Breeding-Bird Populations at Lake Carl Blackwell, Payne County, Oklahoma[1]

WILLIAM A. CARTER, Oklahoma State University

This paper presents field data compiled by Bill Lee Shelton, Roy L. Patterson and William A. Carter. The study was made as a part of the requirements for the Field Ornithology course at Oklahoma State University under the direction of Dr. F. M. Baumgartner. The results give the breeding-bird populations and the ecological communities occupied by the nesting species, and suggest some of the factors which regulate these populations.

Study Methods

Methods used in this study are similar to those suggested by Kendeigh (1944) and by Pough (1947). A base map of the chief physical features and major plant associations was prepared by using aerial photographs and by pacing between fixed points. The aerial photographs were made available by the Cooperative Wildlife Research Unit at Oklahoma State University. Outline maps were reproduced and used on each field trip to record the exact location of each observation. The counting of birds was generally based upon singing males—assuming the number of unmated males which established territories to be few. The observations of nests and of family groups were also utilized. Field trips were made to the area from June 25 through July 29, 1960. Thirty-nine party hours, an average of three hours per trip, were spent in field work. These field trips were made in both mornings and afternoons in an attempt to include all species. At the close of the observation period, records were transferred to a composite map to give the approximate territory of each breeding pair.

The study area was located south of Arm 13 of Lake Carl Blackwell in the SE corner, NE ¼, Sec. 20 and the SW corner, NW¼, Sec. 21, R 1E, T 19N. The area was roughly triangular in shape and covered 81.8 acres. The north and west sides were bounded by Arm 13 and waters backed in a small creek, the south side was the quarter section fence line and the east side was bounded by State Highway 51C.

Observations

The four chief biotic associations within the area were:

I. Post oak-Blackjack oak: The upland along the south boundary, covering about 28.5 acres, was covered with a dense post oak-blackjack oak *(Quercus stellata - Q. marilandica)* woodland. There were a few red cedar *(Juniperus virginiana)*, woolly bumelia *(Bumelia languginosa)*, and chestnut oak *(Quercus prinus)* trees scattered throughout this area. The density of the crown cover was about 80%. The lower branches and sprouts of these trees formed the understory of the area, covering about 75% of the ground. The ground cover was composed chiefly of bluestems *(Andropogon* sp.) with panic grasses *(Panicum* sp.) and coralberry *(Symphoricarpos orbiculatus)* in some areas. The density of this ground cover ranged from 25% up to 50%.

Nine species (see Table I) utilized this association for nesting. A total of 20.5 breeding pairs were recorded in the post oak-blackjack oak

[1] Contribution No. 824 from the Department of Zoology, Oklahoma State University.

woodlands. This represented only 71.9 pairs per 100 acres. This area afforded cover and food, and was near abundant water. The open character of much of the woodland presented a definite edge effect, hence an increase over the numbers expected in more dense, uniform areas of the same type. Low bird populations are typical of the post oak-black jack oak woodlands of this area, however.

II. Grassland-Shrub: The area with tall grasses and a dense shrub growth covered 35.8 acres. The portions nearer the water were covered with a dense growth of rough-leafed dogwood *(Cornus drummondii)* and two species of plum *(Prunus* sp.). Farther from the water the cover was composed of sumacs *(Rhus* sp.) and immature elms *(Ulmus* sp.). Bluestem grasses formed a dense ground cover for all the area axcept beneath the dense growth of elms where panic grasses predominated. The stages of succession seemed evident in the area north and west of the old road. In this area little open grassland was found. It appeared that a scattering of sumacs first invaded the grassland, later becoming very dense. This was being choked out by a growth of elms which, although the diameter breast high (d.b.h.) was only two to three inches, attained a height of 15 feet and soon completely shaded the ground.

Only three species were found nesting in this association. All observations were from the areas which are at least partially covered with shrub growth. A total of 12.5 pairs were found in this area which would be 33.5 pairs per 100 acres. It seemed that the high density of the tall grasses made this ungrazed area unsuitable for the ground nesting and ground feeding species which were found in the near-by grasslands.

III. Timbered Stream Bed: This association covered 15 acres. The trees represented a climax growth of white elm *(Ulumus americana)*, black walnut *(Juglans nigra)*, ash *(Fraxinus* sp.), red cedar *(Juniperus virginiana)*, hackberry *(Celtis laevigata)*, willows *(Salix* sp.), and cottonwood *(Populus deltoides)*. The d.b.h. varied from six inches to two and one-half feet and height varied from 40 to 100 feet. The crown cover density was about 80%. The understory was composed chiefly of the lower branches of these trees with redbud *(Cercis canadensis)*, button bush *(Cephalanthus occidentalis)*, and rough-leafed dogwood *(Cornus drummondii)*. The density of this understory was highly variable, ranging from 10% in the interior up to 90% along the edge. The ground cover was greenbrier *(Smilax* sp.) and panic grasses *(Panicum* sp.) with scattered cattail *(Typha latifolia)*. Johnson grass *(Sorghum halepense)*, and coralberry *(Symphoricarpus orbiculatus)*.

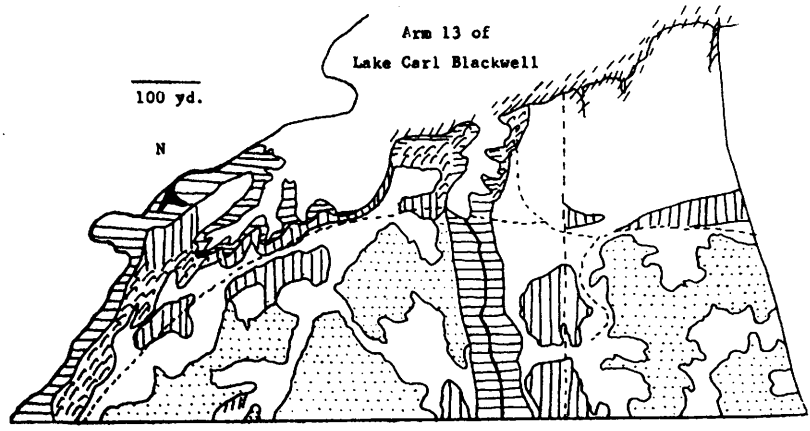
The total nesting species in this association was 17.5 pairs. This gave a total of 116.6 pairs per 100 acres. The dense cover of this area hindered observations and it was thought that other species observed in the surrounding area were probably nesting here.

IV. Lake Shore: The two and one-half acres along the shore line in the northeast corner of the area was covered with sub-climax shrubs and trees. Most prominent were willows *(Salix* sp.), button bush *(Cephalanthus occidentalis)*, and elms *(Ulmus americana)* with occasional cattail *(Typha latifolia)* and sedges *(Cyperus* sp.) The variable water level allowed an intermittent band of these plants to grow about 75 feet from the highwater shore line.

Six nesting pairs were found in this association. This represented 240 pairs per 100 acres. Two pairs of these fed regularly over the grassland-shrub area as well as in this lake shore association.

TABLE I. ESTIMATES OF BREEDING-BIRD PAIRS

Species	Habitat	Post Oak-Blackjack	Grassland-Shrub	Timbered Stream Bed	Lake Shore	Total
	Acres in Area	28.5	35.8	15	2.5	81.8
Bobwhite		1				1
Yellow-billed Cuckoo		2.5				2.5
Chuck-will's-widow		1				1
Downy Woodpecker		1				1
Eastern Kingbird					1	1
Crested Flycatcher				2		2
Carolina Chickadee		5		2.5		7.5
Blue-gray Gnatcatcher		4		2		6
Bell's Vireo					3	3
Red-eyed Vireo				4		4
Black & White Warbler		3				3
Louisiana Waterthrush				2		2
Kentucky Warbler				1		1
Red-winged Blackbird					1	1
Orchard Oriole					1	1
Summer Tanager		2				2
Cardinal		1		4		5
Blue Grosbeak			0.5			0.5
Indigo Bunting			2			2
Field Sparrow			10			10
Species		9	3	7	4	20
Total Pairs		20.5	12.5	17.5	6	56.5
Pairs/100 Acres		71.9	33.5	116.6	240	69.07



Map I

The relationship between these associations can be more readily understood by a brief glance at Map I. It will be noted that the edge effect was predominant over most of the area due to the blending of the four plant associations and the progress of succession in the grassland areas.

A Barred Owl was heard and Red-bellied Woodpeckers were seen just outside the study area. Yellow-breasted Chats were observed in the grassland-shrub association early in the study period but no definite nesting records were determined. Broad-winged Hawks were believed to be nesting in the timbered stream-bed association. Cowbird eggs were found in one Cardinal nest and a young Cowbird was found in an Indigo Bunting nest with two young buntings.

SUMMARY

This breeding-bird census revealed an expected wide variation in nesting populations between the four censused plant associations.

The populations varied from 33.5 pairs to 240 pairs per 100 acres. The average density for the four associations was 69.07 pairs of breeding birds per 100 acres.

The low populations in the grassland-shrub association result from the absence of nesting birds in the dense grass-covered areas.

The density of 116.6 pairs per 100 acres for the timbered stream-bed association compares closely with the 282 breeding-birds per 100 acres reported by Baumgartner (1943).

The limited size of the lake shore association negated the value of the population density of 240 pairs per 100 acres. This association seems to produce highly variable population densities in this region (Baumgartner and Lawrence, 1953).

The artificial habitats produced by the impounded waters of Lake Carl Blackwell attract breeding birds which are typically more eastern in their distribution, such as the Louisiana Waterthrush and Kentucky Warbler.

LITERATURE CITED

Baumgartner, F. M. 1943. Timbered stream-bed and upland oak forest. Audubon Mag., Section II, Sept.-Oct. 1943: 21-22.

Baumgartner, F. M. and Robert G. Lawrence. 1953. Breeding bird populations in Payne County, Oklahoma. Proc. Okla. Acad. Sci. 34: 93-102.

Kendeigh, S. Charles. 1944. Measurement of bird populations. Ecol. Monographs 14: 67-106.

Pough, R. H. 1947. How to take a breeding-bird census. Audobon Mag. 49: 288-297.