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RAPTOR USE OF ARTIFICIAL PERCHES AT NATURAL AREAS, CITY OF FORT COLLINS, COLORADO

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NOTES

RAPTOR USE OF ARTIFICIAL PERCHES AT NATURAL AREAS, CITY OF FORT COLLINS, COLORADO -- The black-tailed prairie dog (*Cynomys ludovicianus*) remains a critical element of the prairie ecosystem even though its numbers and occupied range have declined dramatically since the arrival of Europeans in North America (Antolin et al. 2002). Prairie dog colonies are used by many species of wildlife and help maintain high levels of biodiversity (Kotliar et al. 1999). In the urban-suburban setting, the occurrence of prairie dog colonies also provides opportunities for wildlife viewing and environmental education. Unfortunately, prairie dogs also can come into conflict with humans, especially in the urban-suburban setting, where they cause vegetation and property damage, and pose a health threat attributable to periodic plague (*Yersinia pestis*) outbreaks (Witmer et al. 2003). Efforts to reduce conflicts can involve colony relocation or management so that the prairie dog population and occupied area does not increase (e.g., lethal or non-lethal removal, construction of physical barriers around the colony; Witmer et al. 2003). Artificial perches, placed at prairie dog colonies, can attract raptors, while providing for public viewing of raptors. The artificial perches, if strategically placed, also might increase predation on prairie dogs, slowing the increase in the size of the colony (Witmer et al. 2003). This approach has been used in other settings in an attempt to reduce rodent populations or damage, but most researchers reported little success in rodent control (e.g., Howard et al. 1985, Askham 1990, Moore and Van Vuren 1998, Wolff et al. 1999). A few researchers, however, reported that increased use of artificial perches might help reduce rodent numbers and damage (e.g., Kay et al. 1994, Mulner 2000, Hafidzi and Mohd 2003). In our region, this management practice might be especially effective given the paucity of trees (i.e., natural perches) in the shortgrass prairie outside riparian systems (Weaver et al. 1996). The objective of this study was to document the use of artificial perches by raptors and the food habits of these raptors within the city limits of Fort Collins, Colorado.

This study was conducted at three natural areas within the city limits of Fort Collins, Larimer County, Colorado. All artificial perches were on the natural areas properties. The Cathy Fromme Prairie Natural Area (CF), occupying about 437 ha, was located in southwestern Fort Collins. There were two artificial perches at CF. They were 204 m from each other and oriented along an east-west axis. The closest perch sites (trees or powerlines) were over 200 m from the artificial perches. About 2 km to the southeast of CF was Prairie Dog Meadow Natural Area (PD). This natural area, occupying about 34 ha, was located in south-central Fort Collins, and contained four artificial perches. These were oriented along a north-south axis. Starting with the northern most artifical perch, they were 55 m, 18 m, and 34 m apart. The closest perch

sites (trees or powerlines) were over 120 m from the artificial perches. About 1 km to the southeast of PD was Fossil Creek Wetlands Natural Area (FC). This natural area, occupying about 89 ha, was located in southeastern Fort Collins, and contained four artificial perches. Two were on the northern end of the natural area, were oriented along a north-south axis and were 90 m apart. The other two artificial perches were on the southern end, were oriented along an east-west axis, and were 10 m part. The closest perch sites (trees or powerlines) were over 100 m from the artificial perches. These natural areas were within the shortgrass prairie ecotype, but because they were in an urban-suburban setting, they contained many non-native species of plants. The region was characterized by hot, dry summers and mild winters where snow cover rarely persisted for more than a few days at a time. The region was semi-arid, receiving about 25 cm/yr of precipitation. The perches were made of natural tree trunks and branches. The height was 7-9 m and each had one (and occasionally two) cross piece 1 to 2 m wide.

Observations were made of the artificial perches during fall 1999 (27 October-12 December) and spring 2000 (21 March-9 May). We did not document raptor use of natural perches or powerlines. An observer, using binoculars, would sit quietly in a vehicle on a roadside within a few hundred meters of the artificial perches. Observation sessions were usually about 2 hr in duration. The presence and activity (perched, flying) of raptors were recorded. Miscellaneous comments also were made (e.g., large raptor chasing a smaller raptor). When a raptor was observed, the species was recorded when possible; however, observers were instructed to not risk disturbing the birds by leaving the vehicle or attempting to get closer to obtain a positive species identification.

A raptor food habits analysis was conducted by using regurgitated pellets found in the vicinity of the artificial perches. The pellets were collected at about two week intervals during fall of 1999 and spring of 2000. Because relatively few pellets were collected in the fall of 1999, an additional small collection was made during the fall of 2000. Each pellet was assigned a unique sample number. The pellets were not identified to raptor species and were pooled by season. Pellets were examined in the laboratory and samples of fur, feathers, scales, and toe-nails were removed and placed in a labeled sample bag. The remainder of the pellet was placed in a glass beaker to which a 0.8% solution of sodium hydroxide was added to dissolve all remaining material except bones (Green et al. 1986). The following day, the bone fragments were rinsed thoroughly in water and spread on absorbent paper to dry. Once dry, the bone material was added to the respective bag of materials saved earlier. The contents of each sample bag were examined under a dissecting microscope to determine the species of prey contained therein, by using a reference collection of identified fur, feathers, and bones (e.g., Witmer and DeCalesta 1986). The results were used to determine the frequency of occurrence of prey items in the fall and spring diet of raptors using the artificial perches.

There were 75 observation periods for a combined total of 128 hrs of

observation of the artificial perches during the fall of 1999 and the spring of 2000. Raptors were observed during 63% of the observation periods. During 51% of those periods, raptors were observed flying. During 62% of those periods, raptors were observed perched. The species observed were American kestrel (*Falco sparverius*), red-tailed hawk (*Buteo jamaicensis*), ferruginous hawk (*Buteo regalis*), bald eagle (*Haliaeetus leucocephalus*), and great-horned owl (*Bubo virginianus*). This list should not be considered inclusive because not all raptors could be positively identified to species given the no disturbance protocol. About 25% of the time we could not identify the raptor to species; this was generally when the raptor was flying at a distance away. Other raptors using grasslands as well as dryland and irrigated agricultural lands that have been reported in the general area include rough-legged hawk (*Buteo lagopus*), golden eagle (*Aquila chrysaetos*), northern harrier (*Circus cyaneus*), prairie falcon (*Falco mexicanus*), merlin (*Falco columbarius*), and burrowing owl (*Athene cunicularia*) (Stahlecker and Behlke 1974). There appeared to be little variation in raptor use of the areas during the two seasons, but the relatively small sample size precluded further analysis.

A total of 78 raptor regurgitated pellets was recovered from the vicinity of the artificial perches during fall 1999, spring 2000, and fall 2000. A wide variety of prey species was documented from the pellets, but the most commonly occurring were (in declining order of frequency) voles (*Microtus* spp.), prairie dogs, rabbits (*Sylvilagus* spp.), deer mice (*Peromyscus* spp.), and birds (usually not identified to species) (Table 1). Reptiles/amphibians (not identified to species) and insects (not identified to species) comprised a smaller, but notable part of the diet. Other mammalian species that occurred incidentally included chipmunk (*Tamias* spp.), eastern fox squirrel (*Sciurus niger*), shrew (*Sorex* spp.), an unidentified rodent, raccoon (*Procyon lotor*), and coyote (*Canis latrans*). The latter two species might have been fed upon as carrion. All of the major prey categories occurred in both the fall and the spring (Table 1). The occurrence of voles and reptiles/amphibians remained very consistent across seasons, while there were differences in the other categories. Rabbits, deer mice, and birds all increased in the spring diet, while prairie dogs and insects declined in the spring diet.

Black-tailed prairie dog is very susceptible to predation and a large number of predatory species, both avian and mammalian, will prey upon it (Hoogland 1995). Interestingly, black-tailed prairie dog might have evolved its colonial social behavior system, and its propensity to clip vegetation without eating much of it, in order to reduce predation pressure (Hoogland 1995). Compared to many rodent species, black-tailed prairie dog does not have a particularly high rate of increase; it is a seasonal breeder with females bearing only one litter of three young per year (Hoogland 1995). Feasibly, the raptor predation enhanced by the placement of artificial perches would help reduce colony expansion. Although the colonies we worked in had a history of expansion into bordering private lands, we did not attempt to document colony expansion in this study.

Table 1. Frequency of occurrence (%) of prey items identified in regurgitated raptor pellets (number of pellets in parentheses) collected in the vicinity of artificial perches on natural areas in the City of Fort Collins, Colorado, 1999 to 2000.

Prey Item	Fall 1999/2000 (29 pellets)	Spring 2000 (49 pellets)	Fall/Spring Total (78 pellets)
Vole	44.8 (13)	49.0 (24)	47.4 (37)
Prairie Dog	34.5 (10)	22.4 (11)	26.9 (21)
Rabbit	20.7 (6)	26.5 (13)	24.4 (19)
Deer Mouse	6.9 (2)	26.5 (13)	19.2 (15)
Bird	6.9 (2)	22.4 (11)	16.7 (13)
Insect	20.7 (6)	8.2 (4)	12.8 (10)
Reptile/amphibian	10.3 (3)	10.2 (5)	10.3 (8)

Manci (1992) and Gietzen et al. (1997) noted the value of large urban-suburban prairie dog colonies for large raptors along the Colorado Front Range. Our study documented that a variety of raptors will use artificial perches at urban-suburban black-tailed prairie dog colonies. It also demonstrated that a sizeable portion of the diet of those raptors will include prairie dogs. While this predatory pressure alone might not prevent the expansion of prairie dog colonies, it would probably slow expansion, thus helping reduce conflicts between humans and prairie dogs. Conversely, a declining acreage of occupied prairie dog colonies, as a result of development or plague outbreaks, might adversely affect raptor numbers in the region (Gietzen et al. 1997), ultimately reducing predation pressure on prairie dogs.

We would also caution, however, to not expect raptor predation alone to control colony expansion. There are numerous reasons for this, including the fact that prey populations generally drive predator populations, not the other way around (Erlinge and Hansson 1988). We also note the great-horned owl is nocturnal while prairie dogs are diurnal. Several of the raptor species that use prairie dog colonies (notably American kestrel and burrowing owl) feed primarily on insects and are too small to prey on prairie dog (e.g., Forren 1981). Also, some of the larger raptor species primarily might use artificial perches for resting rather than for actively hunting (Reinert 1984). Nonetheless, the placement of artificial perches and nest boxes could be considered a critical element of an integrated pest management program to reduce conflicts with rodent populations (Antkowiak and Hayes 2004).

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