

INLAND HERONRIES OF NORTH CAROLINA

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There are only a few reports in the literature concerning the past or present locations, species composition, and numbers of colonial herons and egrets nesting in the North Carolina coastal plain. *Birds of North Carolina* (Pearson et al. 1942) lists nine such species that are known to have nested at inland locations, namely the Great Blue Heron (*Ardea herodias*), Green Heron (*Butorides striatus*), Little Blue Heron (*Florida caerulea*), Great Egret (*Casmerodius albus*), Snowy Egret (*Egretta thula*), Louisiana Heron (*Hydranassa tricolor*), Black-crowned Night-Heron (*Nycticorax nycticorax*), Yellow-crowned Night-Heron (*Nyctanassa violacea*), and White Ibis (*Eudocimus albus*). Inland nesting sites are mentioned from the following counties: Carteret, Craven (Great Lake and Jones Mill Pond), Bertie (at Quitsna, which is about 9 miles from Windsor) (Lay 1937, Craighill and Grey 1938), Brunswick (Orton Pond and a small pond near Shallotte), Hyde (Lake Mattamuskeet), Onslow, Robeson (near Red Springs and at Lennon's Marsh near Lumberton), and Washington (near Plymouth).

Between the late 1890s and the mid-1950s, the Great Blue Heron was the most numerous and widely distributed heron reported as breeding in mixed-species colonies inland on the coastal plain. Nest sites, if described, usually were in cypress trees.

At various times during the first half of the present century, Great Blue Herons, Little Blue Herons, Great Egrets, Snowy Egrets, and Louisiana Herons have been found nesting at Orton Pond; but there is no evidence that all these species ever nested there in a single season.

In 1949 Robert Wolff (1951) discovered a heronry composed of Green and Little Blue Herons near Plymouth in northeastern North Carolina. The colony was destroyed by a timbering operation in 1953 (Wray 1954).

Lennon's Marsh near Lumberton was the best known and most diverse of the inland heronries in North Carolina. Stephens (1948) described this colony and listed Great Blue Herons, Little Blue Herons, Great Egrets, and Black-crowned Night-Herons as nesting there. He did not indicate how long this heronry had been active.

In 1950 the first record of nesting White Ibis in North Carolina was reported by Stephens (1950) at the Lennon's Marsh site. Twelve hundred birds were said to be present. There was no indication of whether or not all were nesting. By 1953 the ibis had abandoned the site (Wray 1954). Herons and egrets continued to nest for several years, but the colony finally was abandoned. The abandonment of Lennon's Marsh seems to have signaled the end of the occurrence of the mixed-species heronries other than colonies of Great Blue Herons and Great Egrets in the inland swamps of North Carolina. Although there are few recent reports of inland heronries, the number of reports of estuarine heronries increased during the 1960s and early 1970s.

In 1975 we contracted with the U.S. Fish and Wildlife Service to obtain site locations and population estimates of all wading-bird colonies in coastal North Carolina. We were currently studying the estuarine heronries under a grant from the North Carolina Sea Grant program. We had not, however, surveyed the coastal swamps. With the advent of the U.S. Fish and Wildlife Service contract, we planned aerial surveys of all of the major coastal swamps in eastern North Carolina. The surveys were initiated in the spring of 1975 and were repeated in 1976.

MATERIALS AND METHODS

The initial search for heronries was from the air. In 1975 we used both a Cessna 170 aircraft and a Bell Model No. 47G5 helicopter in the search. Surveying from the fixed-wing aircraft proved to be the more efficient method for locating colonies, but the helicopter was a better platform for counting nests. The helicopter, however, was considerably more expensive than the fixed-wing aircraft, and budgetary constraints eventually

TABLE 1. 1975 survey of inland heronries in the North Carolina coastal plain.

<i>County</i>	<i>Colony Name</i>	<i>Coordinates</i>	<i>Species Present</i>	<i>No. Nests</i>	<i>Habitat</i>
Brunswick	Lockwood's Folly	33°56'-78°12'	Great Blue Heron	5	Cypress swamp
Brunswick	Orton	34°03'-77°58'	Great Blue Heron	27	Cypress swamp
Brunswick	Sandhill Creek	34°08'-77°59'	Great Blue Heron	29	Cypress swamp
Pender	Riegelwood	34°23'-78°14'	Great Blue Heron	2	Cypress/gum swamp
Bladen	Colly Creek	34°38'-78°28'	Great Blue Heron	1	Cypress swamp
			Great Egret	10	
Bertie	Conine Creek	35°53'-76°59'	Great Blue Heron	35	Cypress/gum swamp
			Great Egret	?	
Hertford	Upper Chowan	36°29'-76°57'	Great Blue Heron	56	Cypress/gum swamp
			Great Egret	104	

forced us to eliminate its use. The helicopter also caused greater disturbance in colonies. In 1976 we used only the Cessna 170 aircraft.

The basic search plan involved flying a grid over the coastal swamps and other suitable habitat. After some trial and error, we ascertained that an altitude of about 400 feet and a ground speed of about 80 to 100 miles per hour gave the best results. Two observers, in addition to the pilot, were more effective than one observer and one pilot-observer. Each observer watched one side of a transect with the plane flying down the transect center. In much of our search, the pilot and one observer were used, each watching one side of the flight path. All personnel were experienced in aerial censusing.

All large swamps were surveyed from their junction with the coastal sounds inland until the flooded swamps began to give way to upland habitats or to human development. The stopping points were selected by the observer and were based on his best estimate of habitat suitability. Our efficiency increased as we began to find colonies and gain experience in recognizing suitable habitat.

We also sought information on colony sites from wildlife biologists, fishermen, and other local sources. These sources usually indicated that likelihood of colonies in certain swamps rather than actual colony locations.

In the air, we looked for birds in the tree tops or in flight. Often flying birds were followed, and occasionally this method would lead us to a colony site. Colonies containing Great Egrets were much more visible than colonies without them, and therefore much easier to locate. Great Blue Herons blended into the canopy vegetation and were difficult to see. Surveys done prior to the leafing of the trees were more satisfactory than later ones, the birds being much more readily visible. Surveys coordinated with the blooming of dogwoods appear to be ideal for locating inland heronries in North Carolina. Both Great Egrets and Great Blue Herons are nesting by that time, and most swamp trees have not yet leafed out.

It proved to be almost impossible to count all nests in colonies of more than about 25 nests from a fixed-wing aircraft. Therefore, we photographed all colonies from the air using 35mm single lens reflex cameras and Kodak-Plus-X film. We used either normal or short telephoto lenses. These photographs were enlarged to 8 x 10 or 11 x 14 inches, and individual nests were counted by observing the photographs through a Luxo magnifier. Again, Great Egrets were easier to see than Great Blue Herons, but results were generally satisfactory for both species.

We also visited several colonies by boat and on foot for ground counts. We generally found colonies impossible to census from the ground if the vegetation had leafed out. Because we were unable to make ground checks prior to the leafing out of the trees, we cannot evaluate this technique. Most colonies would be very difficult to reach, however, as many were in remote swamps that were not accessible by boat. Aerial surveys thus apparently offer the best opportunity for nest censuses.

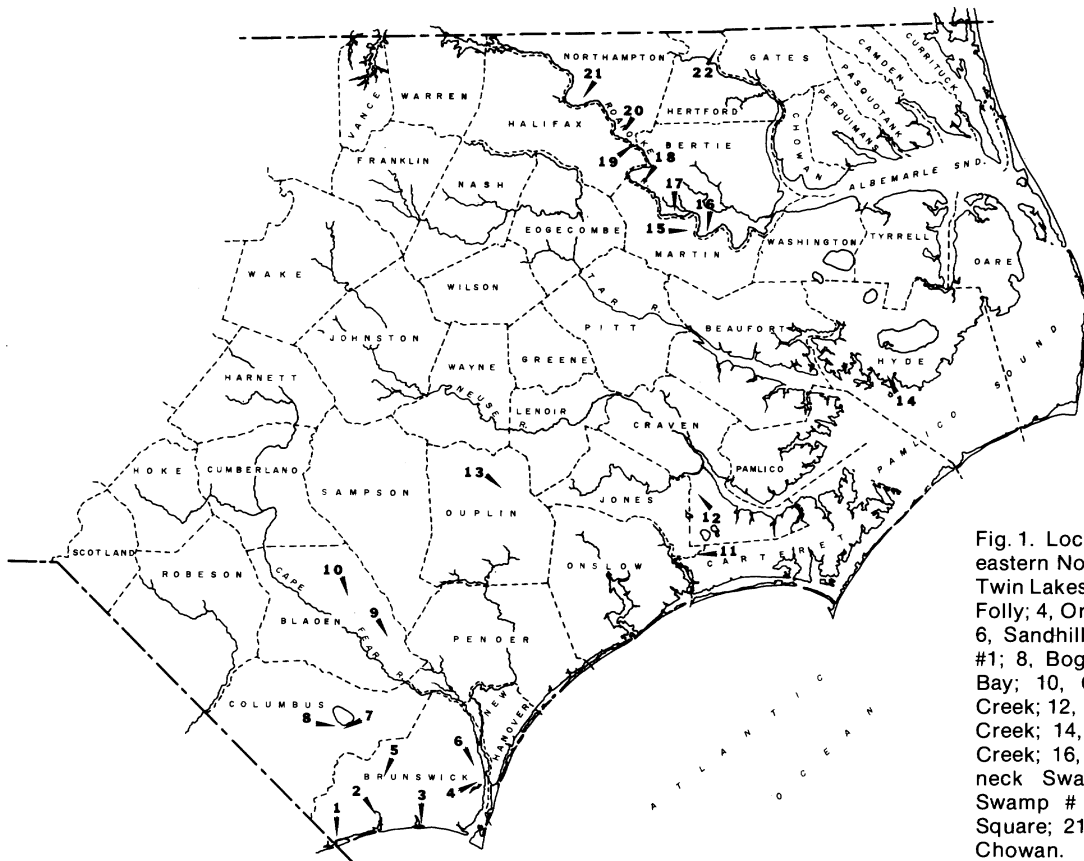


Fig. 1. Locations of inland heronries in eastern North Carolina in 1976. Site 1, Twin Lakes; 2, Shallotte; 3, Lockwood's Folly; 4, Orton Pond; 5, Juniper Creek; 6, Sandhills Creek; 7, Bogue Swamp #1; 8, Bogue Swamp #2; 9, Tussock Bay; 10, Colly Creek; 11, Hunter's Creek; 12, Croatan Forest; 13, Goshen Creek; 14, Swanquarter; 15, Conoho Creek; 16, Conine Creek; 17, Broadneck Swamp # 1; 18, Broadneck Swamp # 2; 19, Roxobel; 20, Rich Square; 21, Occonechee; 22, Upper Chowan.

TABLE 2. 1976 survey of inland heronries in the North Carolina coastal plain.

<i>County</i>	<i>Colony Name</i>	<i>Coordinates</i>	<i>Species Present</i>	<i>No. Nests</i>	<i>Habitat</i>
Brunswick	Twin Lakes	33°56'-78°31'	Great Blue Heron	2	Undev. swamp
Brunswick	Shalotte	33°57'-78°24'	Great Blue Heron	16	Undev. swamp
Brunswick	Lockwood's Folly	33°56'-78°12'	Great Blue Heron	3	Cypress swamp
Brunswick	Orton Pond	34°03'-77°58'	Great Blue Heron	21	Cypress swamp
Brunswick	Juniper Creek	34°04'-78°24'	Great Blue Heron	3	Cypress swamp
Brunswick	Sandhills Creek	34°08'-77°59'	Great Blue Heron	44	Cypress swamp
Columbus	Bogue Swamp #1	34°15'-78°33'	Great Blue Heron	52	Cypress swamp
Columbus	Bogue Swamp #2	34°17'-78°34'	Great Blue Heron	1	Cypress swamp
Bladen	Tussock Bay	34°33'-78°22'	Great Blue Heron	29	Cypress swamp
Bladen	Colly Creek	34°38'-78°28'	Great Blue Heron	10	Cypress swamp
			Great Egret	6	
Carteret	Hunter's Creek	34°49'-77°05'	Great Blue Heron	46	Undev. swamp
Craven	Croatan Forest	34°59'-77°04'	Great Blue Heron	8	Undev. swamp
Duplin	Goshen Swamp	35°02'-77°52'	Great Blue Heron	14	Undev. swamp
Hyde	Swanquarter	35°23'-76°16'	Great Blue Heron	60	Cypress swamp
Martin	Conoho Creek	35°53'-77°02'	Great Blue Heron	80	Gum swamp
			Great Egret	4	
Bertie	Conine Creek	35°53'-76°59'	Great Blue Heron	175	Cypress/gum swamp
			Great Egret	225	
Bertie	Broadneck Swamp #1	35°58'-77°08'	Great Blue Heron	170	Undev. swamp
			Great Egret	3	
Bertie	Broadneck Swamp #2	36°03'-77°14'	Great Blue Heron	36	Undev. swamp
Northampton	Roxobel	36°11'-77°18'	Great Blue Heron	37	Undev. swamp
Northampton	Rich Square	36°12'-77°21'	Great Blue Heron	17	Undev. swamp
Northampton	Occoneechee	36°20'-77°31'	Great Blue Heron	14	Undev. swamp
Hertford	Upper Chowan	36°29'-76°57'	Great Blue Heron	150	Undev. swamp
			Great Egret	20	



Fig. 2. A colony of Great Blue Herons and Great Egrets located in the upper canopy of a swamp forest along the Chowan River can be seen in the aerial photograph on the facing page.

RESULTS

Only Great Egrets and Great Blue Herons were found nesting in the coastal plain swamps. Both species placed their nests in the tops of the canopy vegetation, generally from 50 to 100 feet above the ground. We made no effort to census Green Herons or the night-herons, which usually nest beneath the canopy and cannot be censused from the air. While these species are known to nest in North Carolina, the locations of their inland colony sites and the levels of their populations remain completely unknown. Their occurrence in the estuary has been documented.

Table 1 gives the locations of inland colonies found in 1975. Table 2 and Figure 1 show the locations of colonies found in 1976. The increased number of colonies located in 1976 was primarily the result of a more thorough search. However, some new colonies could have become established. The 1975 data are used only for comparisons between nesting years at particular sites and to indicate that colonies are subject to destruction and fluctuations.

In 1976, 22 heronries were found in the coastal plain swamps of eastern North Carolina. Many were located along the major river systems, but a few were in isolated swamps near major sounds or the Atlantic Intracoastal Waterway. While the search was intensive and carefully done, it is likely that some colonies were not found. Perhaps this report will stimulate the reporting of colony sites not mentioned here.

Great Blue Herons and Great Egrets were the only two species found in the treetop colonies censused. The Great Blue Heron was the more abundant of the two. We located 988 nests in 22 colonies. Five colonies with a total of 258 nests of the Great Egret were found. They were always associated with Great Blue Herons. No other species of egrets or herons were observed at inland nesting colonies, although Green Herons or night-herons may have occasionally occupied lower levels in the colonies. Green Herons were frequently observed flying over the canopy of swamps.

Great Blue Herons and Great Egrets were always found nesting in the upper canopy of the forest although nests were sometimes as much as 20 to 30 feet below the canopy top (Fig. 2). Nests never extended down into the low-tree stratum. Often colony sites were in clusters of trees that were taller than the surrounding canopy level. It appeared that the birds were choosing the most elevated sites available. Colonies were generally in sites dominated either by cypress (*Taxodium* sp.) or gum (*Nyssa* sp.) or a combination of the two. However, two colonies were located in loblolly pines (*Pinus taeda*). The swamp cottonwood (*Populus heterophylla*) was the only other species observed with nests in its canopy. Colonies were generally over water, although some were over irregularly flooded plains or along the edges of swamps or ponds.

Little Blue Herons were the most abundant nesters in the inland colonies along the south Atlantic Coast in the first half of the century (Ogden 1978). In the 1950s they apparently abandoned the inland sites and transferred their breeding effort to the mixed-species colonies in the estuary. Our recent censuses indicate that Great Blue Herons have continued to nest almost exclusively in the inland swamps of the coastal plain in North Carolina, although scattered pairs may nest in the estuary. Great Egrets now nest in greater numbers than formerly in the estuarine colonies, but whether or not this represents a shift or an expansion of the population is unknown. In the future we propose to investigate further this apparent shift of wading birds from inland to estuarine colonies.

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