
Winter raptor use of prairie dog towns in the Denver, Colorado vicinity

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Abstract

The Denver, Colorado metropolitan area is one of the fastest growing areas in the United States. Rapid development is destroying wildlife habitat, and the Colorado Division of Wildlife (CDOW) is attempting to deal with the situation. A large number of black-tailed prairie dog (*Cynomys ludovicianus*) towns exist around the urbanized area, but are rapidly being destroyed. CDOW biologists noted that prairie dog towns in the north metro area appeared to be receiving heavy use during the winter months by feeding raptors, mainly bald eagles (*Haliaeetus leucocephalus*), golden eagles (*Aquila chrysaetos*), ferruginous hawks (*Buteo regalis*), and red-tailed hawks (*Buteo jamaicensis*). The CDOW decided to document the winter raptor/prairie dog connection by gathering specific information on raptor use of prairie dog towns. In the winters of 1994 (12 towns), 1995 (15 towns), and 1996 (38 towns) raptor use of selected prairie dog towns was monitored by observers viewing each town for 15-minute intervals. Also recorded was the acreage, number of active burrows, number of available perches and a description of adjacent land uses. Prairie dog towns received high use by hunting raptors all 3 years of the study: 1994 - 6.6 raptors/hour, 1995 - 5.7 raptors/hour, and 1996 - 4.2 raptors/hour. We felt that these levels of use represented very high raptor reliance on prairie dogs. Four species of raptors were most commonly observed: ferruginous hawks 39.1%, red-tailed hawks 22.5%, bald eagles 15.3%, golden eagles 6.4%, and other/unidentified 16.7%. There was high variability in raptor use from one town to the next, ranging from a high of 12.0/hour to a low of 0.5/hour.

Three possible reasons for the variable use were investigated: 1) number of prairie dogs in the town; 2) availability of hunting perches; and 3) surrounding land use. Raptor use was closely correlated with the number of active prairie dogs in a town, the more prairie dogs the more raptors. Availability of perch sites appeared to be a positive factor in encouraging raptor use, but the data were not conclusive. The amount of urbanization adjacent to the town did not appear to be correlated with raptor use. Many raptors readily hunted prairie dogs close to heavy urbanization.

The CDOW is using this information as the main justification for implementing an initiative to attempt to save or replace prairie dog towns being lost to development as Denver expands.

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INTRODUCTION

The Denver, Colorado metropolitan area is one of the fastest growing urban centers in the United States. Ongoing development is rapidly destroying wildlife habitat as the metro area expands, and the Colorado Division of Wildlife (CDOW) is attempting to deal with the situation. A large number of black-tailed prairie dog (*Cynomys ludovicianus*) towns exist within the urbanized area and on its outer edge. A 1994 prairie dog mapping project identified about 30,000 acres of prairie dog towns present in the metro area, mostly concentrated on the north side of the city. These prairie dog towns are rapidly being destroyed as development proceeds.

In considering the loss of prairie dog towns, CDOW biologists noted that towns in the metro area appeared to be receiving heavy use during the winter months by feeding raptors — mainly bald eagles (*Haliaeetus leucocephalus*), golden eagles (*Aquila chrysaetos*), ferruginous hawks (*Buteo regalis*), and red-tailed hawks (*Buteo jamaicensis*). These birds are adept at preying on prairie dogs and appeared to be heavily relying on them for food during the winter. The large concentration of prairie dogs in the north Denver area appeared to be attracting an unusually large number of wintering raptors, making Denver a significant raptor winter concentration area. To help better understand the situation, the CDOW decided to document the winter raptor/prairie dog connection by gathering specific information on raptor use of prairie dog towns. The goals of the study were:

1. To quantify winter raptor use of prairie dog towns;
2. To determine if some prairie dog towns received significantly more use by raptors than others; and
3. To determine why some prairie dog towns were more or less heavily used by raptors than others

METHODS

From 9-24 of March 1994, a pilot study was done on 12 selected prairie dog towns north of Denver. The study was designed to test methods for counting the raptors using a prairie dog town. A technique of observing each prairie dog town for a 15-minute interval was settled upon. The observer chose a roadside location from which the entire town could be observed, using binoculars and a spotting scope, without trespassing. The same observation point was used for each town throughout the study. During the observation period, the observer identified and counted any raptors which were believed to be exhibiting interest in the prairie dog town. Criteria for regarding raptors as interested included; flying over at a low altitude, perching in trees or poles on or near the town, standing on the ground within the

town, or actually attempting to capture a prairie dog. The observation periods were rotated throughout the course of the day so that each town was visited at various times of day during the study. Also recorded was the acreage of each town, the estimated number of active burrows in the town, the number and kinds of available raptor perches (trees/poles/fence posts), and a description of land uses immediately adjacent to the town (housing, commercial, roadways, farmland, range land, etc.).

Raptor perch categories were: large trees, medium sized trees, telephone poles, power poles, and wooden fence posts. The number of each was determined, counting those on the town and those within 100 yards separately. In order to quantify perch availability at each town, points were assigned to each category: large tree on the town = 10 points each, medium trees on the town = 4 points each, telephone/power poles on the town = 4 points each, large trees within 100 yards = 5 points each, medium trees within 100 yards = 2 points each, telephone/power poles within 100 yards = 2 points each, and wood fence posts on or within 50 yards - add 5 points to the total for more than 10 posts. The point total was summed for each town.

The prairie dog towns studied were selected more or less arbitrarily within the north Denver vicinity, although we tried to include both large and small towns. Counts were continued and expanded during the following 2 winters, using the same methods each year. Counts were conducted at sixteen prairie dog towns 30 January through 3 March 1995 and 38 towns the following winter, 22 January - 5 March 1996.

RESULTS

Results of the study confirmed our casual observations that large numbers of raptors were relying on the prairie dogs in the study area. To quantify raptor use, we calculated a raptors/hour figure for each prairie dog town by simply extrapolating from the 15-minute observation period data. It should be noted that raptors/hour is simply an index for comparison and nothing more. Table 1 shows the pooled raptors/hour data for all 3 years of the study. We believe that these levels of use represented very high raptor reliance on prairie dogs during all 3 years of the study. The differences from year to year are not necessarily important since the same prairie dog towns were not counted each year and the 1994 count occurred in March only.

For simplicity, the remaining results reported will include data only from the 1996 count of 38

towns, which was much more comprehensive than the previous 2 years. The results from the 1994 and 1995 studies were generally comparable.

Four species of raptors were most commonly observed hunting the prairie dog towns. The frequencies in which species were observed in 1996 were: ferruginous hawks 39.1%, red-tailed hawks 22.5%, bald eagles 15.3%, golden eagles 6.4%, and other/unidentified 16.7%.

There was wide variability in the use of different towns by the birds. While the overall average use for 1996 was 4.2 raptors/hour, the range was from 12.0/hour to 0.5/hour. Eight towns were used by at least 7.0 raptors/hour, and 16 towns received <3.0 raptors/hour use. Clearly, some towns were used much more by hunting hawks and eagles than others.

In attempting to analyze why some towns were preferred, we investigated 3 variables: 1) number of prairie dogs in the town; 2) availability of hunting perches near the town; and 3) surrounding land uses.

Table 2 compares the number of active burrows in a town to use by raptors. We assume that the number of active burrows approximates the number of prairie dogs in a town. Based on these data, it was strongly suspected that the number of prairie dogs available in the town was the most important factor in attracting raptors.

In looking at the possible effect of availability of hunting perches on raptor use, we compared the "Perch Index" (the summed perch availability points) for each town to raptor use (Table 3). These data would imply that perch availability is a significant factor in encouraging raptor use, but another variable comes into play, the fact that the larger the prairie dog town, the more likely it is to have perches within 100 yards. This is illustrated in Table 4. Because the larger towns tended to naturally have more perches on or near them, the real relationship between perch availability and raptor use is difficult to determine. Some towns with low raptor use had high perch availability and 1 town with high raptor use had a low perch score. Some of the raptors involved, especially ferruginous hawks, are known to hunt prairie dogs very effectively from the ground. It is believed that perch availability may be of some importance in attracting raptors to prairie dog towns, but we suspect that the number of prairie dogs available in the town is a more significant factor.

We speculated that the amount of urbanization adjacent to the prairie dog towns might be a factor in raptor use, thinking that the birds might be more likely to use undisturbed, rural towns more than those with adjacent human development. Table 5 shows that such was not the case, as no clear

pattern emerged. Our observation is that many raptors are not shy about hunting in heavily urbanized areas.

A variable which was not investigated, but which might very well be of importance, is the number of other prairie dog towns nearby. It is possible that clusters of prairie dog towns generally attract more hunting raptors to a vicinity.

SUMMARY

This study met the Division of Wildlife's main objective of documenting use by wintering raptors of Denver metro area prairie dog towns. We are using this information as the main justification for implementing an initiative to attempt to save or replace prairie dog towns being lost to development as the city expands.

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Table 1. Raptor use of prairie dog towns in Denver, Colorado during the 3 years of the study.

Winter	Towns Counted	Mean Raptors/Hr
1993/94	12	6.6
1994/95	15	5.7
1995/96	38	4.2

Table 2. Comparison of prairie dog abundance to use by hunting raptors in Denver, Colorado.

Active Burrows	Towns	Raptors/Hr
<50	20	2.3
50 - 99	10	4.5
100 - 149	3	7.1
150 - 199	1	7.8
200 - 249	1	8.2
250 - 300	3	10.0

Table 3. Comparison of the availability of hunting perches to use of prairie dog towns by raptors in Denver, Colorado, 1994-1996. The higher the perch index, the more perches available within 100 yards.

Perch Index	Towns	Raptors/Hr
0 - 99	17	2.9
100 - 199	15	4.5
200 - 299	3	5.4
300+	3	8.2

Table 4. Relationship of prairie dog town size to availability of raptor perches in Denver, Colorado, 1996.

Acres	Towns	Perch Index
<50	19	102.8
50 - 99	7	120.1
100 - 149	7	131.0
150 - 199	4	242.8
200+	1	112.0

Table 5. Comparison of urbanization in the vicinity of the prairie dog towns and raptor use in Denver, Colorado, 1966.

% Urbanized	Towns	Raptors/Hr
0 - 24%	3	5.7
25 - 49%	10	2.6
50 - 74%	10	3.5
75 - 100%	15	5.3