

A STUDY OF BIRD POPULATIONS IN SELECTED
HABITATS OF NORTHEAST ARKANSAS

By

EARL LEE HANEBRINK

Bachelor of Science in Education
Southeast Missouri State College
Cape Girardeau, Missouri
1948

Master of Science
University of Mississippi
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of the Oklahoma State University
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Thesis Approved:

J. M. Baumgartner

Thesis Adviser

Carl Stebler

Kenneth S. Liggins

William Marsden

R. R. Walton

J. H. Boyer

Dean of the Graduate School

593486

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CHAPTER I

INTRODUCTION

Statement of Problem

The objectives of this study were to: (1) ascertain the numbers and species of birds present in each major habitat type found in northeast Arkansas, (2) to determine the percentage frequency of occurrence of various birds so that a comparison of the avifauna of the selected habitats could be made, and (3) to prepare a tentative check-list of species for northeast Arkansas with dates of arrival and departure for the non-residents.

Scope of Study

Investigations were limited to six counties of northeast Arkansas: Clay, Greene, Lawrence, Craighead, Mississippi, and Poinsett Counties. Field and roadside censuses were taken in all of the six counties. Crowley's Ridge was sampled in three areas located in Craighead County. Lowland deciduous woods habitats were studied in Clay, Craighead, Mississippi, and Poinsett Counties. Aquatic-woodland habitats were investigated in Mississippi and Poinsett Counties. The two campestrian study areas were located in Craighead County and the edificarian studies were confined to the city of Rector in Clay County. Field investigations began September 20, 1964 and continued until June 2, 1965.

Review of Literature

When Cooke (1888) began the study of bird migration in the Mississippi Valley in 1882 only fragmentary notes on the birds of Arkansas had appeared in the literature. Coues (1877), Hollister (1902) and Pinter (1924) published lists of birds based on a few visits in eastern Arkansas.

Major ornithological compilations that pertain to distribution and natural history of birds throughout Arkansas have been presented by Howell (1911), Wheeler (1924) and Baerg (1927, 1931, and 1951). Deaderick (1938) published a preliminary list of birds from Hot Springs National Park and vicinity. James (1964) summarized recent seasonal occurrences of Arkansas birds. Callahan and Young (1955) published on population densities of the Ozark Plateau in Washington County in the northwestern section of the state.

Detailed studies of avifauna in northeast Arkansas have been limited. This area is probably the least known ornithologically in the state. Mr. Ben Coffey, Jr. from Memphis, Tennessee has made periodic visits to this area and has compiled a few lists. Some of his records have appeared in Audubon Field Notes from time to time. The only intensive study conducted in northeast Arkansas was made by Collins (1960) who conducted a winter and breeding population study of upland and bottom land forest birds in two selected areas in Craighead County.

CHAPTER II

DESCRIPTION OF STUDY AREAS

Physiography of the Region

All of eastern Arkansas is extensive delta with the exception of Crowley's Ridge (Fig. 1). The delta reaches to the base of the Ouachita hills at the edge of North Little Rock. It then continues north into Missouri and south into Louisiana without any natural break (Holder, 1951). Crowley's Ridge runs for a distance of 200 miles from southeastern Missouri down to the Mississippi River at Helena, Arkansas. In places the ridge is twelve miles wide. It is somewhat narrower in Clay County where many of the roadside censuses were taken. Here it is irregular, being highly diversified with valleys, narrow gullies and high hills. Excellent accounts of the geology of Crowley's Ridge are given by Call (1889). Magill (1958) summarized the various theories concerning the origin of the ridge.

Another prominent topographic feature of the northeastern part of the state is the famous Sunken Lands which resulted from the New Madrid earthquake of 1811-1813. A full account of this event is given by Fuller (1912). The so-called Sunken Lands are extensive areas of swamp and overflow bottom land occupying a large part of Mississippi County and portions of Clay, Greene, Craighead, and Poinsett Counties.

The largest sunken areas are Big Lake near Manila and the broad

basin of the St. Francis River. There are other smaller lakes and sloughs in Mississippi County between Little River and the Mississippi which were formed after the New Madrid earthquake. In late summer and fall most of the lakes and rivers in the Sunken Lands shrink greatly in size and some become entirely dry.

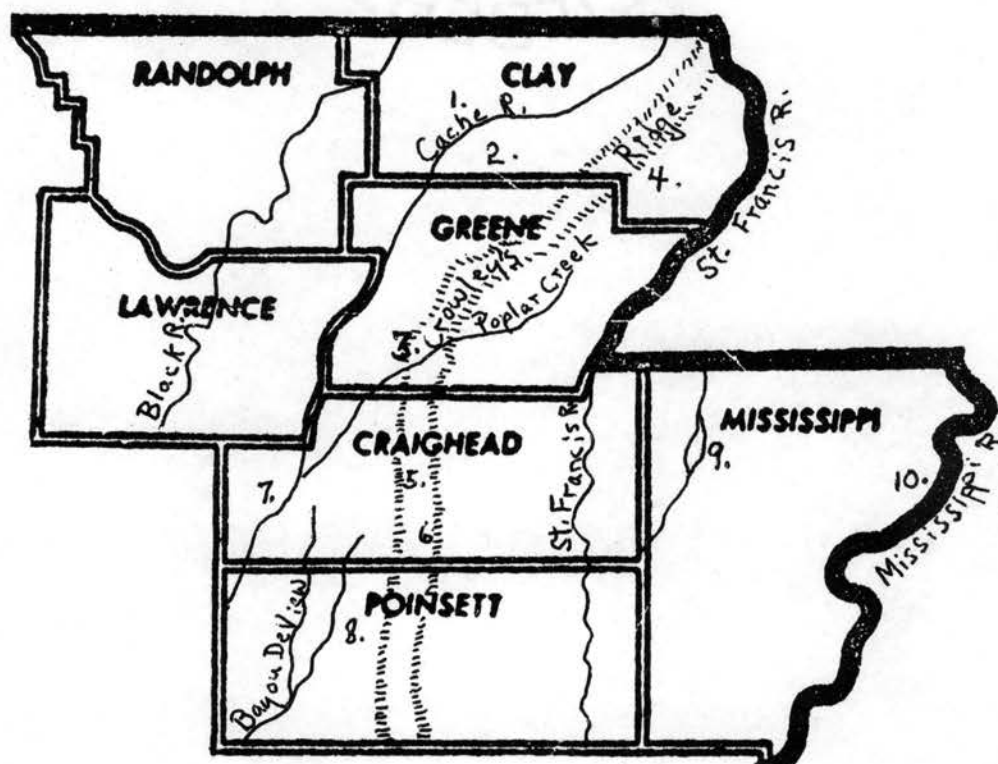
Extensive areas of inundated bottom lands are found in the valleys of the Black River, White River, Cache River, and St. Francis River in northeast Arkansas.

Climate and Rainfall

Northeast Arkansas is in the temperate zone and has hot summers and rather mild winters. There is no distinct dry season, for the driest month receives on the average more than 1.2 inches of rainfall. Craighead County, located in the center of this study area, has an average temperature of 40.4° F. in January and 81.4° F. in July. There is an average of 63 days per year with a minimum temperature of 32° F. or below. The annual precipitation is 47.43 inches, mostly in the form of rain, but snow may occur and remain on the ground for one or two weeks. The greatest rainfall occurs in January, March, April, December, and May, in that order. (Hickmon, 1941).

Habitat Types

Riparian. The riparian habitat consisted of river and creek borders. Nine rivers and streams were included in the study. (Figure 1) and a comparison of vegetation and cover density along these bodies of water is delineated in Table 1. Studies of the riparian habitat were conducted in all six counties.



- | | |
|-------------------------------|-----------------------------|
| 1. Tipperary | 6. Craighead Forest |
| 2. Knob | 7. Cash |
| 3. Crowley's Ridge State Park | 8. Claypool's Reservoir |
| 4. Rector | 9. Big Lake Wildlife Refuge |
| 5. Jonesboro | 10. Heronry at Hillcrest |

Fig. 1. Map of counties in northeast Arkansas showing study areas.

Aquatic-Woodland. Big Lake National Wildlife Refuge, an area of wooded river bottom in the midst of a flat cotton-growing plain in the northeast corner of Arkansas, was studied as a typical aquatic-woodland habitat. The refuge had about 3,000 acres of open water called Big Lake. Little River, which flowed through the center of the lake, spread out for five to seven miles when the land sank after the New Madrid earthquake. Another 3,000 acres of the refuge were flooded most of the time, but contained some trees such as cypress--the only remaining virgin cypress in this section of Arkansas. A description of other vegetation in the refuge is given in Table I.

Claypool's Reservoir, a privately owned waterfowl resting and feeding area of 1,400 acres located nine miles east of Weiner, was the second aquatic-woodland area studied. The reservoir was one-fourth to one-half mile wide at its broadest point, seven to ten feet deep in the main channel, and two to four feet deep elsewhere. The banks of the reservoir were thickly covered with willow trees and buttonbush. Algae, larger underwater aquatics, and a profusion of floating water lilies were found in the reservoir. Also there were many branches and dead tree stumps projecting above the water level. Low swamp oak-hickory woods surrounded the reservoir.

A comparison of vegetation and cover density in the two aquatic-woodland habitats studied is made in Table I.

Lowland Deciduous Woods. The vegetation of the lowland deciduous woods in northeast Arkansas is much alike. These woodlands may collectively be described as mesophytic and hydrophytic oak-hickory climax forests with many of the larger trees cut out. Four areas were selected for study of this habitat type.

TABLE I
COMPARISONS OF HABITAT TYPES

Habitat Types	Location of Study	Characteristic Vegetation	Canopy
Riparian	St. Francis River, Clay Co. Dr. Ditch No. 1 and 13, Clay County.	Black willow, cottonwood, river birch, sycamore, red maple, buttonbush, Hercules club, sweet gum, American elm, willow oak, bald	75% 75%
	Cache River, Clay Co., Pop- lar Creek, Greene Co.	cypress, wild plum, sassafras, water locust, staghorn sumac, winged elm, and persimmon.	75% 75%
	St. Francis River, Craigh. County.		50%
	Cache River, Craighead Co.		75%
	Mississippi River, Miss. Co.		75%
	Black River, Lawrence Co.		85%
	Bayou DeView, Poinsett Co.		70%
Aquatic-Woodland	Big Lake, Mississippi Co.	Black willow, bald cypress, and buttonbush	50%
	Claypool's Reservoir, Poinsett County.	Black willow, buttonbush, species of oaks and hickories.	50%
Lowland Deciduous Woods	Cash, Craighead County.	Oak-hickory lowland woods.	90%
	Bayou DeView, Poinsett Co.	Oak-hickory lowland woods.	80%
	Knob community, Clay Co.	Bald cypress, oak-hickory lowland woods	80%
	Jonesboro, Craighead Co.	Oak-hickory lowland woods	90%
Crowley's Ridge	Crowley's Ridge State Park, Greene County.	Shortleaf pine and oak-hickory upland open woods.	50%
	Craighead Forest, Craigh. County.	Shortleaf pine and oak-hickory upland open woods.	50%
	Old Paragould Rd., Craigh. County.	Shortleaf pine (small to medium sized)	50%
Campestrian	College Farm, Craighead Co.	Pasture and small grain fields	00%
	Valley View, Craighead Co.	Small grain and hay fields.	00%
Short Grass	Jonesboro Airport, Craigh. Co.	Short grass, Korean lespedeza, and white clover	00%
Edificarian	Rector, Clay County	Open oak-hickory (many large southern red oaks).	30%

The swamp woods of the Knob community included a significant amount of bald cypress which the other lowland deciduous woods lacked. These woods were poorly drained and much of the area remained under water during the winter and early spring. During late summer and early fall the water, for the most part, dried up.

In Poinsett County, Bayou DeView, located four miles west of Weiner, was used as a study area. During the winter months the lowland woods were flooded. During late spring and summer most of the water dried from the woods.

An area one mile south of Jonesboro and an area near Cash were the other two lowland deciduous woods habitats studied.

The lowland deciduous woods of northeast Arkansas once supported a magnificent growth of timber including large bald cypress and tupelo gum. At present much of this area is being drained and many of the swamp woods are being cleared and turned into fields planted to cotton, soybeans, and rice. Clearing is proceeding at a rapid rate destroying many of the natural wildlife habitats. Some of the area studied during the early fall had already been cleared and much more is in the process of being cleared of woods. There still remain large areas in central Clay County near Knob which are forested, but much clearing is taking place there also.

Crowley's Ridge. Three areas, Crowley's Ridge State Park, Craighead Forest, and a small woods near Arkansas State College, were selected for study of this habitat type.

Crowley's Ridge State Park, located at Walcott in Greene County, covered 265 acres and had two lakes present. The dominant cover type was shortleaf pine mixed with hardwoods, particularly oaks and hickories.

The man-made lake that had recently been added attracted numerous water birds. The park was an upland woods combined with aquatic and riparian influences.

Craighead Forest, an area of 600 acres located about 8 miles south of Jonesboro, had a 120 acre man-made lake at its center. Vegetation in this park was almost identical to that of Crowley's Ridge State Park in Greene County.

The small woods on Old Paragould Road three miles from Arkansas State College differed from the other two because it contained no lake, and the woods were essentially shortleaf pine. There were gullies and ditches lined with wild plum, persimmon trees and honeysuckle vines.

Campestrian. The campestrian habitat was divided into two types in this study: the short grass habitat type on the airport at Jonesboro and the pasture and grain fields at Arkansas State College. Most of the airport was mowed frequently so that the habitat remained somewhat more uniform throughout the year than the others.

Open pastures, small grain and hay fields of the Arkansas State College farm and similar fields at Valley View comprised the second subdivision of the campestrian type.

Edificarian. The city of Rector in Clay County, a typical small town of 2,000 population in northeast Arkansas, served as the area in which all censuses were taken from this habitat type. The city revealed conspicuous stands of tall southern red oaks, with many ornamental trees and shrubs and other common native species being present.

CHAPTER III

METHODS OF STUDY

Field Census

The accurate measurement of bird populations is difficult. This subject has been extensively treated by Kendeigh (1944). A complete census of the actual numbers of each species found on the study areas would undoubtedly be most valuable, but unfortunately is time consuming and difficult to accomplish in various habitats. Williams (1936) employed the spot-mapping method in which the singing males were located on a field map during successive censuses. Collins (1960) followed this method in her study of breeding birds in Craighead County. Kendeigh (1944), Pough (1947) and Carter (1960) used base maps showing the chief physical features and major plant associations prepared from aerial photographs. In these studies the counting of birds was generally based upon singing males seen or heard while walking over the entire study area. The number of unmated males which established territories is assumed to be few. Colquhoun (1940) stressed that the taking of a complete census may not be justified by the labor involved, and that the essential facts can often be obtained by sampling the bird population. Linsdale (1928, 1932, and 1936) and others have advocated recording the frequency of occurrence of each species. This is nothing more than a species list made on each visit to a particular habitat,

ultimately expressed as a percentage. Kenoyer (1927) suggested that the relative abundance of birds might be expressed by the method developed by Gleason (1920) for plants. In their method no count is made of individuals, but the species are listed on each of twenty-five or more quadrats in the same habitat, each quadrat being the same size. According to their method, if a species is present on each quadrat studied it has a frequency of 100 per cent; if only on one quadrat out of 25 it has a frequency of four per cent. The method suggested by Grinnell and Storer (1924) was followed in this study because it was believed that more habitat types could be sampled in northeast Arkansas and a more complete picture of bird composition could be obtained in the time available for the study. Independent lists as suggested by Dice (1930) were kept for each habitat type. Dice stated that information about relative abundance of birds for a given region is not nearly so valuable as conclusions on the relative abundance of birds in each kind of habitat in a region.

The method employed by the writer in taking these bird censuses in each of the habitats was to identify each bird to species by either sight or sound. An attempt was always made to see a bird which had been identified by sound alone, but if it remained unseen it was recorded when its song could be localized in a specific area. Care was taken not to cover the same ground and record the same bird twice. Neither the route traversed nor the time spent in the habitat was constant, but the majority of counts were made during the morning. The unit of time of one hour, however, remained constant. If an area was sufficiently large so that more than one hour could be spent without covering the same area, often a second census was taken.

Field investigations began September 20, 1964 and continued until June 2, 1965. Forty one hour censuses were taken for each of the riparian, aquatic-woodland, lowland deciduous woods, and Crowley's Ridge habitats. Twenty censuses of one hour's duration were taken during the spring for the campestrian habitat and 20 censuses one hour in length were scattered throughout the fall, winter, and spring for the edificarian habitat.

The Roadside Census

Nice and Nice (1921) used the roadside census to study Oklahoma bird populations in 1920. Since then it has been used by a number of other workers. Kendeigh (1944) evaluated the roadside census in relation to other types of censuses. It has been used as a method of determining relative abundance and not absolute abundance. Howell (1951) made a detailed study of the roadside census in Knox County, Tennessee. He assigned numbers indicating relative conspicuousness to various species of birds. His numbers range from one to 28. This information was secured by actual field counts as compared to the counts of the roadside census. Obviously time limits the size of the area that can be studied by making these comparisons.

In recording information for this study, a field sheet was used which included information on the location, habitat type, date, time, temperature, weather conditions, mileage, species of birds and numbers of each species. The roadside counts were conducted on roads in two major habitat types: namely Crowley's Ridge and the delta farm area. The automobile was driven between 15 and 20 miles per hour and birds were recorded as they appeared in view of the observer. At times it

was necessary for the observer to stop to get a better view of the bird for identification. Generally census work was done under favorable weather conditions. Often it was cloudy and cold but periods of moderate or heavy rains were avoided. Some trips were made after rains or, rarely, during a very light sprinkle. Early morning and late afternoon were the times when most of the census work was conducted. Howell (1951) found during a series of 110 censuses, half of them taken during mornings and half of them taken during afternoons, that 61.8 per cent of all the individuals were counted during the mornings. Field glasses of 7 x 50 power were used for all field and roadside census work.

CHAPTER IV

RESULTS

The population density of a given species has often been stated in terms of estimated relative abundance. In this paper a scale of abundance having seven levels is employed as follows:

Very rare . . less than five individuals seen or heard per year.

Rare 5 - 20 individuals seen or heard per year.

Uncommon . . 21 - 50 individuals seen or heard per year.

Fairly common. 51 - 100 individuals seen or heard per year.

Common . . . 101 - 500 individuals seen or heard per year.

Very common . 501 - 1000 individuals seen or heard per year.

Abundant . . 1,000 or more individuals seen or heard per year.

One hundred and sixty-seven species were listed from a total of 213,030 birds observed between September 20 and June 2, 1964-65 from seven habitat types and two habitats from which roadside censuses were taken. Data are summarized and appear in Tables II - IX. The common names of the birds and their order follow the fifth edition of the Check-List of North American Birds (American Ornithologists' Union, 1957).

The following is a list of the species identified with notes on relative abundance, dates and sites of observations.

Podicepedidae

1. Pied-billed Grebe. Podilymbus podiceps. An uncommon spring and fall migrant. Recorded at Claypool's Reservoir, at the lake at Crowley's Ridge State Park, and in rice ponds along roadsides in the delta region.

Phalacrocoracidae

2. Double-crested Cormorant. Phalacrocorax auritus. A very rare spring and fall migrant. Observed on October 8 on the lake at Crowley's Ridge State Park.

Ardeidae

3. Great Blue Heron. Ardea herodias. A rare transient. Observed on the St. Francis River in Clay County on October 4 and also at Claypool's Reservoir on November 12, March 23 and 30, and April 10.
4. Green Heron. Butorides virescens. A rare summer resident. Found on Poplar Creek on April 17 and on Black River on May 15. Observed from Claypool's Reservoir on April 10, 15, and 20; from low deciduous woods in Knob community of Clay County on May 23; from Bayou DeView on May 31. Observed from a roadside in Knob community on April 18.
5. Little Blue Heron. Florida caerulea. A fairly common summer resident. Seen in large numbers mainly on the Mississippi River in Mississippi County. There is a herony on Highway 120 near Hillcrest in Mississippi County which contains some 2,000 nesting little blue herons. These were observed on May 20, 22, and June 1.

One was observed from a roadside at Tipperary on April 4.

6. Common Egret. Casmerodius albus. Rare in general over northeast Arkansas. Sixteen were observed from the Mississippi River on May 20 and 22, while two were recorded from a roadside census between Claypool's Reservoir and Weiner on April 20. In the heronry there were about 75 adults nesting with the little blue herons.
7. Yellow-crowned Night Heron. Nyctanassa violacea. A rare summer resident. Four birds were seen in a swamp woods near Knob community; three were seen on April 18, and one was observed on May 9.
8. American Bittern. Botaurus lentiginosus. A rare summer resident. Found only at Claypool's Reservoir on April 10, 15, and 20.

Threskionrithidae

9. Glossy Ibis. Plegadis falcinellus. A very rare summer resident. None were observed in regular censuses, but three pairs were found nesting at the heronry at Hillcrest in Mississippi County. This is the first report of a nesting for this species in Arkansas or at any other site in the interior of the United States.

Anatidae

10. Canada Goose. Branta canadensis. Very rare on census samples but fairly common as a spring and fall migrant on large bodies of water. Occasionally found at Claypool's Reservoir in small numbers and occurred at Big Lake in Mississippi County also. Recorded on the lake at Crowley's Ridge State Park on November 28.

11. Blue Goose. Chen caerulescens. Very rare transient. Two were observed on a lake at Crowley's Ridge State Park on November 28, and two were seen from a roadside near Tipperary in Clay County on April 4.
12. Mallard. Anas platyrhynchos. An abundant winter resident and migrant. The largest number of mallards appeared from riparian and aquatic habitats and from roadsides in the delta region. These birds, along with pintails, fed and rested in the submerged rice and soybean fields during late February in their return to the north. A few scattered flocks were found on local ponds on Crowley's Ridge during the winter. They were seen from November 7 to April 18.
13. Black Duck. Anas rubripes. Very rare winter resident. Observed only from Claypool's Reservoir on December 15, January 25, and February 20.
14. Gadwall. Chaulelasmus streperus. A rare spring and fall migrant and winter resident. Observed at Claypool's from December 15 until April 15.
15. Pintail. Anas acuta. An abundant spring and fall migrant. This species, along with the mallard, was common in the Cache bottoms of Clay County during late February. A few were also seen at Claypool's Reservoir.
16. Blue-winged Teal. Anas discors. A very common fall and spring migrant through northeast Arkansas. This is one of the earliest fall and latest spring migrants among the ducks. This species was recorded from riparian, aquatic, low woods, Crowley's Ridge lakes and ponds, and from delta roadside censuses. It was first

seen on October 4 and from the St. Francis River in Clay County and was last recorded on May 29, at the time census work was completed. Some blue-winged teals remained during the summer at Claypool's Reservoir (Mr. Claypool, personal communication). During the winter months the blue-winged teal was scarce in northeast Arkansas.

17. Green-winged Teal. Anas carolinensis. An abundant migrant. Found in large numbers at Claypool's Reservoir between February 20 and March 30.
18. American Widgeon. Mareca americana. A very common spring and fall migrant. Much less common during the winter. Recorded at Claypool's from November 12 through March 13.
19. Shoveler. Spatula clypeata. A very common fall and spring migrant and winter resident. Recorded at Claypool's from December 15 to April 18.
20. Wood Duck. Aix sponsa. A common resident. Most common at Claypool's Reservoir in Poinsett County and at Big Lake in Mississippi County. Seen in riparian, aquatic and low deciduous woods habitats, on ponds and lakes on Crowley's Ridge, and from roadsides of the delta area.
21. Ring-necked Duck. Nyroca collaris. A common winter resident in northeast Arkansas. Observed at Claypool's Reservoir from December 15 until March 23. Seen in rice ponds in the delta and in the lakes on Crowley's Ridge.
22. Lesser Scaup. Nyroca affinis. A common spring and fall migrant. Found to be most common on the lakes of Crowley's Ridge. Recorded from riparian and aquatic habitats; and also observed from

roadsides throughout the delta region. Roadside observations were made at rice ponds and water-covered fields March 28 - April 6. From the aquatic habitat this species was first observed on Big Lake on February 6, and at Claypool's Reservoir from March 30 until April 15. On Crowley's Ridge the lesser scaup was seen on November 10 and 28, and on April 3.

23. Bufflehead. Charitonetta albeola. Very rare in northeast Arkansas. Observed at Claypool's Reservoir on February 20.
24. Ruddy Duck. Erismatua jamaicensis. A rare spring and fall migrant. Observed at Claypool's Reservoir on December 15 and from a roadside near Tipperary in Clay County on April 4.
25. Hooded Merganser. Lophodytes cucullatus. This species is a rare migrant. Two were seen at Claypool's Reservoir on March 30, while five were recorded from a farm pond on Crowley's Ridge the same day.

Cathartidae

26. Turkey Vulture. Cathartes aura. Very rare resident in northeast Arkansas. Seen at Claypool's Reservoir on April 10 and observed from roadsides on Crowley's Ridge on October 31 and April 1. The turkey vulture was observed to be common in the Ozarks farther west in the state.

Accipitridae

27. Sharp-shinned Hawk. Accipiter striatus. Very rare in northeast Arkansas. One was observed on Crowley's Ridge in Clay County on November 27.

28. Coopers Hawk. Accipiter cooperii. Very rare in northeast Arkansas.

One bird was seen darting through the city of Rector on April 17.

29. Red-tailed Hawk. Buteo jamaicensis. Fairly common resident. Ranks next to the sparrow hawk in abundance, being found in the riparian, aquatic, low deciduous woods, and Crowley's Ridge habitats. Recorded from the roadside in both areas. More common during fall and winter; less common during spring.

Krider's Red-tail. Buteo jamaicensis kriderii. This sub-species is very rare. Three individuals were observed during the year. First observed from Poinsett County on March 30; later two were observed from Mississippi County near the Mississippi River on May 22.

30. Harlan's Hawk. Buteo harlani. A rare hawk usually found during late fall and winter. Recorded from riparian, lowland deciduous woods, and Crowley's Ridge habitats. Also recorded from the roadside in Crowley's Ridge and delta areas.

31. Red-shouldered Hawk. Buteo lineatus. Very rare resident. One individual was observed from a low deciduous woods on May 23 in the Knob community.

32. Broad-winged Hawk. Buteo platypterus. Uncommon resident in northeast Arkansas. Sixteen were observed in migration over a lowland deciduous woods on April 6, while two more were recorded as they were flying over lowland deciduous woods in Craighead County on November 29 and April 11. Two were also recorded from riparian habitats.

33. Swainson's Hawk. Buteo swainsoni. A rare migrant. This species was observed primarily from roadsides in the delta region. It

is more common during the early fall.

34. Bald Eagle. Haliaeetus leucocephalus. A very rare visitant. One immature bird was observed on November 12 at Claypool's Reservoir, while one other specimen was trapped near Black Rock during the early winter.
35. Mississippi Kite. Ictinia misisippiensis. A very rare spring visitant. One was seen on the Mississippi River about 12 miles north of Wilson, Arkansas on May 20. This is an extension of the range of this bird 150 miles north of the previous report in Arkansas. (James, personal communication).
36. Marsh Hawk. Circus cyaneus. A fairly common fall and winter resident. Ranks next to the red-tailed hawk in abundance, being more common in the delta lowland regions where more than half of the birds were observed.

Pandionidae

37. Osprey. Pandion haliaetus. A very rare visitant in spring. One individual was observed from Claypool's Reservoir on April 10.

Falconidae

38. Pigeon Hawk. Falco columbarius. A rare spring visitant. Observed from the roadside on Crowley's Ridge on March 7.
39. Sparrow Hawk. Falco sparverius. A fairly common fall and winter resident. Somewhat rare during the spring and summer. Observed from most habitat types throughout the year. The sparrow hawk is the most common hawk in northeast Arkansas.

Phasianidae

40. Bobwhite. Colinus virginianus. A fairly common permanent resident.
Less common in the delta region than in the riparian habitats.

Meleagridae

41. Turkey. Meleagris gallopavo. Very rare in northeast Arkansas.
Three gobblers were observed at the edge of a lowland deciduous woods at Bayou DeView on May 4. The wild turkey has been restocked at Bayou DeView and on Black River in Lawrence County.

Raillidae

42. Sora. Porzana carolina. A rare spring and fall migrant through northeast Arkansas. Observed at Claypool's Reservoir on March 20; April 10, 15, 20; and May 12.
43. American Coot. Fulica americana. An abundant fall, winter, and spring resident. Most abundant at Claypool's Reservoir. When the last census was made there on May 29 there were still coots present. It is probable that a few remain throughout the summer.

Charadriidae

44. Killdeer. Charadrius vociferus. A common permanent resident. Recorded as most numerous in the delta area. Riparian habitats supported the next largest number.

Scolopacidae

45. American Woodcock. Philohela minor. A rare permanent resident.
Observed at Claypool's Reservoir on February 20.

46. Common Snipe. Capella delicata. A rare migrant. Two birds were observed in water-covered fields in the delta area of Clay County on April 18 and May 4.
47. Upland Plover. Bartramia longicauda. A very rare transient. Three individuals were recorded from an open field south of Gibson Switch on April 6.
48. Spotted Sandpiper. Actitis macularia. A very rare transient. Observed from pasture fields and from the roadside in the delta. First observed on March 25 from wet pasture fields in Craighead County.
49. Solitary Sandpiper. Tringa solotaria. A fairly common transient. First observed in wet pasture fields in Craighead County on March 25.
50. Willet. Catoptrophorus semipalmatus. A rare transient. Found in riparian and campestrian (airport) habitats. Observed on the St. Francis River at Lake City in Craighead County on April 16 and at the Jonesboro airport on May 20.
51. Greater Yellowlegs. Totanus melanoleucus. A very rare transient. Three were observed from the roadside in the delta region of the Cache bottoms in Clay County on April 18.
52. Lesser Yellowlegs. Totanus flavipes. A rare transient. Observed mostly from the roadsides in the delta region of the Cache bottoms. The first birds were seen on April 18 and the last one was observed May 6 on the St. Francis River in Craighead County.
53. Pectoral Sandpiper. Erolia acuminata. A common transient often seen in large numbers. First observed from the delta roadsides on April 6. The last observations of a flock of 75 was on May 12.

54. Least Sandpiper. Erolia minutilla. A rare transient found mainly at the water's edge on lakes and ponds on Crowley's Ridge. Recorded from the lake at Walcott on April 24 and from Craighead Lake on May 16.
55. Buff-breasted Sandpiper. Tryngites subruficollis. A very rare transient. One bird was observed at Lake City on the St. Francis River. It was found probing in the mud with other species of sandpipers on May 6.

Laridae

56. Herring Gull. Larus argentatus. Erratic in occurrence. Very rare in northeast Arkansas. Recorded from the Cache bottoms in the Knob community on April 4.

Columbidae

57. Mourning Dove. Zenaidura macroura. An abundant permanent resident observed in all habitat areas. Most numerous during the fall.

Cuculidae

58. Yellow-billed Cuckoo. Coccyzus americanus. A rare summer resident. Observed from riparian, aquatic, and lowland deciduous woods habitats.

Tytonidae

59. Barn Owl. Tyto alba. A very rare permanent resident. One specimen was collected near Gibson Switch in Craighead County.

Strigidae

60. Screech Owl. Otus asio. A rare permanent resident. Found nesting at Big Lake in Mississippi County. Seen from the roadside in the delta area. Observed from aquatic, lowland deciduous woods, and Crowley's Ridge habitats.
61. Great Horned Owl. Bubo virginianus. A very rare permanent resident. Four birds were seen throughout the year. All were found in the lowland deciduous woods.
62. Barred Owl. Stix varia. Recorded as a rare permanent resident because of its nocturnal habits. Found in riparian, aquatic and lowland deciduous woods habitats.

Caprimulgidae

63. Chuck-wills-widow. Caprimulgus carolinensis. Based on the number of observations it was assigned the status of a rare summer resident. However, this rating is far too low. Because of its nocturnal habits very few of the birds actually present were seen. This species is commonly heard at night in wooded areas throughout northeast Arkansas. The first individual was seen on April 6 in a lowland deciduous woods in Craighead County.
64. Nighthawk. Chordeiles minor. This bird was recorded as a rare summer resident but this rating is far too low. None were observed from Rector, the city where all the edificarian censuses were taken. During late afternoon the nighthawk was fairly common in the larger cities of Paragould and Jonesboro. All individuals recorded on censuses were from the Jonesboro airport. There are

indications that these birds nest there on the ground because they often would dive at the writer as censuses were being taken.

Apodidae

65. Chimney Swift. Chaetura pelagica. A very common summer resident in cities. Found in most habitat types. First observed in Rector, Arkansas on April 3.

Trochilidae

66. Ruby-throated Hummingbird. Archilochus colubris. An uncommon summer resident. Found in most habitat types in small numbers. First observed on April 20 from Claypool's Reservoir.

Alcedinidae

67. Belted Kingfisher. Megaceryle alcyon. An uncommon permanent resident. Most common at Claypool's Reservoir.

Picidae

68. Yellow-shafted Flicker. Colaptes auratus. A common permanent resident. Most abundant in aquatic-woodland and lowland deciduous woods habitats.
69. Pileated Woodpecker. Ceophloeus pileatus. A common permanent resident found mostly in aquatic and lowland deciduous woods. More common than the hairy woodpecker or the yellow-bellied sapsucker. Seldom found on Crowley's Ridge.
70. Red-bellied Woodpecker. Centurus carolinus. A very common permanent resident. The most common woodpecker in northeast Arkansas. Found in all habitats studied that contain trees, but most common in the

lowland deciduous woods.

71. Red-headed Woodpecker. Melanerpes erythrocephalus. A common permanent resident. Ranked third in abundance, below the red-bellied woodpecker and the yellow-shafted flicker. The lowland deciduous woods supported by far the highest numbers; however, not all lowland deciduous woods contained uniform numbers. Also, their distribution was spotty during the winter. This species was rare on Crowley's Ridge and uncommon in riparian habitats.
72. Yellow-bellied Sapsucker. Sphyrapicus varius. A fairly common winter resident. Most common on Crowley's Ridge in the mixed pine woods. In the other wooded habitats studied this species was found in smaller numbers. First observed on October 23 from Crowley's Ridge State Park; last observed on April 16 from Big Lake Wildlife Refuge.
73. Hairy Woodpecker. Dryobates villosus. A fairly common permanent resident. The least common woodpecker in northeast Arkansas. Found in all wooded habitats studied, but not common in any habitat.
74. Downy Woodpecker. Dryobates pubescens. A common permanent resident. Found in greatest numbers in the aquatic-woodland habitat. Also found in the lowland deciduous woods, riparian, and Crowley's Ridge habitats.

Tryannidae

75. Eastern Kingbird. Tyrannus tyrannus. A fairly common summer resident. Last observed in the fall from the roadside on Crowley's Ridge on September 20. The first spring appearance was in the delta area in Craighead County on April 15.

76. Great Crested Flycatcher. Myiarchus crinatus. A fairly common summer resident. Most common in the lowland deciduous woods. Also found in the mixed oak-hickory and pine woods of Crowley's Ridge. The first spring record of the arrival of this species was on April 20 from Claypool's Reservoir.
77. Eastern Phoebe. Sayornis phoebe. A rare summer resident. This species is limited in habitat; it is found near streams and often builds nests under bridges. It is fairly common where the habitat is suitable, but it was not observed very often on the census areas.
78. Acadian Flycatcher. Empidonax virescens. An uncommon summer resident. Found in moist deciduous woods. Best identified by its voice. All individuals observed were in the lowland deciduous woods habitat.
79. Least Flycatcher. Empidonax minimus. A rare spring migrant. Observed on Black River on May 15 and in a moist deciduous woods on May 23.
80. Eastern Wood Pewee. Contopus virens. A common summer resident in moist wooded habitats. Easily identified by its voice and habits. First observed on April 24 at Crowley's Ridge State Park. The last record was on September 20 from the same park.

Alaudidae

81. Horned Lark. Otocoris alpestris. A common permanent resident. Less common in late spring and summer. Found in greatest numbers at the airport and along roadsides throughout the delta.

Hirundinidae

82. Tree Swallow. Iridoprocne bicolor. A rare spring and fall transient.

Thirteen birds were found flying near the water's edge at the lake located at Crowley's Ridge State Park on April 3.

83. Rough-winged Swallow. Stelgidopteryx ruficollis. A fairly common summer resident. On September 26 many birds were seen on telephone wires in the delta farming area of Craighead County. The first spring record was on April 16 from St. Francis River at Lake City.

84. Barn Swallow. Hirundo rustica. A common summer resident. First seen in the spring on April 14 and last seen on October 10.

85. Purple Martin. Progne subis. A common summer resident. Most common in the city where it nests in bird houses. The first observed spring arrival at Jonesboro was on March 31.

Corvidae

86. Blue Jay. Cyanocitta cristata. An abundant permanent resident.

Most abundant during the fall and found in all habitat types studied with the exception of the airport. The greatest number appeared from Crowley's Ridge, but it was common in all wooded areas studied. Crowley's Ridge supported a total count of 640 compared to 190 for the delta region.

87. Crow. Corvus brachyrhynchos. A very common permanent resident.

Recorded in greatest numbers from the roadside censuses of the delta lowlands.

Paridae

88. Carolina Chickadee. Parus carolinensis. A very common permanent resident. Most common in riparian, aquatic lowland deciduous woods, and Crowley's Ridge habitats.
89. Tufted Titmouse. Parus bicolor. A very common permanent resident. Found in lowland deciduous woods, aquatic, riparian and Crowley's Ridge habitats in larger numbers than in the others.

Sittidae

90. White-breasted Nuthatch. Sitta carolinensis. A rare permanent resident. Observed from a lowland deciduous woods near Knob community in Clay County and from a riparian habitat on the Cache River in Craighead County.

Certhiidae

91. Brown Creeper. Certhia familiaris. An uncommon winter resident. Found in all wooded habitats and in the city, but not recorded from roadside censuses. First recorded on November 17 from Craighead Forest and last seen on April 4 from the Knob community of Clay County.

Troglodytidae

92. Winter Wren. Troglodytes troglodytes. A rare winter resident. First recorded from Big Lake on December 1, but later recorded from a lowland deciduous woods near Cash on January 22. Last seen on February 20 from Claypool's Reservoir.

93. Bewick's Wren. Thryomanes bewickii. A very rare permanent resident. Only three birds were observed: one was seen near Claypool's Reservoir and two were seen in lowland deciduous woods.
94. Carolina Wren. Thryothorus ludovicianus. A common permanent resident. Found in all wooded areas, but most common in aquatic-woodland ecotone habitats.

Mimidae

59. Mockingbird. Mimus polyglottis. A very common permanent resident. Less common during the winter months. The largest numbers were recorded from roadside censuses taken on Crowley's Ridge. The number recorded from Crowley's Ridge was 305 compared to 155 counted from the roadside in the delta area. Also common in the city.
96. Catbird. Dumetella carolinensis. An uncommon summer resident. First observed on April 27 in the state park at Walcott. Found in greatest numbers in the city.
97. Brown Thrasher. Toxostoma rufum. A common summer resident. Rare during the winter months. Most common on Crowley's Ridge.

Turdidae

98. Robin. Turdus migratorius. An abundant permanent resident. Less common during the winter than in the spring. Most common along roadsides on Crowley's Ridge. Found in all habitat types except the short grass habitat of the airport.
99. Wood Thrush. Hylocichla mustelina. A common summer resident. Most common in the lowland deciduous woods. First spring observance

was on April 11 from the lowland deciduous woods near Cash.

Last seen during the fall on October 29 from lowland woods five miles north of Jonesboro.

100. Hermit Thrush. Hylocichla guttata. A rare spring and fall migrant.

First observed from Drainage Ditch No. 13 in Clay County on April 4, and last seen on April 25 from the low deciduous woods near Cash. One bird was recorded from the same woods on November 14.

101. Swainson's Thrush. Hylocichla ustulata. A very rare transient.

Four individuals were observed at Big Lake on May 4.

102. Gray-cheeked Thrush. Hylocichla minima. A rare migrant. Observed

in small numbers from riparian, lowland deciduous woods, and Crowley's Ridge habitats. First observed from Craighead Forest on April 27; then seen at Bayou DeView on May 4; it was sighted in a lowland deciduous woods one mile south of Jonesboro on May 12 and 13.

103. Eastern Bluebird. Sialia sialis. A common permanent resident.

Most numerous along roadsides on Crowley's Ridge. Always more common on the ridge than on the delta.

Sylviidae

104. Blue-gray Gnatcatcher. Polioptila caerulea. A common summer resident in lowland wooded habitats. Rare on Crowley's Ridge. First observed on April 6 from a lowland deciduous woods near Cash.

105. Golden-crowned Kinglet. Regulus satrapa. An uncommon winter resident. Observed from riparian, aquatic-woodland, lowland deciduous woods, and Crowley's Ridge habitat types throughout most of

the winter. First recorded from Craighead Forest on November 17 and last seen on April 4 on Ditch No. 13 in Clay County.

106. Ruby-crowned Kinglet. Regulus calendula. A fairly common winter resident. Found in all wooded habitats including the city. First observed on November 7 at Claypool's Reservoir; last seen on April 17 from Craighead Forest.

107. Cedar Waxwing. Bombycilla cedrorum. A common winter resident. The first group of 175 was observed at Claypool's Reservoir on November 12 and the latest record was from Craighead Forest on May 13. Often seen in rather large groups that were erratic in their appearance.

Laniidae

108. Loggerhead Shrike. Lanius ludovicianus. A common permanent resident. Found along roadsides in the delta. There were 183 birds observed in the delta while only 38 were observed from the roadsides on Crowley's Ridge. Other habitats supported a small number.

Sturnidae

109. Starling. Sturnus vulgaris. An abundant permanent resident. This introduced species was found in all habitats except the short grass of the airport. Most numerous along roadsides in the delta farming area, but also numerous in the city. Only six species were more common than the starling in total count.

Vireonidae

110. White-eyed Vireo. Vireo griseus. A fairly common summer resident.

This species appeared in all wooded habitats, being most numerous in the lowland deciduous woods. The first spring appearance was on April 10 from Claypool's Reservoir.

111. Yellow-throated Vireo. Vireo flavifrons. A very rare resident.

Two birds were observed: one from a lowland deciduous woods in Craighead County on May 6, and the other from Craighead Forest on April 17.

112. Red-eyed Vireo. Vireo olivaceus. A fairly common summer resident.

Most common in the lowland deciduous woods. First recorded during the fall on October 17 from the St. Francis River at Lake City and observed during the spring from Crowley's Ridge on May 13.

113. Philadelphia Vireo. Vireo philadelphicus. A rare spring and fall migrant. Recorded on October 17 from the St. Francis River at Lake City and also observed during the spring from Crowley's Ridge on May 13.

114. Warbling Vireo. Vireo gilvus. A rare summer resident. First recorded on the St. Francis River at Lake City on April 16. Later found at Craighead Forest on May 13.

Parulidae

115. Black and White Warbler. Mniotilta varia. A very rare summer resident found mainly in riparian habitats. Found on the St. Francis River at Lake City as late as November 14. Recorded from Craighead Forest on April 21 and from the Mississippi River on May 20.

116. Prothonotary Warbler. Protonotaria citrea. A fairly common summer resident. Most common in aquatic-woodland and riparian habitats.

Also found in the swamp woods of the Cache bottoms in Clay County.

First appeared on April 10 at Claypool's Reservoir.

117. Worm-eating Warbler. Helmitheros vermivorus. A rare summer resident. All seven observed birds appeared in a lowland deciduous woods one mile south of Jonesboro on May 6 and 8.

118. Tennessee Warbler. Vermivora peregrina. A very rare migrant. One bird was observed on October 17 in a lowland deciduous woods in Craighead County.

119. Orange-crowned Warbler. Vermivora celata. A very rare transient. Two birds were recorded from a swamp woods in the Knob community on May 9.

120. Yellow Warbler. Dendroica aestiva. A very rare summer resident. Two birds were observed on April 25 in a lowland deciduous woods near Cash.

121. Myrtle Warbler. Dendroica coronata. A common winter resident. This species was the most common warbler in northeast Arkansas. Less common during the colder months of the winter. Found in greatest numbers in aquatic-woodland habitats. Last observed on May 13 from Craighead Forest.

122. Blackburnian Warbler. Dendroica fusca. A very rare migrant. Observed in a lowland deciduous woods one mile south of Jonesboro and in Craighead Forest on May 15. First observed on May 10 in Craighead Forest (Mrs. John Ellis, personal communication).

123. Yellow-throated Warbler. Dendroica dominica. A very rare summer resident. Two birds were recorded: one from a lowland deciduous woods on the Knob community on April 18, and the other from Black River of Lawrence County on May 15. Another bird was re-

ported from Craighead Forest on April 4 (Mrs. John Ellis, personal communication).

124. Chestnut-sided Warbler. Dendroica pensylvanica. A rare spring and fall migrant. Observed on the St. Francis River in Clay County on October 25. Recorded from Craighead Forest on May 13, and from a low deciduous woods one mile south of Jonesboro on May 6 and 16.
125. Bay-breasted Warbler. Dendroica castanea. A very rare spring and fall migrant. Observed in Craighead Forest on May 11. Reported on May 7 from the same woods (Mrs. John Ellis, personal communication). Observed again in the same woods on May 13.
126. Blackpoll Warbler. Dendroica striata. A very rare spring and fall migrant. First seen at Craighead Forest on May 12 (Mrs. John Ellis, personal communication). Observed by the writer in the same woods on May 13.
127. Pine Warbler. Dendroica pinus. A rare permanent resident in pine woods. Observed in a pine woods at Crowley's Ridge State Park on October 31. A single bird spent the winter at Craighead Forest (Mrs. John Ellis, personal communication).
128. Prairie Warbler. Dendroica discolor. A very rare summer resident. Two birds were seen in an open pine woods on the Old Paragould Road on May 16.
129. Louisiana Waterthrush. Seiurus motacilla. A very rare summer resident. Seen at Crowley's Ridge State Park on March 30.
130. Yellowthroat. Geothlypis trichas. A fairly common summer resident. Most common in riparian habitats and in low deciduous woods. The first spring record was on April 15 at Claypool's Reservoir.

131. Yellow-breasted Chat. Icteria virens. A common summer resident found in all wooded habitats studied. Most numerous in riparian habitats. The first spring record was on April 17 from Craighead Forest.
132. Canada Warbler. Wilsonia canadensis. A very rare migrant. No birds were observed on censuses; however one male was seen at the heronry in Mississippi County on May 22. Another appeared at Craighead Forest on May 15 (Mrs. John Ellis, personal communication).
133. American Redstart. Setophaga ruticilla. A rare summer resident. Seven individuals were recorded. First observed in a low deciduous woods one mile south of Jonesboro on May 6 and 8. Five individuals were seen on Black River in Lawrence County on May 15. One was reported from Craighead Forest on May 10 (Mrs. John Ellis, personal communication).

Ploceidae

134. House Sparrow. Passer domesticus. An abundant permanent resident. Most numerous along roadsides in the delta farming area. Ranked fifth in abundance for northeast Arkansas.

Icteridae

135. Bobolink. Dolichonyx oryzivorus. A common fall and spring migrant. Observed in the airport area and in other campestrian habitats from May 13 to May 28. One hundred and seventy-six birds were seen in all.
136. Eastern Meadowlark. Sturnella magna. An abundant permanent resident. Most numerous along roadsides on Crowley's Ridge in open fields.

137. Western Meadowlark. Sturnella neglecta. A very rare transient.

Three birds were found around feed lots on the Arkansas State College farm on March 27. One was heard on Crowley's Ridge on March 30.

138. Redwinged Blackbird. Agelaius phoeniceus. An abundant permanent resident. Ranked third in abundance in northeast Arkansas.

Present in all habitat types, being recorded in greatest numbers from roadside censuses taken through the delta farming area.

139. Orchard Oriole. Icterus spurius. A fairly common summer resident.

Most common at Claypool's Reservoir. First recorded on April 11 from lowland deciduous woods near Cash.

140. Baltimore Oriole. Icterus galbula. An uncommon summer resident.

First recorded from the St. Francis River at Lake City on April 16. Found to be most common in the tall cottonwoods and willows along the Mississippi River in Mississippi County.

141. Rusty Blackbird. Euphagus carolinus. A very common winter resident.

Found in greatest numbers in swamp deciduous woods and first observed in a swamp woods in Knob community on November 27. Last seen at Claypool's Reservoir on April 1.

142. Common Grackle. Quiscalus versicolor. An abundant permanent resi-

dent. This is the most abundant species in northeast Arkansas; 38 per cent of the total population was composed of this one species. Recorded in large numbers from all habitat types studied except the short grass of the airport. Occurs in this habitat type during winter. Recorded in largest numbers from the roadside habitats through the delta farming area.

143. Brown-headed Cowbird. Molothrus ater. An abundant permanent resident. Found in all habitat types studied except the short grass of the airport. The largest numbers were recorded from the lowland deciduous forest and from roadsides.

Thraupidae

144. Scarlet Tanager. Piranga olivacea. A rare migrant. First observed in a lowland deciduous woods one mile south of Jonesboro on May 6 and 8. Later found at Craighead Forest on May 11. Last recorded May 12 at Claypool's Reservoir.
145. Summer Tanager. Piranga rubra. A fairly common summer resident. Most common in the oak-hickory woods on Crowley's Ridge. The first spring record was made at Walcott on April 17.

Fringillidae

146. Cardinal. Richmondia cardinalis. An abundant permanent resident. Found in all habitat types except the short grass at the airport. Most numerous in riparian habitats but common in the other habitats as well.
147. Rose-breasted Grosbeak. Pheucticus ludovicianus. A very rare fall and spring migrant through northeast Arkansas. First observed in a lowland deciduous woods near Cash on April 25. Observed at Craighead Forest on April 27 and May 11.
148. Blue Grosbeak. Guiraca caerulea. A very rare summer resident. Found only at Craighead Forest and recorded there on May 13 and 27.
149. Indigo Bunting. Passerina cyanea. A common summer resident. Most numerous in riparian, aquatic-woodland and lowland deciduous

woods habitats. The first spring arrival recorded was on April 24 at Poplar Creek in Greene County.

150. Dickcissel. Spiza americana. A common summer resident. Found most commonly in campestrian habitats along fence rows bordering small grain and hay fields. First observed on March 30, a lone bird feeding with a flock of house sparrows. Not observed again until May 4 from a roadside in the delta west of Weiner. The dickcissel was observed on May 1, but no census was taken at that time. The March 30 date was unusually early for this area.
151. Purple Finch. Carpodacus purpureus. A rare winter resident. First observed on March 28 in a riparian habitat on the Cache River in Craighead County. Last seen April 11 in a lowlands deciduous woods near Cash. Reported as rare at feeding stations in Jonesboro during the winter (Mrs. John Ellis, personal communication).
152. American Goldfinch. Spinus tristis. A very common permanent resident. Much less common during the summer. Large flocks are often seen throughout the fall and winter.
153. Rufous-sided Towhee. Pipilo erythrophthalmus. A common permanent resident found in all wooded habitat types studied.
154. Savannah Sparrow. Passerculus sandwichensis. A common winter resident and possibly a permanent resident in the extreme northern counties Baerg (1951). Still present at the airport the last of May. Most numerous at the airport.
155. Grasshopper Sparrow. Ammodramus savannarum. A common summer resident. Restricted to pasture fields and short grass of the airport. Most numerous at the airport and found nesting there. First observed at the airport on April 24.

156. LeConte's Sparrow. Passerherbulus caudacutus. An uncommon fall and spring migrant. First observed in tall grass near the water's edge in backwater from the St. Francis River of Clay County on October 25. The only spring record was from the levee at Big Lake on April 16.
157. Vesper Sparrow. Poecetes gramineus. A rare spring and fall migrant. First observed on October 25 from the St. Francis levee in Clay County. During the spring on April 14 one bird was observed in the delta lowlands of the upper Cache bottoms near Knob.
158. Slate-colored Junco. Junco hyemalis. An abundant winter resident. First recorded on October 25 from the St. Francis River in Clay County. Last seen in Rector on April 18.
159. Oregon Junco. Junco oreganus. A rare winter visitant. Recorded from Craighead Forest and Crowley's Ridge State Park from February 14 until March 30.
160. Chipping Sparrow. Spizella passerina. A rare summer resident. First observed on April 17 from Crowley's Ridge State Park.
161. Field Sparrow. Spizella pusilla. An abundant permanent resident. Most common on Crowley's Ridge in high weed fields and woodland borders.
162. White-crowned Sparrow. Zonotrichia leucophrys. A common winter resident. Found in small brush along roadsides both on Crowley's Ridge and in the lowland. Also recorded from the city in small numbers. First observed on November 27 from a roadside in Craighead County; last recorded from Jonesboro on April 28.

163. White-throated Sparrow. Zonotrichia albicollis. An abundant winter resident. Seen on Crowley's Ridge on October 15. Last observed in a lowland deciduous woods one mile south of Jonesboro on May 15.
164. Fox Sparrow. Passerella iliaca. A common winter resident. Most common in riparian and aquatic-woodland habitats. First observed in the Knob community in a riparian habitat on November 26 and last recorded from Big Lake Wildlife Refuge on April 1.
165. Swamp Sparrow. Melospiza georgiana. A common winter resident found in all wooded areas around water. Most common in the lowland deciduous woods. During the winter these woods were mainly covered with water. Last recorded on April 25 in a lowland deciduous woods near Cash.
166. Song Sparrow. Melospiza melodia. An abundant winter resident. Recorded in greatest numbers from riparian habitats. First recorded on the St. Francis River in Clay County on October 15; last recorded on the St. Francis River at Lake City on May 6.
167. Smith's Longspur. Calcarius pictus. An uncommon fall and spring migrant. Two observations were made at the Jonesboro airport, the only habitat in which this species occurred. February 28 and March 7 a flock of 15 was found.

TABLE II

ORNITHOLOGICAL COMPARISON BY HABITAT TYPES BASED ON CENSUSES
(September 20 - March 13, 1964-65)

Habitat Types	No. of Species	No. of Birds	No. of Hours	Ave. No. of Birds Per Hour	Ave. No. Species Per Hour
Riparian	55	8,560	20	428.0	16.4
Aquatic-Woodland	63	30,216	20	1,510.8	21.4
Lowland Deciduous Woods	57	32,563	20	1,628.1	18.0
Crowley's Ridge	58	3,561	20	178.0	16.2
Edificarian	28	3,191	10	319.1	12.4

TABLE III

ORNITHOLOGICAL COMPARISON BY HABITAT TYPES BASED ON FIELD CENSUSES
(March 20 - June 2, 1965)

Habitat Types	No. of Species	No. of Birds	No. of Hours	Ave. No. of Birds Per Hour	Ave. No. Species Per Hour
Riparian	84	2,256	20	112.8	23.3
Aquatic-Woodland	86	7,081	20	354.0	25.2
Lowland Deciduous Woods	79	2,764	20	133.2	23.3
Crowley's Ridge	84	2,470	20	123.5	23.7
Edificarian	35	5,325	10	532.5 ¹	17.0
Airport ²	16	829	10	82.9	5.7
Campestrian	30	2,654	10	265.4	9.7

¹On April 4, 1965 there were 2,546 common grackles flying overhead through the city. This figure increases the total of birds per hour far above the normal number usually seen per hour. Without this figure the average number would be 277.9 birds per hour.

²Classified separately from Campestrian type because of its uniqueness.

TABLE IV

ROADSIDE CENSUSES COMPARING CROWLEY'S RIDGE WITH THE DELTA HABITAT TYPES
(September 20 - March 13, 1964-65)

Habitat Types	No. of Species	Total No. of Birds	Total Miles	Ave. No. of Birds Per Mile	No. of Individual Trips
Crowley's Ridge	38	18,478	465.4	39.7	30
Delta Area	47	73,094	645.8	113.1	30

TABLE V

ROADSIDE CENSUSES COMPARING CROWLEY'S RIDGE WITH THE DELTA HABITAT TYPES
(March 20 - May 28, 1965)

Habitat Types	No. of Species	Total No. of Birds	Total Miles	Ave. No. of Birds Per Mile	No. of Individual Trips
Crowley's Ridge	58	5,456	283.4	19.2	20
Delta Area	68	14,389	305.1	47.1	20

TABLE VI

PERCENTAGE FREQUENCY AND TOTAL NUMBER OF BIRDS FROM TWENTY FIELD CENSUSES IN HABITAT TYPES
(September 20 - March 14, 1964-65)

Name of Bird	Riparian		Aquatic- woodland		Lowland decid- uous Woods		Crowley's Ridge		Edificarian *	
	P. F.	T. N.	P. F.	T. N.	P. F.	T. N.	P. F.	T. N.	P. F.	T. N.
Pied-billed Grebe			15	4			10	2		
Double-crested Cormorant	0	0	0	0			5	1		
Great Blue Heron	5	1	5	1						
Canada Goose							5	1		
Blue Goose							5	2		
Mallard	15	4004	100	20,289	10	30	10	76		
Black Duck			15	3						
Gadwall			15	14						
Pintail	5	1000	15	8	5	2				
Green-winged Teal			15	333						
Blue-winged Teal	10	10	5	35			5	22		
American Widgeon			30	861			5	25		
Shoveler			35	91						
Wood Duck			25	124	10	11				
Ring-necked Duck			25	125			5	12		
Lesser Scaup Duck	10	4	5	2			15	99		
Bufflehead			5	1						
Ruddy Duck			5	1						
Red-tailed Hawk	25	6	25	6	20	4	15	3		
Harlan's Hawk	5	1	10	2	5	2	5	1		
Broad-winged Hawk					5	1				
Swainson's Hawk					5	1				
Bald Eagle			5	1						
Marsh Hawk	20	4	30	6	10	2	15	3		
Sparrow Hawk	10	2	5	1	5	1	10	2	10	1

Table VI Continued

Name of Bird	Riparian		Aquatic-Woodland		Lowland deciduous Woods		Crowley's Ridge		Edificarian	
	P. F.	T. N.	P. F.	T. N.	P. F.	T. N.	P. F.	T. N.	P. F.	T. N.
Bobwhite	10	44								
American Coot			55	2,889			10	2		
Killdeer	25	14	10	2	10	9	25	9		
American Woodcock			5	1						
Mourning Dove	50	129	25	13	40	214	50	204	70	79
Yellow-billed Cuckoo	10	2								
Great Horned Owl					10	3				
Barred Owl			5	1	30	8				
Belted Kingfisher	5	2	15	5			10	2		
Yellow-shafted										
Flicker	40	32	90	75	95	81	70	48	40	7
Pileated Woodpecker	30	10	80	34	65	21	5	1		
Red-bellied										
Woodpecker	80	46	85	59	85	68	80	61	90	29
Red-headed										
Woodpecker	10	2			65	272	25	5		
Yellow-bellied										
Sapsucker	5	1	15	3	5	1	35	13	40	4
Hairy Woodpecker	30	10	35	9	25	6	20	5		
Downy Woodpecker	55	27	75	37	70	29	50	20	30	4
Eastern Phoebe							5	1		
Eastern Wood Pewee							5	1		
Horned Lark			5	1						
Rough-winged Swallow							5	12		
Barn Swallow	5	2								
Blue Jay	90	184	95	263	100	298	100	521	90	230
Crow	50	37	80	149	65	47	40	46	10	1
Carolina Chickadee	85	83	95	173	80	98	85	69	90	25
Tufted Titmouse	60	54	90	73	75	60	46			
White-breasted										
Nuthatch	5	2								

Table VI Continued

Name of Bird	Riparian		Aquatic- Woodland		Lowland decid- uous Woods		Crowley's Ridge		Edificarian	
	P. F.	T. N.	P. F.	T. N.	P. F.	T. N.	P. F.	T. N.	P. F.	T. N.
Brown Creeper	10	2	20	5	30	14	10	2	10	1
Winter Wren			10	4	5	2				
Bewick's Wren					5	2				
Carolina Wren	45	28	80	52	25	9	25	5	30	3
Mockingbird	25	10	30	7	20	5	45	20	100	34
Brown Thrasher	10	2	10	4	30	7			10	1
Robin	30	24	30	20	35	49	50	45	20	9
Wood Thrush					5	1				
Hermit Thrush					5	1				
Eastern Bluebird	5	7					40	31		
Golden-crowned Kinglet			20	11	10	3	15	6		
Ruby-crowned Kinglet	10	3	30	20	5	3	25	15	10	1
Cedar Waxwing			5	175	5	8	5	6	10	17
Loggerhead Shrike	15	3	5	1	20	4	10	3		
Starling	15	206	5	2	10	31	25	28	100	1,073
White-eyed Vireo					5	1	5	1		
Philadelphia Vireo	5	7								
Black and White Warbler	5	2								
Tennessee Warbler					5	1				
Myrtle Warbler	10	20	30	41	10	3	25	16		
Chestnut-sided Warbler	5	5								
Pine Warbler							5	12		
House Sparrow					5	12	20	52	100	777
Eastern Meadowlark	45	99	10	20	5	2	55	61	40	9
Redwinged Blackbird	25	182	65	543	45	2,859	15	28	20	102
Rusty Blackbird			5	1	30	781				

Table VI Continued

Name of Bird	Riparian		Aquatic- Woodland		Lowland decid- uous Woods		Crowley's Ridge		Edificarian	
	P. F.	T. N.	P. F.	T. N.	P. F.	T. N.	P. F.	T. N.	P. F.	T. N.
Common Grackle	30	204	25	2,248	85	20,732	45	287	40	157
Brown-headed Cowbird	5	200	10	203	25	4,896	5	7	10	400
Cardinal	75	87	80	71	85	70	65	65	80	24
American Goldfinch	30	60	35	83	40	55	10	13		
Rufous-sided Towhee	45	32	55	35	75	55	20	5		
LeConte's Sparrow	10	22								
Vesper Sparrow	5	6			5	3				
Slate-colored Junco	75	584	45	289	60	419	85	898	40	27
Oregon Junco							10	3		
Field Sparrow	60	104	35	222	25	40	50	233	20	50
White-crowned Sparrow									20	8
White-throated Sparrow	80	421	55	248	95	906	55	185	80	110
Fox Sparrow	40	86	20	20	5	1				
Swamp Sparrow	50	107	80	85	55	148	25	29		
Song Sparrow	85	333	85	117	50	171	75	185	30	8

*Edificarian habitat was based on 10 counts.

TABLE VII

PERCENTAGE FREQUENCY AND TOTAL NUMBER OF BIRDS FROM TWENTY FIELD CENSUSES IN HABITAT TYPES
(March 23 - June 2, 1965)

Name of Bird	Riparian		Aquatic- Woodland		Lowland de- ciduous Woods		Crowley's Ridge		Edifica- rian*		Campestrian*		Airport*	
	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.
Pied-billed Grebe			25	8			15	3						
Great Blue Heron			15	5										
Green Heron	10	2	15	4	10	2	15	3						
Little Blue Heron	10	65												
Common Egret	10	16												
Yellow-crowned Night Heron					10	4								
American Bittern			20	8										
Mallard			20	1615										
Gadwall			5	2										
Green-winged Teal			10	772										
Blue-winged Teal	20	22	55	365	10	2	10	9						
Shoveler			35	777										
Wood Duck	10	4	40	22	25	11	5	1						
Ring-necked Duck			5	2										
Lesser Scaup			15	19			5	26						
Hooded Merganser			5	2										
Turkey Vulture			5	1										

Table VII Continued

Name of Bird	Riparian		Aquatic- Woodland*		Lowland de- ciduous Woods		Crowley's Ridge		Edifica- rian*		Campestrian*		Airport*	
	P.F.	T.N.	P.F.	T.N.	P.F.	T. N.	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.
Mississippi Kite	5	1												
Coopers Hawk									10	1				
Red-tailed Hawk	15	3	5	1			5	1						
Red-shouldered Hawk					5	1								
Broad-winged Hawk	10	2			10	17								
Marsh Hawk			10	2									10	2
Osprey			5	1										
Sparrow Hawk			5	1										
Bobwhite	35	13			10	9	35	15			30	7	20	4
Turkey					5	3								
Sora			30	12										
American Coot			75	1074			15	6						
Killdeer	40	17	5	1			5	1			10	1		
Spotted Sandpiper							5	1						
Solitary Sandpiper	5	2									20	35		
Willet	5	3											10	2
Lesser Yellowlegs	5	1												
Pectoral Sandpiper	5	3												
Least Sandpiper	5	1					10	12						

Table VII Continued

Name of Bird	Riparian		Aquatic- Woodland*		Lowland de- ciduous Woods		Crowley's Ridge		Edifica- rian*		Campestrian*		Airport*	
	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.
Buff-breasted Sandpiper	5	1												
Herring Gull	5	1			5	1								
Mourning Dove	70	86	70	79	60	51	95	128	100	230	70	140	10	2
Yellow-billed Cuckoo	5	4	10	2	15	4								
Barn Owl	5	1												
Screech Owl			5	2	5	1	5	1						
Great Horned Owl					5	1								
Barred Owl			5	1										
Chuck-wills- widow					10	3	10	3						
Nighthawk Chimney													30	20
Swift	15	9			10	4	20	11	100	465	10	1		
Ruby-throated Hummingbird	20	9	20	5	35	10			10	1				
Belted Kingfisher			40	18			20	8						
Yellow-shafted Flicker	40	28	55	41	40	25	60	35	30	4				
Pileated Woodpecker			50	22	65	17	15	4						
Red-bellied Woodpecker	85	60	95	68	100	94	95	70	30	4				
Red-headed Woodpecker	30	18	5	2	65	117	25	7	50	7				
Yellow-bellied Sapsucker	10	3	25	15	20	5	15	21						

Table VII Continued

Name of Bird	Riparian		Aquatic- Woodland*		Lowland de- ciduous Woods		Crowley's Ridge		Edifica- rian*		Campestrian*		Airport*	
	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.
Hairy														
Woodpecker	25	7	20	5	5	1	25	10						
Downy														
Woodpecker	35	10	45	18	65	16	40	11	50	6				
Eastern														
Kingbird	30	8	20	6	10	7	30	13			20	8		
Great Crested														
Flycatcher	35	14	25	11	50	36	40	23	30	6	10	2		
Eastern														
Phoebe	10	2	5	2										
Acadian														
Flycatcher					45	21								
Least														
Flycatcher	10	3			5	2								
Eastern Wood														
Pewee	45	42	20	13	60	68	50	33						
Horned Lark			5	1							40	12	90	158
Tree Swallow							10	13						
Rough-winged														
Swallow	10	7	10	6			20	13						
Barn Swallow	10	4	10	3			5	2	30	6	20	6	20	20
Purple Martin			5	8	5	1	10	22	100	73			10	6
Blue Jay	85	110	100	173	95	181	100	451	100	212	10	2		
Crow	65	42	15	3	45	29	35	11	10	1				
Carolina														
Chickadee	65	48	95	98	55	24	70	33						
Tufted														
Titmouse	95	71	85	104	100	144	85	74	10	1				
White-breasted														
Nuthatch					15	6								
Brown														
Creepers			5	1	10	2								

Table VII Continued

Name of Bird	Riparian		Aquatic- Woodland*		Lowland de- ciduous Woods		Crowley's Ridge		Edifica- rian*		Campestrian*		Airport*	
	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.
Bewick's Wren			5	1										
Carolina Wren	80	41	75	56	65	31	55	14	60	7				
Mockingbird	20	5	10	2	15	3	30	8	100	30	10	1		
Catbird	10	3			15	3	15	8	50	12				
Brown Thrasher	45	26	45	32	45	31	90	77	90	31	20	4		
Robin	25	20	25	22	15	12	80	168	100	188	40	91		
Wood Thrush	35	15	25	11	60	48	45	26	20	2				
Hermit Thrush	5	7			5	1								
Swainson's Thrush			10	4										
Gray-cheeked Thrush	5	2			15	4	5	4						
Eastern Bluebird							20	9						
Blue-gray Gnatcatcher	35	26	45	20	55	55								
Golden-Crowned Kinglet	5	2												
Ruby-crowned Kinglet			10	5	15	6	15	5	10	1				
Cedar Waxwing							10	28	10	4				
Loggerhead Shrike			5	1										
Starling	25	25	25	23			60	25	100	54	30	18		

Table VII Continued

Name of Bird	Riparian		Aquatic- Woodland*		Lowland de- ciduous Woods		Crowley's Ridge		Edifica- rian*		Campestrian*		Airport*	
	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.
White-eyed Vireo	35	25	55	22	40	31	10	3						
Yellow-Throated Vireo					5	1	5	1						
Red-eyed Vireo	30	12	5	2	55	30	30	8						
Philadelphia Vireo							5	1						
Warbling Vireo	10	2					5	6						
Black and White Warbler	5	1					5	1						
Prothonotary Warbler	45	34	65	42	20	10								
Worm-eating Warbler					10	7								
Orange-crowned Warbler					5	2								
Yellow Warbler					5	2								
Myrtle Warbler	10	3	30	22	10	7	10	6						
Blackburnian Warbler					5	2	5	1						
Yellow-throated Warbler	5	1			5	1								
Chestnut-sided Warbler					10	4	5	2						
Bay-breasted Warbler							5	1						

Table VII Continued

Name of Bird	Riparian		Aquatic- Woodland*		Lowland de- ciduous Woods		Crowley's Ridge		Edifica- rian*		Campestrian*		Airport*	
	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.
Blackpoll Warbler							5	1						
Prairie Warbler							5	2						
Louisiana Waterthrush							5	1						
Yellowthroat	35	23	40	15	35	24	20	6						
Yellow-breasted Chat	50	49	35	25	30	34	30	11						
American Redstart	5	5			10	2								
House Sparrow	5	10	10	6			45	55	100	648	100	667	10	2
Bobolink											20	44	40	132
Eastern Meadowlark	50	65	20	16			85	49	80	17	90	85	100	158
Western Meadowlark											20	3		
Redwinged Blackbird	80	195	90	671	85	220	80	89	20	51	60	676	30	22
Orchard Oriole	20	5	35	25	15	4	25	6			20	10		
Baltimore Oriole	25	31	10	2			20	5	10	1				
Rusty Blackbird	5	2	15	9	10	13								
Common Grackle	70	281	45	131	55	625	75	319	100	2,600*	70	403		
Brown-headed Cowbird	50	35	40	18	60	226	20	17			50	60		
Scarlet Tanager			5	1	10	2	5	3						

Table VII Continued

Name of Bird	Riparian		Aquatic-Woodland*		Lowland deciduous Woods		Crowley's Ridge		Edificarian*		Campestrian*		Airport*	
	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.
Summer														
Tanager	20	9	15	4	30	10	65	41						
Cardinal	100	143	95	110	95	107	90	65			20	3		
Rose-breasted Grosbeak					10	2	10	2						
Blue Grosbeak							10	3						
Indigo Bunting	60	66	30	61	45	66	35	19						
Dickcissel	20	9	5	2			5	1			60	268	50	38
Purple Finch	5	1			5	5	10	2						
American Goldfinch	35	68			25	45	15	71						
Rufous-sided Towhee	55	38	75	31	45	18	60	29						
Savannah Sparrow	5	2	5	12			5	1			40	31	60	135
Grasshopper Sparrow											10	16	60	98
LeConte's Sparrow			5	1										
Slate-colored Junco	15	9	15	52	5	2	10	96	10	1	20	28		
Oregon Junco							5	2						
Chipping Sparrow			5	1	5	1	5	8	10	1				

Table VII Continued

Name of Bird	Riparian		Aquatic- Woodland*		Lowland de- ciduous Woods		Crowley's Ridge		Edifica- rian*		Campestrian*		Airport*	
	P.R.	T.N.	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.
Field Sparrow	55	67	30	16	65	47	30	17	10	1	20	29		
White-throated Sparrow	60	97	55	112	70	180	40	58	40	29	10	2		
Fox Sparrow	10	2	5	11	10	3								
Swamp Sparrow	5	4	60	46	40	27	5	2						
Song Sparrow	30	39	40	38	10	3	25	17	10	2	10	1		
Smith's Longspur													20	30

*Based on 10 counts.

TABLE VIII

PERCENTAGE FREQUENCY AND TOTAL NUMBER OF BIRDS FROM ONE HUNDRED ROADSIDE CENSUSES
(September 20 - May 28, 1965)

Name of Bird	Fall and Winter				Spring			
	Crowley's Ridge		Delta		Crowley's Ridge		Delta	
	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.
Pied-billed Grebe			7	8				
Green Heron							5	1
Little Blue Heron							5	1
Common Egret							5	2
Blue Goose							5	2
Mallard	3	5	30	8,134			25	4
Pintail			20	5,070				
Blue-winged Teal							50	210
American Widgeon							5	1
Shoveler							30	86
Wood Duck					5	5	10	2
Ring-necked Duck							5	2
Lesser Scaup							25	178
Ruddy Duck							10	8
Hooded Merganser					5	5		
Turkey Vulture	3	1			5	1		
Sharp-shinned Hawk	3	1						
Red-tailed Hawk	33	15	63	31	10	2	10	4
Krider's Red Tail							5	1
Harlan's Hawk	7	1	7	2				
Swainson's Hawk			17	10	5	1		
Marsh Hawk	10	3	40	21			25	5
Pigeon Hawk	3	1						
Sparrow Hawk	40	15	60	58	15	3	5	2

Table VIII Continued

Name of Bird	Fall and Winter				Spring			
	Crowley's Ridge		Delta		Crowley's Ridge		Delta	
	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.
Bobwhite					20	7	10	2
American Coot							40	37
Killdeer			20	62	15	4	55	24
Common Snipe							10	2
Upland Plover							5	3
Solitary Sandpiper							15	27
Greater Yellowlegs							10	3
Lesser Yellowlegs							10	10
Pectoral Sandpiper							35	277
Mourning Dove	67	142	63	151	90	202	85	102
Screech Owl			3	1				
Chimney Swift					25	12	5	9
Belted Kingfisher			3	1	10	2	10	3
Yellow-shafted Flicker	33	24	30	18	40	31	35	30
Pileated Woodpecker			7	2				
Red-bellied Woodpecker	43	16	23	8	50	12	20	7
Red-headed Woodpecker	3	2	13	5			20	7
Yellow-bellied Sapsucker					10	2		
Hairy Woodpecker	10	5	10	3				
Downy Woodpecker	7	2			5	2	15	3
Eastern Kingbird	7	7					5	1
Great Crested Flycatcher					35	13		
Eastern Phoebe					10	2		
Eastern Wood Pewee	3	1			5	1	5	2
Horned Lark			30	81	5	2	40	19
Rough-winged Swallow			3	29	20	6	5	2
Barn Swallow			7	79	60	31	40	19
Purple Martin					5	1	15	4
Blue Jay	90	359	80	143	100	281	70	47
Crow	57	67	73	272	70	35	55	36
Carolina Chickadee	10	3	3	1	25	7	15	4
Tufted Titmouse	3	2			55	21	30	9

Table VIII Continued

Name of Bird	Fall and Winter				Spring			
	Crowley's Ridge		Delta		Crowley's Ridge		Delta	
	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.
Carolina Wren			3	1	20	5		
Mockingbird	93	118	90	97	100	187	85	58
Catbird					10	2		
Brown Thrasher			3	1	75	51	55	25
Robin	37	234	23	34	75	182		
Eastern Bluebird	47	50	23	25	65	43	10	6
Cedar Waxwing					5	7		
Loggerhead Shrike	37	19	93	152			80	51
Starling	87	791	100	2,284			90	182
Myrtle Warbler	3	1	3	7				
Yellowthroat					5	1		
Yellow-breasted Chat					10	2		
House Sparrow	100	1,582	100	4,291	100	743	100	1,181
Eastern Meadowlark	90	318	87	385	100	448	90	138
Western Meadowlark					5	1		
Redwinged Blackbird	17	859	70	14,073	90	310	100	5,442
Orchard Oriole					25	7	5	2
Baltimore Oriole					5	2		
Common Grackle	67	12,946	73	33,299	100	2,060	90	4,920
Brown-headed Cowbird			37	3,719	45	46	50	741
Summer Tanager					15	9		
Cardinal	63	60	53	83	95	127	80	68
Indigo Bunting					40	17	5*	7
Dickcissel					25	31	10*	16
American Goldfinch	7	152	7	127			5	5
Rufous-sided Towhee	3	1	3	1	30	9	20	6
Savannah Sparrow			3	3	5	1	20	16
Vesper Sparrow							5	1

Table VIII Continued

Name of Bird	Fall and Winter				Spring			
	Crowley's Ridge		Delta		Crowley's Ridge		Delta	
	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.	P.F.	T.N.
Slate-colored Junco	50	271	30	122	30	82	15	15
Chipping Sparrow					15	3		
Field Sparrow	17	139	23	62	50	30	50	34
White-crowned Sparrow	17	53	17	33	10	18	40	49
White-throated Sparrow	20	99	30	27	35	25	30	20
Fox Sparrow			3	4			5	1
Swamp Sparrow			7	14	5	2	20	8
Song Sparrow	37	102	60	182	30	25	50	86

TABLE IX
TOTAL NUMBER OF BIRDS RECORDED IN EACH HABITAT TYPE

Name of Bird	Habitat Type ¹									Total
	1	2	3	4	5	6	7	8	9	
Pied-billed Grebe		12		5				8		25
Double-crested Cormorant				1						1
Great Blue Heron	1	6								7
Green Heron	2	4	2	3				1		12
Little Blue Heron	65							1		66
Common Egret	16							2		18
Yellow-crowned Night Heron			4							4
American Bittern		8								8
Glossy Ibis			6							6
Canada Goose				1						1
Blue Goose				2				2		4
Mallard	4,004	21,904	30	76				5	8,184	34,193
Black Duck		3								3
Gadwall		16								16
Pintail	1,000	8	2						5,070	6,080
Green-winged Teal		1,105								1,105
Blue-winged Teal	32	400	2	31				210		675
American Widgeon		861		25				1		887
Shoveler		868						86		954
Wood Duck	4	146	22	1				5	6	184
Ring-necked Duck		127		12					2	141
Lesser Scaup	4	21		125					157	307
Bufflehead		1								1
Ruddy Duck		1							8	9
Hooded Merganser		2						5		7
Turkey Vulture		1						2		3

Table IX Continued

Name of Bird	Habitat Type ¹									Total
	1	2	3	4	5	6	7	8	9	
Sharp-shinned Hawk								1		1
Coopers Hawk							1			1
Red-tailed Hawk	9	7	4	4				17	36	77
Harlan's Hawk	1		2	1				1	2	7
Red-shouldered Hawk			1							1
Broad-winged Hawk	2		18							20
Swainson's Hawk			1					1	10	12
Bald Eagle		1								1
Mississippi Kite	1									1
Marsh Hawk	4	8	2	3		2		3	26	48
Osprey		1								1
Pigeon Hawk								1		1
Sparrow Hawk	2	1	1	2			1	18	60	85
Bobwhite	57		9	15	7	4		7		99
Turkey			3							3
Sora		12								12
American Coot		3,963		8					37	4,008
Killdeer	31	3	9	10	1			4	86	144
American Woodcock		1								1
Common Snipe									2	2
Upland Plover									3	3
Spotted Sandpiper				1						4
Solitary Sandpiper	2				35				27	64
Willet	3					2				5
Greater Yellowlegs									3	3
Lesser Yellowlegs	1								10	11
Pectoral Sandpiper	3								277	280
Least Sandpiper	1			12						13
Buff-breasted Sandpiper	1									1
Herring Gull	1		1							2
Mourning Dove	215	92	265	332	140	2	339	344	253	1,982

Table IX Continued

Name of Bird	Habitat Type ¹									Total
	1	2	3	4	5	6	7	8	9	
Yellow-billed Cuckoo	6	2	4							12
Barn Owl									1*	1
Screech Owl		2	1	1					1	5
Great Horned Owl			4							4
Barred Owl	1	2	8							11
Chuck-wills-widow			3	3						6
Nighthawk						20				20
Chimney Swift	9		4	11	1		465	12	9	511
Ruby-throated Hummingbird	9	5	10				1			25
Belted Kingfisher	2	23		10				2	4	41
Yellow-shafted Flicker	60	113	106	83			11	55	48	476
Pileated Woodpecker	18	56	38	5					2	119
Red-bellied Woodpecker	106	147	162	131			33	28	15	622
Red-headed Woodpecker	20	2	389	12			7	2	12	444
Yellow-bellied Sapsucker	4	18	6	34			4	2		68
Hairy Woodpecker	17	14	7	15				5	3	61
Downy Woodpecker	37	55	45	31			10	4	3	185
Eastern Kingbird	8	6	7	13	8			20		62
Great Crested Flycatcher	14	11	36	23	2		6			92
Eastern Phoebe	2	2		1				2		7
Acadian Flycatcher			21							21
Least Flycatcher	3		2							5
Eastern Wood Pewee	42	13	68	34				2	2	161
Horned Lark		2			12	158		2	100	274
Tree Swallow				13						13
Rough-winged Swallow	7	6		25				6	30	74
Barn Swallow	6	3		2	6	20	36	31	98	202
Purple Martin		8	1	22		6	73	1	4	115

Table IX Continued

Name of Bird	Habitat Type ¹									Total
	1	2	3	4	5	6	7	8	9	
Blue Jay	294	436	479	972	2		442	640	190	455
Crow	79	152	76	57			2	106	308	776
Carolina Chickadee	131	171	122	102			25	10	5	666
Tufted Titmouse	125	177	204	120			1	23	9	659
White-breasted Nuthatch	2		6							8
Brown Creeper	2	6	16	2			1			27
Winter Wren		4	2							6
Bewick's Wren		1	2							3
Carolina Wren	69	108	40	19			10	5	1	252
Mockingbird	15	9	8	28	1		64	305	155	582
Catbird	3		3	8			12	2		28
Brown Thrasher	28	36	38	77	4		32	51	26	292
Robin	44	42	61	214	91		197	416	114	1,179
Wood Thrush	15	11	49	26			2			103
Hermit Thrush	7		2							9
Swainson's Thrush		4								4
Gray-cheeked Thrush	2		4	4						10
Eastern Bluebird	7			40				93	31	171
Blue-gray Gnatcatcher	26	20	55							101
Golden-crowned Kinglet	2	11	3	6						22
Ruby-crowned Kinglet	3	25	9	20			2			59
Cedar Waxwing		175	8	34			21	7		245
Loggerhead Shrike	3	2	4	3				38	183	233
Starling	231	25	31	53	18		1,594	1,070	2,466	5,488
White-eyed Vireo	25	22	32	4						83
Yellow-throated Vireo			1	1						2
Red-eyed Vireo	12	2	30	8						52
Philadelphia Vireo	7			1						8
Warbling Vireo	2			6						8
Black and White Warbler	3			1						4

Table IX Continued

Name of Bird	Habitat Type ¹									Total
	1	2	3	4	5	6	7	8	9	
Prothonotary Warbler	34	42	10							86
Worm-eating Warbler			7							7
Tennessee Warbler			1							1
Orange-crowned Warbler			2							2
Yellow Warbler			2							2
Myrtle Warbler	23	63	7	22				1	7	115
Blackburnian Warbler			2	1						3
Yellow-throated Warbler	1		1							2
Chestnut-sided Warbler	6		4	2						12
Bay-breasted Warbler				1						1
Blackpoll Warbler				1						1
Pine Warbler				12						12
Prairie Warbler				2						2
Louisiana Waterthrush				1						1
Yellowthroat	23	15	24	6						68
Yellow-breasted Chat	49	25	34	11				2		121
Canada Warbler			1							1
American Redstart	5		2							7
House Sparrow	10	6	12	107	667	2	1,425	2,325	5,472	10,026
Bobolink					44	132				176
Eastern Meadowlark	164	36	2	110	85	158	26	766	523	1,870
Western Meadowlark					3			1		4
Redwinged Blackbird	377	1,214	3,079	127	676	22	153	1,169	19,515	25,332
Orchard Oriole	5	25	4	6	10			7		57
Baltimore Oriole	31	2		5			1	2		41
Rusty Blackbird	2	10	794							806
Common Grackle	485	2,376	21,357	606	403		2,757	14,906	38,219	81,109
Brown-headed Cowbird	235	221	5,122	24	60		486	46	4,460	10,654
Scarlet Tanager		1	2	3						6
Summer Tanager	9	4	10	41				9		73
Cardinal	230	181	177	130	3		64	187	151	1,123
Rose-breasted Grosbeak			2	2						4

Table IX Continued

Name of Bird	Habitat Type ¹									Total
	1	2	3	4	5	6	7	8	9	
Blue Grosbeak				3						3
Indigo Bunting	66	61	66	19				17	7	236
Dickcissel	9	2		1	268	38		31	16	365
Purple Finch	1		6	2						8
American Goldfinch	128	83	100	84				152	132	679
Rufous-sided Towhee	70	66	73	34				10	7	260
Savannah Sparrow	2	12		1	31	135			19	200
Grasshopper Sparrow					16	98				114
LeConte's Sparrow	22	1								23
Vesper Sparrow	6		3						1	10
Slate-colored Junco	594	341	421	994	28		28	353	137	2,896
Oregon Junco				5						5
Chipping Sparrow		1	1	8			1	3		14
Field Sparrow	171	238	87	250	29		51	169	96	1,091
White-crowned Sparrow							8	71	82	161
White-throated Sparrow	518	360	1,086	243	2		139	124	47	2,519
Fox Sparrow	88	31	4						5	128
Swamp Sparrow	111	131	175	31				2	22	472
Song Sparrow	372	155	174	202	1		10	127	268	1,309
Smith's Longspur						30				30

- ¹Habitat type:
- | | |
|----------------------------|--------------------------------|
| 1. Riparian | 5. Campestrian (Fields) |
| 2. Aquatic-Woodland | 6. Campestrian (Airport) |
| 3. Lowland Deciduous Woods | 7. Edificarian |
| 4. Crowley's Ridge | 8. Crowley's Ridge Roadside |
| | 9. Delta Farming Area Roadside |

CHAPTER V

DISCUSSION AND ANALYSIS OF BIRD COMPOSITION

Validity of Census Methods

The census methods used in this study had some limitations. It is evident that nocturnal and secretive species would often escape observation. Also, gregarious birds such as the common grackle were given too low a relative frequency. One hundred birds in a flock would be recorded only once by the observer and appear as but one record in a list; while the same one hundred birds scattered evenly over a habitat would be included in a number of lists. However, in general this method gave useful figures for comparative abundance with a minimum of time for field observations. This made it possible to cover a larger area than otherwise would have been possible.

Habitat Relations

One hundred and sixty-seven species of birds were observed and studied during the 1964-65 year in the six counties studied in northeast Arkansas. From a study of Tables VI, VII, VIII, IX, it is evident that both the numbers and species of birds present vary markedly from one habitat type to another.

Birds that occurred in greater numbers in the lowland deciduous woods habitat than in any other habitats studied were the red-bellied woodpecker, red-headed woodpecker, crested flycatcher, Acadian flycatcher,

eastern wood pewee, tufted titmouse, wood thrush, blue-gray gnatcatcher, white-eyed vireo, yellowthroat, rusty blackbird, common grackle, red-winged blackbird, brown-headed cowbird, white-throated sparrow and swamp sparrow.

The current trend toward clearing the lowland deciduous woods had the important effect of reducing the number of woodland species, but this practice favored gregarious, seed-eating species such as the common grackle, redwinged blackbird, cowbird, starling and house sparrow. In fact the most common two birds, not only in the lowland deciduous woods but in all of northeast Arkansas, were the common grackle and the red-winged blackbird. Numbers of birds increased as the woods were cleared and converted to agricultural crops, but the number of species decreased (Table IX).

Dead trees that served as dens, an abundant supply of acorns, and large numbers of insects were features of the lowland deciduous woods habitat which attracted large numbers of woodpeckers. Woodpeckers, especially the red-headed woodpecker, congregated in large numbers in these woods during fall and winter. However, their numbers decreased in the woods in the spring when these birds dispersed and were more common in city parks and more open situations. Water, standing in the lowland woods sometimes one foot deep, attracted several species of ducks during the winter. The prothonotary warbler, whose usual habitat is aquatic ecotones and riparian, was found in these woods.

Thick undergrowth and the heavily shaded canopy of the lowland woods during the spring were favored by such species as the wood thrush, white-eyed vireo, red-eyed vireo, Acadian flycatcher and tufted titmouse.

In the higher branches and tops of trees in the lowland woods the

crested flycatcher, blue-gray gnatcatcher and the wood pewee were found.

Cover and protection offered by the lowland woods during winter attracted large numbers of white-throated sparrows, swamp sparrows, song sparrows, and slate colored juncos.

The lowland woods during the fall and winter supported the largest number of birds found in any of the habitat types studied (Table II). Accessible rice and soybean fields near wooded areas provided a good food source for such icterids as the common grackle and redwinged blackbird. Great flocks of these two species contributed to the large total number of birds found in this habitat. However during the spring the lowland woods did not support the largest number of birds (Table III) as the common grackles and redwinged blackbirds did not remain in large flocks in this season. Callahan and Young (1955) found from their study of avifauna in the northwestern part of the state that birds were more concentrated in the flood plain communities. Collins (1960) found that during the winter bottom land populations were higher than in the upland. However, from her breeding bird censuses the reverse was true. She states that this reversal might have been due to the occurrence of a great amount of forest edge in her upland study area. Other studies in the state generally show that bird populations in bottom land forests are higher than in upland forests (James, 1955, 1956a, and 1956b; Hoiberg, 1953, 1955a, 1955b, 1956a, and 1956b.).

In ecotones of aquatic-woodland situations many species of ducks, coots, crows, pileated woodpeckers, downy woodpeckers, yellow-shafted flickers, carolina chickadees, carolina wrens, ruby-crowned kinglets, prothonotary warblers and myrtle warblers reached their greatest numbers.

The aquatic-woodland habitat type had a large body of water present

not found in the lowland woods, although in many other respects these are similar. The aquatic-woodland habitat supported the largest number of species, for both open water and woodland birds were present. The large numerical count of birds seen in the aquatic-woodland habitat type was due to the high populations of ducks and coots. (Table III).

Birds that showed a definite preference for riparian habitat situations were the yellow-billed cuckoo, yellow-breasted chat, American redstart, cardinal, Baltimore oriole, fox sparrow and song sparrow.

Many transients were found in riparian habitats, as they tend to follow large bodies of water. Numbers of birds were far less than in the lowland woods or aquatic-woodland situation because fewer gregarious species occurred in this habitat. Although many waterfowl followed the rivers, they did not congregate in large numbers as they did in reservoirs and other open water situations.

On Crowley's Ridge the blue jay, brown thrasher, yellow-bellied sapsucker, robin, mockingbird, eastern meadowlark, summer tanager, mourning dove, and bluebird occurred in greatest numbers (Tables II and III). These are species that prefer the dry open woods typical of Crowley's Ridge. The yellow-bellied sapsucker was most numerous in this habitat type as the short leaf pine found there provided excellent sources of food.

The number of species found on Crowley's Ridge was about the same as the number of species found in aquatic-woodland, riparian, and lowland woods (Tables II and III) but the actual number of birds observed per hour was far less. Crowley's Ridge was diversified, therefore it provided suitable niches for many species of birds, but, due to the distance of this habitat type from agricultural areas, food was not

available to support large numbers of gregarious species.

The city habitat type supported the greatest numbers of mourning doves, chimney swifts, purple martins, mockingbirds, catbirds, starlings, and house sparrows.

Since Rector is located on Crowley's Ridge, many of the same species were found there as were found in the Crowley's Ridge habitats. Because of the large number of homes and feed stores, house sparrows and starlings congregated there. Many bird houses suitable for purple martin nesting were provided in the city and chimneys of homes provided places for roosting and nesting chimney swifts. The city had fewer species than study areas on Crowley's Ridge, but more birds were observed per hour from the city because of the high starling and house sparrow counts (Tables I and II).

Species reaching their greatest numbers in the campestrian habitat type were horned larks, bobolinks, nighthawks, eastern meadowlarks, dickcissels, savannah sparrows, grasshopper sparrows and Smith's longspurs. These birds are ground nesters and prefer the short grass of meadows and airports for purposes of feeding, resting and roosting.

This habitat type supported the least number of species, and had the smallest average number of birds per hour. However, several of the species found here, such as the Smith's longspur, grasshopper sparrow, and bobolink, are restricted in habitat, for they were not found in any other habitat studied.

Campestrian habitats also contained large numbers of common grackles, redwinged blackbirds, and house sparrows. During the winter starlings added to this list. In some small grain fields a high mourning dove population occurred. Dickcissels and meadowlarks were also common

in this habitat type.

The roadside censuses, taken in the delta and on Crowley's Ridge, verified the fact that the density of bird populations was higher in the delta than on Crowley's Ridge (Tables IV and V). Several species of birds observed on the roadside censuses were not observed in the field counts. These were the common snipe, upland plover, greater yellowlegs and the barn owl. Since a greater distance was covered by roadside censuses than by field censuses, the roadside census methods proved helpful in locating hawks, vultures, and species of game birds. Also, the roadside census proved highly valuable in recording shore birds and waterfowl in the delta areas during spring migration.

The spring roadside censuses on Crowley's Ridge tallied 20 more species of birds than the fall censuses. In the delta, the spring roadside censuses tallied 21 additional species. Many of the summer residents had already left when census work began in the fall. Most of the additional species were due to summer residents returning during the spring plus some migratory species passing through. Also some of the winter residents remained in early spring. The average number of birds per mile was greater during the fall for both habitats. Conspicuousness of birds is a factor here along with the fact that during the fall there were mass movement of blue jays, mourning doves, common grackles, and redwinged blackbirds.

In comparing the number of species obtained by walking and by roadside counts from an automobile on Crowley's Ridge during the fall, 58 species were counted by field census while 38 were recorded from the roadside. During the spring the numbers were 84 and 58 respectively. Twenty to 26 additional species were obtained by field censuses. Relative

conspicuousness is an important factor in roadside counts as many of the smaller passerine birds were difficult to see and therefore were not recorded from the roadside. Roadsides usually provide more open situations and certain species which require more cover were not found commonly along roads.

CHAPTER VI

EDUCATIONAL VALUES OF STUDY

This study can be used as a guide and reference for biology and science teachers in the secondary schools and colleges and also for students and others who are interested in the study of birds in northeast Arkansas. From reading this study, a student can obtain information on methods used in the study of birds, what kind of birds may be expected, where they live, and in what numbers they appear. The cited literature should serve as a good reference guide to previous works pertinent to this kind of study.

Birds are one of our most important and valuable natural resources. Cultivating an acquaintance with them is one way to gain an understanding of problems of wildlife conservation.

Northeast Arkansas is located in the center of the Mississippi flyway. Because of this location and the kinds of available habitats, it is visited each year by northern, southern, eastern, and a few western species. One hundred and sixty-seven species were recorded during the past year and with further observations over an extended period this number would be increased. Bird populations and species change from one season to another; therefore it is necessary to continue such a study for a period of several years to appreciate and enjoy the birds. As for the aesthetic and educational values of birds in the world, one has only to ask himself, "What would the countryside be like without birds?"

Bird watching does not require much specialized equipment. A pair of field glasses is highly desirable, but by no means required. A great deal can be learned without them, and many of our earlier naturalists carried out their work without this aid. Nevertheless, it is difficult to identify some birds at a distance, such as tiny warblers in tree-tops or hawks a long distance away. Certain types of field glasses are most helpful in observing birds. The writer personally likes 7 X 50's. These are especially good for identifying waterfowl and hawks, but are cumbersome to use for birds that are nearby. For birds of the forest a pair of 6 X 30 field glasses is most useful. These can be quickly focused and are especially good for the shorter distances. Some observers have used spotting scopes to advantage, but these, in general, have limited use in bird study.

A good field guide with accurate pictures is an indispensable aid in field identification. One of the best field guides to this area is A Field Guide to the Birds Peterson (1956) . Many excellent charts, pictures, and leaflets available at no cost from various conservation departments are suitable for elementary and secondary school use.

For college students good collections of prepared bird skins housed in museums and educational institutions are an excellent aid to bird study and full use should be made of them. There are several reasons why collections should be kept only in museums and educational institutions. In order to prevent promiscuous killing of protected birds there are federal and state laws governing the collection and mounting of specimens even for study purposes. The preparation of a mount or even a study skin calls for special training and skill. Proper labeling, display, and care of such specimens require more time, money,

cases, and space than most high schools are able to provide. Therefore, the collecting of bird specimens or eggs for secondary school purposes should be discouraged.

Elementary teachers can do much to acquaint the students with common birds through displays of charts, pictures, and old nests from the previous year. The teaching of conservation is especially important in the elementary school because, in the years that follow, boys become interested in guns and a sitting or flying bird makes a good target at which to shoot. In the secondary school and through scout organizations scheduled field trips can be planned for beginning students of birds. This is best done in small groups. A record should be kept throughout the season and dates of spring and fall migrants should be recorded. Particular habitat types ought to be selected for field trips and species recorded for each.

Some general suggestions to beginning students of bird study are to begin with familiar species and, if possible, to make your first trips with an experienced bird observer. Visit several habitat types, but, if you are keeping a record, be specific and do not mix data from different habitats. Always remember to fit yourself into the surroundings. Avoid wearing bright colors and approach the birds whenever possible with the sun at your back; it is more difficult for the bird to see you and easier for you to see the bird. Remember birds usually locate you before you see them; therefore you should move slowly and quietly.

After some experience in bird identification you should begin to learn as many species as you can by song and calls. More birds will be heard than seen. A good aid to learning bird songs is listening to records of bird songs. A. A. Allen of Cornell University has recordings

published of bird songs which can be purchased from the Comstock Publishing Company at Ithaca, New York.

Locally, the flycatcher family contains several similar species which are difficult even for experienced ornithologists to distinguish by color patterns. With this group, voice and habits of the bird are most useful for correct identification. The fish crow can best be differentiated from the common crow by voice. Some similar species such as the eastern and western meadowlark can be identified in the field only by voice.

It is important for the student learning birds to follow the study throughout the year. Different birds appear during the various seasons. Often color changes are encountered. This is especially true with species of warblers. Many of these birds lack conspicuous markings during the fall and are more difficult to distinguish.

For the information given in this paper a check-list could be prepared showing relative abundance and seasonal status of each bird species found in northeastern Arkansas. This would provide a most useful aid for students, teachers, and others interested in birds. This study may also be useful as a measure for gauging man's impact on the landscape on a long term basis and the character of this impact.

CHAPTER VII

SUMMARY

A study of populations and relative frequencies of birds was conducted in six counties of northeast Arkansas. The study began September 20, 1964 and continued until June 2, 1965.

Bird composition was analyzed in riparian, aquatic-woodland, lowland deciduous woods, Crowley's Ridge, edificarian and campestrian habitat types. Roadside censuses were conducted on Crowley's Ridge and in the delta region.

Two hundred hours were spent in the field and 100 roadside censuses which average 16.9 miles each were conducted both in the delta and on Crowley's Ridge. Field census work was conducted on an hour's basis. From the roadside birds were recorded in numbers per mile.

On roadside censuses the delta area supported the greatest number of birds per hour and the greatest number of species. Conspicuous passerine birds that showed a definite preference for delta roadsides included the horned lark, crow, starling, house sparrow, redwinged blackbird, common grackle and brown-headed cowbird. Birds that showed a preference for upland habitats found on Crowley's Ridge included the mourning dove, blue jay, mockingbird, robin, bluebird, eastern meadowlark and cardinal.

One hundred and sixty-seven species of birds were recorded from a total of 213,030 birds observed from seven habitat types and roadside

censuses. Certain species were adapted to a wide variety of habitat types. Others were sharply restricted.

The bird population was highest in the delta. The common grackle was the most abundant bird recorded from northeast Arkansas, making up 38 per cent of the grand total of birds observed. In winter the relative concentration of birds in the bottom lands was more pronounced than in the spring. Winter bottom land populations were higher than on Crowley's Ridge.

Accessible rice and soybean fields near wooded areas provided a good food source for those species which alternate between open country and lowland woods.

The aquatic-woodland habitat type supported the largest number of species. The greatest number of birds was observed from the lowland deciduous woods. Species of blackbirds were primarily responsible for the large numbers in this habitat during fall and winter.

The short grass habitat type of an airport supported the smallest number of birds observed per hour and the fewest species.

For the first time the glossy ibis was found nesting in Arkansas or at any site in the interior of the United States.

The range of the Mississippi kite was extended approximately 150 miles northward over previous records.

This type of study provided information that is useful for the education of primary, secondary and college students. The study may also be useful as a measure for gauging man's impact on the landscape on a long term basis and the character of this impact.

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A P P E N D I X

Appendix 1. Scientific names of common trees found in bottom woods of the delta of northeast Arkansas. Wildlife cover type No. 4 (Holder, 1951).

Ash, Green Fraxinus pennsylvanica var. lanceolata (Borkh.) Sarg.
 Ash, Pumpkin Fraxinus tomentosa Bush.
 Ash, White Fraxinus americanus L.
 Birch, River Betula nigra L.
 Cottonwood Populus heterophylla L.
 Cypress, Bald Taxodium distichum (L.) Rich.
 Elm, American Ulmus americana L.
 Elm, Slippery Ulmus fulva Muhl.
 Elm, Winged Ulmus alata Michx.
 Hickory, Shellbark Carya laciniosa (Michx.) Loud.
 Hickory, Water Carya aquatica (Michx) Nutt.
 Locust, Water Gleditsia aquatica Marsh.
 Oak, Overcup Quercus lyrata Walt.
 Oak, Pin Quercus palustris Muench.
 Oak, Southern Red Quercus falcata Michx.
 Oak, Swamp Chestnut Quercus prinus L.
 Oak, Water Quercus nigra L.
 Oak, White Quercus alba L.
 Oak, Willow Quercus phellos L.
 Pecan Carya pecan (Marsh) Engl. and Graebn.
 Persimmon Diospyros virginiana L.
 Planer Tree Planera aquatica (Walt.) J. F. Gmel.
 Privet, Swamp Forestiera acuminata (Michx) Poir.
 Sugarberry Celtis laevigata Willd.
 Sycamore Platanus occidentalis L.
 Tupelo, Water Nyssa aquatica L.
 Willow, Black Salix nigra Marsh.

Appendix 2. Scientific names of common trees found on Crowley's Ridge in northeast Arkansas. Wildlife cover type No. 8 (Holder, 1951).

Ash, Green Fraxinus pennsylvanica var. lanceolata (Borkh.) Sarg.
 Ash, White Fraxinus americanus L.
 Basswood Tilia glabra Vent.
 Beech Fagus grandifolia var. caroliniana (Loud.) Fernald and Rehder.
 Buckeye Aesculus discolor Pursh.
 Box Elder Acer negundo L.
 Cedar, Red Juniperus virginiana L.
 Cherry, Black Prunus serotina Ehrh.
 Dogwood, Flowering Cornus florida L.
 Elm, American Ulmus americana L.
 Elm, Slippery Ulmus fulva Muhl.
 Elm, Winged Ulmus alata Michx.
 Farkleberry Vaccinium arboreum Marsh.
 Gum, Black Nyssa sylvatica Marsh.
 Gum, Sweet Liquidambar styraciflua L.
 Hercules Club Zanthoxylum clava-herculis Mill.
 Hickory, Bitternut Carya cordiformis (Wang) Koch.
 Hickory, Mockernut Carya tomentosa (Lam.) Nutt.
 Hickory, Shagbark Carya ovata (Mill) Koch
 Holly, Deciduous Ilex decidua Walt.
 Maple, Red Acer rubrum L.
 Oak, Black Quercus velutina Lam.
 Oak, Blackjack Quercus marylandica Muench
 Oak, Bur Quercus macrocarpa Michx.
 Oak, Northern Red Quercus borealis Michx.
 Oak, Post Quercus stellata Wang.
 Oak, Southern Red Quercus falcata Michx.
 Oak, White Quercus alba L.
 Oak, Swamp Chestnut Quercus prinus L.
 Osage Orange Maclura pomifera (Raf.) Schneider
 Plum, Wild Prunus americana Marsh.
 Pine, Shortleaf Pinus echinata Mill.
 Redbud Cercis canadensis L.
 Sassafras Sassafras albidum (Nutt.) Nees.
 Sugarberry Celtis laevigata Willd.
 Sycamore Platanus occidentalis L.
 Walnut, Black Juglans nigra L.

VITA

Earl Lee Hanebrink

Candidate for the Degree of

Doctor of Education

Thesis: A STUDY OF BIRD POPULATIONS IN SELECTED HABITATS OF NORTHEAST ARKANSAS

Major Field: Higher Education

Biographical:

Personal Data: Born in Cape Girardeau, Missouri, March 24, 1924, the son of Harry H. Hanebrink and Augusta Hanebrink.

Education: Attended grade school, Egypt Mills, Missouri; graduated from College High School, 1942. Received Bachelor of Science in Education degree from Southeast Missouri State College, Cape Girardeau, Missouri, with majors in biology and agriculture, May, 1948. Received Master of Science degree from the University of Mississippi, Oxford, Mississippi with major in biology, January, 1955. Graduate courses at University of Mississippi, Oxford, Mississippi summer 1957; University of Wyoming, Laramie, Wyoming, summer, 1959; Duke University Marine Laboratory, Beaufort, North Carolina summer 1962. Entered Oklahoma State University, Stillwater, Oklahoma Fall, 1963.

Professional Experience: High School Biology and Science Teacher, Parma, Missouri and Kennett, Missouri from 1948 - 1957. Instructor, Arkansas State College, Jonesboro, Arkansas 1958 - 1960. Assistant Professor, Arkansas State College, Jonesboro, Arkansas 1961 - 1965. Author, Flora of Southeast Missouri, 1957.

Member of: Tri-Beta, Phi Sigma, American Ornithological Union, Wilson Ornithological Society, Society of Southwest Naturalists, and Arkansas Academy of Science.