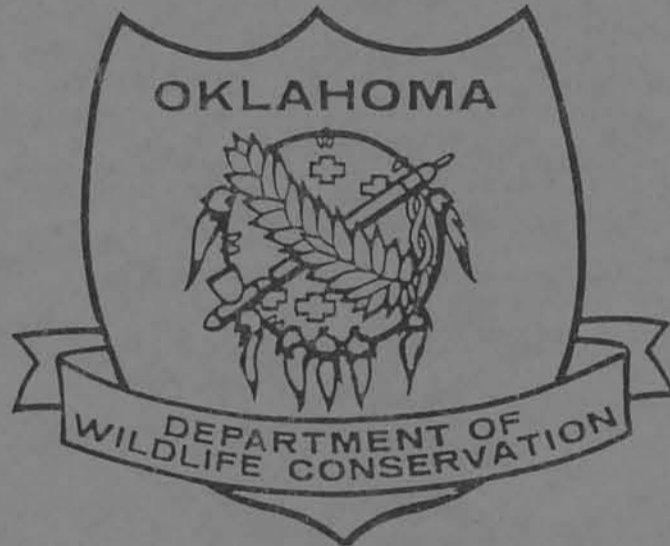


FINAL REPORT

SECTION 6

ENDANGERED SPECIES ACT



FEDERAL AID PROJECT E-53

Determining Black-tailed Prairie Dog Acreage in Oklahoma

JULY 3, 2000 - JULY 2, 2003

FINAL REPORT

STATE: Oklahoma

GRANT NUMBER: E-53

GRANT TYPE: Research

SEGMENT DATES: July 3, 2000 - July 2, 2003

PROJECT TITLE: Determining Black-tailed Prairie Dog Acreage in Oklahoma

ABSTRACT:

The aerial black-tailed prairie dog survey of the short grass High Plains region of Oklahoma was completed in September, 2002. Difficulties with airplane and pilot contracts, combined with weather complications, delayed the completion of this survey until that time. The survey was conducted by flying north-south transects 3.2 km (2 miles) apart at an elevation of 228 meters (750 feet). Two technicians (one on each side of the plane) recorded the location and size of the black-tailed prairie dog towns visible within 0.8045 km (0.5 mile) east and west of the flight transect line. Thus, each transect covered a 1.609 km (1.0 mi) strip, resulting in 10,461 km² (50%) of the study area being surveyed. From the air, 1,093 prairie dog towns were detected, encompassing 61,284 acres. All prairie dog towns discovered from the air were overlaid onto digital orthophoto quarter-quadrangles (DOQQs) taken during 1995. Of the 1,093 prairie dog towns detected by the 2002 aerial survey, 433 towns were observed on DOQQs, totaling 13,523 occupied acres. Ground verification was begun in June 2003, but was not completed prior to the writing of this report, but will be included in State Wildlife Grants project T-4-P.

I. Objectives:

- 1) Locate and measure the acreage of black-tailed prairie dog towns in Oklahoma using standardized protocol developed by the multi-state Black-tailed Prairie Dog Conservation Team.

II. Introduction:

The black-tailed prairie dog (*Cynomys ludovicianus*) was petitioned in 1998 for listing as a threatened species under the Endangered Species Act. On February 4, 2000, the U.S. Fish and Wildlife Service (USFWS) issued a 12-month finding that the species warranted listing as threatened but was precluded from doing so by higher priority listing actions (65 FR 5476). The black-tailed prairie dog was designated as a state species of special concern by the Oklahoma Department of

Wildlife Conservation (ODWC) in 1992, but has been a species of special interest to its Wildlife Diversity Program since its inception in 1983. In 2002, the black-tailed prairie dog was listed as a Tier I State Species of Greatest Conservation Need.

In the southern portion of the species' range, where the vast majority of prairie dog towns exist on private property, the main threats to the species' persistence appear to be isolation of the existing towns due to habitat loss and fragmentation, and plague. Following the 1998 petition to list the black-tailed prairie dog as a threatened species, the eleven states within the species historic range formed the Black-tailed Prairie Dog Conservation Team (BTPDCT) to compile existing status information and address data gaps and threats to the species.

One objective of the BTPDCT's Conservation Assessment and Strategy (VanPelt 1999) was to collect accurate information regarding the number and size of active black-tailed prairie dog towns throughout the species' range. Determining the number of prairie dog towns is straight forward but still challenging due to the large proportion of habitat which occurs on private property in areas inaccessible from public roads. Assessing prairie dog town acreage is difficult due to the variety of methods that have been employed to measure acreage across the species' range. The BTPDCT continues work on developing a standard set of procedures to be used by all states when measuring prairie dog occupied acres. Standardization of methodologies will facilitate more comprehensive data collection across the black-tailed prairie dog's range, allowing for comparisons of acreage estimates and trends among states.

Two methods which have been scrutinized are aerial transect surveys (Sidle 2000 in press) and satellite image surveys (pers. comm. Bob Luce, Interstate Black-tailed Prairie Dog Coordinator). There also have been two pilot programs using Landsat 7 satellite imagery to develop a search image for prairie dog towns; one on the Kiowa National Grasslands in New Mexico (pers. comm. Kris Johnson, New Mexico Natural Heritage Inventory) and the other in the Thunder Basin area of Wyoming (pers. comm. Bob Luce, Wyoming Game and Fish Department). Results from these two pilot projects have not shown Landsat 7 to be very effective in systematically searching for black-tailed prairie dog towns over large portions of the range. Therefore, the more traditional method of flying aerial transects is still being used to obtain a preliminary census of current prairie dog occupied acreage across the range.

Statewide surveys for black-tailed prairie dog towns in Oklahoma were conducted in 1969 by a doctoral student at the University of Oklahoma, and in 1989 by a contractor of the ODWC. During these surveys, visual acreage estimates were made for each town encountered, however it is unclear whether the exact same protocol was used in both surveys. In the fall of 1998, field personnel from the ODWC attempted to verify the continued existence of 311 of the 399 prairie dog towns known to exist in 1989. During this verification attempt, 186 out of 311 prairie dog towns were documented as still in existence, and 113 new prairie dog towns were discovered incidentally near existing or abandoned towns. Thus, during 1998, black-tailed prairie dog towns existed at or near 299 of 311 towns (96%) documented in 1989.

While the 1998 effort was not a systematic survey of the state, it does suggest that the number of prairie dog towns in Oklahoma has remained stable since 1989. During the 1998 effort, however, no attempt was made to measure the acreage of each prairie dog town due to the number of individuals involved in the project and the lack of a standard procedure. A need still existed to collect acreage information to assess the viability of prairie dog populations in Oklahoma. Anecdotal information from

a recent research study in the Oklahoma panhandle suggested that average size of prairie dog towns in Oklahoma had declined dramatically over the past 10 years. By using a standardized protocol for identifying prairie dog towns and measuring their acreage, a reliable monitoring program can be developed which will use changes in prairie dog acreage as an indicator of prairie dog population trends at both the regional (e.g. shortgrass High Plains) and statewide scale.

III. Procedures:

ODWC worked in cooperation with the other 10 states that comprise the interstate BTPDCT to identify an appropriate technique for large scale prairie dog town inventory. An aerial transect survey was determined to be the most appropriate both in terms of data reliability and expense. In 2000, ODWC worked with the Kansas Department of Wildlife and Parks to conduct an aerial survey for black-tailed prairie dogs in western Kansas and the panhandle and extreme northwest Oklahoma. In 2002, ODWC continued with a more intensive aerial survey in the same portion of Oklahoma.

During 2000, five counties in northwestern and panhandle regions of Oklahoma, were surveyed over an 20,923 km² area. Aerial transects were flown by using a Cessna 182 airplane at an average speed 209 km/hr (130 mph) at 0.15 km (500 feet) elevation. Transects were run north-south across the three Oklahoma panhandle counties, and all or portions of Harper, Ellis, Woodward, and Woods counties. Transects were spaced 6.44 km (4 mi) apart. In April 2002, a Cessna 172 was used to fly north-south transects at 228 meter elevation, spaced 3.22 km (2 mi) apart in the same 20,923 km² study area. Only Cimarron County was completed before pilot and plane problems delayed completion of the survey until the fall. Finally in September 2002, the entire survey was completed by using a Cessna 182 flown at a speed of 209 km/hr and an elevation of 228 meters (750 feet).

Two crews were used to survey the area during the two different survey years, 2000 and 2002. Each crew consisted of one pilot and two observers. Observers remained constant throughout the aerial survey year, but were different between years. All observers completed a training period prior to the initiation of the survey.

A Global Position System (GPS) was used to navigate along the delineated transects and ensure accurate flight patterns were maintained. The GPS units were also used to record the locations of black-tailed prairie dog towns that intercepted the transect lines, as well as towns visible up to 0.805 km (0.5 mi) on either side of the flight line. Latitude and longitude of the prairie dog towns observed from the air were recorded and corrected for direction and distance from the transect line. Each identified town's acreage was also estimated.

The first step in verifying the accuracy of the aerial survey was accomplished by overlaying aerial GPS locations onto 1995 digital orthophoto quarter-quadrangles (DOQQs). The idea was to see if towns recorded from the air during 2002 could also be seen on the DOQQs taken seven years earlier. Compressed MrSID images were used because of the ease and speed in downloading and processing. But, since MrSID files are compressed, the images are of lower quality than uncompressed DOQQ files. As a result, many of the images were unsuitable for use because of poor image quality. Boundaries of towns observed on DOQQs were on-screen digitized and the area measured by using ArcView 3.2a, and compared with those observed from the air. Ground verification of the final 2002

aerial survey will be completed in the summer of 2003 and reported under State Wildlife Grants project T-4-P.

IV. Results:

Fifty-one transects were flown during August, 2000. Because of an unexpected observer error, only those black-tailed prairie dog towns recorded by one observer could be used for analysis. As a result, only 2,597 km² of the 20,923 km² study area was adequately surveyed for prairie dog towns in 2000. Additional transects spaced in between the original transects scheduled to be flown in April 2001, were not able to be completed due to a lack of funds and changes in contractors. A more thorough aerial survey still needed to be conducted. In April 2002, a second aerial survey was begun. At that time, 29 transects were flown at intervals of 3.2 km (2 mi) over the 4,769 km² of Cimarron County, Oklahoma. Each transect covered 1.609 km (1.0 mi) wide strip, resulting in 2,384 km² (50%) of the county being surveyed. But because of difficulties in securing an adequate plane and pilot, the 74 additional transect routes could not be completed until September, 2002. Upon conclusion of the survey, 103 transects had been flown over the study area, comprising 50% coverage, or 10,461 km² of the area being surveyed (Figure 1). Only data collected from the 2002 survey was used in further analysis.

One thousand ninety-three black-tailed prairie dog towns were recorded either under or within 0.805km (0.5 mi) of either side of the 103 aerial transects; 273 (25%) were detected directly under the flight line. The total occupied acreage estimate for the 1,093 prairie dog towns was 64,214 acres. Texas County had the greatest number of towns (395 towns), while Cimarron County had the greatest number of occupied acres (24,291 acres). Town size estimates ranged from 2 to 800 acres for a single town. Average town size throughout the study area was 59.0 acres. The average town size was greatest in Cimarron County (71.6 acres), followed by Texas County. The largest town detected was in Texas County.

In the three panhandle counties of Cimarron, Texas and Beaver, 1,013 black-tailed prairie dog towns were detected (Table 1). The total acreage estimated to be occupied by the 1,013 prairie dog towns was 61,284 acres (Table 1). When the aerially recorded prairie dog towns were overlayed onto 1995 DOQQs, 433 were visible on the DOQQs. Since these towns were observed at two points in time, seven years apart, it was assumed that they were still active towns in 2002. Since further ground verification of the aerial survey data had not been completed by the time of this report, the 433 towns that were observed on both the 1995 DOQQs and from the air during 2002 were considered to be the minimum number of occupied acres and towns for the three panhandle counties. All further analyses involved only those 433 towns.

Table 1. Aerial Survey Data Collected during 2002 in the three panhandle counties of Cimarron, Texas and Beaver.

Category	Number of Towns	Occupied Acres	Average Town Size	Town Size Range
Unverified towns observed from 2002 aerial survey	1,013	61,284	60.50	2 to 800
2002 aerial survey towns also seen on 1995 DOQQ	433	32,199	74.36	2 to 800
1995 DOQQ digitized towns corresponding to 2002 aerial survey towns.	433	35,109	81.08	2 to 608

The visually estimated total occupied acreage of the 433 towns from the 2002 aerial survey was 32,199 acres (Table 1). Those same towns occupied 35,109 acres when onscreen digitized polygons of the towns from the 1995 DOQQs were measured (Table 1). Although the overall occupied acreage for these 433 towns was greater in 1995 than in 2002, 29% of the towns had a greater estimated acreage during 2002 than in 1995. Thirty-three percent of the towns were about the same size in 1995 and in 2002, while 38% of the towns were larger in 1995 than in 2002.

Complexes of prairie dog towns were evaluated for the 433 towns observed in both the 2002 aerial survey and on the 1995 DOQQs. A complex was defined by grouping prairie dog towns that were within 7 km or less of each other (Biggins, et al. 1993). A large linear complex connected 377 towns from east to west across the entire panhandle region (Figure 2). The total acreage encompassed in these 377 towns was 27,977 acres, with an average town size of 74.2 acres, based on 2002 town size estimates.

Town status was not determined aerially for any of the towns observed. Towns observed in 2002 and also in 1995, however, were considered to be active. Ground verification must be completed before an inventory of occupied acres can be concluded for this region. Ground verification and analysis for the 2002 aerial survey data are ongoing and results will be published under State Wildlife Grants project T-4-P.

V. Discussion

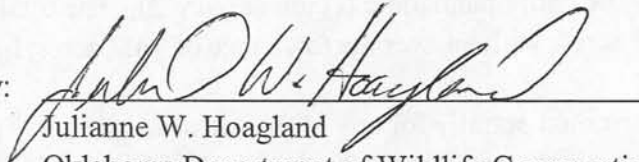
Data from both the aerial survey and the 1995 DOQQs suggest that the number of occupied acres of black-tailed prairie dog towns in Oklahoma is greater than previously thought. The statewide estimate of occupied acres reflected in the USFWS' 12-month finding for Oklahoma was 9,500 acres. This survey of 50% of Cimarron, Texas and Beaver counties revealed a minimum of 32,199 occupied acres. If representative of the area surveyed, it is conceivable that twice this number of occupied acres could exist in the panhandle region alone. Previous estimates of prairie dog occupied habitat in Oklahoma were based on roadside surveys and following up on information provided by willing landowners of where prairie dogs existed on their property. This aerial survey is the first comprehensive systematic survey completed for the shortgrass High Plains region in Oklahoma, and provides the most accurate estimate of the number of prairie dog occupied acres for this portion of the state. Discrepancies between earlier estimates and those from the aerial survey probably have more to

do with efficiency of the method used rather than a dramatic increase in prairie dog occupied acres. In fact, the 1995 DOQQs corroborate that the number of occupied acres has not considerably changed in the last seven years.

Forty-three percent of the towns detected from the air were also visible on DOQQs taken seven years earlier. The quality of the DOQQs, however, varied tremendously. Thus it is likely that many 2002 aerial survey towns were not observed on the 1995 DOQQs due to poor image quality rather than aerial observer errors. A project is underway to assess the quality of the existing habitat within a 7 km diameter circle of the 433 towns identified from both the aerial survey and the DOQQs. A cursory look at the distribution of the 433 prairie dog towns indicates that 63.7% of the towns are in untilled landscapes based on USGS land use and land cover data (USGS 1990). Many of these towns, however, exist on mere islands of suitable habitat surrounded by cropland or other agricultural land uses that are not suitable for prairie dog occupation.

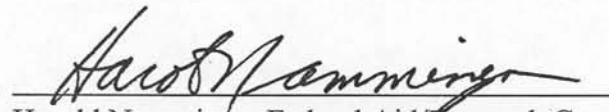
Many of the prairie dog towns in Oklahoma are relatively small in size (average town size of 74.36 acres), but are within 7 km of other towns. Eighty-seven percent of the 433 towns are within 7 km of at least of one other town in a large linear complex, stretching east-west across the panhandle region. The habitat between these towns may or may not be suitable for town expansion, but may allow immigration and emigration between towns. Following ground verification of the aerial survey data (to be completed under State Wildlife Grants project T-4-P), a more complete picture of the number of prairie dog occupied acres and habitat suitable for occupation, in the shortgrass High Plains region of Oklahoma, will be available.

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VII. Date: August 19, 2003

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VIII. Literature Cited

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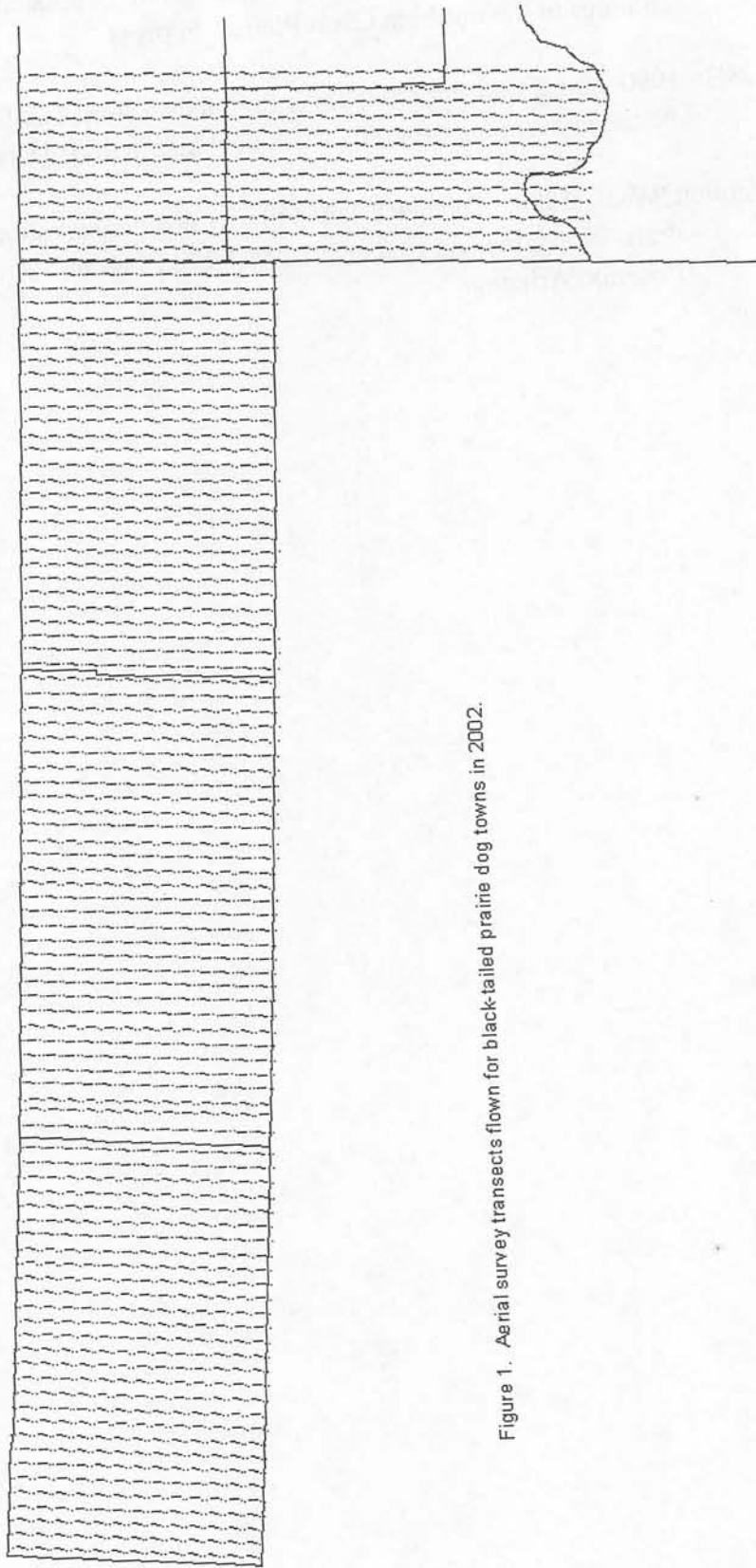
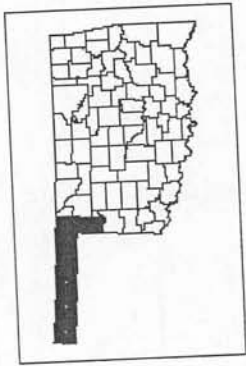


Figure 1. Aerial survey transects flown for black-tailed prairie dog towns in 2002.

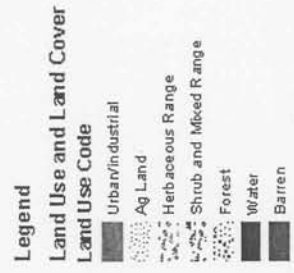
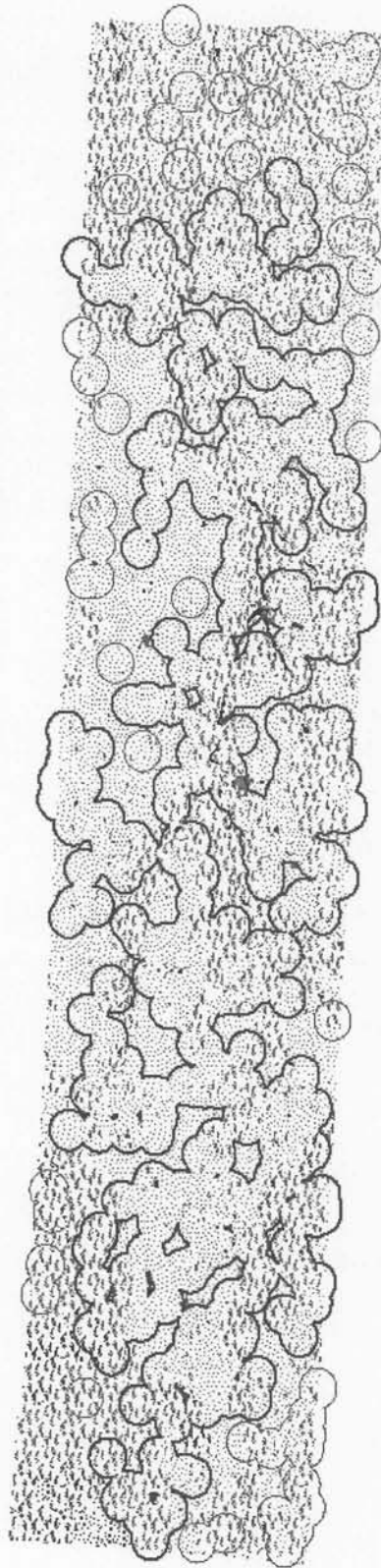
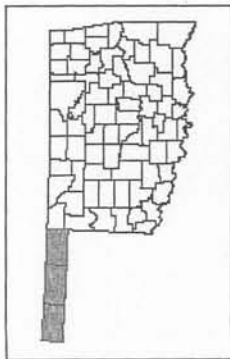
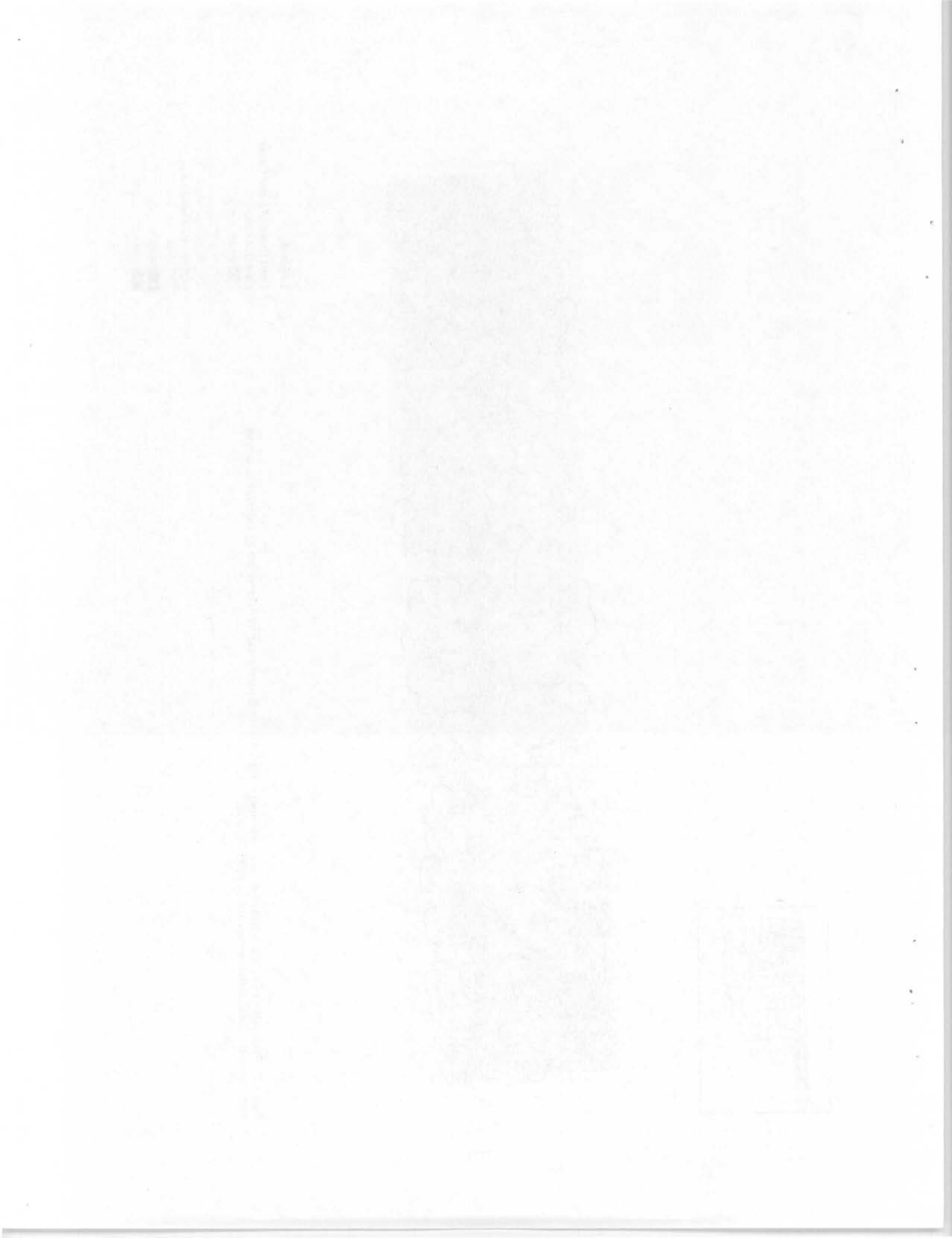


Figure 2. Prairie dog complexes (based on the 7 km rule) in the Oklahoma panhandle as determined by colonies observed both during the 2002 aerial survey and on 1995 DOQQs.



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