

MIXED HERONRIES OF OKLAHOMA

G. William Sallee

U.S. Army Corps of Engineers, Tulsa District, P. O. Box 61, Tulsa, Oklahoma 74121

The objectives of this 3-year study were to locate mixed heronries in Oklahoma, census breeding pairs of each species, and identify site characteristics that may be important to heron ecology. During the study, 17 mixed heronries, containing a total of six ardeid species, were found in Oklahoma. The majority of heronries (82%) were located within the oak-woodland fauna region. Other site characteristics determined to be important were the slope of the topography, nearness to a permanent water source, and proximity to urban areas. In 1980, approximately 27,850 pairs of herons were estimated to have nested in 17 heronries. Cattle egrets (*Bubulcus ibis*) are most numerous (61%) and yellow-crowned night herons (*Nyctanassa violacea*) are least common in the state.

INTRODUCTION

In recent years many drastic changes have occurred in the appearance and usage of Oklahoma land. Rivers have been dammed, wetlands drained and filled, and forests cleared. Plant and animal populations have been affected by these changes.

Heronry depend heavily on wetland habitats, which are also under pressure for human development. Since wetlands are an important component in heron ecology, many agencies and individuals have shown interest in monitoring and protecting heron populations.

In Oklahoma six species of herons nest in communal heronries. These mixed heronries usually include great egret (*Casmerodius albus*), cattle egret (*Bubulcus ibis*), little blue heron (*Florida caerulea*), and snowy egret (*Egretta thula*). Some also contain black-crowned night heron (*Nycticorax nycticorax*), and yellow-crowned night heron (*Nyctanassa violacea*). Sutton (1) reported nine heronries in Oklahoma. Most of these no longer exist and very little information was available regarding their site characteristics.

I began this inventory to describe site characteristics important to heron ecology that may be affected by changing land uses.

MATERIALS AND METHODS

From 1977 to 1980, heronries were found by soliciting information from federal and state agencies and ornithological groups, and by ground and aerial surveys in areas containing concentrations of herons. In 1979 and 1980 breeding seasons, flight-line counts (J. C. Ogden, personal communication) were used to determine the number of breeding pairs of each species at all heronries located in Oklahoma. The area of each heronry and slope of its topography were determined. Species of trees used as nest trees were identified. Distance to the nearest town was measured for each heronry. Avian species nesting in association with herons were also recorded.

RESULTS

Seventeen heronries were found in 14 counties (Table 1). Three heronries were found in Muskogee County, and two in Sequoyah County. The other 12 counties each contained only one. These mixed heronries are found from the Red River north to Tulsa County, and from Arkansas west to Grady County (Fig. 1). Only four heronries were found in the western half of the state (west of Highway I-35).

The distribution of discovered colonies may reflect some bias in investigative efforts. However, a considerable amount of time was spent searching for heronries in the east central counties without results. It is believed that additional heronries may be found along the Red River and in the northern and eastern counties. There were oral reports of heronries northeast of Oklahoma City, near Norman, and in the Shawnee Lake area, but these could not be corroborated.

Many of the heronries (47%) were located less than 1 km from the nearest town, and none were found more than 3 km from the nearest town (Table 2). Sallee (2) suggested that by establishing colonies in

TABLE 1. Summary of heronries studies; their species composition and abundance of breeding pairs. Species are: GREG- great egret, SNEG- snowy egret, LBHE- little blue heron, BNHE- black crowned night heron, YNHE- yellow-crowned night heron, CAEG- cattle egret.

| Heronry | County | Number of Breeding Pairs | | | | | |
|--------------|-----------|--------------------------|-------|------|------|------|------|
| | | CAEG | LBHE | GREG | SNEG | BNHE | YNHE |
| Atoka | Atoka | 822 | 231 | 1 | 1 | | |
| Boynton | Muskogee | 1553 | 1264 | 70 | 35 | 5 | |
| Crescent | Logan | 235 | 322 | 10 | 2 | | |
| Cushing | Payne | 41 | 40 | 3 | | | |
| Harrah | Oklahoma | 401 | 512 | | 2 | | |
| I-40 | Sequoyah | | | 50 | 8 | | |
| Inola | Rogers | 1347 | 760 | 46 | 29 | | |
| Keota | Haskell | 536 | 418 | 10 | 21 | | |
| Lake Sahoma | Creek | 1310 | 1184 | 65 | 15 | | 1 |
| Leverly | Grady | 31 | 26 | | 3 | | |
| McAlester | Pittsburg | 1104 | 1000 | 74 | 17 | | |
| Muldrow | Sequoyah | 1349 | 1213 | 25 | 5 | | |
| Muskogee | Muskogee | 35 | 48 | 111 | 34 | | |
| Mustang | Canadian | 1356 | 1464 | 42 | 19 | | |
| Owasso | Tulsa | 1205 | 811 | 25 | 5 | | |
| SW Muskogee | Muskogee | 4800 | 376 | 6 | | | |
| Thackerville | Love | 815 | 498 | | 9 | | |
| | Total | 16950 | 10167 | 538 | 75 | 5 | 1 |

urban areas, herons may have decreased their chances of being disturbed by predators or man.

The majority of heronries are located within the oak-woodland fauna region (3) (Fig. 1). Within this region, herons nest in three woodland types: upland, bottomland, and osage orange (*Maclura pomifera*) groves. Upland tree species consist of post oak (*Quercus stellata*), blackjack (*Quercus marilandica*), hackberry (*Celtis occidentalis*), hawthorne (*Crataegus spathulata*), black locust (*Robinia pseudoacacia*), persimmon (*Diospyros virginiana*), and elm (*Ulmus* spp.) The bottomland type habitat differs from the upland in that most of the trees are found along creeks and few or no oaks are present. The groves consist entirely of osage orange.

Most heronries contain elements of both upland and bottomland habitat types, with the upland portion being the largest (Table 2). However, three colonies were located in osage orange groves. These groves were planted in rows, 2 m apart and 2-m spacing between trees.

Two other characteristics of heronry sites are the slope of the topography and nearness to a permanent source of water. Trees growing in areas without slope appear to die from the accumulation of feces and food. The establishment of heronries on sites with a high degree of slope aids in the removal of waste from the heronry floor. All heronry sites are associated with a source of permanent water. Most sites are found near creeks, and 52% were also located near ponds.

During the heat of the summer, both adults and immature herons can be found loafing at ponds and creeks. Herons may use these areas to help regulate their body temperatures.

In 1980, approximately 27,850 pairs of herons were estimated to have nested in 17 heronries (Table 1). Cattle egrets are the most numerous herons in Oklahoma (16,950 pairs), while the least common heron is the yellow-crowned night-heron (Table 1). In 1979, Sallee (2) estimated 15,500 pairs of herons nesting in 15 mixed colonies. This is a 1-year increase of approximately 12,550 pairs (61%). The in-

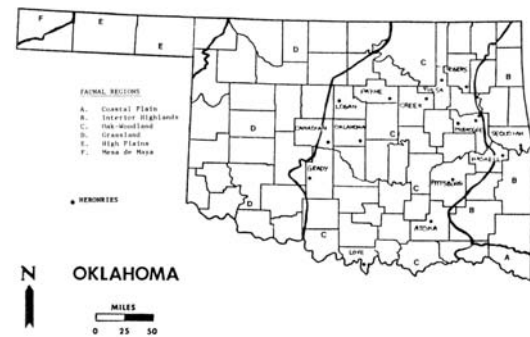


FIGURE 1. Distribution of mixed heronries and faunal regions in Oklahoma.

crease is due partly to an increased number of heronries found, but more to an increase in the number of cattle egrets.

The size in area of Oklahoma heronries is very uniform. The mean area is 1.2 ha with a range of 0.4-3.0 ha (Table 2). Assuming suitable nest trees are available, the size of the area occupied by a colony appears to be related to the number of breeding pairs, which may be limited by available food within the feeding range limits of each species.

Associated Species

During the study, other avian species found nesting in association with herons included mississippi kites (*Ictinia mississippiensis*), great-tailed grackles (*Quiscalus mexicanus*), nesting in the perimeters, and one pair of black-billed magpie (*Pica pica*) (4).

DISCUSSION

Thirteen heronries were found in the eastern half of the state, while only four were located in the western half. The distribution of heronries in Oklahoma suggests that characteristics suitable for establishing such colonies are most favorable in the eastern half of the state. These characteristics presumably include: availability of nest trees, proximity to water, and slope. These characteristics vary greatly between the east and west. A greater amount of habitat suitable for colonization and most of Oklahoma's water is located in the eastern half of the state. Heronries found west of Highway I-35 are found on sites with a mean slope of 39.3 degrees and eastern sites had a mean slope of 54.4 degrees. These characteristics may be important in the selection of a site but the distribution of heronries probably depends more on availability of food. Because of these differences in quantity and quality of site characteristics, fewer pairs nest in western heronries than eastern ones.

The fact that 18% of heronries were located in osage orange groves suggests that heron nesting habitat can be planted to manage heron populations.

In 80% of the heronries found, cattle egrets were the most numerous species of heron. Sutton (1) reported that cattle egrets first nested in Oklahoma in 1964. In the past 17 years, the pastoral feeder has become the most numerous heron species in Oklahoma. Part of its success is due to an apparently open food niche. Food habitat studies conducted in Florida indicate grasshoppers as being the principal food of the cattle egrets (5, 6). As more of Oklahoma woodlands are cleared for pastures, the cattle egret is likely to continue increasing in numbers and expanding its range.

ACKNOWLEDGMENTS

This research was conducted as partial fulfillment of the requirements for the completion of a Master's degree at Oklahoma State University. I thank Scott Shalaway and Jim W. Lish for critically reviewing earlier drafts of this paper, and for their valuable suggestions. I also thank George M. Sutton for his words of encouragement and inspiration.

The Oklahoma Department of Wildlife Conservation, National Audubon Society, Oklahoma Ornithological Society, and the Tulsa District Corps of Engineers provided valuable assistance in locating heronries.

TABLE 2. Characteristics of heronry sites.

| Characteristic | Mean | Range |
|-------------------------------|------|-----------|
| Vegetation | | |
| % Upland forest | 57 | 25 - 100 |
| % Bottom land forest | 26 | 35 - 100 |
| % Osage orange grove | 18 | - |
| Topography | | |
| Degree of slope | 51 | 19° - 81° |
| Degree of slope east | 54 | 25° - 81° |
| Degree of slope west | 39 | 19° - 73° |
| Heronry Size | | |
| Area (ha) | 1.2 | 3.4 - 3.0 |
| Distance to nearest town (km) | 0.9 | 0.0 - 3.0 |

I gratefully acknowledge their efforts, as well as those of Vickie Hatfield, Rhonda Mitchell, and Sue Woodward, who gave me many hours of assistance in the field.

REFERENCES

1. G. M. SUTTON, *Oklahoma Birds*. Univ. Oklahoma, Norman, 1967.
2. G. W. SALLEE, J. Field Ornithol. (In press).
3. R. BAILEY, *Description of Ecoregions of the United States*. Forest Ser., U.S. Dept. Agr., 1978.
4. G. W. SALLEE, *Breeding of Black-Billed Magpie in Northeastern Oklahoma*, 1980 Bull., Oklahoma Ornithol. Society.
5. M. J. FOGARTY and W. M. HETRICK, *Auk* 90: 268-280 (1973).
6. D. A. JENNI, *Auk* 90: 821-826 (1973).