

NORTH DAKOTA GAME AND FISH DEPARTMENT

Final Report
Status of the Black-tailed Prairie Dog in North Dakota
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STATUS OF THE BLACK-TAILED PRAIRIE DOG IN NORTH DAKOTA

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ABSTRACT: A survey for black-tailed prairie dog (*Cynomys ludovicianus*) colonies in southwestern North Dakota was conducted in 2005 and 2006. This survey consisted of an aerial survey of 413 known prairie dog colonies during late August and September 2005. This survey was restricted to prairie dog colonies occurring on private, Tribal, state, Bureau of Land Management, and Army Corps of Engineers land. Colonies on Forest Service land in the Little Missouri National Grasslands and National Park Service land within the North and South Units of Theodore Roosevelt National Park were not included in the survey because the managing agencies conducted their own prairie dog inventory in 2005. The purpose of the aerial survey was to determine which prairie dog colonies were active and to estimate the size of each active colony. Following the aerial survey, an attempt was made to visit each prairie dog colony site on the ground, and if possible, obtain permission to map active colonies. Prairie dog colonies occurring on Tribal land within the Standing Rock and Fort Berthold Reservations were not part of the ground mapping effort. The aerial and ground surveys resulted in the inspection of 493 prairie dog colony sites and 440 (89%) of these colonies were determined to be active. Prairie dogs were not observed at 53 colonies and poisoning appeared to be the primary cause of prairie dog loss at these sites. Poisoning was also considered to be the cause of prairie dog decline at another 134 colonies. However, overall the number of prairie dog colonies in North Dakota appeared to increase as a result of finding 121 new and/or previously undocumented colonies. Combining this information with current prairie dog abundance data for Theodore Roosevelt National Park and the Little Missouri National Grassland resulted in a minimum of 607 active prairie dog colonies in North Dakota during 2005-2006, which occupied an estimated 22,597 acres of land. Comparable figures for a similar prairie dog survey conducted in 2001-2002 were 540 prairie dog colonies occupying 20,074 acres of land. Prairie dog distribution in North Dakota remains clustered along the Little Missouri River and its tributary drainages, and the Standing Rock Reservations and adjacent areas.

INTRODUCTION

In 2001 and 2002, southwestern North Dakota was surveyed for black-tailed prairie dogs (*Cynomys ludovicianus*) (Knowles 2003). This survey reported that prairie dogs were found in a minimum of 540 colonies and occupied about 20,074 acres. Prairie dogs were found in 12 North Dakota counties. Distribution was largely restricted to either side of the Little Missouri River and its tributary drainages, and the Standing Rock Reservation and adjacent areas, with some scattered isolated colonies in upland prairie between these 2 large prairie dog complexes.

At the time of this survey, the black-tailed prairie dog was listed by the U.S. Fish and Wildlife Service (FWS) as a candidate Threatened Species with a "warranted but precluded" status. The 2003 North Dakota prairie dog status report (Knowles 2003) concluded that the black-tailed prairie dog was not threatened with extinction in North Dakota and that viable prairie dog populations existed within the 2 major complexes. Since this status report, the FWS has removed the black-tailed prairie dog from the candidate Threatened Species list. In 2005, North Dakota Game and Fish initiated another prairie dog survey as a follow-up to the 2001-2002 survey. This report summarizes the results of this latter survey.

STUDY AREA AND METHODS

The study area was all of unglaciated North Dakota, south and west of the Missouri River. Based on historical accounts, this area encompasses most of the original range distribution of prairie dogs in North Dakota (Bailey 1926), and represented about 12,283,520 acres. Emmons County (east of the Missouri River) was not included in the survey because the prairie dog was believed extirpated from this area. Elevation within southwestern North Dakota ranged from about 1,800 feet to 3,500 feet. Based on physiography, this area of North Dakota consists of 2 distinct landforms: 1) The Little Missouri River corridor with river breaks and badland formation in the western portion of the study area, and 2) Rolling prairies in the eastern portion of the study area. A large complex of prairie dog colonies occurred throughout the Little Missouri area and is referred to in this report as the Little Missouri Complex. Another large complex of prairie dog colonies occurred on the Standing Rock Reservation (Sioux County) and adjacent areas in Grant and Morton Counties. This prairie dog complex is referred to in this report as the Standing Rock Complex.

The Little Missouri Complex was located in the western third of the study area. In this area, prairie dog colonies were associated with the Little Missouri River that formed a north/south oriented corridor from the North Dakota/South Dakota border to Lake Sakakawea. Much of this area was characterized by badland formations, scoria buttes, and river breaks topography. In addition, there were also a few large isolated buttes that were 300-500 feet higher than the surrounding upland areas (e.g., Bullion and Square Buttes). Reid (1954) provided a description of the soils and physiography of this region. The Little Missouri area also contained plains cottonwood (*Populus deltoides*) dominated river bottomlands, hardwood draws dominated by green ash (*Fraxinus pennsylvanica*) and north slopes with Rocky Mountain juniper (*Juniperus scopulorum*). Most of the privately owned land on the Little Missouri River bottomlands has been converted to agricultural crop production, and some upland ridges were also cultivated. However, much of the land within the Little Missouri corridor was Federally owned (Forest Service, National Park Service, Bureau of Land Management) and not farmed. The upper drainage basins of the Cannonball, Heart, and Knife Rivers are included in the Little Missouri corridor because these areas lie within the Little Missouri National Grassland. Also, portions of northern McKenzie County were considered within the Little Missouri Corridor even though drainages flowed directly into the Yellowstone and Missouri Rivers. The 2005-2006 prairie dog survey did not include U.S. Forest Service managed land in the Little Missouri National Grassland and National Park Service land in Theodore Roosevelt National Park.

The Standing Rock Complex was located within the eastern two thirds of the study area and was primarily associated with rolling prairies dissected by the Heart and Cannonball Rivers. Limited badland formations were present in some areas along these drainages. Land ownership in this area was primarily private and Tribal with a substantial portion of the area converted to agricultural crop production. However, extensive areas of native grasslands remained in Sioux County, and portions of Grant and Morton Counties. Common native grass species within the study area included western wheatgrass (*Agropyron smithii*), blue grama (*Bouteloua gracilis*), needle-and-thread grass (*Stipa comata*), green needle grass (*Stipa viridula*), prairie June grass (*Koeleria cristata*), and blue grass (*Poa* spp.).

This inventory of North Dakota prairie dogs consisted of two distinct phases. The first phase was an aerial survey of all prairie dog colonies documented during the 2001-2002 survey effort except those on Forest Service and National Park Service land. Latitude and longitude coordinates for 413 prairie dog colony were ordered in a logical manner to minimize travel distances between points and then stored as waypoints in a Garmin 12XL GPS unit. Each colony was flown over with a single engine fixed-winged aircraft to determine if the colony was active or inactive and estimate its size in acres. The colony sites were initially viewed from about 500 feet above ground level, and a lower pass was made to verify that the colony was active. Activity was based on open burrows, clipped vegetation, and the presence of prairie dogs. Occasionally, new prairie dog colonies were found when searching for previously recorded prairie dog colonies, and a latitude longitude coordinate for these colonies was recorded. Prairie dog colonies located on Forest Service and National Park Service lands were not included in the aerial survey because these agencies monitor the prairie dog colonies on the lands that they manage. All active colonies found during the aerial survey were plotted on a "North Dakota Atlas and Gazetteer" (Delorme 1999) which served as a working field map during the second phase of the project which was to visit all active prairie dog colonies on the ground. Copies of these original field maps are presented in Appendix B.

The second phase of the project consisted of visiting or attempting to visit each active colony site on the ground and accurately mapping the colony with a GPS unit. Mapping of private land prairie dog colonies required landowner permission and for some colonies the landowner could not be located or permission to map was not granted. For the most part, however, private landowners with prairie dogs were very cooperative and granted permission to map prairie dog colonies on their land. A letter from the Director of North Dakota Game and Fish was given to each land owner that explained the purpose of the mapping project. The letter explained that results of the 2001-2002 mapping effort were influential in the FWS decision to remove prairie dogs off of the Threatened and Endangered Species list, and that updated information on the status of the black-tailed prairie dog would help keep management of the prairie dog under state jurisdiction. If

the landowner had questions, I usually explained that the mapping effort was not part of an effort to protect prairie dogs, but that updated information on prairie dog abundance would probably help to continue their rights to manage prairie dogs on private land. The frequent reason cited for not granting permission to map was that the landowner planned to poison the prairie dogs. A few landowners stated that they did not want to be on a list that would result in more prairie dog shooters, and a couple of landowners said that they did not want the government knowing what they had on their land. Where the landowner was not found or where the landowner did not grant permission to map, I used the colony size that was visually estimated during the aerial survey. The size of new colonies where the landowner could not be found was estimated visually from a public road.

Between 2002 and 2006, a significant number of prairie dog colonies were poisoned. The level of control obtained varied widely (this is discussed in the results section). Colonies where no prairie dogs were observed or only a few prairie dogs were observed were not mapped because there was no obvious (clipped vegetation) area occupied by prairie dogs. Colonies where no

prairie dogs were observed are designated in Appendix A as 2 dashes (- -). Prairie dogs are semi-fossorial and the lack of prairie dog observations at a poisoned colony does not necessarily mean that the colony was extinct, since surviving prairie dogs may have been underground in their burrows. Colonies where a limited number (up to a dozen or so) of prairie dogs were observed are recorded as 1 occupied acre in Appendix A. These colonies were for certain active, and would be expected to recover from the effects of poisoning provided that there are no additional control efforts. Poisoned colonies with low levels of control, or where prairie dogs were in the process of population recovery, were mapped. During the 2 North Dakota prairie dog surveys there was no indication that sylvatic plague was a factor influencing prairie dog colonies and depopulated colonies were assumed to have been poisoned. Frequently, landowners confirmed that they had poisoned their colonies.

Prairie dog colonies located within the exterior boundary of the Standing Rock Reservation were mapped if they occurred on deeded land while those occurring on Tribal land were not mapped. However, colonies that partially occurred on Tribal land were mapped in their entirety if the private landowner leasing the Tribal land granted permission to map the entire colony. Four prairie dog colonies were known to exist on the Fort Berthold Reservation and there was 1 colony on deeded land next to the Reservation that was Tribally owned. These colonies were not mapped. Prairie dog colonies occurring on Forest Service land were not mapped and in situations where colonies occurred both on private and Forest Service land only the private portion of the colony was mapped. However, there were exceptions in cases that landownership was not designated with a fence or in cases where the Forest Service had no record of prairie dogs on their land. In those cases, the entire colony was mapped.

Prairie dog colonies were mapped by driving (or walking) the perimeter of the colony with an ATV and recording latitude/longitude coordinates with a Geo Explorer II GPS unit at 5 second intervals. The PDOP value was set at 6.0 and a minimum of 30 points were required to complete a polygon. The ATV was paused at all sharp turns to record a point at the apex of the turn. Generally, the perimeters of smaller colonies (few acres) were walked, and colonies on state land were walked unless specific permission was obtained from the lessee to drive the perimeter with the ATV. The perimeter of the colony was defined as the outermost active burrows. Burrows were considered active if the vegetation was trimmed on the mound, and there were prairie dog feces on or around the mound. At the end of each day in the field, shape files were transferred from the GPS unit to a laptop computer, and the polygons were reviewed for accuracy. Colonies showing unusual spikes or long straight sections on a perimeter were considered inaccurately mapped and were mapped again. Shape files of the prairie dog colonies were differentially corrected by North Dakota Game and Fish. For each colony visited during the mapping effort, I made a visual estimate of prairie dog density (low, medium, high), if there was suspected plague activity, and if the colony appeared to be stable, increasing or decreasing.

(Missing from digital copy - map of North Dakota indicating south and west of the Missouri River as the Survey Area)

Figure 1. Map of North Dakota showing the location of the prairie dog colony survey area.

RESULTS AND DISCUSSION

NUMBER OF PRAIRIE DOG COLONIES

The aerial and ground surveys resulted in the inspection of 493 prairie dog colony sites and 440 (89%) of these colonies were determined to be active. The 53 inactive colonies were attributed to poisoning and land conversion to cropland which is discussed in detail below. There were also 23 colony sites where 2 or 3 closely spaced colonies had expanded and merged into a single larger colony. The Little Missouri National Grassland (LMNG) and Theodore Roosevelt National Park (TRNP) both contained significant numbers of prairie dogs, but these Federal lands were not part of the survey because both agencies inventoried their prairie dogs in 2005. On the LMNG there were 126 colonies on Federal land, and within the 2 Units of TRNP, there were 40 colonies (Mike Oehler, wildlife biologist, TRNP, pers. commun.). The minimum total number of active prairie dog colonies in North Dakota during 2005-2006 was 601 colonies (Table 1). This is a minimum figure since there were undoubtedly some colonies that were not detected during the survey. However, this accounting of active prairie dog colonies probably represents the majority of the colonies in North Dakota and is suitable to provide population trend data. A similar prairie dog colony survey in 2001-2002 documented 540 active prairie dog colonies (Knowles 2003), suggesting an upward trend in number of prairie dog colonies in North Dakota despite substantial prairie dog control efforts on private land between 2002 and 2006. This is about an 11% increase in the number of colonies in a 4 year period. (Note also that the merging of colonies lowers the total count even though there is an expansion in acreage.) This is supported by the fact that during the 2005-2006 survey 121 previously unrecorded colonies were found. Most of these colonies were small and probably not present during the 2001-2002 survey. However, a few colonies were larger and had obviously been missed during the 2001-2002 survey.

Many of the prairie dog colonies had multiple ownerships such as private/state, private/Forest Service and private/Tribal. A minimum of 49 prairie dog colonies had 2 or 3 landowner classifications. In addition, some private land prairie dog colonies had 2 or 3 private landowners. Of the 499 prairie dog colony sites visited during this survey, 427 colonies were on private land, 82 were on Tribal land, 26 were on state land, 3 were on BLM land and 3 were on Army Corp of Engineers (ACE) land. Thirty-four colonies extended onto Forest Service land, but generally, the Forest Service portion of the colony was not mapped. The number of private land prairie dog colonies in North Dakota are more than double those occurring on Forest Service and National Park Service lands combined, and the private land owner appears to play a significant role in prairie dog conservation. This was especially true in the Standing Rock Complex where the vast majority of the prairie dogs were on private land. Surprisingly, even on the Standing Rock Reservation (Sioux County), a majority of prairie dog colonies occurred on deeded land or deeded/Tribal land as opposed to being entirely on Tribal land.

PRAIRIE DOG ACREAGE

Tracking the number of prairie dog colonies is important because colonies represent distinct sub-populations. The more colonies and the greater their distribution, the overall prairie dog population would be expected to have greater population persistence. However, prairie dog population persistence is also influenced by the number of prairie dogs in each of the sub-

populations (colonies). An indirect measure of prairie dog population is the area occupied by prairie dog colonies. Prairie dogs are organized into small family groups within a colony and these groups are territorial. Although territory size and number of family members within a territory varies in relation to climate, soil productivity and other environmental factors, the differences within a prairie dog complex are not so great to invalidate the use of area occupied as an indicator of population size. For North Dakota, a prairie dog colony that has not been poisoned or subjected to prairie dog shooting, would be expected to support about 10 prairie dogs per acre during the summer.

During this survey it was estimated that the 440 active prairie dog colonies occupied about 16,241 acres of land. An additional 1,526 acres of prairie dogs were present in the 2 Units of TRNP, and 4,830 acres of active prairie dog colonies occurred on the LMNG. The estimated minimum prairie dog acreage for North Dakota in 2005/2006 would be 22,597 acres. This is about an 13% increase from the 20,074 occupied acres estimated in the 2001-2002 survey (Table 1). The average prairie dog colony size in 2005-2006 was 37.2 acres which was is the same average size of estimated for prairie dog colonies in 2002.

The increase in prairie dog acreage from 2002 to 2006 can be attributed to increase in size of non-poisoned colonies, recovery of prairie dog colonies poisoned in 2002, discovery of a few previously undocumented prairie dog colonies, and about 100 new colonies. In a sample of 40 prairie dog colonies where I could be certain of no prairie dog control between 2002 and 2006, there was a 40.1% increase in acreage with the average colony size increasing from 41.8 acres to 58.8 acres. This is about a 10% growth rate per year. I also had data for 7 prairie dog colonies that were poisoned at the time that I mapped them in 2002, and these colonies increased 38% from an average of 17.2 acres to 23.8 acres. I also had pre-treatment data from 2002 for 22 prairie dog colonies that appeared to be treated with zinc-phosphide between 2002 and 2006. Acreage of these colonies declined an average of 78.3% from 27.3 acres to 5.9 acres. It is probably significant that the 2 categories of treated colonies were smaller than the untreated group.

The largest mapped prairie dog colony during this survey was 327 acres located in upland prairie between Amidon and Belfield. The 450-acre colony in Morton County, which was the largest mapped colony during the 2001-2002 survey, was recently poisoned when I examined it during the fall of 2006. When I mapped this colony in 2002, the landowner was a widow who explained that the prairie dogs had not been managed in the 9 years since her husband died. When this colony was checked during the aerial survey in September 2005, it was active and had merged with an adjacent colony, and was estimated to have grown to about 640 acres. In 2006, the ranchhouse was abandoned and the driveway had a locked chain and gate across it.

Another colony in Sioux County was estimated to be about a section during the aerial survey. In May 2006, I drove past this colony and it was very active and 2 dispersing prairie dogs were observed on the county road. When I returned in September 2006 to map this colony, it had just recently been poisoned.

By far the best complex of prairie dog colonies that I encountered during the survey was just west of Selfridge. Here there were over a dozen large colonies and over a 1,000 acres of prairie

dogs. The 10,000-acre ranch at the core of this complex was owned by a person who was injured by an anhydrous ammonia accident 7 years earlier. During this period, prairie dogs were not managed.

Table 1. Summary of number of prairie dog colonies and prairie dog occupied acres in the Little Missouri Complex and the Standing Rock Complex, and for all of North Dakota.

| Area | 2006 | | 2002 | |
|-------------------------|------------|--------|------------|--------|
| | # Colonies | Acres | # Colonies | Acres |
| Little Missouri Complex | 343 | 12,505 | 316 | 11,060 |
| Standing Rock Complex | 264 | 9,864 | 224 | 9,014 |
| North Dakota | 607 | 22,597 | 540 | 20,074 |

PRAIRIE DOG DISTRIBUTION

Prairie dog distribution in North Dakota remains very similar to their distribution in 2001-2002. A couple of small isolated colonies in the Dickinson area appear to have been eliminated between 2002 to 2006. This represents a small range contraction, but this was offset by the discovery of a couple of isolated prairie dog colonies elsewhere. The prairie dog colony complex along the Little Missouri River contained a minimum of 343 colonies and 12,505 acres. At the Standing Rock Complex, there were 264 colonies and 9,864 acres of prairie dogs. Maps in Appendix B show the locations of all prairie dog colonies encountered during the 2001-2002 and 2005-2006 surveys. Within the range distribution of prairie dogs in North Dakota (area south and west of the Missouri River), prairie dogs occupy about 0.18% of the land area.

PRAIRIE DOG POISONING

Of the 437 prairie dog colonies occurring on private and public land (state, BLM, ACE) categories, 187 (43%) were determined to have been poisoned since 2002. Management of prairie dogs on Tribal land was not addressed during this survey, but based on the aerial survey none of the Tribal colonies appeared to have been poisoned. Fifty-three prairie dog colonies were classified as inactive because prairie dogs were not observed, but some of these colony sites may have had a few surviving prairie dogs that were in their burrows when the colony was examined. Level of control obtained in the prairie dog control efforts varied widely from complete eradication in some smaller colonies to no appreciable decline in prairie dogs. The level of control did not appear to be consistent with the applicator or the type of poison used.

I talked to many landowners who had poisoned their prairie dogs since 2002 and found that there were 2 basic modes of control. These were contracted control work with zinc-phosphide treated grain bait, and individual control efforts usually with an anti-coagulant with the trade name of

Ramik Green. The vast majority of the contracted control work was conducted by an individual from Nebraska (Lamb Pest Control, Kilgore, NE) who had been working late summer through fall in North Dakota since at least 2004. His control effort consisted of pre-baiting colonies 1 week and returning the next week to apply zinc-phosphide treated grain bait. It appeared that he generally achieved about a 90% reduction in prairie numbers but there were some colonies that the level of control was considerably less. Individuals who stated that they used zinc-phosphide to control prairie dogs seemed to obtain a lower level of control as compared to the contractor, but this was just my visual impression and was not based on hard data. Most people reported paying \$4/acre for pretreatment, \$1/acre for the grain bait, and \$4/acre to apply the treated grain bait, or about \$9/acre for the entire operation. The contractor found farms and ranches with prairie dogs by placing ads in local papers and asking clients if they had neighbors with prairie dogs.

I had pre-treatment data from 2002 for 22 prairie dog colonies that appeared to be treated with zinc-phosphide between 2002 and 2006. Acreage of these colonies declined an average of 78.3% from 27.3 acres to 5.9 acres. However, it should be understood that these data were not part of a controlled experiment and there was probably considerable variation in application technique and follow-up control after the initial poisoning. Also, I did not have pretreatment data for any of the colonies classified as inactive, and I had very little information on colonies that contained a few surviving prairie dogs. If these were included in the sample, the decline would have been considerably greater. In contrast though, data for 40 prairie dog colonies where I could be certain of no control work between 2002 and 2006 showed an increase of 40.1% from an average of 41.8 acres to 58.8 acres. I also had data for 7 prairie dog colonies that were poisoned at the time that I mapped them in 2002, and these colonies increased an average of 38% from 17.2 acres to 23.8 acres. These data indicate that even after substantial population declines, prairie dog numbers are capable of recovering within a few reproductive cycles. However, prairie dog poisoning should not be trivialized since it is apparent that poisoning can be used to hold colony size to a small acreage and that persistent landowners can eliminate prairie dog colonies. Probably the 2 largest prairie dog colonies in North Dakota, each about a section, were poisoned in 2006 with very few surviving prairie dogs. These 2 colonies represented about 6% of the prairie dog acreage in North Dakota.

In Sioux County on the Standing Rock Reservation, I encountered landowners using Ramik Green to poison prairie dogs. This is an anti-coagulant that is not registered for prairie dog control in North Dakota. Label restrictions show that Ramik Green was approved for use in and around buildings, and was not to be broadcast in a field situation. Prairie dog population consequences resulting from use of this poison ranged from total elimination of prairie dogs to no discernable affect. Based on label information, about a quarter pound of treated bait is required to kill a prairie dog size rodent. Continuous feeding of the bait is recommended and generally 5 days are required before prairie dogs die. According to the label this poison is toxic to all birds and mammals. Animals consuming a rodent killed by Ramik Green are considered to be at moderate risk to secondary poisoning.

Landowners were obtaining Ramik Green from grain elevator operators in McIntosh, South Dakota, Flasher, North Dakota and other small agricultural communities. The treated bait costs

about \$1 per pound and to successfully treat a 1 section prairie dog colony required about \$5,000 of treated bait and 14 people on ATVs. Based on comments of landowners, they were aware that Ramik Green was not approved for use on prairie dogs, and that the grain elevator operators were aware of how the poison was being used. There also was a statement that the manufacturer of the poison was concerned with the amount of Ramik Green being ordered by the McIntosh grain elevator. Apparently this poison is much easier to obtain than zinc phosphide treated grain bait which requires Federal pesticide applicator certification. Ramik Green comes in 5 gallon green plastic buckets or it can also be obtained in 50 pound cardboard boxes. Two landowners stated that they kept a bucket of Ramik Green in their shops to kill dispersing prairie dogs that were trying to establish colonies on their land.

Use of Ramik Green may not have been restricted to Sioux County and adjacent areas. In August 2006, I was observing prairie dogs from a county road near Marmarth at a 120-acre colony when the landowner drove up specifically to assess the status of his colony. He lived in Marmarth and had paid a neighbor to poison his prairie dogs. It had been 7 days since his colony was treated and he was curious how effective the treatment was. He told me that it took 5-7 days for the prairie dogs to die from the poison (with zinc phosphide, prairie dogs die within 24-48 hours). He did not state what poison was used. Much to his disappointment it was difficult to tell that the colony had even been treated.

In addition to killing prairie dogs differently than zinc-phosphide, Ramik Green has some other notable differences. These include that it apparently does not have a detectable odor or flavor, and prebaiting is not required to control prairie dogs. In addition, prairie dogs apparently keep eating the treated bait well after they obtain a lethal dose. Since there is no bait aversion with Ramik Green, immediate retreatment of colonies is possible. Ramik Green is also persistent in the environment. Zinc phosphide has a definite odor and flavor, and prebaiting is required to get prairie dogs to consume enough treated grain bait to obtain a lethal dose. Prairie dogs obtaining sub-lethal doses are unlikely to take treated grain bait again, and retreatment of a colony does little to improve the level of control. Zinc phosphide is neutralized by moisture and is not persistent in the environment. Landowners apparently successfully controlling prairie dogs with Ramik Green reported placing a large ladle full of treated bait on each mound. One landowner with very poor results reported broadcasting the bait in colonies.

In 2002, landowners reported using a variety of methods to control prairie dogs, but in 2006 outside of the 2 previously discussed poisons, anhydrous ammonia was the only "home remedy" and it was only mentioned once. It appears that many landowners mistakenly believed that they could not legally poison prairie dogs in 2002 because the black-railed prairie dog was a candidate Threatened Species. Virtually all landowners that I spoke to in 2005 and 2006 were aware that the black-tailed prairie dog was no longer a candidate Threatened Species. Removal of the black-tailed prairie dog from the candidate Threatened Species list also exposed the Forest Service to intense political pressure to poison prairie dogs on the LMNG. Several landowners in Sioux County reported that prairie dog colonies expanded greatly in 2006 as a result of extreme drought, and that when there was no hay to cut and bale in June, they decided to poison prairie dogs. In at least 1 case, it was a cooperative group effort of several landowners. I encountered 2 landowners who reported that they had strychnine treated grain bait in their shops, but they did

not like using it because of the secondary toxicity hazard. One landowner reported his source of strychnine came from friends in Montana, and the other person did not state where he got his strychnine from. I also received 1 report of strychnine being used south of MacIntosh, South Dakota with prairie dogs dying on the surface by the thousands. Six of the poisoned colonies that I observed had been converted to agricultural cropland. Prairie dogs were gone from the cropped area, but in 2 cases a few prairie dogs remained on adjacent uncultivated land.

Although prairie dog poisoning can result in a dramatic change in prairie dog numbers in a specific colony or group of colonies, the overall picture in North Dakota is that prairie dog acreage and number of active colonies are relatively stable or increasing slowly. Despite the nearly universal disdain by landowners for prairie dogs, there appears to be some tolerance of prairie dogs at low densities. Very few landowners take advantage of poisoning to completely eradicate prairie dogs from their property, but rather use poisoning as a means to manage prairie dog populations at levels they can tolerate. The colonial nature of prairie dogs, however, make this a unique situation in that virtually all individuals of a population can be located and killed. The technology to eliminate prairie dogs is there it is just a matter of landowner motivation. The landowner who organized a cooperative poisoning effort in Sioux County told me that he had a 960-acre colony on his land when he purchased the property 20 years previous, and that he had eliminated it over the years by repeatedly poisoning the colony. He told me this when I was stopped along the road making notes about this site once being a large colony. His neighbors described him as a real prairie dog killer.

In 2002, many landowners described how frustrated they were in not being able to effectively control prairie dogs. Some of these same landowners in 2006 expressed great satisfaction with Lamb Pest Control's ability to control prairie dogs. Several of the landowners said it was so simple. This was in reference to the fact that Lamb Pest Control only had a pickup truck, an ATV and a stock trailer loaded with treated grain bait. From my perspective, I was amazed by how many prairie dogs one person could poison. Both in the Marmarth area and Sioux County he left a trail of depopulated colonies.

Prairie dog shooters were encountered at several prairie dog colonies, and landowners had many stories of shooters coming from far away places to shoot prairie dogs. It is difficult to judge the effect of shooting on prairie dog populations. One landowner, who was an avid prairie dog shooter and had a 10-acre colony on his land, was delighted to learn that his colony grew very little while neighboring colonies had grown considerably between the 2 surveys. Another elderly landowner told me that he wagered a 1949 Chevrolet to an avid prairie dog shooter from Dickinson that he could not shoot out his 20-acre prairie dog colony. He said that he lost the car, but that his prairie dogs were gone. There also was a series of small colonies close to the mouth of the Little Missouri River where the landowner rented a cabin to prairie dog shooters. These colonies showed very little growth from 2002 to 2006.

ASSOCIATED SPECIES

Several wildlife species were frequently observed in prairie dog colonies and probably had some level of association with prairie dogs or habitat provided by prairie dogs. The primary species of concern were the burrowing owl (*Athene cunicularia*), ferruginous hawk (*Buteo regalis*), and

golden eagle (*Aquila chrysaetos*). During the survey, 107 burrowing owls were observed in 44 colonies. The frequency of burrowing owl occurrence at mapped colonies between 1 May and 30 September 2006 was 21%. (This analysis only used colonies that were mapped because they had a higher probability of detecting owls than just viewing a colony from a county road.) However, since prairie dog colonies were not specifically searched for burrowing owls, these observations were only a minimum estimate of burrowing owl occurrence and numbers. During the 2001-2002 survey burrowing owls were found at 63 colonies and their frequency of occurrence in colonies was 21% and 78% in the Little Missouri Complex and Standing Rock Complex, respectively. Very few colonies appeared to contain more than 1 burrowing owl family. One 30-acre colony northeast of Watford City stands out as having an abundance of owls during both surveys. In 2002, 17 owls were observed on this colony and in 2006, 22 owls were observed. The average colony size used by burrowing owls was 71.9 acres, but this figure includes owls observed at 5 poisoned colonies. If the poisoned colonies are removed from the sample, the average prairie dog colony size used by burrowing owls was 80.9 acres. This is more than twice as large as the average size of prairie dog colonies in the survey area. During the 2001-2002 survey, the average size of colony used by burrowing owls was 85 acres in the Little Missouri Complex and 64 acres in the Standing Rock Complex. Burrowing owl observations tended to be concentrated in the Marmarth area, Watford City area, and Sioux County.

Twenty-four ferruginous hawks were observed at 19 prairie dog colonies. The average size colony used by ferruginous hawks was 86.9 acres. A ferruginous hawk was observed in 1 poisoned colony and if this colony is removed from the sample, the average size colony used by ferruginous hawks was 91.7 acres. This is almost 2.5 times larger than the average prairie dog colony. The frequency of occurrence of ferruginous hawks at all mapped prairie dog colonies was 9%. The 2001-2002 survey found ferruginous hawks at 10% and 11% of the prairie dog colonies in the Little Missouri Complex and Standing Rock Complex, respectively. The average size colony used by ferruginous hawks in 2002 was 82 acres and 63 acres for the Little Missouri Complex and Standing Rock Complex, respectively. Observations of ferruginous hawks between the 2 surveys seem to be relatively similar. During the 2005-2006 survey, most observations of ferruginous hawks were made in the Marmarth area and Sioux County.

Seven golden eagles were observed at 6 prairie dog colonies, and 2 active golden eagle nests were found adjacent to 2 other colonies. The average size prairie dog colony used by golden eagles was 61.7 acres. A pair of eagles were observed feeding on a prairie dog in a poisoned colony and if this colony is removed from the sample, the average size colony used by eagles was 73.8 acres. Golden eagles were observed at 3% of the mapped prairie dog colonies. During the 2001-2002 survey, golden eagles were observed at 7% and 17% of the colonies in the Little Missouri Complex and Standing Rock Complex, respectively, and the average size colony used by eagles was 66 acres and 68 acres, respectively. Observations of these three associated species were very similar between the 2 surveys. Each of the species appears to select for larger prairie dog colonies and make very little use of colonies less than 10 acres even though the smaller colonies are more abundant.

Other wildlife species commonly observed in prairie dog colonies included the horned lark (*Eremophila alpestris*), killdeer, upland sandpiper (*Bartramia longicauda*), turkey vulture

(*Cathartes aura*), coyote (*Canis latrans*), and American pronghorn (*Antilocapra americana*). Several of the coyote observations were in poisoned colonies, and it was assumed that they were scavenging dead prairie dogs. Two of the turkey vultures were observed feeding on shot prairie dogs and it is assumed that their occurrence in prairie dog colonies is associated with prairie dog shooting.

CONSIDERATIONS FOR FUTURE SURVEYS

The combination of flying to previously recorded prairie dog colonies to determine activity status and approximate colony size, and then returning on the ground to talk to landowners and map colonies seems to work well. It was apparent that the activity status of recently poisoned colonies was difficult to accurately assess during the aerial survey because the clip line at the edge of the colony was still present. Perhaps flying lower and slower over colonies would help assess the situation, but generally prairie dogs drop into their burrows upon approach of an aircraft and observing prairie dogs on the surface is not a good criteria to judge colony activity.

This survey method undoubtedly misses some prairie dog colonies. An aerial survey with systematically placed flight lines spaced at about 2 miles intervals could be used to locate the remaining undocumented prairie dog colonies.

A major problem encountered during the mapping effort was a significant number of prairie dog colonies were owned by absentee landowners. On occasion, even the neighbors were uncertain who the landowner was. Absentee landowners were generally North Dakota residents but did not live in the vicinity of the prairie dog colony. Frequently these colonies were located in close proximity to an abandoned ranch headquarters. Since landowner contact is critical for mapping prairie dog colonies on private land, I took notes with respect of who the landowners were and where they might be found. Hopefully this will be useful in future prairie dog surveys. However, the 2006 survey found that several of the elderly landowners had passed away or moved off the land, and their land was held in trust, or the land was owned by a new absentee landowner and the ranch headquarters was abandoned.

Probably the most important part of the 2 prairie dog surveys has been landowner contact. It was an opportunity to learn how private landowners manage prairie dogs, and it also let landowners with prairie dogs know that North Dakota Game and Fish has an interest in the status of prairie dogs. The conclusion of the 2001-2002 survey that 2 viable populations of prairie dogs are present in North Dakota is also the conclusion of this survey. Prairie dog populations and distribution in North Dakota do not appear to be based on biological carrying capacity but rather on landowner tolerance. The 22,000 acres/600 colonies of prairie dogs in North Dakota might represent a social/political equilibrium.

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APPENDIX A

LIST OF PRAIRIE DOG COLONIES

VISITED DURING THE 2005-2006 SURVEY

Redacted. N.D.C.C. § 20.1-02-29.

APPENDIX B

COPIES OF FIELD MAPS USED DURING

THE 2001-2002 AND 2005-2006

PRAIRIE DOG COLONY SURVEYS

Redacted. N.D.C.C. § 20.1-02-29.