

Bogue Sound

Bogue Sound is the body of shallow water to the north of Bogue Banks, separating the barrier island from the mainland of Carteret County. The sound is bordered by Bogue Inlet and the White Oak River to the west and Beaufort Inlet and the Newport River to the east. The Atlantic Intracoastal Waterway (AIWW) traverses the northern portion of Bogue Sound in an east-west orientation. Salinity varies in the sound, with the highest levels closest to the two inlets where the tidal influence is strongest. The North Carolina Division of Water Quality (NC DWQ) has designated Bogue Sound as having Outstanding Resource Waters (ORW) due to their high quality.

The sound is of moderate size for North Carolina (with a maximum fetch of ~23 miles), larger than any open-water sound to the south but covering less area than Albemarle or Pamlico Sounds to the north (which have maximum fetches of 30-70 miles). The southern portion of the sound along Bogue Banks contains several areas of sand shoals and *Spartina* spp. marsh (Figure 15). Shellfish beds and submerged aquatic vegetation (SAV) occur throughout the sound. Comparatively deeper waters allow navigational use and transport of larval stages of fishery resources.

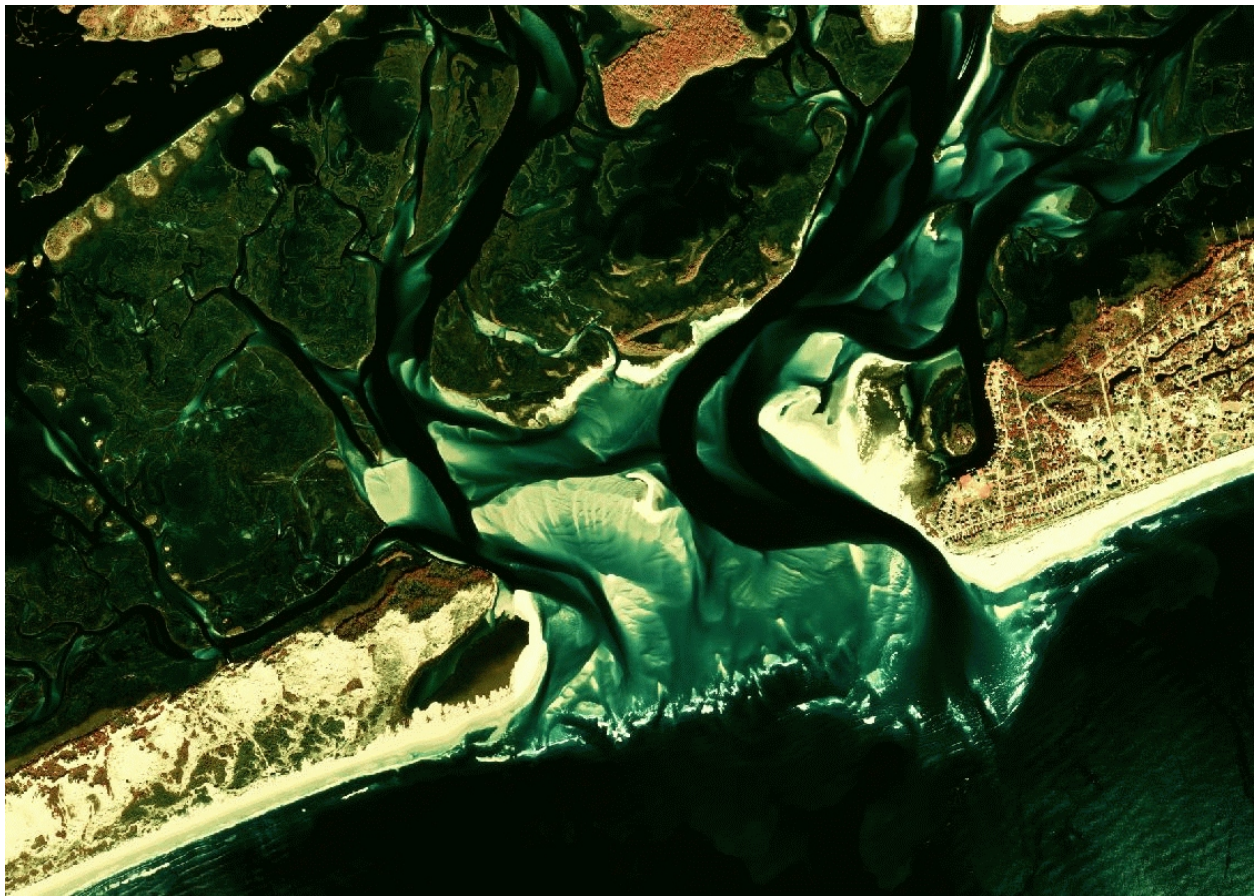


Figure 15. An aerial view of Bogue Inlet in 1998. Note the extensive sand shoals within the inlet. Emerald Isle is to the right and Hammocks Beach State Park to the left. Bogue Sound is at the upper right of the photograph. Photo courtesy of the US Geological Survey.

There are 10 active and 33 inactive dredge spoil islands along the AIWW between Mile Markers 29 and 78 from Beaufort to Bogue Inlets. These dredge spoil islands are artificially created and currently cover an estimated 387 acres. The spoil islands tend to have large areas above sound waters and many are over 50 years old. The older islands support mature vegetation (trees and scrub-shrub thickets), which provide habitat for migratory songbirds. Younger and more active islands tend to have large areas of bare sand, which provide nesting habitat for colonial waterbirds (Everhart et al. 1980). Brandt Island is the largest of these at ~80 acres and is connected to Fort Macon State Park by marsh and wetland areas. This disposal island receives dredge disposal material from the Morehead City State Port and is pumped out for disposal on Atlantic Beach every 8 to 10 years.

An unnamed skipper (*Atrytonopsis* sp.) has recently been discovered on Brandt and Radio Islands at the eastern end of Bogue Sound. Genetic studies are currently underway to determine if the skipper is endemic to this area or a previously known species. The habitat requirements for the skipper are also under study. Colonial waterbirds known to nest on islands in Bogue Sound, Bogue Inlet and Beaufort Inlet are listed in Table 8. Most of these species nest in colonies in bare ground areas, often abandoning an area once vegetation matures and eliminates wide expanses of bare ground (Everhart et al. 1980). The Natural Heritage Program has designated the natural and dredge spoil islands in Bogue Sound as a Significant Natural Heritage Area for shorebirds and colonial waterbirds.

The sand shoals within Bogue Sound provide habitat for foraging, staging and loafing shorebirds and colonial waterbirds, protection for SAV beds from predominant winds, and shelter for fishery resources. In any individual year, there may be upwards of thousands of colonial waterbirds nesting within or adjacent to Bogue Sound (Table 8). Some of the shoal areas are byproducts of navigational dredging while others are natural accumulations of sand. Brandt Island used to support large colonies of nesting terns, but its nesting value has decreased as the island has enlarged, stabilized with vegetation, and provided habitat for mammalian predators (D. Allen, NC WRC, pers. comm.). Everhart et al. (1980) found nesting colonies averaged less than 6% vegetative cover for gull-billed terns and black skimmers and 26% for common terns. The preferred elevation of the bare ground nesting sites was between 1 and 3 m (3.3-9.8 ft) above surrounding waters (Everhart et al. 1980).

Bogue Sound also provides diverse aquatic resources. Over 6100 acres of SAV were located in the sound in 1988 or 1993 (NOAA 2002). These beds have been designated as Essential Fish Habitat (EFH) by the South Atlantic Fishery Management Council (SAFMC) for their high value to blue crab (*Callinectes sapidus*), juvenile fish, and shrimp (*Penaeus* sp.). All five species of sea turtles found in North Carolina waters (Epperly et al. 1995) and the West Indian manatee (*Trichechus manatus*), all Federally-protected species, may forage in Bogue Sound during warmer summer months. As herbivorous and/or omnivorous species, these aquatic species forage upon SAV beds for nourishment. Figure 16 shows the distribution of the SAV beds surveyed by NOAA.

Table 8. Species of colonial waterbirds known to nest on islands within Bogue Sound, Bogue Inlet and Beaufort Inlet; the most recent year to record nesting; and the maximum number of nests in any recorded colony. Data from the NC WRC.

Waterbird Species	Recent Nesting Years	Colony Size Range (number of nests in any colony)
Common tern <i>Sterna hirundo</i>	1977 - 2001	1 - 576
Least tern <i>Sterna antillarum</i>	1977 - 2001	1 - 200
Gull-billed tern <i>Sterna nilotica</i>	1977 - 1993	2 - 175
Forster's tern <i>Sterna forsteri</i>	1995	9
Black skimmer <i>Rynchops niger</i>	1977 - 2001	1 - 182
Black-crowned night-heron <i>Nycticorax nycticorax</i>	1976 - 2001	1 - 72
Cattle egret <i>Bubulcus ibis</i>	1975 - 2001	8 - 689
Great egret <i>Casmerodius albus</i>	1975 - 2001	1 - 334
Green heron <i>Butorides striatus</i>	1975 - 1995	1 - 18
Little blue heron <i>Egretta caerulea</i>	1975 - 2001	8 - 362
Snowy egret <i>Egretta thula</i>	1975 - 2001	4 - 247
Tricolored heron <i>Egretta tricolor</i>	1975 - 2001	8 - 920
Great blue heron <i>Ardea herodias</i>	1977	1
Glossy ibis <i>Plegadis falcinellus</i>	1989 - 1995	4 - 5

Figure 16 insert

There are approximately 808 acres of freestanding saltwater and brackish marsh in Bogue Sound that is not contiguous to the mainland or Bogue Banks. Most of the marsh is adjacent to disposal islands and is more abundant at the eastern and western ends of the sound than in the central portion. The NC DCM delineated an additional ~339 acres of scrub-shrub wetlands in the sound associated with the marsh and disposal island complexes.

Several estuarine areas along the northern boundary of Bogue Sound have been designated as fishery nursery areas by the North Carolina Division of Marine Fisheries (NC DMF). These include Goose Creek (~77 acres), Broad Creek (~48 acres) and Gales Creek (~47 acres). In addition, the NC DMF maintains permanent easements on over 4700 acres of Bogue Sound waters and estuarine areas, all located adjacent to the soundside shoreline of Bogue Banks.

Bogue Sound contains many areas closed to shellfishing. The Shellfish Sanitation Branch of the North Carolina Division of Environmental Health has closed several local marinas and harbors to shellfishing, as well as large areas near Morehead City, Beaufort, Swansboro, Pine Knoll Shores, Salter Path, and the Atlantic Beach causeway. On the southern side of Bogue Sound, along Bogue Banks, closed shellfishing areas include Hoop Pole Creek, Beacons Reach, and Archer Creek. Other closed shellfishing areas in Bogue Sound are Peletier Creek, Spooners Creek, Gales Creek, Broad Creek, Sanders Creek, Deer Creek, and Hunting Island Creek. The White Oak River estuary contains conditionally approved shellfish harvesting areas while significant portions of the Newport River estuary to the east is largely closed to shellfishing.

Commercial fishery landings from Bogue Sound average 539,680 lbs for an average annual value of \$ 672,512. Table 9 lists the two dozen fishery species, their average catch and commercial value from 1994 to 2001 for Bogue Sound. Blue crab, shrimp, hard clams (*Mercenaria mercenaria*), spot (*Leiostomus xanthurus*), mullet (*Mugilidae* sp.), southern flounder (*Paralichthys lethostigma*), and bay scallop (*Argopecten irradians*) are the largest annual catches by weight from Bogue Sound (NC DMF, unpublished data; Appendix E).

The diverse ecological resources of Bogue Sound also support a successful ecotourism industry. Several outfitters rent kayaks and canoes for both guided and individual trips through the marshes, to disposal islands, estuarine beaches and shallow waters. Bird watching, dolphin watching, seining, and shellfishing are all advertised attractions for the outfitters. Other entities heavily utilize the area for nature field trips, including the North Carolina Coastal Federation (NCCF), Hammocks Beach State Park staff, the Rachel Carson Estuarine Research Reserve west of Beaufort Inlet, and the marine labs at Duke University, the Institute of Marine Sciences at the University of North Carolina-Chapel Hill (IMS-UNC) and the National Oceanic and Atmospheric Administration (NOAA). The latter three utilize the ecological resources of Bogue Sound and adjacent areas extensively for scientific research.

Table 9. Commercial fisheries landings from Bogue Sound, 1994 to 2001. Data are provided by the North Carolina Division of Marine Fisheries and represented in state fiscal years (July 1 through June 30). See Appendix E for landings and value data by year.

Species	Average Landings (lbs) [§]	Average Value [§]
Bluefish	3,715	\$ 982
Butterfish	479	\$ 187
Croaker	914	\$ 246
Black drum	990	\$ 233
Red drum	2,982	\$ 2,961
Southern flounders	19,113	\$ 31,817
Kingfishes (sea mullet)	805	\$ 734
Menhaden bait	7,579	\$ 3,232
Minnows	2,261	\$ 2,666
Mulletts	114,156	\$ 86,204
Pigfish	1,012	\$ 210
Gray seatrout	1,241	\$ 676
Spotted seatrout	7,684	\$ 9,041
Sheepshead	473	\$ 164
Spanish mackerel	3,507	\$ 2,126
Spot	67,621	\$ 26,307
Blue crab, hard	205,334	\$ 135,475
Blue crab, peeler	4,132	\$ 6,576
Blue crab, soft	786	\$ 3,136
Stone crab	657	\$ 1,689
Shrimp (unclassified, heads on)	27,961	\$ 53,563
Brown shrimp [†]	6,965	\$ 8,980
White shrimp [†]	17,260	\$ 33,796
Pink shrimp [†]	1,517	\$ 3,673
Hard clam (meats)	35,887	\$ 225,302

Arc clam	208	\$ 584
Eastern oyster	6,896	\$ 27,804
Whelks/conchs (meats)	2,009	\$ 1,921
Bay scallop (meats)	13,748	\$ 46,085
Total for all species[∇]	539,680	\$ 672,512

[§] Averages do not include confidential data.

[†] Brown, white and pink shrimp categories contain data from 1999-2001.

[∇] Total includes species categories not listed in table.