

# Kansas Ornithological Society

## BULLETIN

PUBLISHED QUARTERLY

Vol. 26

September, 1975

No. 3

### POPULATION DENSITIES OF SCREECH OWLS IN NORTHEASTERN KANSAS

Calvin L. Cink

Efforts to document population densities of birds and their fluctuations, especially on a continent-wide scale, have concentrated primarily on the diurnal species. Very little is known about the densities and fluctuations in population size of nocturnal species such as owls. The Screech Owl (*Otus asio*) is regarded as a common resident in woodland and open woodland throughout Kansas; however, Fitch (1958) could not obtain records with sufficient regularity (13 in six years) to even indicate that the University of Kansas Natural History Reservation was occupied by a permanent population.

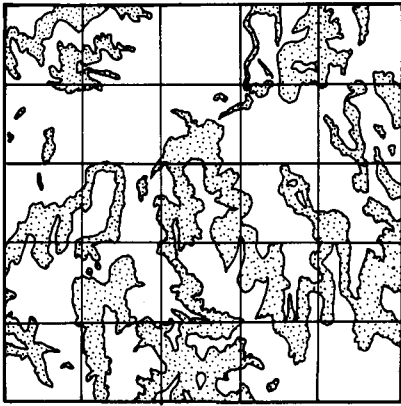
Listening for territorial birds at night seems to work well for such species as the Great Horned Owl (*Bubo virginianus*) and has been used to estimate population sizes (Rusch et al., 1972). Other species, such as the Screech Owl, which call infrequently and irregularly, seem unsuited to the technique. Sometimes owls can be censused by flushing them from their roosts during the day but Screech Owls are usually undetected because they commonly roost in hollow trees. Previous use of tape-recorded Screech Owl calls to stimulate calling of wintering individuals led me to believe that playback would be a good tool with which to estimate population densities in this species. It has gained recent popularity as a census technique for other species (e.g., Braun et al., 1973).

The purpose of this study was to estimate population densities of the Screech Owl in northeastern Kansas and then to try and relate density to the amount of woodland available to the owls. Most existing literature deals with food habits and natural history and any information on factors influencing abundance would be important.

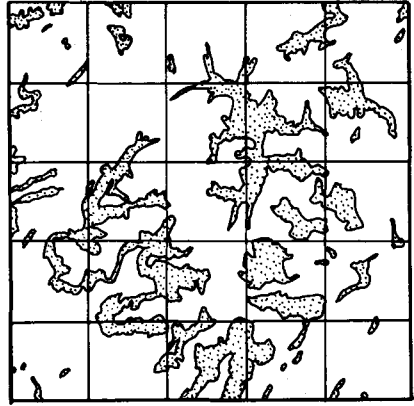
Three study areas were selected near Lawrence, Kansas during spring 1973 and a fourth was added in spring 1974. All were 25 square miles in area and each was selected to contain a varying amount of woodland. Distribution and percentage of woodland cover (Figure 1) was estimated from topographic maps. Possible changes due to recent clearings are probably not significant. In each area I selected census points in the form of a grid such that each point was on a traversible road and was a mile from any other point. Twenty-six points were selected within each area—the maximum number that can be covered adequately in a four-hour period with five minutes per stop. Major highways and small villages were avoided as census points.

Censusing was done in late March and throughout April in 1973; in mid-March in 1974. Each census began at dark and at each stop I spent alternating half-minute periods playing a tape of Screech Owl calls and listening for responses. During 1973 each route was run in the reverse direction the following night to remove bias due to time of evening. Nights with considerable wind or any rain were avoided.

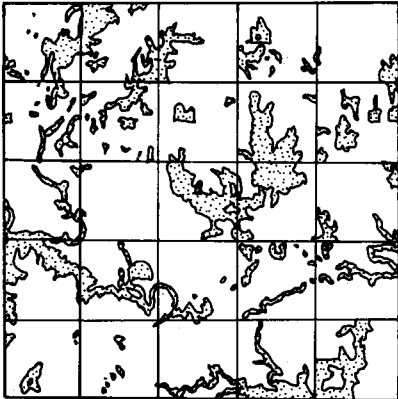
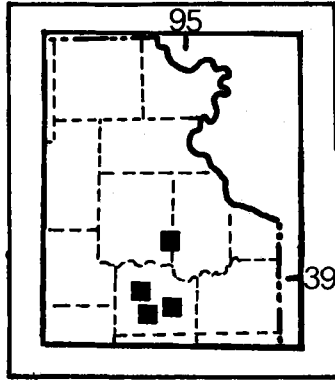
Table 1 summarizes the results of the study. Densities of owls were calculated by extrapolating from the census route within each study area. Effective listening distance was about one-quarter mile on either side of the road. Each route was 25 miles in length thus providing an effective listening area of 12.5 square miles or one-half of each total study area.



34.0%



20.4%



16.8%



8.8%

Figure 1. The four study areas showing the percentage of woodland (stippled portions) in each. The insert shows the locations of the study areas within the northeast corner of Kansas.

**Table 1. Number and densities of Screech Owls recorded from four study areas in northeastern Kansas.**

Area	Percent Woodland	Year	No. of Owls	Owls—25 sq. miles	Owls—sq. mile
1	34.0	1973	4	8	0.32
		1974	7	14	0.56
2	20.4	1973	2	4	0.16
		1974	3	6	0.24
3	16.8	1973	—	—	—
		1974	5	10	0.40
4	8.8	1973	1	2	0.08
		1974	2	4	0.16

The influence of time of evening on calling was not apparent. Owls usually called from the same part of an area on a subsequent evening even at different times. Only once did an owl fail to respond on the second night at the same place and this was probably due to wind. The difference between years is readily apparent but I am uncertain whether this represents a population increase. The 1974 censusing was done in March. In 1973 it was delayed until April by weather and logistics problems. It may be that Screech Owls become less responsive to calls later in the breeding season. Perhaps territories are well-established before mating and little defense is required. This seems unlikely but only future censuses in the same area during the same periods will resolve the question.

There is no question, however, that playback is effective. Two known Screech Owl territories were visited in April 1973 and no recordings were used. The owl in one territory called only briefly nearly an hour after I arrived; the other did not call until the next night after a tape was played.

This is the first census of Screech Owls to be conducted during the breeding season; thus is an index to the breeding population. Craighead and Craighead (1956) and Nowicki (1974) obtained indices of population size in Michigan during fall. The Craigheads reported about 0.39 Screech Owls per square mile in 1941 and 0.61 per square mile in 1947 and 1948 in a township-size (36 square mile) study area that was about 11 percent wooded. This is close to the 0.40 value which I obtained in an area that was 16.8 percent woodland. Nowicki reported 1.4 owls per square mile in a township that was about 22.6 percent wooded. This is considerably higher than the values I found (0.16-0.56) for areas that were 20.4 and 34 percent woodland.

Nowicki (1974) suggests that available habitat influences the number of individuals in an area, with the greater amount of woodland providing more nesting and feeding habitat to sustain a larger population of owls. I tested this hypothesis by plotting the numbers of owls censused in spring 1974 on each area against the percentage of woodland in each area (Figure 2). The slope of the resulting regression line is significantly different from 0 ( $p < 0.001$ ). To what extent the regression holds at higher proportions of woodland per study area is not known, but below 40 percent the relationship is clear; more woodland increases the density of Screech Owls.

Two important behavioral variables must be investigated before tape censuses can be accepted as accurate population estimates of the Screech Owl. Do both sexes respond to the calls? If only the male responds (which is likely if the calls function in territorial advertisement) then estimates would be in terms of breeding pairs. If both respond, estimates must be given in terms of actual numbers of birds present. Also, how large are Screech Owl territories and do owls prefer to hunt in woodland or in some combination of woodland and nearby fields?

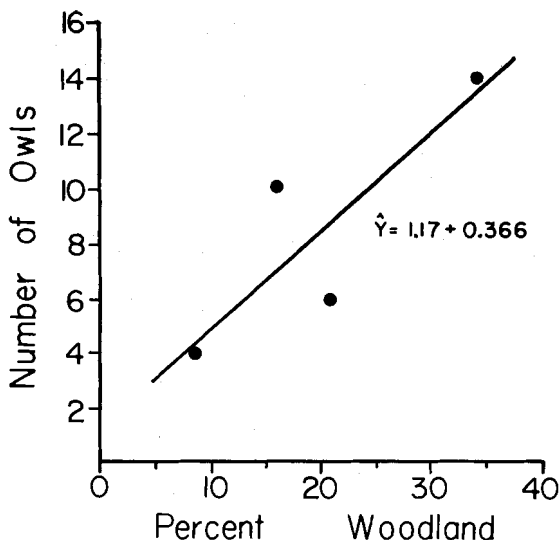


Figure 2. A regression of the number of owls on each study area on the percentage of woodland within that area.

My sincere appreciation goes to Richard F. Johnston for his helpful comments on the manuscript.

#### Literature Cited

- Braun, C. E., R. K. Schmidt, Jr., and G. E. Rogers. 1973. Census of Colorado White-tailed Ptarmigan with tape-recorded calls. *J. Wildl. Manage.* 37:90-93.
- Craighead, J. J. and F. C. Craighead. 1956. *Hawks, owls and wildlife.* Stackpole Co., Harrisburg, Penn. 443 pp.
- Fitch, H. S. 1958. Home ranges, territories, and seasonal movements of vertebrates of the Natural History Reservation. *Univ. Kansas Publ. Mus. Nat. Hist.*, 11:63-362.
- Nowicki, T. 1974. A census of Screech Owls (*Otus asio*) using tape-recorded calls. *Jack-Pine Warbler* 52:98-101.
- Rusch, D. H., E. C. Meslow, P. D. Doerr, and L. B. Keith. 1972. Response of Great Horned Owl populations to changing prey densities. *J. Wildl. Manage.* 36:282-296. *Museum of Natural History, University of Kansas, Lawrence, Kansas 66045.*

#### Kansas Ornithological Society

##### Officers for 1975-76

President .....	Dwight R. Platt, R.F.D. 2, Newton, Kansas 67114
Vice-President .....	Jean Schulenberg, R.F.D. 1, Admire, Kansas 66830
Corresponding Secretary .....	Sondra Williamson, 316 Denison, Manhattan, Kansas 66502
Membership Secretary .....	Amelia J. Betts, Baldwin City, Kansas 66006
Treasurer .....	Eugene R. Lewis, 1285 MacVicar, Topeka, Kansas 66604

##### Board of Directors

Stephen Fretwell	1974-76	John Breukelman
Mary Louise Myers	1973-75	Thomas Shane

##### Editorial Board

Editor, <i>The Newsletter</i> .....	Thomas Shane, 713 W. 8th, Junction City, Kansas 66441	
Editor, <i>The Bulletin</i> .....	Charles A. Ely, FHKSC, Hays, Kansas 67601	
Regular Membership, \$3.00	Student Membership, \$1.00	Sustaining Membership, \$6.00

Dues payable January 1 to the Treasurer

Subscription to the Bulletin is included in any class of membership

Published 30 September 1975