

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

The Prairie Naturalist

Great Plains Natural Science Society

6-2014

DIURNAL RAPTORS OF BUFFALO COUNTY, NEBRASKA

Thomas L. Freeman

Follow this and additional works at: <https://digitalcommons.unl.edu/tpn>



Part of the [Biodiversity Commons](#), [Botany Commons](#), [Ecology and Evolutionary Biology Commons](#), [Natural Resources and Conservation Commons](#), [Systems Biology Commons](#), and the [Weed Science Commons](#)

This Article is brought to you for free and open access by the Great Plains Natural Science Society at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in The Prairie Naturalist by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

DIURNAL RAPTORS OF BUFFALO COUNTY, NEBRASKA—Diurnal birds of prey are apex predators, which often are utilized as indicators of potential environmental change (Newton 1979, Rodriguez-Estrella et al. 1998). While the Platte River Valley of Nebraska and the central plains are recognized as important winter habitat for numerous bird of prey species (United States Fish and Wildlife Service [USFWS] 1981, Root 1988), there are few published studies describing the distribution and abundance of raptors in Nebraska (Mathisen and Mathisen 1968, Craighead and Craighead 1969, USFWS 1981). In addition, studies summarizing the long-term distribution or density of Falconiformes in Nebraska are limited due to the absence of long-term studies, scarcity of published reports, and low number of raptors identified by Breeding Bird Surveys or Christmas Bird Counts (Johnsgard 2001). Therefore, the objective of my study was to provide additional data on the occurrence and abundance of raptors in Nebraska.

My study area consisted of Buffalo County, Nebraska. The Platte River borders the southern edge of Buffalo County, and the county is approximately 5200 km² in area. The central Nebraska Loess Plains and Platte River Lowlands are the principle physiographic regions within the study site (Weaver and Bruner 1948). The Nebraska Ornithological Union (NOU 2008) indicated 17 diurnal raptor species on the 2008 Buffalo County checklist of birds, including American kestrel (*Falco sparverius*), merlin (*F. columbarius*), peregrine falcon (*Falco peregrinus*), prairie falcon (*F. mexicanus*), bald eagle (*Haliaeetus leucocephalus*), golden eagle (*Aquila chrysaetos*), northern harrier (*Circus cyaneus*), sharp-shinned hawk (*Accipiter striatus*), Cooper's hawk (*A. cooperii*), broad winged hawk (*Buteo platypterus*), Swainson's hawk (*B. swainsoni*), red-tailed hawk (*B. jamaicensis*), ferruginous hawk (*B. regalis*), rough-legged hawk (*B. lagopus*), osprey (*Pandion haliaetus*), turkey vulture (*Cathartes aura*) and Mississippi kite (*Ictinia mississippiensis*).

I established 86 survey points in Buffalo County, Nebraska, to estimate the abundance and occurrence of diurnal birds of prey. I established survey points in a non-random manner on maps before entering the field. I located survey points every 4.8–6.5 km along county roads to produce a uniform sampling grid throughout the county, and I made no attempt to distribute effort to reflect the proportion of habitats present. I recorded a habitat type for each plot, which included 16, 20, 42 and 8 plots described as row crop, rangeland or pasture, a mixture of row crop and rangeland/pasture, and riparian with a marked abundance of trees, respectively. I assigned 15 to 23 survey points to each of four driving routes ranging in length from 120 to 204 km to facilitate completion of approximately 25% of the plots in a single day. I did not conduct surveys when it was raining or when wind speed exceeded 40 km per hour. Approximately every other month, between 1 January 2011 and 26 January 2013, I surveyed the plots within one driving route. A total of 242 surveys were

conducted with each plot surveyed 2–3 times over the course of the study. I focused survey effort between September and May, with approximately 8% of the plots surveyed between June and August. I enumerated birds of prey at each survey point for 3–5 minutes utilizing 10 × 50 binoculars (Model 7218, Nikon, Melville, NY, USA) and a 20–60 × 60 spotting scope (Model WC206060, Tasco, Overland Park, KS, USA). I estimated distance to each bird by targeting a consumer class laser range finder (Simmons LRF600, Suresnes, France) on a reflective object, such as a tree or building, judged to be at the same distance from the observer, or when necessary, targeted on an object judged to be half the distance from the observer to approximate the distance to the bird. I estimated density using methods described in Buckland et al. (2009). I recorded 0 for survey points if no raptors were observed. I included all samples for calculation of the mean and standard error estimates. I excluded birds >1,000 m from the observer from estimates because the laser range finder was only accurate to 1,000 m.

I observed 96 raptors at <1,000 m, of which all individuals (e.g., 7 American kestrels, 7 bald eagles, 3 northern harriers, 1 sharp-shinned hawk, 74 red-tailed hawks, and 4 turkey vultures) were included in density calculations. I obtained density estimates (i.e., birds/km) for American kestrel (0.433, SE = 0.054), bald eagle (0.027, SE = 0.003), northern harrier (0.036, SE = 0.004), sharp-shinned hawk (0.130, SE = 0.016), red-tailed hawk (1.472, SE = 0.153) and turkey vulture (0.108, SE = 0.013). Density estimates for other species listed on the NOU checklist for Buffalo County were not possible as none were encountered within the plots. Estimating the density of species with low abundance or low detectability is a well-known confounding factor associated with these types of studies (Johnsgard 2001, Buckland et al. 2009). For example, a single sharp-shinned hawk was observed which severely limits the confidence of the density estimate provided, and it is quite likely that Cooper's hawks are not as rare as suggested by the data because the author has frequently observed several individuals on multiple occasions within Buffalo County. Also, a small proportion of survey sites were characterized as having a marked number of trees, which would likely decrease the number of woodland species observed. However, density estimates for other species, notably the red-tailed hawk, were calculated from a much higher number of encounters and provided a higher confidence estimate that is more likely to reflect the actual population value.

In summary, this study reports the density and occurrence of diurnal raptors in a single county of south-central Nebraska. While density estimates were obtained for six of the 17 raptor species enumerated in the Nebraska Ornithological Union checklist for the county, the robustness of these estimates were likely confounded by limited observations of species that occur at low densities—*Thomas L. Freeman*¹.
Department of Biology, University of Nebraska at Kearney,

Kearney NE 68849, USA. ¹Corresponding author email address: freemantl@unk.edu.

LITERATURE CITED

- Buckland, S. T., D. R. Anderson, K. P. Burnham, J. L. Laake, D. L. Borchers, and L. Thomas. 2009. Introduction to distance sampling: Estimating abundance of biological populations. Oxford University Press, New York, USA.
- Craighead, J. J., and F. C. Craighead. 1969. Hawks, owls, and wildlife. Dover Publications, New York, New York, USA.
- Johnsgard, P. A. 2001. Comments of Nebraska's Falconiform and Strigiform bird fauna. *Nebraska Bird Review* 69:80–84.
- Mathisen, J. E., and A. Mathisen. 1968. Species and abundance of diurnal raptors in the panhandle of Nebraska. *Wilson Bulletin* 80:479–486.
- Nebraska Ornithologists' Union (NOU). 2008. Nebraska County Checklists. <<http://www.noubirds.org/Birds/CountyChecklists.aspx>>.
- Newton, I. 1979. Population ecology of raptors. Buteo Books, Vermillion, South Dakota, USA.
- Rodriguez-Estrella, R., J. A. Donazar, and F. Hiraldo. 1998. Raptors as indicators of environmental change in the scrub habitat of Baja California Sur, Mexico. *Conservation Biology* 12:921–925.
- Root, T. 1988. Atlas of wintering North American birds: an analysis of Christmas Bird Count data. University of Chicago Press, Chicago, Illinois, USA.
- United States Fish and Wildlife Service. 1981. The Platte River ecology study special research report. U.S. Fish and Wildlife Service, Jamestown, ND. Jamestown, ND: Northern Prairie Wildlife Research Center Online. <<http://www.npwrc.usgs.gov/resource/habitat/plriveco/index.htm> (Version 16JUL97)>.
- Weaver, J. E., and W. E. Bruner. 1948. Prairies and pastures of the dissected Loess Plains of Central Nebraska. *Ecological Monographs* 18:507–549.

*Submitted 3 September 2013. Accepted 20 January 2014.
Associate Editor was Mark Rumble.*