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### BREEDING BIRD ASSOCIATIONS IN RIPARIAN HABITAT IN NORTH EAST KANSAS

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Eastern forest species extend their breeding ranges westward along river systems (Johnsgard 1979). Ely (1982), however, found these species less frequently than expected; perhaps due to their habitat being much reduced by agricultural practices in north central Kansas. We surveyed seven counties in northeastern Kansas during June, 1985 to determine the relative abundance and density of birds along riparian corridors as baseline inventories and to determine the extent of riparian habitat.

#### Methods

The study was conducted in Washington (WAA), Marshall (MAA), Nemaha (NEA), Brown (BRA), Clay (CLA), Jackson (JAA), and Atchison (ATA) Counties. Plots that we considered as typical floodplain forest vegetation were selected and plant species presence was recorded (Table 1). Plant species composition varied from west to east with

TABLE 1. Plant species recorded on census plots for each county.\*

Overstory Species	CLA	WAA	MAA	NEA	BRA	ATA	JAA
Cottonwood	X	X	X	X		X	
Bur Oak	X	X	X	X	X	X	X
Black Oak					X	X	X
Red Oak						X	
White Oak					X	X	
Chinquapin Oak			X		X	X	X
Bitternut Hickory					X	X	X
Shagbark Hickory					X	X	X
American Elm	X		X	X			X
Silver Maple	X			X			
Red Mulberry	X			X			
Hackberry		X			X		X
Black Walnut	X		X	X	X	X	X
Green Ash	X						
Black Locust	X						
Honey Locust	X			X			X
Sandbar Willow	X						
Black Willow				X			
Osage Orange				X			
Russian Olive				X			
<b>Understory Species</b>							
Bristly Greenbrier	X					X	
Wild Gooseberry					X	X	
Smooth Sumac		X		X	X		X
Poison Ivy	X	X	X	X	X	X	X
Riverbank Grape	X	X				X	
Rough-leaved Dogwood	X			X			
Coralberry	X	X	X	X	X	X	X
Elderberry	X			X		X	X

\*Counties: CLA = Clay, WAA = Washington, MA = Marshall, NEA = Nemaha, BRA = Brown, ATA = Atchison, and JAA = Jackson.

Bur Oak/Cottonwood as co-dominants in Clay, Washington, Marshall, and Nemaha Counties and Bur, Black, White, and Chinquapin Oak/Bitternut and Shagbark Hickory as co-dominants in Brown, Atchison, and Jackson Counties. Cottonwood, Sandbar Willow, Silver Maple, and American Elm were present as saplings on most of the plots. The understory varied with the degree of flood damage and disturbance. Some areas adjacent to the rivers were nearly devoid of ground vegetation while the upper slopes had a well developed understory. The Atchison County plot on the Missouri River had the densest tangles of shrubs. Coralberry and Poison Ivy were present on all plots.

Two censuses were conducted at each plot from 12 to 26 June using a fixed-width strip transect (Eberhardt 1978). A transect line was established using plastic flagging and a steel tape. The length of line was determined within the constraints of available riparian habitat. A 1.1 km line was used for 3 censuses but the remaining 4 could only be completed by using a 0.55 km transect. A single transect line was deemed to be best suited to the narrow patchy terrain bordering the rivers.

Censusing began one-half hr after sunrise and was completed within 2 hrs to coincide with the greatest period of avian activity. Weather was clear or less than 65 percent overcast, although wind speeds ranging up to 25 mph were encountered on three censuses. Stops were made at intervals of 50 m along the transect. All birds seen or heard on each side of the line at right-angles to or ahead of the observer were counted. Those flying overhead were not assumed to belong to the community being censused and were excluded from the count. Right-angle and radial distances to the transect line were recorded for each individual, although only right-angle distances were used in the density calculation. Strip width was determined by the lateral distance from each first sighting to the transect line within belts of 0-30 m and 31-60 m.

The density expressed in birds per ha for each species was based on the mean number of individuals for each species recorded on two censuses of each plot using the equation  $D = \frac{n}{l \times d \times 2} \times \frac{66000^2 \text{m}^2}{6.6 \text{ ha}}$  (Balph, Stoddart, and Balph 1977, Franzreb 1981) where  $n$  is the number of individuals,  $d$  is the strip width that includes all sightings from the transect line and doubled to include both sides, and  $l$  is the length of the transect. Relative abundance and species composition were reported for each census plot.

## Results

Avian densities for each census plot are given in Table 2. A total of 42 species was recorded on all censuses, with 14 species common to all plots. Abundance of these species varied among the plots. Community density was highest in the smaller (3.3 ha) plots. As should be expected, more species and more individuals were recorded within the 0-30 m strip than in the 31-60 m strip (Table 3). This strip-width contained 97 percent of the total number of species and 92 percent of the total number of individuals recorded on all censuses. Widening the strip to 60 m added few species, (5 compared to 178) and increased the density by 8 percent. The Tufted Titmouse (*Parus bicolor*) in Clay County, Northern Bobwhite (*Colinus virginianus*) in Atchison County, American Goldfinch (*Carduelis tristis*) in Washington County, and Northern Bobwhite and Gray Catbird (*Dumetella carolinensis*) in Jackson County were recorded only in the 31-60 m strip. Other species were excluded by the small size and narrow character of the census plots. Black-billed Cuckoos (*Coccyzus erythrophthalmus*) were present and possibly breeding outside the plot area in Nemaha and Jackson Counties, but were not represented on the censuses. Blue-gray Gnatcatcher (*Poliophtila caerulea*), Eastern Phoebe (*Sayornis phoebe*), and American Crow (*Corvus brachyrhynchos*) in Nemaha County and Brown Thrasher (*Toxostoma rufum*) and American Crow in Jackson County were recorded outside the census plots. The census also failed to record Wood Thrush (*Hylocichla mustelina*) in Atchison County, Rose-breasted Grosbeak (*Pheucticus ludovicianus*) in Jackson County, Scarlet Tanager (*Piranga olivacea*) in Marshall County, and Yellow Warbler (*Dendroica petechia*), although these species had been observed on the plots during preliminary surveys. Some of these species may have begun nesting earlier and were no longer singing by 12 June.

**TABLE 2. Densities (indiv./ha) in the 0)-30 m strip for each county censused.**

Species	CLA	BRA	ATA	WAA	MAA	NEA	JAA
Northern Bobwhite	.01	.13	—	.18	—	.05	—
Mourning Dove	.09	.18	.16	.46	.09	.37	.05
Yellow-billed Cuckoo	.09	.08	.10	.28	.46	.18	.46
Great Horned Owl	.01	—	—	—	—	—	—
Chuck-will's-widow	—	—	—	—	—	—	.05
Red-headed Woodpecker	.09	.07	.05	.32	.28	.46	.23
Red-bellied Woodpecker	.10	.08	.16	.14	.46	.18	.60
Downy Woodpecker	.07	.08	.21	.09	.23	.32	.69
Hairy Woodpecker	—	.05	.05	—	.14	.09	.32
Northern Flicker	.02	.17	.02	.05	.23	.37	.37
Eastern Wood-Pewee	.30	.16	.17	.28	.41	.41	.37
Eastern Phoebe	.02	—	—	—	—	—	—
Great Crested Flycatcher	.05	.16	.09	.09	.18	.09	.32
N. Rough-wing. Swallow	.05	—	—	.23	—	—	—
Blue Jay	.09	.15	.17	.05	.28	.23	.69
American Crow	.02	.06	.01	.05	.23	—	—
Black-capped Chickadee	.23	.41	.15	.46	.55	.51	.51
Tufted Titmouse	—	—	.16	—	.09	—	.37
White-breast. Nuthatch	.10	.08	.18	.18	.37	.18	.60
Carolina Wren	—	—	—	—	—	—	.09
House Wren	—	—	—	.05	.05	.60	—
Blue-gray Gnatcatcher	.01	—	.01	—	.05	—	—
Wood Thrush	.07	—	—	—	—	—	—
American Robin	—	.30	.29	—	—	.73	—
Gray Catbird	—	—	.01	—	—	.32	—
Brown Thrasher	.02	.05	.03	.09	—	.14	—
European Starling	—	.01	—	—	—	.09	—
Warbling Vireo	.06	.01	—	.46	—	.37	.14
Red-eyed Vireo	.01	—	—	—	.09	—	.28
Northern Parula	—	—	—	—	—	—	.05
Common Yellowthroat	—	—	—	—	—	.09	—
Summer Tanager	—	—	.02	—	—	—	.14
Northern Cardinal	.41	.28	.28	.46	.73	.41	.41
Rose-breasted Grosbeak	.01	.08	.02	—	—	.18	—
Indigo Bunting	.09	.03	.18	.14	.23	.14	.32
Chipping Sparrow	—	—	.01	—	—	—	—
Field Sparrow	—	.01	—	—	—	—	—
Red-winged Blackbird	—	—	—	.23	—	—	—
Common Grackle	.03	.07	.03	—	.09	.05	.09
Brown-headed Cowbird	.14	.09	.05	.28	.05	—	.09
Northern Oriole	.21	.18	.06	.60	.09	.55	.18
American Goldfinch	.09	.01	.05	—	—	.09	.18
<b>Total</b>	<b>2.47</b>	<b>2.98</b>	<b>2.72</b>	<b>5.17</b>	<b>5.38</b>	<b>7.20</b>	<b>7.60</b>

**TABLE 3. Species and individuals recorded in strips on census plots.**

Census	No. of species		No. of individuals		Transect length (m)
	Strip-width (m) 0-30	31-60	Strip-width (m) 0-30	31-60	
CLA	29	1	109.5	8	1100
BRA	26	0	130	5	1100
ATA	27	1	119	15	1100
WAA	23	1	56	6.5	550
MAA	22	0	58.5	6.5	550
NEA	26	0	78.5	2	550
JAA	25	2	82.5	7.5	550
<b>Total</b>	<b>178</b>	<b>5</b>	<b>634</b>	<b>50.5</b>	

## Discussion

Counts of birds from points on a transect line give an index of population density within the habitat censused. Environmental impact studies need only show relative differences in bird populations rather than absolute values. Transect methods (Eberhardt 1968, 1978, Emlen 1971, 1977, Burnham, Anderson, and Laake 1980) are appropriate census methods, especially where time, economics, and the nature of physical terrain are important considerations. The fixed-width strip method (Conner and Dickson 1980, Franzreb 1981) was chosen for this study for its simplicity in recording observations and analyzing data and because it offers a more practical approach to censusing narrow habitat strips. It also has an advantage in data analysis in that estimated lateral distances need only fall within the sampling belt on either side of the transect line, while precise distance measurements are necessary for accuracy in the variable-strip method (Emlen 1971, 1977).

Since there were relatively few species added by using the 31-60 m strip-width, the 0-30 m strip-width was chosen for data analysis on all censuses. The probability of observing a bird decreases with distance from the transect line or remains constant to a given distance then declines rapidly (Franzreb 1981). Anderson and Ohmart (1981) found decreased detectibility at 15 m from the transect.

Results of fixed-width strip censuses may be biased to the degree that certain assumptions are not met during the census. Recording errors caused by observer bias may always be present (Bart 1985). Separating all species and individuals visually and aurally during the height of a dawn chorus is difficult if not impossible. Weather factors such as wind and temperature also decrease detectibility. Sampling should be done under as ideal conditions as possible to prevent these errors. Time constraints and unfavorable weather conditions in June limited the number of censuses in this study to two on each plot. Some species or individuals were undoubtedly missed, with females and non-singing males most often underrepresented. Additional replicate censuses made within the breeding period may have increased the chance that all individuals present would be sampled.

Some species were missed because they were not found within the census plots. Ideally, a census plot should be large enough to include all members of a community. Plot size in this study was determined by the availability of homogeneous habitat and much of the floodplain forest surveyed had been destroyed or was too altered to permit censusing.

Riparian habitat no longer exists in contiguous corridors along rivers in the seven northeastern Kansas counties surveyed. Inroads made by agriculture and urban populations have removed much of the original riverine forest, leaving remnant wooded tracts. These tracts provide breeding habitat for a variety of eastern forest species. Woodpeckers and other cavity nesters, dependent on dead snags for nest sites, were found throughout as were such generally abundant edge species as Northern Cardinal (*Cardinalis cardinalis*), Northern Oriole (*Icterus galbula*), Blue Jay (*Cyanocitta cristata*), Indigo Bunting (*Passerina cyanea*), and Mourning Dove (*Zenaida macroura*). All sites surveyed contained breeding Eastern Wood-pewees (*Contopus virens*).

Yellow Warblers, abundant throughout on the preliminary survey, were not recorded on the June censuses. The Northern Parula (*Parula americana*) possibly bred in Jackson and Atchison Counties, but was absent from other portions of the survey area where it might have been expected. Also absent were Kentucky Warbler (*Oporornis formosus*), Louisiana Waterthrush (*Seiurus motacilla*), and Ovenbird (*Seiurus aurocapillus*), all species associated with undisturbed understorey.

To a degree rivers still provide a route westward through the prairies for some species. Enclaves of Wood Thrush in Clay County and Summer Tanager (*Piranga rubra*) in Jackson and Atchison Counties and Scarlet Tanager, Rose-breasted Grosbeak, Red-eyed Vireo (*Vireo olivaceus*), and Carolina Wren (*Thryothorus ludovicianus*) are extant but none could be considered well established. The preliminary nature of this survey precludes a conclusion on the status of riparian bird populations in northeastern Kansas. However,

it is known that the destruction of floodplain forest habitat greatly diminishes both the density and diversity of its birdlife (Hurst, Hehnke, and Goude 1980). Riparian species need further investigation and the scarcer components of their habitat need protection, restoration, and careful management on public and private lands.

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#### Literature Cited

- Anderson, B. W. and R. D. Ohmart. 1981. Comparison of avian census results using variable distance transect and variable circular plot techniques. Pp. 186-192. Estimating numbers of terrestrial birds (C. J. Ralph and J. M. Scott, eds.). Stud. Avian Biol. 6.
- Balsh, M. H., L. C. Stoddart, and D. F. Balsh. 1977. A simple technique for analyzing bird transect counts. Auk 94: 606-607.
- Bart, J. 1985. Causes of recording errors in singing bird surveys. Wilson Bull. 97: 161-172.
- Burnham, K. P., D. R. Anderson, and J. L. Laake. 1980. Estimation of density from line transect sampling of biological populations. Wildlife Monogr. No. 72. 202pp.
- Conner, R. N. and J. G. Dickson. 1980. Strip transect sampling and analysis for avian habitat studies. Wildl. Soc. Bull. 8: 4-9.
- Eberhardt, L. L. 1968. A preliminary appraisal of line transects. J. Wildl. Manage. 32: 82-88.
- Eberhardt, L. L. 1978. Transect methods for population studies. J. Wildl. Manage. 42: 1-31.
- Ely, C. A. 1982. Assessment of breeding bird populations in northcentral Kansas. Kansas Fish and Game Commission Contract No. 35. 45pp.
- Emlen, J. T. 1971. Population densities of birds derived from transect counts. Auk 88: 323-342.
- Emlen, J. T. 1977. Estimating breeding season bird densities from transect counts. Auk 94: 455-468.
- Franzreb, K. E. 1981. The determination of avian densities using the variable-strip and fixed-width transect surveying methods. Pp. 139-145. Estimating numbers of terrestrial birds (C. J. Ralph and J. M. Scott, eds.). Stud. Avian Biol. 6.
- Hurst, E., M. Hehnke, and C. C. Goude. 1980. The destruction of riparian vegetation and its impact on the avian wildlife in the Sacramento River Valley, California. Amer. Birds 34: 8-12.
- Johnsgard, P. A. 1979. *Birds of the Great Plains*. University of Nebraska Press. 538pp. Rt. 2, Box 36, Admire, KS 66830.

**First Nesting Record of the Cerulean Warbler in Kansas.**—During the spring 1985 K.O.S. field trip, many people were able to see and hear a Cerulean Warbler (*Dendroica cerulea*) near the Marais des Cygnes Wildlife Area in Linn Co., Kansas. M. McHugh and M. Cooksie indicated that they had observed the bird in early summer, 1984 and suspected that it nested in that location. However, no definite evidence had been obtained documenting nesting in the state.

The morning of 26 May 1985, D. Stout, J. Crossley and I returned to the location, 2.5 km north and 1.7 km west of the management headquarters. We played a taped song of the Cerulean Warbler without any response. After playing the tape for approximately 20 minutes, a male Cerulean Warbler appeared overhead, but it never sang. We had observed the male for approximately 15 minutes when the female appeared in the same tree. The female appeared to be foraging and suddenly flew from about 3 m, nearly straight up, to 12 m above the ground and disappeared into a Virginia creeper vine (*Parthenocissus quinquefolia*) about 2.5 m out on a small limb of a silver

maple (*Acer saccharinum*) which was 75 cm dbh. The nest limb stuck out into a clearing. The tree was located about 75 m across the river and we did not have any way of crossing. By observing the female from our side of the river for the next 30 minutes, I was finally able to determine that the bird was carrying nesting material to the limb. We decided to return after the young had hatched.

We returned on 16 June with a canoe and the intent to construct a blind in the tree. The water was up to the top of the bank and was nearly 30 cm deep at the base of the tree. The first limb was about 7 m up and the trunk supported the most luxuriant growth of poison ivy (*Rhus radicans*) I had ever seen. We decided to return 18 June with better optical equipment and attempt to photograph the adults at the nest from across the river. We did take some pictures on the 18th but the lighting was poor. M. Pressgrove and I returned 19 June to take more pictures with much better success. We observed both the male and female feeding the young on both dates. At least two young could be seen, but the entire nest could not be seen.

This nest site conforms precisely with Bent's (1953. Life Histories of North American Wood Warblers, U.S. Nat. Mus. Bulletin 203:330) quote from Verdi Burtch, but differs from Harrison (1975. A Field Guide to Birds' Nests in the U.S. East of the Mississippi River, Houghton Mifflin Co., Boston, p. 188) in that all his nests were found in oak trees.

Observations of the birds suggested that the female delivered food to the young at intervals of 5 to 15 minutes. The male fed the young every 10 to 20 minutes. The female fed the young 2 to 3 times for every feeding by the male. The female often brooded the young after feeding on 18 June but was not observed brooding on 19 June. The young appeared to be well-feathered on 19 June with the tail feathers being half-grown. Food items observed were both green and brown caterpillars and small unidentified arthropods, possibly mosquitoes or flies.

On several occasions when the male brought food to the young, the female also flew in but did not feed the young. Usually after feeding, the adults hesitated on the limb next to the nest for 5 to 15 seconds. Twice a young bird was observed to turn around in the nest, protrude its abdomen towards the adult and out of the nest, and defecate. The adult grabbed the fecal pellet as it was produced, flew off and dropped it after a short distance. Both male and female were seen performing this behavior.

During nest construction and tending the young, the female usually departed the nest by dropping straight down from the limb for about 5 m before flying off. The male always departed in a nearly horizontal direction. On 18 June the male sang numerous times between 1530 and 1700 hours. On 19 June, however, the male did not sing at all while we were there between 1430 and 1630 hours. No attempt was made to determine if other singing males were in the area.

This is the first documented nesting of the Cerulean Warbler in Kansas. Thanks to B. Schmidt and J. Boyd for helpful comments on the manuscript.  
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