

Status and Conservation of American and Least Bitterns in South Carolina

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Introduction

Two species of solitary marsh-nesting Ardeidae, the American Bittern (*Botaurus lentiginosus*) and the Least Bittern (*Ixobrychus exilis*), nest in North America. Both have been classified in parts of their respective ranges as threatened, endangered, or of special concern. Their population declines are related to destruction of freshwater wetlands. Due to the secretive behavior of these birds and the relatively inaccessible habitats that they occupy, little is known about their biology in southeastern North America. In this paper I review what is known of the two species in South Carolina and adjacent areas.

American Bittern

Autumn and winter. Unlike other herons occurring in the Southeast, most individuals of this species are solitary and cryptic all year. This behavior makes it difficult to locate more than one or two individuals in a day's field work. Because the American Bittern occurs in the summer as either a breeder or vagrant, it is difficult to establish the dates of its arrival in the autumn or of its departure in the spring. Single birds reported on the edge of Hell-Hole Swamp, Charleston County, on 11 August 1921 (E. A. Hyer) and at Bear Island, Colleton County, on 10 July 1991 (J. E. Cely) were possibly vagrants (McNair and Post 1993).

Tomkins (1958) states that although the American Bittern was "more common than one would suspect" during winter at the Savannah River Wildlife Refuge (Jasper County), E. O. Mellinger, the refuge manager, had no information that the species occurred in summer.

A few birds have been found in winter in the upper Piedmont and in the mountains. For example, one was seen on 14 February 1989 in northern York County (H. Walker *in* LeGrand 1989), and one was seen 21 December 1986 in Greenville (J. Batson *in* LeGrand 1987).

Breeding. The American Bittern is a casual and sporadic breeder on the Coastal Plain of South Carolina. It apparently prefers large (at least 10 ha [25 a]) shallow freshwater wetlands with a dense, robust growth of emergent vegetation (Gibbs et al. 1992). Nests are difficult to find: besides using inaccessible habitats, the bittern is solitary and secretive. Only four cases of breeding have been confirmed in South Carolina. One case is documented by a clutch of eggs.

On 29 March 1833, nine miles from Charleston, Audubon and Bachman collected females that had small eggs in their ovaries. Then, on 29 April 1833, 40 miles from Charleston, Bachman collected several more females. These individuals had large eggs in their ovaries and presumably would have deposited them within a week (Audubon 1838). The specimens collected by Audubon and Bachman no longer exist. The earliest extant American Bittern specimen from South Carolina is a skin (Museum of Comparative Zoology 186363) collected at Frogmore, Beaufort County, 31 March 1884 by W. W. Worthington.

Wayne (1910) found young American Bitterns in June 1887 in a rice field near Yemassee, Beaufort County, probably at Buckfield Plantation, and saw several pairs of adults from May through July. This appears to be the only breeding incident at Yemassee. Wayne (1910) worked in the Yemassee area March–October 1890, and although he saw many bitterns, he was unable to find a nest containing eggs.

More than 75 years later, on 5 July 1962, T. A. Beckett, III found two pre-flight young in an impounded brackish marsh on the Ashley River at Magnolia Gardens, Charleston County. One, or possibly two, pairs were seen at Magnolia Gardens during the breeding seasons of 1967–1968, but no further breeding evidence was obtained (McNair and Post 1993). Intensive field work in the same marsh (Fig. 1) during the summers of 1985–1992 revealed no American Bitterns (Post and Seals 1991).



Figure 1. Impounded cattail (*Typha angustifolia* and *T. domingensis*) marsh at Magnolia Gardens, Charleston County, South Carolina, breeding site of American and Least Bitterns.

The first and only South Carolina nest was found by Ernest Cutts on 23 May 1968, on James Island, near the Stono River in Charleston County. The nest had three eggs (Cutts set mark 68.3; Charleston Museum 2731–2733).

Cutts stated that the nest was “a pile of reeds with flat platform top holding the eggs. Nest was about 3 feet from bank in pond on sixth hole of golf course. Incubation had started.” (Charleston Museum egg slip).

Since Cutts’s 1968 breeding record, no further evidence of nesting has been obtained in South Carolina, and the species may be even less common now than 40 years ago. The Breeding Bird Survey showed a significant decline (–2.4%/yr, 1966–1989) in population numbers in the United States (Robbins et al. 1986). It is possible that the range of American Bitterns is shifting northward, tracking the distribution of palustrine wetlands created by the retreating glaciers (Gibbs et al. 1992). Indeed, the American Bittern’s dependence on inland freshwater marshes prompted Payne and Risley (1976) to suggest that it is a relict species. Declines in the United States may represent an acceleration of its northern retreat, hastened by habitat destruction in the southern part of its range (Gibbs et al. 1992).

Status in neighboring regions. Pearson et al. (1942) knew of only one breeding record in North Carolina: a nest found by J. C. Rabb in a clump of Black Needle-rush (*Juncus roemerianus*) on Church’s Island, Currituck County, on 19 May 1941. The young had left the nest, but Rabb collected egg shell fragments, and took them to the North Carolina State Museum.

In North Carolina, as in South Carolina, American Bitterns are solitary, but it is possible that they may aggregate during migration periods, especially when suitable habitats are limited. In the interior, six were seen on 15 April 1972 at Oconeechee Neck, Northampton County, North Carolina (M. Lynch in Teulings 1972). Highly unusual was a report of 26 seen on 24 April 1983 at Falls Lake, near Durham (M. Schultz in LeGrand 1983). It is possible that this report involved at least some juvenile Black-crowned Night-Herons (*Nycticorax nycticorax*).

Based on summer sightings, Burleigh (1958) thought that the American Bittern might be found breeding in Okefenokee Swamp, Georgia. Beaton et al. (2003) do not cite any breeding records for the state. The maximum Georgia count is 10–13 at Grand Bay Wildlife Management Area (Lanier/Lowndes Counties) in early March 2000 (Beaton et al. 2003)

Burleigh (1958) incorrectly stated that the American Bittern nested in Florida. Tangible evidence of breeding is still lacking from that state, although Stevenson and Anderson (1994) list many summer records, including specimens of adults, as far south as the Everglades.

Conservation and management. As suggested by the reports of Audubon and Bachman, it is possible that the American Bittern was more common in the 1700s and 1800s, when rice was grown extensively on the Coastal Plain from lower Cape Fear, North Carolina, to the Altamaha River, Georgia (Silver 1990). An indication of this bittern’s former abundance is Audubon’s (1838) statement that “some dozens” may be seen in a particular place. Little is known about the basic biology of this species anywhere in its range (Gibbs et al. 1992).

The most urgent management need is preservation of shallow freshwater wetlands with a dense growth of emergent vegetation. This is the preferred

habitat of the species during both the breeding and wintering periods (Gibbs et al. 1992). As individual breeding home ranges may encompass up to 20 ha, it is important to preserve relatively large areas of contiguous nesting and feeding areas. In some areas of the middle western United States, American Bitterns forage outside their nesting marsh, as for example in hayfields. The minimum size marsh needed to support one nesting pair has not been determined, and the configuration of the marsh may be important in determining size. As with other marsh nesters, the bitterns may prefer to place their nests in predator-secure sites, which are usually on islands surrounded by open water, and often some distance from tall trees that might provide perches for predators. Managers of wetlands should be encouraged to maintain predator-free islands with sufficient overwintering vegetation to provide secure nest sites for bitterns and other marsh nesters.

Least Bittern

Autumn and winter. For the most part, Least Bitterns winter in South Florida, the Greater Antilles and northern South America (Schorger 1962, Gibbs et al. 1992). Sprunt and Chamberlain (1949) considered the species to be casual in winter anywhere in South Carolina. Later, based on winter records made primarily by T. A. Beckett, III in a brackish impoundment at Magnolia Gardens, Burton (1970) revised its status to "permanent resident, rare in winter." This winter status applies only to the Coastal Plain, as there seem to be no verified winter records north of the Fall Line in South Carolina (Post and Gauthreaux 1989, McNair and Post 1993).

Breeding. On the coast, resident birds return as early as March, but because of the presence of overwintering individuals, it is difficult to determine definitive arrival dates. In the breeding season, this species is locally common on the immediate coast of South Carolina. It is decidedly local and uncommon on the remainder of the Coastal Plain, and rare in Piedmont.

Least Bitterns nest solitarily or in loose groups. They forage in dense cover, usually at the edge of deep water. The highest breeding densities have been found in marshes that have a heterogeneous mixture of open water and emergent vegetation, such as cattails (*Typha* spp.) or Cut-grass (*Zizaniopsis miliacea*). Although Least Bitterns do not appear to be colonial in the sense of social affiliation, pairs may nest close together in suitable sites (Kushlan 1973). Audubon (1835) mentions a report by Dr. Horlbeck of Charleston that they were seen breeding in colonies of four or five pairs.

Recent studies suggest that Least Bitterns are able to avoid predators by congregating on isolated marsh islands (Post and Seals 1991, 1993; Post 1998). The latter authors studied a breeding population in an impounded cattail marsh at Magnolia Gardens, Charleston County. Breeding density was 12 pairs per ha of vegetated habitat. Most pairs nested in groups of two to fifteen, often in colonies of Boat-tailed Grackles (*Quiscalus major*), usually on small cattail islands surrounded by open water (Fig. 2).



Figure 2. Cattail island in the impounded marsh at Magnolia Gardens, South Carolina, nesting site for Least Bitterns.

At Magnolia Gardens, Least Bitterns began nesting in late April. The average completion date of the first clutch was 22 April (7-year range: 6 April–12 May). The average clutch size was 3.80 (N=110). Modal clutch size was four (50% of clutches), followed by three (28%), five (17%) and two (5%). No clutches of six were located. Mean brood size was 2.93, and an average of 2.68 young left the nest. Hatching success (N=548 eggs) was 54%. Fledging success (percentage of 297 young that left the nest) was 92%.

The incubation period is 19 days, but young are able to climb in and out of the nest six days after hatching (Fig. 3). Most mortality to eggs and young was due to nest instability. Avian predators were uncommon, as they were chased from the nesting areas by Boat-tailed Grackles. Terrestrial predators were seldom found in the marsh, possibly due to the presence of American Alligators (*Alligator mississippiensis*).

Least Bitterns appear to raise only one brood per year in South Carolina. Later clutches, those laid at the end of May and in June, most likely represent second nestings by pairs that failed earlier. At Magnolia Gardens, the latest clutch was completed on 5 July (1989). Eggs were found as late as 24 July (1989), and young (5–6 days old) were still in the nest on 31 July. The average length of the breeding season, defined as the time between the laying of the first egg and the day when the last young has left the nest, was 83 days (7-yr range, 62–101 days).



Figure 3. Nestling Least Bitterns. The larger young (day six) are able to climb out of the nest. Magnolia Gardens, South Carolina, May 1990.

Fifty-five oology records are available for coastal South Carolina: mean clutch size is 3.95 ± 0.68 . The frequency distribution of clutch sizes is: four: 60%; three: 20%; five: 18%; two: 2%. This distribution does not differ from that found in the Magnolia Gardens study cited above. The mean clutch completion date calculated from oology records is 1 June, range 10 April–19 July. This mean is 13 days later than that found at Magnolia Gardens, but the range of dates is about the same. Oologists probably concentrated their collecting in the middle of the nesting season in order to maximize their take, but, as the Least Bittern shows little variation in clutch size over season in South Carolina, uneven sampling by oologists, if it existed, probably would not have been a significant source of bias.

Least Bitterns also nest in salt marshes, as indicated by data from egg slips (Charleston Museum collection). Ivan Tomkins collected a set of two eggs in Smooth Cordgrass (*Spartina alterniflora*) on Jones Island (Jasper County), and Ernest Cutts collected a set of three and a set of four from a Black Needle-rush (*Juncus roemerianus*) marsh on the Stono River (Charleston County).

Apparently, the largest inland breeding population in South Carolina is on managed impoundments on Santee National Wildlife Refuge, Clarendon County, where 13 birds were calling on 9 May 1984 (D. B. McNair, Charleston Museum files). B. F. Taylor stated that this bittern nested at Columbia, probably below the Fall Line, before 1915 (Charleston Museum files), but no material documentation is known. In Barnwell County, at the

Savannah River Site, Norris (1963) stated that the Least Bittern was still "fairly common." He found two pairs in one Carolina bay, and one pair in another bay. Similarly, Post (1969) found two pairs in the nearby Williston Carolina bay, also in Barnwell County.

Above the Fall Line, in the Piedmont of South Carolina, there is only one report suggesting possible breeding: the species was included on a list of species nesting in Greenwood County (Gee 1936), but no documentation was provided.

Status in neighboring regions. Its winter status in Georgia is about the same as in South Carolina. Beaton et al. (2003) state that they know of about 10 winter records from the immediate coast and from the Coastal Plain. These authors give Georgia extreme dates of 26 April to 26 October.

In Georgia, as in South Carolina, Least Bitterns nest most commonly near the coast (Burleigh 1958). On the upper Coastal Plain of Georgia, this species was once a "common" breeder in restricted habitats in the Middle Savannah River Valley (Murphey 1937). Occasionally, breeding extends into the Piedmont. Single nests were found at Candler Lake, Atlanta, in 1944 and 1945 (Major and Johnston 1944; Major 1945). A recent report of suspected breeding above the Fall Line is that of two "family groups" seen in a marsh in Greene County, east of Atlanta, in the summer of 1995 (P. Sykes et al. *in* Davis 1995).

Conservation and management. As in the case of the American Bittern, this species was undoubtedly more common on the Coastal Plain during the rice-growing era. Wayne (1910) worked during the period just after the demise of the rice industry. He said little of the Least Bittern's abundance during the nesting season. He collected eight specimens, only two of which were summer birds.

Least Bitterns may have already declined by the late nineteenth century. Since the 1920s, this decline was undoubtedly hastened by changes in agricultural practices, which encouraged farmers to clear marginal areas such as marshes (Lee 1999). For example, many shallow-water wetlands such as Carolina bays have disappeared throughout the southeastern Coastal Plain (Barry 1980, Bennett and Nelson 1991).

Fortunately, Least Bitterns tolerate humans, and may even persist in urban areas (Gibbs et al. 1992). The bittern adapts to man-made marsh habitats such as impoundments, which can be managed to provide habitats for nesting marsh birds (Post and Seals 1991, Post 1998).

The first conservation priority for the Least Bittern should be the establishment of suitable nesting areas in the upper Coastal Plain, where the species once may have been more common. For example, the islands in the Chicora-Hatchery area of southern Lake Moultrie, Dorchester County, South Carolina, provide extensive nesting habitats for bitterns. With appropriate water-level management, Least Bitterns may be encouraged to nest on other public lakes, which now form an extensive network throughout the inlands of the Carolinas and Georgia.

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