

The Breeding Birds of Battery Island, N.C.: An Update

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Battery Island lies near the mouth of the Cape Fear River in Brunswick County, N.C. This site has supported a mixed-species heronry since at least 1938 (Brimley 1938), and the long-legged wading birds nesting there have been the subject of numerous studies (e.g. Quay and Adams 1956, Adams 1963, Parnell and Soots 1979, Allen-Grimes 1982, Parnell and McCrimmon 1984, Bjork 1986, Shields and Parnell 1986). Other species of birds breeding on Battery Island have received much less attention. The first and only complete list of breeding bird species on the island was published in 1960 (Funderburg 1960). Here, we provide an up-to-date list of the island's breeding birds and describe changes in vegetation and bird species that have occurred in the last quarter century.

STUDY AREA AND METHODS

Currently, Battery Island comprises about 40 ha, 75% of which is intertidal salt marsh. Four upland areas make up the remaining 25%. The largest upland (7 ha) is at the southern end of Battery Island. This site, designated the South Colony, consists of a dredged-material dome covered by grasses and forbs and fringed by a maritime thicket. Trees and shrubs are also scattered in clumps across the dome. A small (0.6 ha) upland, apparently of natural origin, lies 0.5 km to the north and is completely surrounded by salt marsh. This area, designated the North Colony, is covered by a maritime shrub thicket. The North Colony was the site of the earliest heronry reported on Battery Island (Brimley 1938). Two dredged-material uplands of about 1 ha each form the northwestern edge of the island complex. These sites were created in the late 1960s or early 1970s (J.F. Parnell, pers. comm.). Today, they are covered by grasses, forbs, and a few small trees. Detailed descriptions of the study site can be found in Bjork (1986) and Shields and Parnell (1986).

One or both of us visited the island one to four times per week from 5 May to 1 September 1982 and from 1 March to 1 September 1983, 1984, and 1985. We regularly recorded all species of birds seen and made particular note of nesting activities. In addition, we censused the wading-bird population during the peak of nesting each year. We have organized our list of breeding birds following the habitat classification scheme used by Funderburg (1960), except that we have combined the shrub-thicket and thicket-woodland categories.

RESULTS AND DISCUSSION

Funderburg recorded a total of 25 breeding bird species, but we found only 18 (Table 1). Seventeen species were present during both studies, eight were reported only by Funderburg, and only one species was unique to our study. Interestingly, the one species not found by Funderburg, the White Ibis, is now the most abundant breeding bird on the island.

All species that Funderburg found nesting in the salt-marsh habitat were recorded during our study. The salt marsh may be considered a "climax" community, and little change in the vegetation or nesting birds is expected over time. However, we found none

of the four species associated with the unvegetated dunes habitat. This was undoubtedly the result of vegetation succession on the South Colony's dome; unvegetated dunes no longer exist on Battery Island. Funderburg (1960) predicted this change in vegetation and avifauna.

Three of the six species that nested in the partially to fully vegetated dunes habitat similarly disappeared by the 1980s. We observed nesting by a fourth species in this group, the Common Nighthawk, only once. The reduction of breeding species in this habitat may also have been caused by increased density of herbaceous vegetation and by encroachment of woody vegetation. In addition, large numbers of Marsh Rabbits (*Sylvilagus palustris*) now inhabiting the island may have disrupted the activities of some ground-nesters and caused their decline (see Brown 1974, Courtney 1979). Rabbits may have little effect on the relatively aggressive Willets and American Oystercatchers, and these two species are still common nesters at Battery Island.

One species was lost and one gained in the shrub-thicket/thicket-woodland habitat. We cannot explain the disappearance of the Common Yellowthroat. The shrub-thickets preferred for nesting by this species are still available, and the species is a common winter resident. It is possible that we overlooked this small bird, even though its song is easily recognized. The addition of the White Ibis may be explained by the gradual northward expansion of the species' breeding range in the last 50 years (Sprunt 1944, Shields and Parnell 1983). We observed two additional species (Northern Mockingbird, *Mimus polyglottos*, and Northern Cardinal, *Cardinalis cardinalis*) in the thicket during the breeding season, but we found no direct evidence of nesting.

Funderburg (1960) found eight species of wading birds nesting in the North Colony. In 1961, many of these birds began nesting in the developing shrub-thicket in the South Colony, and in 1963 the first White Ibis nests were discovered there (Adams 1963). In 1985, the South Colony supported nine species of waders, while the North Colony supported only six species. Numbers of waders breeding in the North Colony have decreased as woody vegetation there has deteriorated rapidly during the past several years, apparently the result of storm damage and many years of over-fertilization by the birds themselves. Concomitant increases in nest numbers in the South Colony suggest that many birds have moved from the North to the South Colony. Continued expansion of the thicket onto the South Colony dome should ensure the availability of future breeding habitat for wading birds. However, declines in ground-nesters may be expected as the thicket replaces herbaceous vegetation.

In summary, most of the declines in breeding bird species over the past 25 years were directly related to vegetation succession on the dredged-material dome, a process that is fairly predictable (Soots and Parnell 1975). The fewest changes occurred in the most stable habitats, the salt marsh and the shrub-thicket/thicket-woodland.

NOTE: Battery Island is now a National Audubon Society research sanctuary. Because human disturbance is generally detrimental to the breeding success of birds, unauthorized visits to the island are prohibited. Persons interested in visiting the sanctuary *must* contact Dr. James F. Parnell, Department of Biological Sciences, University of North Carolina at Wilmington, Wilmington, NC 28403.

TABLE 1. Breeding bird species on Battery Island, N.C. Habitat types and data for 1960 are from Funderburg (1960). An "x" indicates presence, a dash indicates absence. The maximum yearly nest number of each species during our study, when known, is given in parentheses.

Habitat type/species	1960	1982-1985
Salt Marsh: herbaceous, <i>Spartina-Juncus</i> complex		
Clapper Rail (<i>Rallus longirostris</i>)	x	x
Marsh Wren (<i>Cistothorus palustris</i>)	x	x
Seaside Sparrow (<i>Ammodramus maritimus</i>)	x	x
Red-winged Blackbird (<i>Agelaius phoeniceus</i>)	x	x
Open Dunes: unvegetated		
Wilson's Plover (<i>Charadrius wilsonia</i>)	x	—
Gull-billed Tern (<i>Sterna nilotica</i>)	x	—
Least Tern (<i>Sterna antillarum</i>)	x	—
Black Skimmer (<i>Rynchops niger</i>)	x	—
Herbaceous Dunes: partially to fully vegetated		
American Oystercatcher (<i>Haematopus palliatus</i>)	x	x (18)
Willet (<i>Catoptrophorus semipalmatus</i>)	x	x
Mourning Dove (<i>Zenaida macroura</i>)	x	—
Chuck-will's-widow (<i>Caprimulgus carolinensis</i>)	x	—
Common Nighthawk (<i>Chordeiles minor</i>)	x	x (1)
Eastern Meadowlark (<i>Sturnella magna</i>)	x	—
Shrub-thicket/thicket-woodland		
Common Yellowthroat (<i>Geothlypis trichas</i>)	x	—
Red-winged Blackbird	x	x
Green-backed Heron (<i>Butorides striatus</i>)	x	x (3)
Little Blue Heron (<i>Egretta caerulea</i>)	x	x (196)
Cattle Egret (<i>Bubulcus ibis</i>)	x	x (306)
Great Egret (<i>Casmerodius albus</i>)	x	x (233)
Snowy Egret (<i>Egretta thula</i>)	x	x (332)
Tricolored Heron (<i>Egretta tricolor</i>)	x	x (405)
Black-crowned Night-Heron (<i>Nycticorax nycticorax</i>)	x	x (59)
Glossy Ibis (<i>Plegadis falcinellus</i>)	x	x (163)
White Ibis (<i>Eudocimus albus</i>)	—	x (4849)
Fish Crow (<i>Corvus ossifragus</i>)	x	x
Boat-tailed Grackle (<i>Quiscalus major</i>)	x	x

ACKNOWLEDGMENTS

Our research at Battery Island was funded by the National Audubon Society, the New Hope and Forsyth Audubon Societies, Chapter 35 of the Telephone Pioneers of America, and the Charlotte Hornets Nest Council of the Telephone Pioneers of America. Logistic support was provided by the Department of Biological Sciences, UNC-Wilmington. We thank J.F. Parnell for his assistance through all phases of our studies.

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