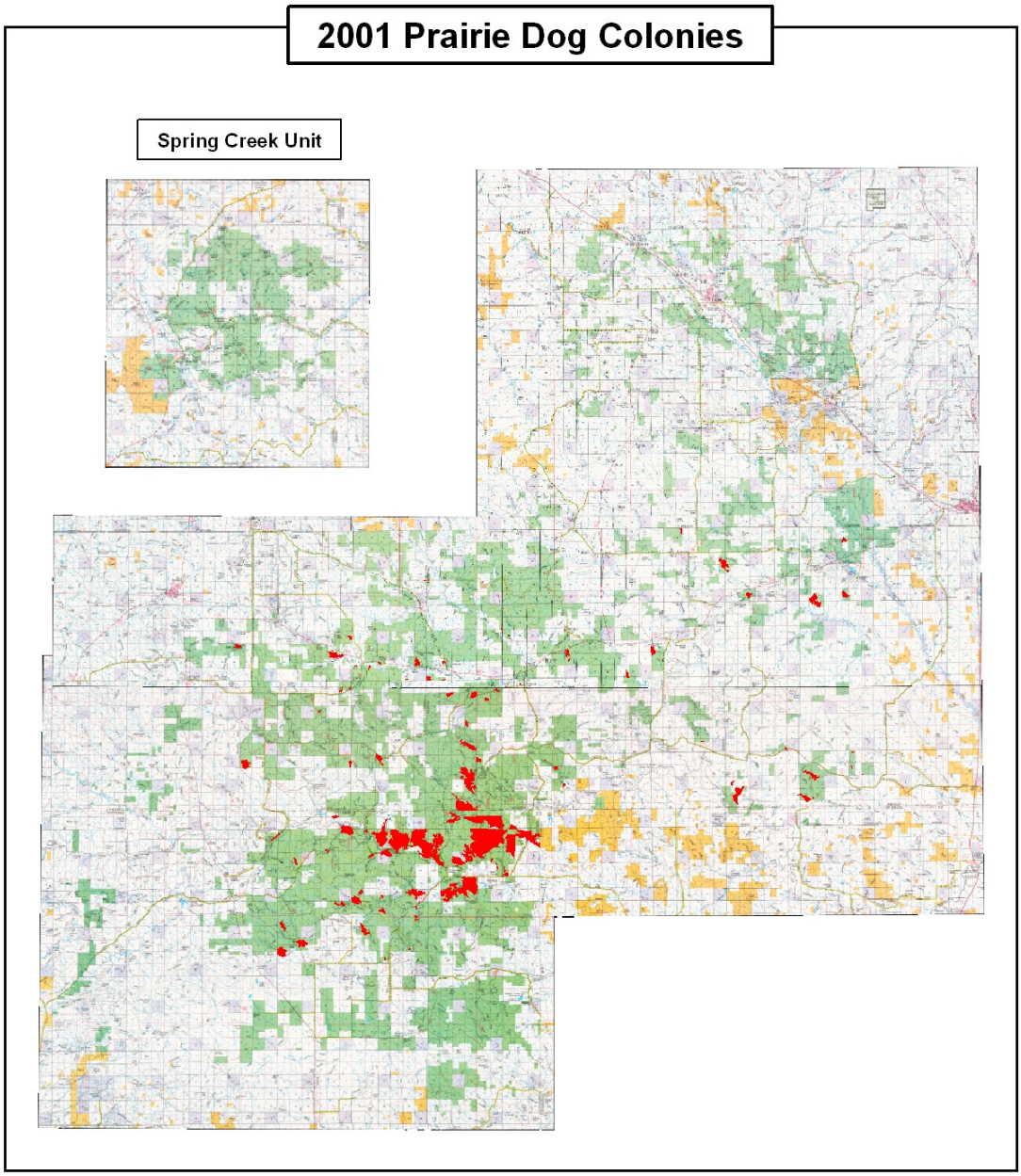


Figure 9. 2001 Prairie Dog Colonies



2001 Prairie Dog Colonies

0 4 8 16 Miles

N

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The Forest Service uses the most current and complete data it has available. GIS data and product accuracy may vary. They may be: developed from sources of differing accuracy, accurate only at certain scales, based on modeling or interpretation, incomplete while being created or revised, have represented features not in accurate geographic locations, etc. The Forest Service makes no expressed or implied warranty, including warranty of merchantability and fitness, with respect to the character, function, or capabilities of the data or their appropriateness for any user's purposes. The Forest Service reserves the right to correct, update, modify, or replace this geospatial information based on new inventories, new or revised information, and if necessary in conjunction with other federal, state or local public agencies or the public in general as required by policy or regulation. Previous recipients of the product s may not be notified unless required by policy or regulation. For more information, contact the Medicine Bow - Routt National Forests and Thunder Basin National Grassland Supervisor's Office (2468 Jackson Street, Laramie, WY 82070, 307-745-2300).

Figure 10. 2002 Prairie Dog Colonies

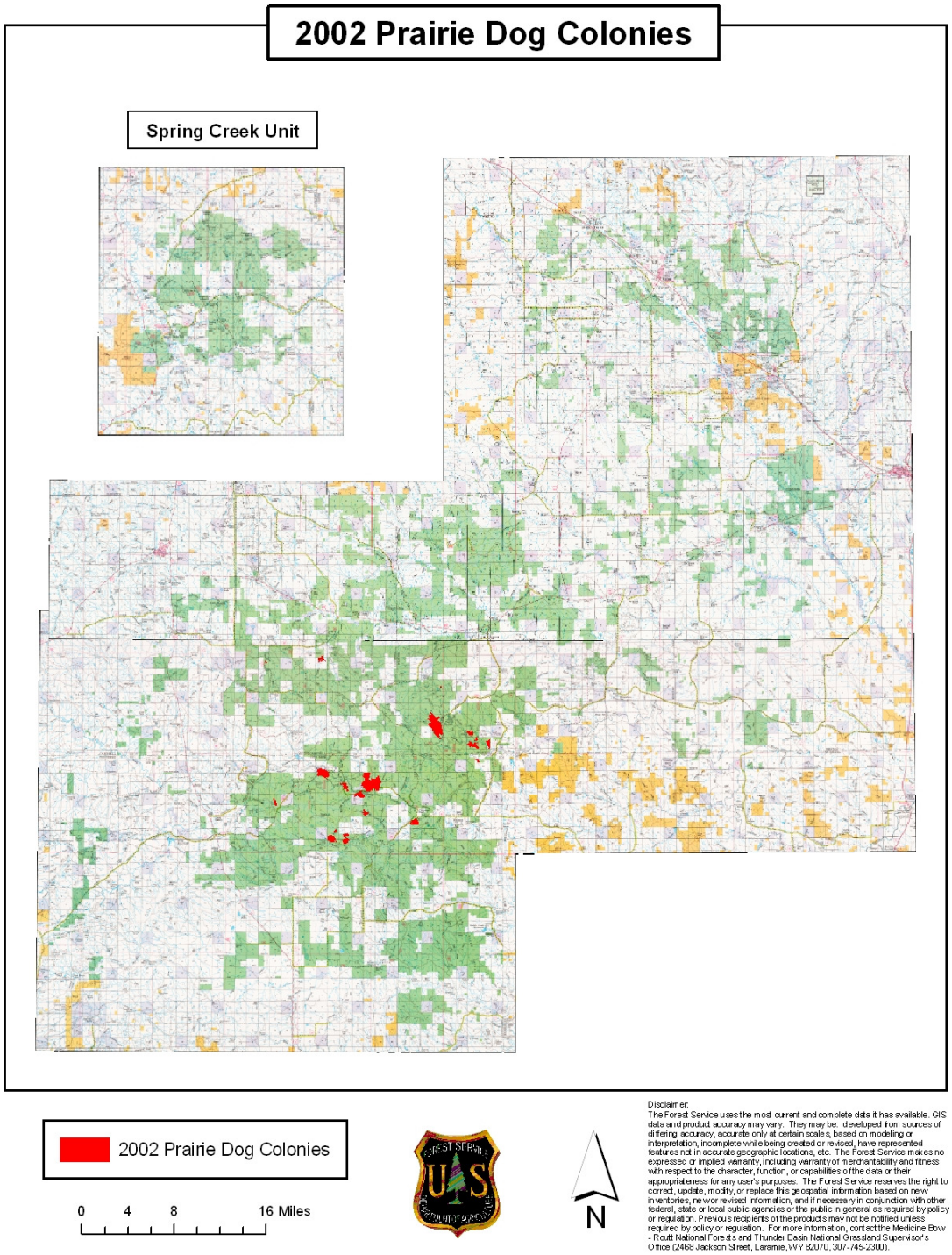


Figure 11. 2003 Prairie Dog Colonies

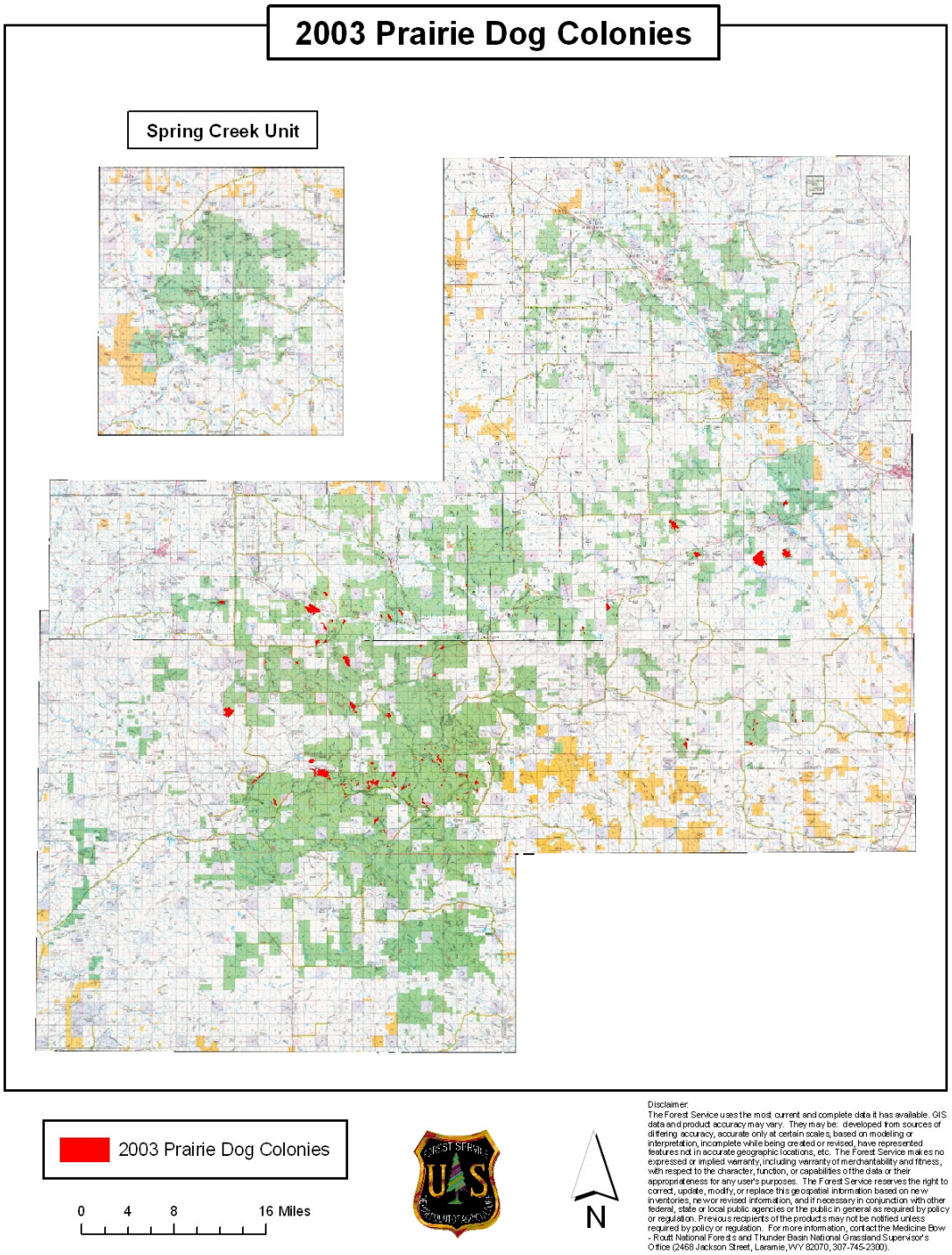
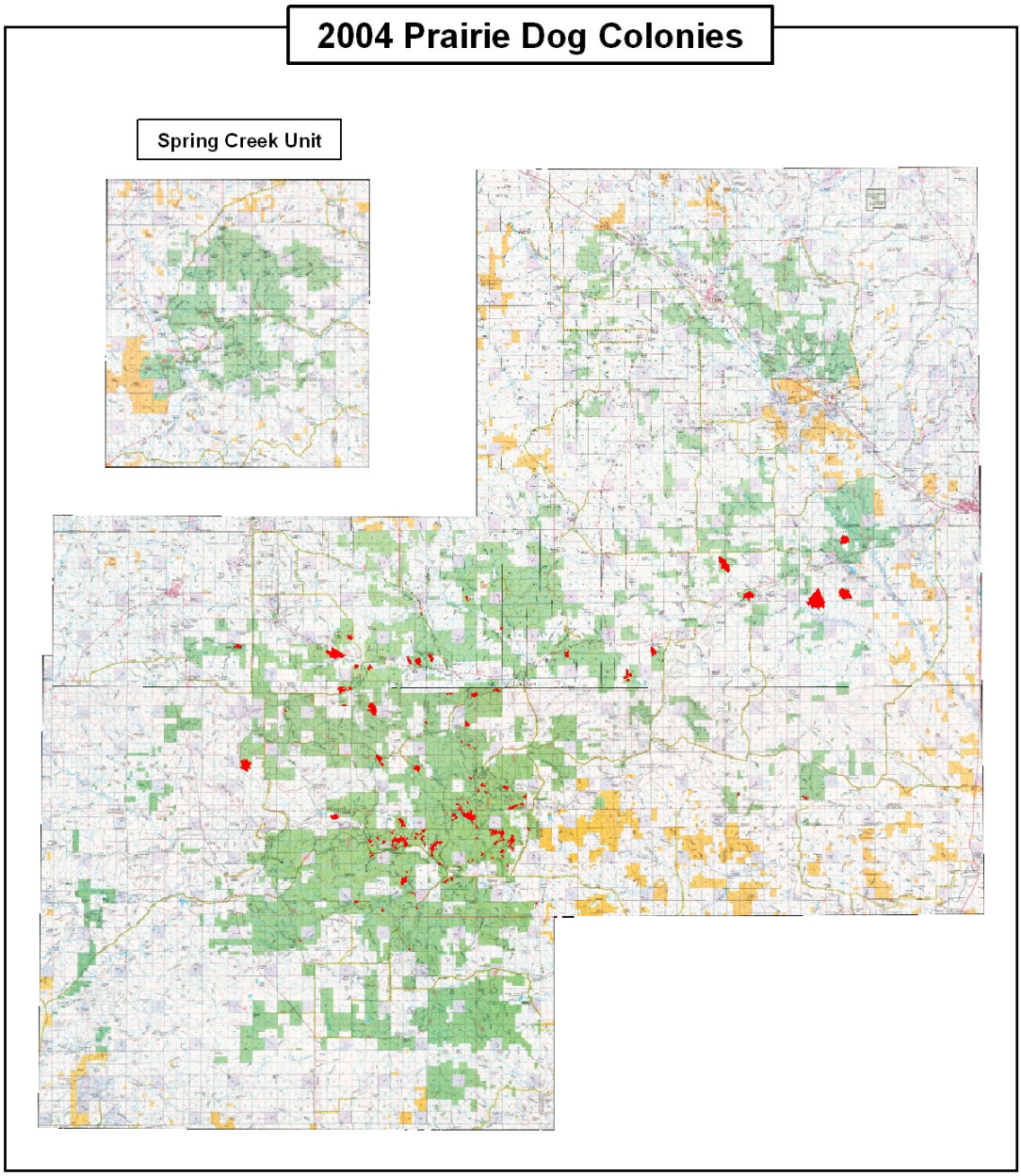


Figure 12. 2004 Prairie Dog Colonies



2004 Prairie Dog Colonies

0 4 8 16 Miles

N

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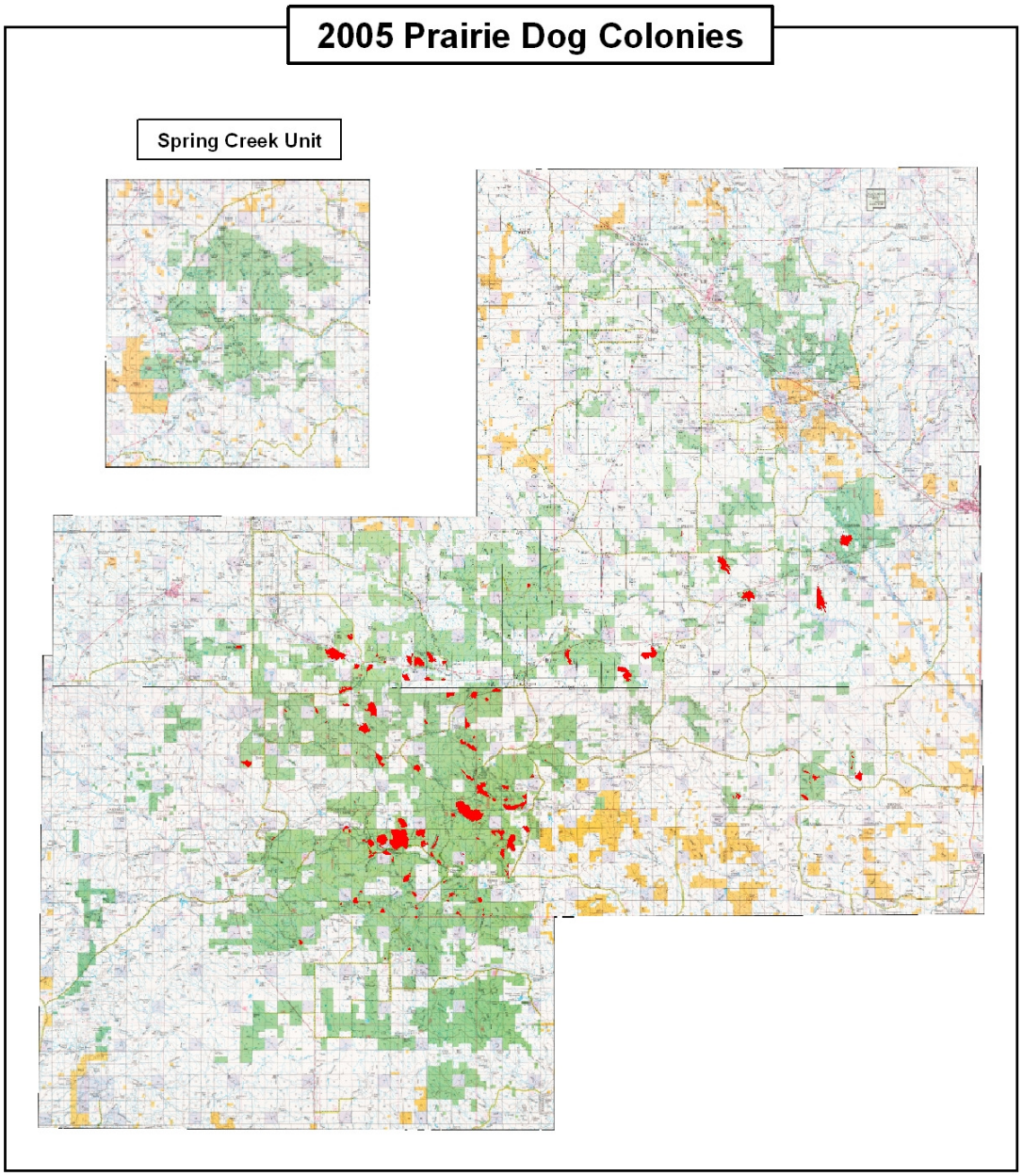
Figure 13. 2005 Prairie Dog Colonies



2005 Prairie Dog Colonies

0 4 8 16 Miles

N

Disclaimer:
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Figure 14. 2006 Prairie Dog Colonies

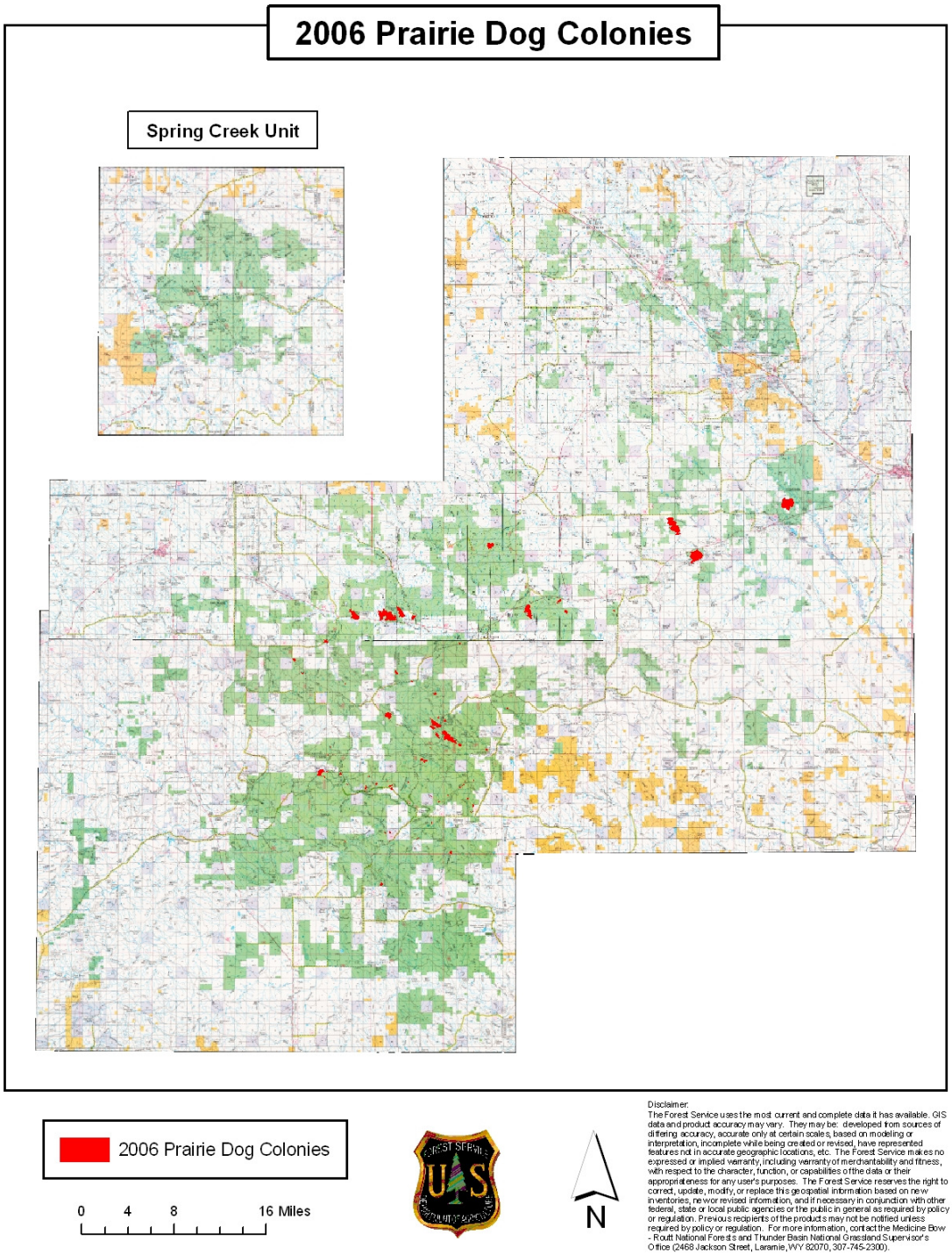


Figure 15. 2007 Prairie Dog Colonies

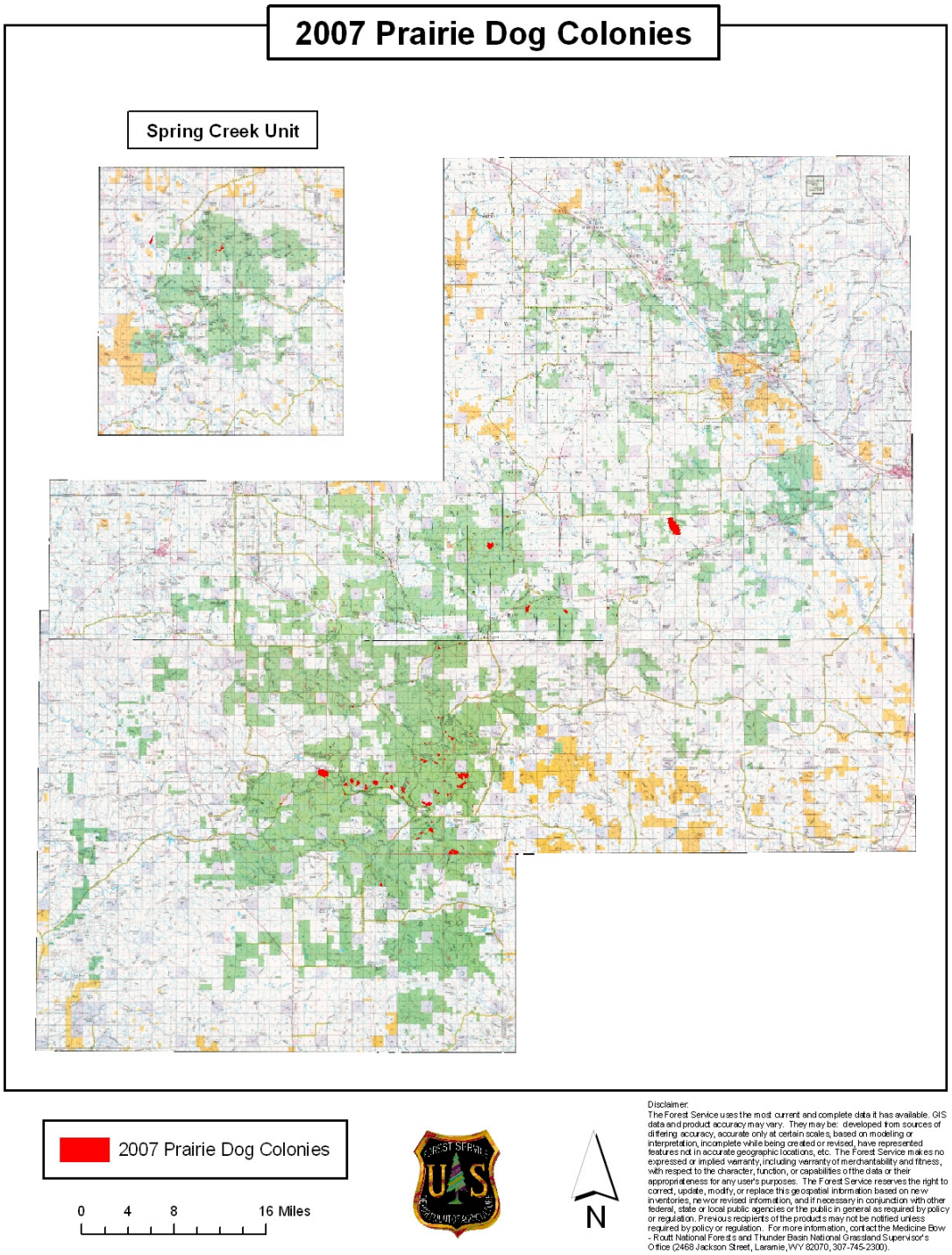
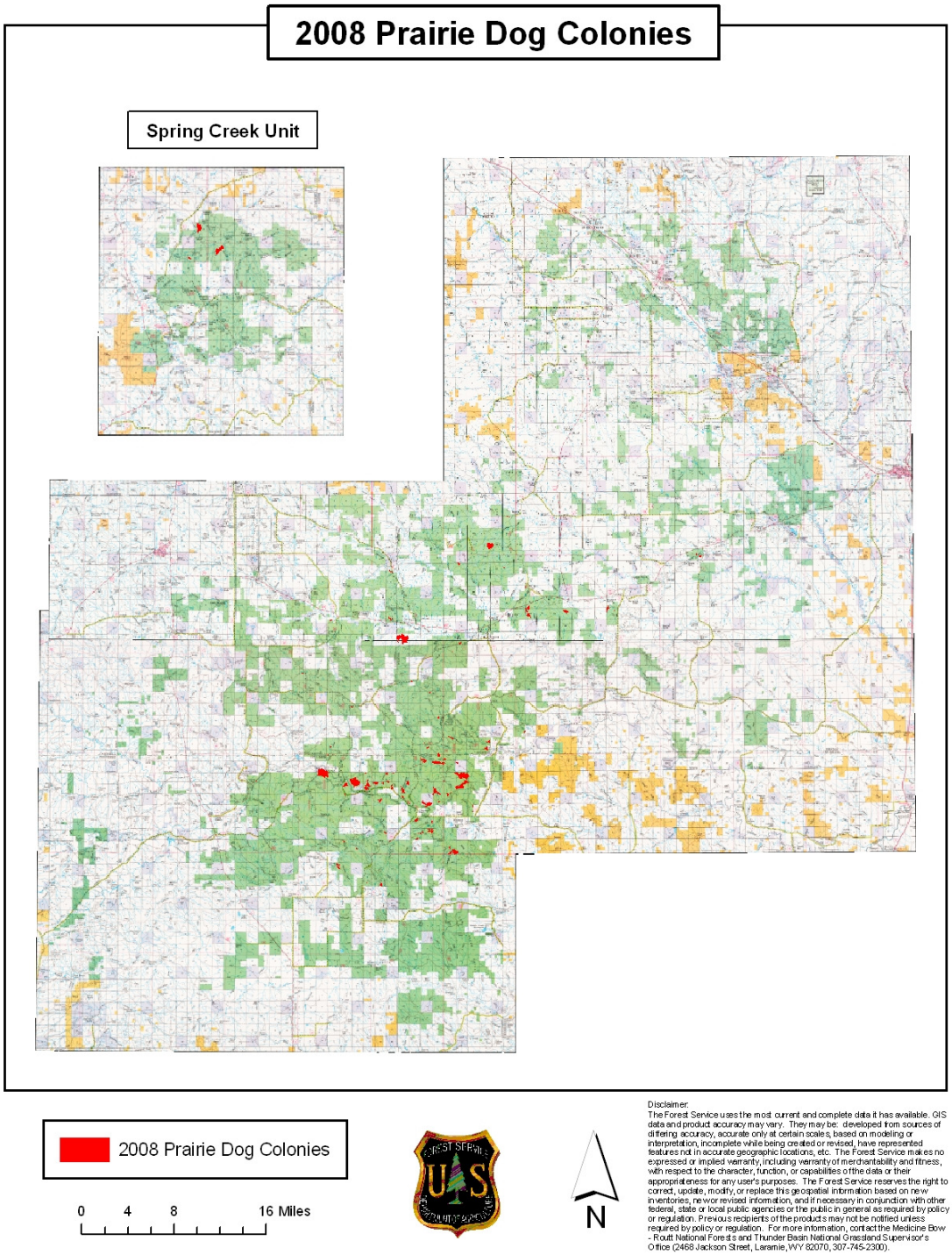


Figure 16. 2008 Prairie Dog Colonies



Black-footed Ferret Habitat

Surveys were completed in 2005 year to determine burrow activities within prairie dog towns. Transect were run on three towns using standardized protocol used by the Wyoming Game and Fish Department, and developed by USFWS/USGS. A ferret family rating (FFR) can be determined using this protocol. The following tables and figure show the results from 1990 through 2005. Transects were not completed in 2006-2008 because the USFWS no longer uses this method to evaluate sites for black-footed ferret habitat.) Table 2 shows individual ferret family ratings for each colony surveyed.

Total Ferret Family Rating by Year

1990	85.75
1997	95.00
2002	7.41
2004	1.4
2005	52.23

Figure 14: Ferret Family Rating Trend Graph

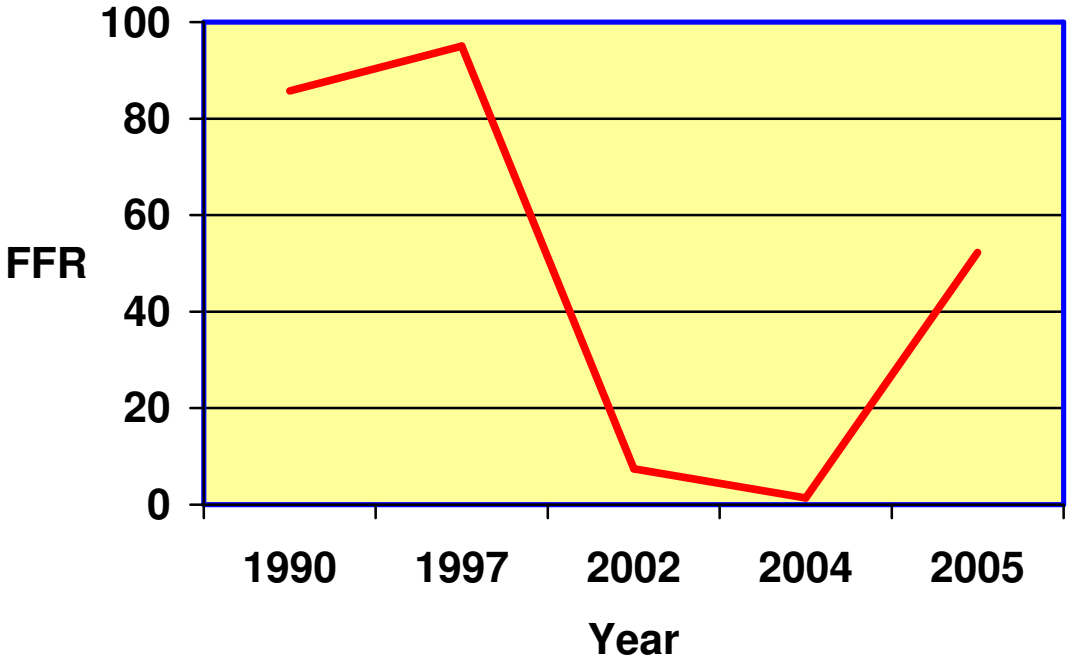


TABLE 2: Comparison of Ferret Family Ratings by Year and Colony

PRAIRIE DOG COLONY	2005	2004	2002	1997	1990
212-5					6.87
212-6	5.23				1.15
212-9	2.02				
212-10	0.00				
215-1	0.00				2.62
222-3	3.52		0.00	0.49	0.00
231-1-5	0.00	0.81	0.62	18.19	16.22
231-9	0.00				
231-11		0.00	6.21	1.28	2.07
231-14					3.97
231-15	0.00				
231-16-18	11.07	0.59	0.58	5.43	1.74
231-22	0.00				
231-26			0.00	0.00	0.00
231-6,19&27	6.49				
231-38	1.05				
231-44	0.00				
249-1-2	2.35				
249-3	0.00		0.00	1.33	1.59
249-5,6	0.00				5.43
249-7	0.00				
249-8			0.00	1.38	0.00
272-1					0.43
288-1			0.00	1.04	0.00
299-1	0.57				1.23
299-2-5	6.40		0.00	44.09	25.64
299-4	0.00	0.00	0.00	17.38	10.52
299-6	8.90	0.00	0.00	3.94	4.73
Rothleutner A	0.00				
Rothleutner B	0.00				
Total	52.23		7.41	95.00	85.75

B. MANAGEMENT TOOLS

Conservation Agreements

A Candidate Conservation Agreement (CCA) is a formal, voluntary agreement between the U.S. Fish and Wildlife Service (USFWS), one or more federal agencies and potentially additional non-federal landowners, addressing the conservation needs of one or more candidate species or species likely to become candidates in the near future. Candidate species are those species eligible for listing under the Endangered Species Act (ESA), but are currently not protected by the ESA. The primary objective of a CCA is to implement specific conservation actions designed to remove or reduce threats to the covered species, so that federal listing may not be necessary. The USFWS accomplishes this by: working with partners to identify threats to candidate species; developing conservation measures needed to address these threats and conserve the species and its habitat; identifying willing landowners; collaborating on agreements designed to implement conservation measures; and monitoring their effectiveness (USFWS, 2009). It is the intent of the Forest Service (TBNG) to enter into a CCA with the USFWS once a mutually acceptable prairie dog management strategy is adopted.

A Candidate Conservation Agreement with Assurances (CCAA) is similar to a CCA but is only between the USFWS and non-federal property owners. In return for implementing appropriate conservation measures, non-federal participants receive assurances that they will not be required to implement additional conservation measures should the covered species be listed under the ESA (USFWS, 2009). There is a CCAA between the 4W Ranch FLP and the USFWS to undertake conservation measures for black-tailed prairie dog, mountain plover, burrowing owl and ferruginous hawk. Some of the lands designated to be managed to provide prairie dog habitat are adjacent to TBNG lands.

CCA and CCAA can be very effective in conserving candidate species and their habitats, especially across multiple land ownerships. They can be instrumental in eliminating threats to candidate species. Although there are no direct monetary costs of a CCA or CCAA, there are some indirect costs incurred through the implementation of the management tools and conservation measures.

Conservation Easements

In the context of this document, a conservation easement is a voluntary agreement between two parties such as the U.S. Government or non-governmental organization and a private landowner, wherein a prairie dog colony on private land is tolerated in return for a payment to the landowner. The primary objective of this tool is to reduce or mitigate the conflicts involved with unwanted prairie dog colonization on private lands by having a long term easement agreement which provides for such colonization. Currently the USFWS is considering developing such a program; and when available, it may be highly effective at meeting this objective. It has not been used on lands adjacent to the TBNG.

A conservation easement agreement could be developed wherein a landowner agreed to allow a prairie dog colony to remain for 3 years in exchange for an annual payment. The acreage involved would be determined by on-the-ground mapping. The value of the annual payment would be negotiated. If that value was determined based on its economic “cost”, the following

process might be used. The initial stocking rate multiplied by the average cost of rented rangeland equals the economic value per acre. This figure could then be used as the basis of the value of the conservation easement. Of course the presence of prairie dogs does not exclude the use of these acres by livestock. Therefore, the direct "cost" of allowing prairie dogs to remain would be less than this rate. An added economic benefit would be the negation of the cost of poisoning prairie dogs. Control costs typically vary from $6 to $25 per acre (Luce 2003, p. 27).

Land Exchange or Purchase

The U.S. Forest Service can exchange like-value land parcels with willing landowners through a long and involved approval process. The primary objective of this tool is to create large blocks of NFS lands and reduce the amount of intermingled private lands and shared boundary. It can assist in minimizing unwanted colonization onto adjacent non-federal lands, and requires a willing landowner and available NFS lands that are mutually agreeable for exchange.

The TBNG has concluded three recent land exchanges that have benefited the prairie dog, black-footed ferret, and other associated species. The Fiddleback Land Exchange exchanged 29,468 acres of federal lands for 19,068 acres of non-federal lands, and the Fiddleback II land exchange exchanged 4,380 acres of federal lands for 2,964 acres of non-federal lands. These exchanges resulted in a net gain of suitable and occupied prairie dog habitat, and a net reduction of shared private land boundary and private inholdings within the MA 3.63. The Dull Center Land Exchange exchanged approximately 4,478 acres of federal land for approximately 4,318 acres of non-federal land. This exchange gained a considerable amount of suitable and occupied prairie dog habitat, and is part of the basis for adjusting the MA 3.63 boundary.

Plague Management

Dusting and Vaccination

The use of pesticides to reduce flea populations, which spread sylvatic plague within prairie dog colonies and complexes, can reduce outbreaks of this disease. The primary objective of dusting prairie dog colonies with a pesticide is to reduce or eliminate flea populations that are transmitting the disease to prairie dogs and other mammals. Repeated dusting of burrows with pesticides (e.g., Deltadust) is labor intensive, expensive, and not practical for large colonies and complexes (Roelle, et.al, 2005). However, it may be justified for use in high value areas such as ferret reintroduction sites. Webb et al (2006) suggests applying insecticides during the early stages of epizootics can stop the spread of plague. However, when applied in later stages of epizootics, applying insecticides failed to stop the spread of plague. It can be moderately effective at reducing populations of the plague vector and other flea species for at least 84 days (Seery et al., 2003). Cost of dusting in Conata Basin is approximately $28 per acre (R. Griebel, USFS, pers. com. 2009). There has not been any past dusting of prairie dog colonies on the TBNG.

Results from other black-footed ferret reintroduction sites suggest that flea control from dusting may afford moderate protection for local prairie dog populations, but does not eliminate plague from the dusted area. Because of this, vaccination of ferrets is may be necessary before and after reintroduction. Wild born ferrets in the Conata Basin are routinely captured and vaccinated. A similar plague vaccine is being developed for use in prairie dogs (USFWS, 2008).

Spatial Distribution of Prairie Dog Complexes

The best plague abatement strategy is to maintain many colonies and complexes of prairie dogs throughout their geographic range (Cully et al, 2006). This approach requires conservation of prairie dogs on private lands because 87% of currently inhabited prairie dog habitat is on private land (Luce et al, 2006). Conservation of prairie dogs on private lands adjacent to federal lands would maintain or increase connectivity and increase the spatial distribution of active colonies and complexes, promoting prairie dog movement across the landscape. This may result in larger complexes that are less likely to be extirpated by plague and in more source populations for those colonies that have been affected by plague (Sidle et al, 2006). The Prairie Dog Management Strategy is designed to utilize spatial distribution across the TBNG to minimize plague impacts.

The primary objectives of plague management strategies are to reduce the impact of the disease on prairie dogs and associated species by limiting the spread of the disease and increasing individual prairie dog survival.

Predator Enhancement

Enhancement of predator habitat (raptor nesting platforms or perches) has often been suggested as a means of prairie dog control. Raptor nest platforms are often ineffective and impractical and expensive for the elimination or reduction of prairie dogs (Andelt, 2006). The primary objective of this tool is to use predation to reduce prairie dog densities within established colonies and survival rates of individual dispersers. On the TBNG, three raptor nest platforms have been placed at a cost of $500/platform in or near prairie dog colonies to encourage raptors to prey on resident and dispersing prairie dogs. The effectiveness of this tool at reducing prairie dog densities in existing prairie dog colonies is presumably low.

Prescribed Burning

Burning prairie has been shown to facilitate prairie dog colony expansion (Augustine et al, 2007). The primary objective of prescribed burning is to improve habitat for prairie dogs, which encourages prairie dogs to fill in areas that are currently inactive, or to influence the direction of colony expansion. Expansion rates onto burned areas range from 38-42% (Augustine, et al, 2007) at an average cost of $37/acre (Westbrook, USFS, Pers. Comm., 2009). Habitat manipulations designed to enhance habitat quality on the margins of existing black-tailed prairie dog colonies may be used to influence colony expansion (Milne-Laux and Sweitzer, 2006). In the spring of 2009, two prescribed burns totaling 2200 acres were completed on the TBNG to enhance habitat conditions for prairie dogs, mountain plovers and other associated wildlife.

Prescribed Grazing

Black-tailed prairie dogs prefer areas with low vegetative structure, a condition most often associated with concentrated livestock grazing. Resting pastures from livestock grazing can significantly decrease prairie dog populations (USFS, 2004). Significant numbers of prairie dog colonies encompass or adjoin cattle point attractants, such as water sources. The existence of cattle point attractants encourages prairie dog colonization.

Managing vegetation structure is very cost effective in large areas and can reduce population growth rates of prairie dogs on areas deferred from grazing. It may also be an effective tool in

limiting re-colonization after treatment by rodenticide (Cable et al. 1987). It can also be used as a tool for creating low vegetation structure conditions to encourage prairie dog colonization. Livestock grazing can be modified through different techniques to create mosaics of vegetation structural diversity and to reduce conflict between conservation and livestock production (Derner et al, 2009).

High structure vegetation can be highly effective at limiting prairie dog colony expansion for little or no cost. Effectiveness is dependent on visual obstruction, a combination of height and density of vegetation. Based on field review on other National Grasslands, vegetation that has a Visual Obstruction Reading (VOR) of 3 inches or more is effective (USFS, 2004). A 130-135 foot buffer strip with a vegetation height of 15-16 inches and a VOR of 3-4 inches is likely adequate at reducing expansion (Terrell, 2006). A predicted buffer width necessary for zero breakthroughs ranged from 275 feet to 340 feet, with a mean of approximately 300 feet (Terrell, 2006). Drought and rainfall can influence effectiveness of vegetative barriers (Terrell, 2006). This level of structure is typically produced in lightly or moderately grazed areas, idle areas, hay land (before mowing), and in Conservation Reserve Program fields.

The primary objectives of this tool are to create high vegetation structure along private and state land boundaries that reduces prairie dog colony expansion and influences its direction. Prescribed grazing can also be used to enhance habitat and influence the direction of prairie dog expansion by creating low structure. The TBNG has not yet used this tool due to the need to complete updated Range Allotment Management Plans. As these plans are implemented, prescribed grazing for prairie dog management will be included on a site-specific basis where colony expansion onto private lands is an issue.

Recreational Shooting

Recreational shooting is an activity that is often found in prairie dog colonies. Shooting is accomplished by individual recreationists. Control of prairie dog colony expansion or colony density is largely influenced by where shooting is allowed.

The primary objective of this tool is to reduce the expansion of prairie dog colonies by reducing the overall prairie dog density in the colony. This reduction in numbers or density would therefore reduce the number of prairie dogs that could expand onto neighboring private lands. There is also a desire by recreationists to allow some recreational shooting activitiy. Shooting of prairie dogs can be moderately effective in achieving this objective on a relatively small scale, but is not practical or cost effective as prairie dogs often become gun-shy (Barbalace, 2007). It has a population density reduction success rate of 35-69% (12, 13, 19).

Recreational shooters killed 1.23 million prairie dogs on non-tribal land in South Dakota in 2000 (USFS 2004). The TBNG currently prohibits recreational shooting of prairie dogs on approximately 72,500 acres of National Forest System lands within and around MA 3.63. This order was coordinated with the U.S. Fish and Wildlife Service and the Wyoming WGFD (see LRMP p. 1-16) when it was completed in 2002 and with the WGFD when it was renewed in 2008.

Rodenticide (Chemical Control)

The only rodenticide approved for use on prairie dogs on the TBNG is zinc phosphide. Based on label and LRMP restrictions, zinc phosphide-treated oats can only be applied after October 1. Untreated oats are first placed at each burrow within a colony. Three days later, oats coated with zinc phosphide are placed at these same burrows. Up to 90% of a colony's prairie dogs can be killed. If this process is repeated within the following few years, it can be very effective at greatly reducing colony expansion or eliminating the colony (Forrest and Luchsinger, 2006).

The primary objectives of the use of rodenticide are for reducing unwanted colonization on private lands. The use of zinc phosphide is highly effective in achieving these objectives. The percentage of prairie dogs killed by use of this tool averages 75-85% (Barbalace, 2007) (Boren, 2003) and costs about $10/acre. Rodenticide was used on the TBNG until 1997.

Translocation

New prairie dog colonies can be established by translocating the animals to prepared sites (Long et al, 2006).

At the current time, the WGFD and the Food and Drug Administration must issue permits because there are restrictions on the interstate and intrastate movement of prairie dogs.

The primary objectives of this tool are to: 1) remove prairie dogs from colonies that are causing unwanted colonization; 2) augment prairie dog populations in colonies affected by plague, for example; or 3) create new colonies. The use of this tool can be moderately effective with a range of $30-$300 per prairie dog (average $165 per dog) (Barbalace, 2007a). Actual costs vary depending on what methods and restrictions are used and required. Survival rates range from 30-95% (Barbalace, 2007a). Optimal translocation requires: disease free prairie dogs and release site; capture site close to the release site; high trapping efficiency for a capture of 60-100 animals with sex ratio 2(F):1(M); and no history of plague at release site; and short vegetation (<12 cm (5 in.)) and pre-existing burrows at release site (Truett et al., 2001). Retention baskets of fenced enclosures may be used to reduce dispersal and predation (Truett et al., 2001). Control of predators may be needed prior to or following release (Truett et al., 2001). Translocation of prairie dogs has not taken place on the TBNG.

The best techniques to date are:

- Carefully select the site for the new colony. The best locations are those that were formally occupied, especially if some evidence of the old burrows is still intact. All new sites should have abundant short grass species such as buffalograss or blue grama, slopes of less than 6 percent, and well-rained sandy loam or loam clay soils.
- Capture prairie dogs between late June and mid-September using wire mesh livetraps (such as the "Tomahawk" brand trap used in small mammal studies). Place the traps on level ground within 1-2 yards of the burrow entrance and bait them with horse sweet feed, mixed grain, or whole oats. Check traps several times per day (more frequently in hot, sunny weather or during snow or cold rain; overheating in hot weather is the most common cause of prairie dog mortality during livetrapping). The source population should have as high a prairie dog density as possible. Colonies that have been little disturbed by poisoning or

trapping should be favored. Note that livetrapping is easiest on those colonies (portions of colonies) that have little or low-quality forage. (Long et al. 2006). Transplant success may be enhanced by translocating as many family members as possible (Robinette 1982, Werner et al. 2001, but see Long et al. 2006).

- Consider dusting the prairie dogs while they are in the livetraps with insecticide-dust such as carbaryl or permethrin to kill fleas.
- Transport prairie dogs in holding cages, such as "Havahart" rabbit hutches. Be sure to protect the prairie dogs from prolonged direct sunlight, precipitation, or high (>70F) or low (<40F) temperatures.
- The new site should have had all tall vegetation removed from at least an area of 4-5 acres by mowing, grazing, or burning.
- At sites without an intact burrow system, acclimation cages should be placed at least 50 meters from surrounding tall vegetation. Acclimation cages are at least 30" diameter, roofed, hardened plastic culverts at least 12" feet tall. The cage is buried at least 4 feet deep. A 4" flexible corrugated plastic tube connects the underground chamber to an aboveground retention basket. Some researchers recommend cutting holes in this tube to encourage the prairie dogs to dig ancillary tunnels.
- The retention basket is a 6-sided, rectangular, wire-mesh cage at least 2' long on its short axis. Four to ten prairie dogs are placed in each retention cage, and regularly fed carrots, cabbage, and lettuce, as well as sodium-free cattle cake. The retention cage is removed at sunrise or sunset, after one week.

1. The Wyoming Game and Fish Department must be contacted prior to any translocation efforts so that a permit may be obtained. A permit from the FDA must be obtained as well, as there existing restrictions on the interstate and intrastate movement of prairie dogs.

<u>Criteria for Sending areas:</u>

- Prairie dog towns are threatened by lethal control;
- The area supports sufficient acres of prairie dogs to provide donor stock without significantly impacting prairie dog acreage;
- Prairie dogs must be captured and translocated within the same county;

<u>Criteria for Receiving Areas:</u>

- Prairie dog towns must be larger than 500 acres and a minimum of 7 km (4.35 miles) from private lands;
- Area was historically occupied by prairie dogs;
- Area is below prairie dog management objectives;
- Area contains suitable habitat within historic distribution of prairie dogs;
- All towns selected for translocations should be vacant of prairie dogs prior to translocation;
- Prairie dogs will be moved only once, and only to vacant prairie dog towns;
- Translocations will be completed prior to mid February or after late July;

Visual Barriers

Prairie dogs rely on open vistas to detect predators, to disperse, and to communicate with other prairie dogs. Tall vegetation impedes such behavior. Colony establishment and expansion can

be discouraged by natural and artificial barriers (vinyl fencing, privacy fencing, vegetation) established before the emergence of juvenile prairie dogs in May.

Vinyl fencing is effective for about five years. The vinyl must be opaque, stabilized in the ground, and able to withstand extreme weather conditions. Chicken wire must be installed on the prairie dog colony side to discourage chewing. Although vinyl fencing is used around small colonies in urban and suburban settings, it is not practical or economical for large areas where they are very susceptible to wind damage (Barbalace, 2007a). Vinyl barriers are frequently breached by prairie dogs, but vinyl associated with tall vegetation is breached less frequently (Witmer et al., 2008). Corrugated metal or fiberglass extending above and below ground are rarely breached but add a substantial cost to the barrier (Witmer et al., 2008). Corrugated metal costs $60/yard and vinyl fence costs $30/yard (Witmer et al., 2008).

Privacy fencing refers to at least a 3-foot high wood-slatted fence with chicken wire installed on the prairie dog side, and edging strips in the soil along the bottom to prevent light penetration. Pine boughs or burlap can be laid against the fence to enhance the visual barrier.

The primary objectives of this tool are to create a visual obstruction that reduces the ability of prairie dogs to expand, and influences the direction of expansion. Visual barriers have not been used on the TBNG.

Table 3: Comparison of Effectiveness of Management Tools

Management Tool	Effectiveness	Cost	Rationale
Plague Management (Dusting)	moderate	$27.90/ acre	Repeated dusting of burrows with pesticides is labor intensive, expensive, and not practical for large colonies and complexes (2). It can be effective at reducing populations of the plague vector and other flea species for at least 84 days (3). Cost of dusting in Conata Basin is running approximately $27.90 per acre (R. Griebel, USFS, pers. com. 2009)
Predator Enhancement	Low	$500/ platform	Adding perches for predatory birds is a method that does not work well, and is impractical and expensive for the elimination or reduction of prairie dogs (10). Perches already constructed in prairie dog colonies on TBNG are not being utilized by raptors.
Prescribed burning	moderate (average 40%)	$37/acre	Burning can be used to increase colony expansion rates. Expansion rates on to burned areas range from 38-42% (14). Can be used to restore historic disturbance regimes. Later winter burns in moderately grazed areas do not negatively effect herbaceous production (16), which means burning can positively effect prairie dog management and grazing management. Average cost per acre to burn is $37/acre (Westbrook, 2009, Pers. Communication).
Prescribed Grazing (Vegetative Barrier)	High	No cost to FS	Use of vegetative buffer strips are effective in limiting prairie dog town expansion (6). Effectiveness is dependent on visual obstruction and vegetation height; need at least 40cm height and Visual Obstruction Reading (VOR) of 10cm to minimize breakthrough (6). When conditions allow for a 40cm vegetation height and 10cm VOR, a 40m buffer strip is likely adequate at reducing expansion (15). A predicted buffer width necessary for zero breakthroughs ranged from 85.1 m to 103.1 m with means ranging from 91.3 m (15). Drought and rainfall are two factors that can influence effectiveness of

Management Tool	Effectiveness	Cost	Rationale
			vegetative barriers (15).
Prescribed Grazing	High	No cost to FS	Cost effective and can be done on large scale. Can reduce population growth rates of prairie dogs on areas deferred from grazing (7). It may also be an effective tool in reducing re-colonization after treatment from rodenticide (7), so that future rodenticide use may not be needed. Livestock grazing can be modified through different techniques to create mosaics of vegetation and increase structural diversity, and reduce conflict between conservation and livestock production (8).
Recreational Shooting	moderate (average 52%)	No cost to FS	Can be effective on small scale, but not practical or cost effective as dogs often become gun-shy(12). Has potential to limit rather than eliminate populations (13). May limit local food supply for large predators like coyotes, which could increase chance of predation of livestock (10). Has a population density reduction success rate of 35-69% (12, 13, 19). Shooting can dramatically alter behavior of prairie dogs that have survived plague, reducing body condition, which reduces reproduction and prevents quick recovery (17). Shot prairie dogs could make lead accessible to predators and scavengers, and potential poison them (18). Need to consider using non-expanding lead bullets to reduce likelihood of lead consumption by non-target species (18).
Rodenticide Use (Chemical Control)	high (average 80%)	$10/acre	Have population density reduction success rates of 75-85%(12, 20), are relatively inexpensive, with a cost of about $10/acre (20). Effects of one-time or infrequent use are usually short lived (10). Not 100%, and prairie dogs survive and reproduce well under conditions of low populations and reduced competition that follow rodenticide use (10). It has the potential to kill other non-target species (10).
Translocation	moderate (average 62%)	$300/dog	Can be expensive, with a range of $30-$300 per dog (average $165 per dog) and time consuming (11). Survival rates range from 30-90%, with city and county officials reporting 30-50%, and private organizations reporting 50-95% (11). Considerations that need to be considered are disease, genetics, trapping, release sites (10). Translocation is more successful if: animals are disease free, going to disease free site; are captured from source site close to release site; high trapping efficiency (rarely do more than 25% of live traps capture dogs); release site has no history of plague (or may have to dust); can capture at least 60-100 dogs, with sex ratio 2(F):1(M) (10). Release sites also do better if they have short vegetation (<12cm tall) and pre-existing burrows (9). Retention baskets of fenced enclosures may be used to reduce dispersal and predation (9). Control of predators may be needed prior to or following release (9). If implementing all of the previously mentioned considerations, in order to increase chance of survival, cost could be closer to $300 per dog.
Visual Barriers	low	$45/meter (average)	Not practical or economical for large areas. Plastic visual barriers are least effective due to wind damage (11). Vinyl barriers are frequently breached by prairie dogs, but barriers including vegetation were breached less (1). Corrugated metal or fiberglass extending above and below ground are rarely breached, but are twice the cost of vinyl (1). Presence of visual barriers do not hinder prairie dog colony expansion (5), although some are more effective than others. Galvanized roofing costs $60/m and vinyl fence costs $30/m (1).

CONSIDERATIONS FOR DESIGNATING MANAGEMENT CATEGORIES

A. Category 1 Prairie Dog Habitat

One of the primary objectives for managing prairie dog habitat on the Thunder Basin National Grassland is to provide for suitable habitat to support the reintroduction of the black-footed ferret (cite grassland plan). The Conata Basin had approximately 10,000 acres of active prairie dog colonies at the beginning of reintroductions. Based on population studies and modeling, 10,000 acres has been proposed as the minimum acreage necessary to support a successful reintroduction of black-footed ferrets in plague-free habitat (Carnwath, 2005). Further the black-footed ferret recovery plan indicates that in order to support 30 individual ferrets, approximately 3700 acres of active prairie dog colonies are needed. (USFWS, 2006) In the presence of plague, periodic habitat reductions of more than 50 percent have been observed on the TBNG. Based on historical distributions and sizes of prairie dog colonies on the TBNG, one area of suitable size was identified.

Category 1 Prairie Dog Habitat – Size and Spatial Configuration
Documentation of historical population levels indicate that this area has ranged from approximately 14,000 acres to a modeled estimate of 23,000 acres as described in the Prairie Dog Supplemental Information Report (USFS, 2002). Based on these population estimates and available suitable habitat, it is reasonable to achieve an objective of 18,000 acres. It is anticipated that 18,000 acres will be sufficient habitat to allow ferrets to persist through a plague epizootic and recover naturally along with the prairie dog populations. The acreage in Category 1 is not capped at 18,000 acres, but would be allowed to grow within the boundary of the MA 3.63. The 18,000 acre objective only serves as a potential trigger point if prairie dogs are expanding onto adjacent private lands. Alternatively, this should be a sufficient size to allow managers time to detect and hopefully contain an outbreak of plague before it critically alters habitat integrity. (Carnwath, 2005)

Total Prairie Dog Habitat size, however, may be adjusted in the future depending upon success of reintroduction efforts and the results of this analysis, the parameters defining a Category 1 Prairie Dog Habitat may change.

The exact spatial configuration of prairie dog colonies needed for a viable population of black-footed ferrets is not completely known, particularly for an area known to experience periodic outbreaks of plague such as the TBNG. Data from the Conata Basin in South Dakota as well as experience from failed ferret reintroduction efforts have, however, demonstrated several critical attributes of viable black-footed ferret habitat. For example, prairie dog colonies must be located within a common dispersal distance of ferrets to facilitate movement between habitat patches. Therefore, colonies within a Category 1 Prairie Dog Habitat were delineated so that each colony is no more than 1.5 km from another colony at the perimeter of the Prairie Dog Habitat (CBSG 2004).

Category 1 Prairie Dog Habitat - Location
The location for the Category 1 Prairie Dog Habitat is based on the current and historical distribution of prairie dogs across the planning landscape as well as the most suitable prairie dog habitat. Secondly, the Category 1 Prairie Dog Habitat is sited so as to utilize, to the maximum extent feasible, public lands such as Thunder Basin National Grassland. Natural barriers to prairie dog expansion such as large areas of unsuitable habitat were utilized to the maximum extent feasible to bound the Category 1 Prairie Dog Habitat.

Category 1 Prairie Dog Habitat - Control and Management
Inside the Category 1 Area, prairie dogs will be allowed to disperse and colonize new areas naturally until they reach 18,000 acres of active colonies. At this point, rodenticide would be available within these boundaries manage prairie dog populations to reduce expansion onto adjacent private lands. The acreage in Category 1 is not capped at 18,000 acres, but would be allowed to grow within the boundary of the MA 3.63. The 18,000 acre objective only serves as a potential trigger point if prairie dogs are expanding onto adjacent private lands. In areas where no natural barriers exist, a buffer of ungrazed or lightly grazed areas will be used to discourage colonization out of the designated Prairie Dog Habitat.

However, if these management techniques prove insufficient, rodenticides would be available for use to control prairie dogs that disperse outside of the Prairie Dog Habitat. If and when control becomes necessary within the Category 1 area, selection of colonies to be controlled should be based on habitat values to black-footed ferrets.

Although the objective in the Category 1 area is to provide a minimum of 18,000 acres of active colonies, the area is approximately 58,000 acres, this allows for prairie dogs to disperse and colonize into preferred habitats and provides more flexibility for prairie dogs to disperse and colonize new areas before they spread outside of the designated boundary. It is reasonable to expect a natural tendency for prairie dogs to disperse outside of designated Prairie Dog Habitats, thus increasing the need of prairie dog control. This larger area is also expected to allow colonies to survive and recover from an outbreak of plague.

Recreational shooting of prairie dogs will not be permitted within the Category 1 Prairie Dog Habitat. While shooting is not viewed as an effective control for prairie dogs, recent information indicates that it can reduce densities of prairie dogs within colonies. Further, shooting has been found to leave prairie dog carcasses that contain high levels of lead fragments. These fragments could lead to secondary poisoning of black-footed ferrets if consumed. (Pauli, 2005)

Translocation of prairie dogs may be used to augment a Category 1 Prairie Dog Habitat as needed. In the wake of a plague epizootic, for example, strategic translocations of new individuals from other areas into the affected area could greatly increase the rate of recovery. If active prairie dog acreage falls below 10,000 acres within a Category 1 Prairie Dog Habitat (the minimum area necessary to support a reintroduction of black-footed ferrets), translocations will be considered.

C. Category 2 Prairie Dog Habitat

Category 2 areas are intended to provide an adequate distribution of prairie dogs and their associated species across the landscape and provide some level of protection against a landscape-wide plague epizootic. At least two Category 2 Prairie Dog Habitats will be maintained within the planning landscape. In the TBNG, each Category 2 Prairie Dog Habitat will contain a minimum of 1,500 acres of active prairie dog colonies within a defined area. Combined, Category 2 Prairie Dog Habitats should contain 7,000 acres of active prairie dog colonies. Historically, there has been as much as 1500 acres in these proposed Category 2 areas. Therefore, a minimum acreage of 1500 is within the scope of historical populations. Based on the suitable habitat available in these areas, it is reasonable to expect that the active prairie dog colonies could expand to 7,000 acres.

Category 2 Prairie Dog Habitat – Size and Spatial Configuration.
There is no single size of prairie dog colonies which is considered *ideal* for prairie dogs and their associated species.

A full array of the range of colony sizes and configurations will be provided within the Category 2 designation to represent the variety of colony sizes represented historically. Mountain plover need larger prairie dog colonies (approximately 640 acres) for nesting (Ball, personal Communication). Based on the needs of mountain plover, burrowing owls and other associated species, the Category 2 areas were designed to not only meet the minimum requirements for these species but also to withstand fluctuations in prairie dog populations and maintain viable populations of the associated species. Category 2 areas will be composed of relatively large colonies (>300 acres) while other Prairie Dog Habitats will be composed of smaller and more numerous colonies.

Category 2 Prairie Dog Habitat - Location
Locations for Category 2 Prairie Dog Habitats are based on habitat suitability as well as the current and historical distribution of prairie dogs. Furthermore, areas that have a known presence of associated species were considered high value habitat for other reasons and are prioritized for Category 2 Prairie Dog Habitats. Habitat requirements and suitability of associated species such as mountain plovers (*Charadrius montanus*), burrowing owls (*Athene cunicularia*), ferruginous hawks (*Buteo regalis*), and swift fox (*Vulpes velox*) will be considered in locating and maintaining a Category 2. If information arises which suggests a specific colony configuration is more suitable for a desired species, Category 2's can be managed to provide such conditions.

At least one Category 2 will be located as far as possible from the Category 1 Prairie Dog Habitat to reduce and/or slow the spread of a plague epizootic and provide some redundancy in the system.

Category 2 Prairie Dog Habitat - Control and Management
Translocations will be considered if any individual Category 2 Prairie Dog Habitat falls below 500 acres *or* total Category 2 acreage falls below 1,500 acres. In the event that Category acreage exceeds 7,000 acres, control of colonies within Category 2 areas could be considered. In such

cases, newer colonies and colonies with lower habitat value for associated species would be prioritized. The use of rodenticides may occur on Category 2 Prairie Dog Habitats in a manner that is consistent with the specified goals of each Category 2 Prairie Dog Habitat and with incentive agreements.

Regulated shooting could be allowed on Category 2 Prairie Dog Habitats so long as it is not found to compromise the ecological objectives of these areas. Use of full-metal jacket bullets is recommended to reduce possible secondary lead poisoning.

The locations and boundaries of Category 2 Prairie Dog Habitats may change and shift depending on prairie dog activity, new information, or other management objectives.

D. Category 3 Colonies

Category 3 Prairie Dog Habitats are small isolated colonies which do not fall within the boundaries of Category 1 or 2 Prairie Dog Habitats and occur south of Highway 450 and east of R67W. They also fall within the TBGPEA potential CCAA area.

- ☐ Category 3 Prairie Dog Habitats are small isolated colonies which do not fall within the boundaries of Category 1 or 2 Prairie Dog Habitats.
- ☐ Two thousand acres of Category 3 Colonies strategically located across the planning landscape should be maintained. The primary purpose of Category 3 Colonies is to provide a source for natural dispersal to Category 1 and 2 Prairie Dog Habitats following a plague outbreak and to provide a widespread geographic distribution of prairie dog colonies and their associated species across the TBNG.
- ☐ Priority will be given to Category 3 colonies which can serve to recolonize Category 1 and 2 Prairie Dog Habitats as well as colonies with a documented presence of species of concern such as burrowing owls and mountain plovers.
- ☐ Ideally, these colonies should be located approximately 10-20 km from Category 1 and 2 Prairie Dog Habitats. An abundance of Category 3 colonies <7km from a Category 1 Prairie Dog Habitat should be discouraged to provide a buffer zone which could slow the spread of plague.
- ☐ A distribution of approximately 500-1,000 acres of Category 3 Colonies should be maintained in isolation from Category 1 and 2 Prairie Dog Habitats to provide additional protection from a landscape wide plague epizootic as well as insure wide geographic distribution of prairie dogs.
- ☐ A colony will be considered isolated if it is >20km from a Category 1 or 2 Prairie Dog Habitat or separated by significant amounts of unsuitable habitat.
- ☐ Management actions should be considered if Category 3 Colonies fall below 500 acres or above 2000 acres.
- ☐ Regulated shooting could be allowed on all Category 3 Colonies.

E. Category 4 Colonies

Category 4 Prairie Dog Habitats are small isolated colonies which do not fall within the boundaries of Category 1 or 2 Prairie Dog Habitats and are north of Highway 450 and East of R67W. They also fall outside the TBGPEA potential CCAA area.

- ☐ Four thousand acres of Category 4 Colonies strategically located across the planning landscape will be maintained.
- ☐ The primary purpose of Category 4 Colonies is to provide a source for natural dispersal to Category 1 and 2 Prairie Dog Habitats following a plague outbreak and to provide a widespread geographic distribution of prairie dog colonies and their associated species across the TBNG.
- ☐ Priority will be given to Category 4 colonies which can serve to recolonize Category 1 and 2 Prairie Dog Habitats as well as colonies with a documented presence of species of concern such as burrowing owls and mountain plovers.
- ☐ Ideally, these colonies should be located approximately 10-20 km from Category 1 and 2 Prairie Dog Habitats. An abundance of Category 4 colonies <7km from a Category 1 Prairie Dog Habitat should be discouraged to provide a buffer zone which could slow the spread of plague.
- ☐ A distribution of Category 4 Colonies should be maintained in isolation from Category 1 and 2 Prairie Dog Habitats to provide additional protection from a landscape wide plague epizootic as well as insure wide geographic distribution of prairie dogs.
- ☐ A colony will be considered isolated if it is >20km from a Category 1 or 2 Prairie Dog Habitat or separated by significant amounts of unsuitable habitat.
- ☐ Regulated shooting could be allowed on all Category 4 Colonies.

F. Colonies not in Category 1, 2, 3, or 4

- ☐ Coal Mine Area-colonies will not be scheduled for control and do not count toward category goals but will be maintained until they are impacted by mining.
- ☐ New-colonies will be maintained until a review of their values are conducted and a determination of their designations is completed under the strategy
- ☐ Control-Colonies will be controlled on a priority basis as follows(see decision screens):
    1. Colonies close to residences where health and safety are a concern
    2. Colonies expanding onto private land not in categories 1, 2, 3 or 4
    3. Colonies expanding onto private land near boundaries of categories 1, 2, 3 or 4
    4. Colonies getting close to private land

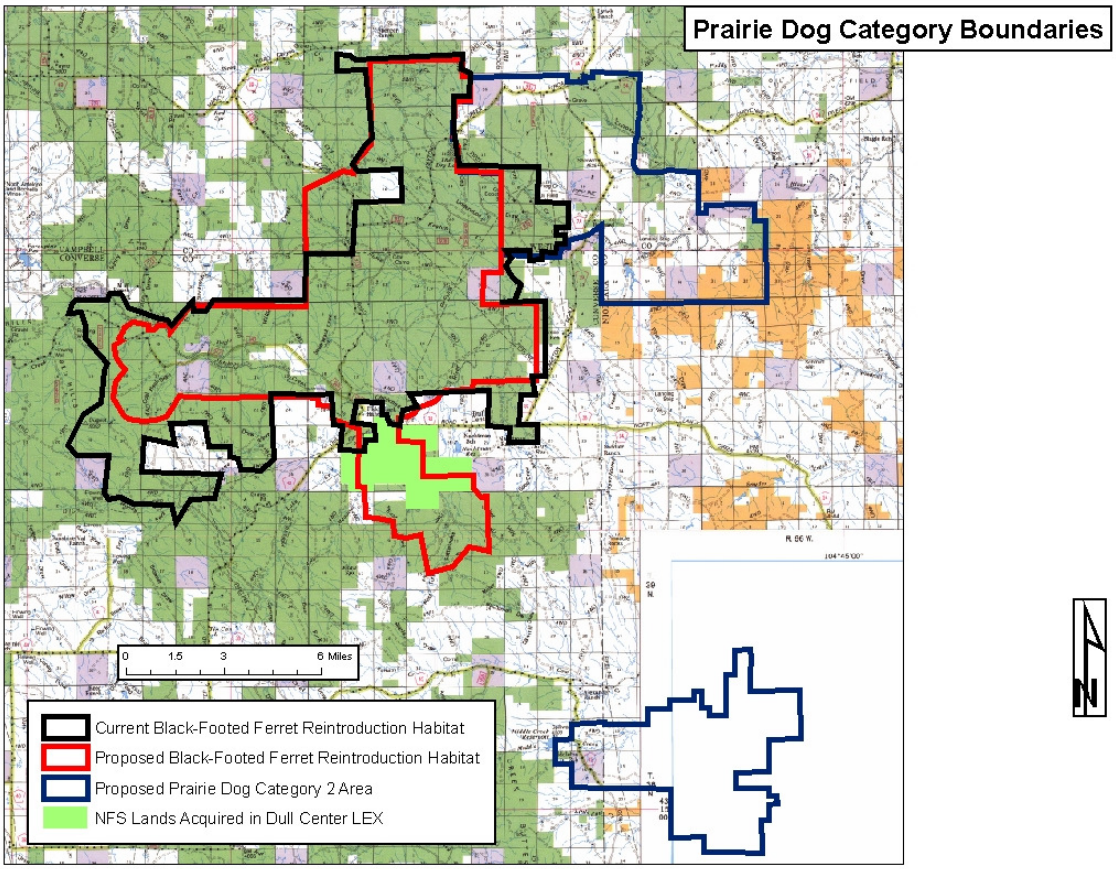
General Management

Chemical control of prairie dogs entails substantial investments in personnel and funding. Based on past management history, neither available personnel nor available budget are likely to be sufficient to address all complaints of unwanted prairie dog colonization. Because of this, priority should be given to new sites of unwanted colonization (a new site being defined as an area where unwanted colonization has not occurred within the previous 10 years). By focusing on new problem sites, there is a greater likelihood of “nipping the problem in the bud”. Sites

with chronic problems of unwanted prairie dog colonization should be prioritized for land exchange, acquisition, or conservation easements.

Anytime that unwanted colonization occurs, vegetation management to encourage high structure vegetation should be implemented. This will typically require grazing regimes to be modified to prevent creation of low structure vegetation on or near the colonized site that would facilitate recolonization.

Figure 17: Category 1 and 2 Prairie Dog Habitats identified on Grassland



Monitoring

This strategy will be monitored by assessing the prairie dog population annually and by monitoring changes in size, location and expansion of the colonies. Management methods used will be monitored for effectiveness based on the changes in the population before further use of that method or before moving to a different method.

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